



Urban Sprawl and Quality Growth in Ohio



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Executive Summary

Urban sprawl has surged to the forefront of local policy debate in Ohio. Concerns about the loss of open space, farm productivity, traffic congestion, and rising public-service costs have led many to demand more government control over land development. On the state level, concern about sprawl has led to large-scale government funding for open space protection and environmental clean-up as well as new planning mandates to protect agriculture. On the local level, more communities are adopting restrictive growth control policies to slow the pace of development.

Little data or objective analysis, however, has been applied to the issue of land use and urban development in Ohio. Most media and growth-control advocates rely on slogans and faulty intuition to support calls for more comprehensive planning on the local and regional level. For example, many define urban sprawl as the uncoordinated or unplanned development, yet virtually all new housing and commercial development is subject to extensive public hearings and development approval procedures on the local or county levels.

This study provides a rational analysis of economic, demographic, and land-use trends in Ohio and their relationship to key concerns all Ohioans have about the pace and pattern of land development in Ohio. Among the study's key findings are the following:

Land and Urban Development in Ohio

- After two centuries of urban development, the vast majority of Ohio remains rural — less than 14 percent of the state's total surface land area is developed (including rural highways and roads), and only about two-thirds of that developed land is urbanized. In fact, more than 43 percent of Ohio's total surface area is cropland—land used to grow and harvest food. Another 7.1 million acres, or 26.8 percent, is forest land. The remainder is pasture, range and “other” rural land.
- Ohio's rate of land development has consistently lagged the nation since 1982.
- Decentralization of cities has been occurring for most of the 20th century in the United States, with the most rapid rate of decentralization occurring in the 1920s and 1930s. Moreover, trends toward decentralization in Europe at rates similar to the United States suggests that suburbanization is not uniquely American.

- Declines in population and population density at the city level mask increases in population and population density on a regional level. Ohio's population tripled from just 4.2 million people in 1900 to almost 12 million people in 2000. Ohio's cities, like urban America more broadly, have been changing to meet shifting desires. Two-thirds of Ohio's largest metropolitan areas experienced an increase in population density between 1980 and 2000.
- The trend in Ohio is toward more dense metropolitan areas and less dense central cities. Rather than abandoning urban life, Ohioans appear to be refocusing it. Suburbs and central cities may well be converging toward an "optimal" density (or an optimal range of densities) that suit households in the 21st Century more effectively than the old model of a high-density, mixed-use core.

Ohio's Agriculture and Farmland

- Ohio has 14.9 million acres of land in farms, and declines in farmland have moderated, not accelerated, in recent years.
- A review of crop productivity data reveal that Ohio's agriculture is at least as productive at the end of the 20th century as it was in 1980.
- While harvested cropland for Ohio's five major crops—corn, soybeans, winter wheat, hay, and oats—has declined overall since 1980, it actually *increased* 4.7 percent from 1990 to 1999.
- Of Ohio's 88 counties, 52 are rural in character, and the impacts of growth on farmland are likely to be localized and limited to regions of the state already highly urbanized.
- According to the most recent Natural Resources Inventory (NRI), about half of the decline in Ohio's cropland since 1992 reverted to pasture, forest, and range, not development, and from 1949 to 1992, Ohio's forests actually grew faster than development.
- Just 4 percent of Ohio's cropland loss can be attributed to economic demand for urban land. Weak demand for cropland (because of improvements in agricultural productivity) is far more important in explaining cropland loss.
- Farmland preservation efforts can have unintended consequences: the land next to protected open space will be valued higher as a residential location and conversion is likely to occur sooner around these protected areas.

Suburbanization and Infrastructure Costs

- The most common method used to determine if development is paying its own way at the local level is a Cost of Community Services study, where a cost versus revenue analysis compares residential, farm, and industrial/commercial land uses. These are fundamentally flawed, however, and should not be used to guide development policy. Among other errors, they:
 - Inappropriately allocate education expenditures;

- Do not take into account varied construction methods or demographics;
 - Ignore the potential of government expenditures to be excessive;
 - Ignore potential economic benefits of growth, including increased property valuation;
 - Focus on average costs where marginal costs would be more appropriate; and
 - Recommend farmland preservation to balance local budgets, while showing industrial development generates greater revenue.
- Most Cost of Community Service studies fail to consider the benefits of new development, including higher tax revenues generated from urban uses, diversification of the economy, a more diverse and higher quality housing stock, and the relatively small economic value of farming in urban environments compared to alternative uses.
 - Although a definitive analysis of the cost of new public services has not been done, land development appears to cover its direct costs based on case studies and interviews with local officials.
 - In areas where development is not covering its public-service costs, communities have the tools necessary to ensure they do in the future.

Transportation Issues in Ohio

- Although it is just 35th largest geographically, Ohio claims the fifth largest Interstate highway system, the seventh largest population, and the ninth largest overall highway system. In addition, Ohio has the nation's fifth highest volume of truck traffic.
- Ohioans log more than 100 billion miles on their vehicles each year, 63 billion in urbanized areas. Ohio also maintains more than 4,000 miles of urban highways carrying an average of 7,147 vehicles per lane on an average day.
- The combined costs to travelers, commuters, and businesses from the lost productivity as a result of being “stuck” in traffic in Cincinnati, Columbus, and Cleveland reach almost \$2 billion each year. Despite these costs, congestion is still lower in major Ohio metropolitan areas compared to their peers in other states.
- Most traffic is funneled onto a very small portion of a large, complex network of freeways. Ohio's freeways are congested at specific times of the day when highway traffic exceeds capacity, suggesting traffic congestion problems need to be addressed by using underutilized highway times more efficiently and adopting public policies that encourage shifts in travel behavior to non-peak driving times.
- Adopting policies that restrict new suburban development or prevent new beltway construction have not been shown to slow the growth in traffic volume or congestion. The ongoing shift into low-density suburban areas has actually relieved congestion for most people, even commuters.
- Statewide, more than twice as many people walk or telecommute to their jobs than use public transit. Transit has not been shown to be a viable option to reduce congestion.

The Environmental Effects of Suburbanization

- Ongoing migration to low-density suburban locations, and away from high-density urban areas, reflects an environmental choice. A desire for larger homes and yards drives the decision of many households to move away from the core city.
- A home's lot size has been shown to have a significant impact on property values. In general, homes located adjacent to trails, parks, and even golf courses sell more quickly, are assessed at higher values, and are more likely to increase in value than homes not near open spaces.
- Ironically, just as Ohioans have become concerned about land-use trends and air quality, virtually all long-term data suggest air quality is improving. Most major categories of air pollutants declined in every metropolitan area in recent years. Carbon monoxide has fallen by 25 percent or more in every major metropolitan area since 1988. Sulfur dioxide has fallen by 50 percent or more in Columbus, Lima, and Toledo. In a number of cases, air-quality improvements from 1988 to 1997 exceeded national averages.

"Smart" Growth . . .

- Most smart growth plans adopt a prescriptive rather than evolutionary view of cities and urban development. Rather than letting consumers decide where they want to live, most plans implicitly accept a mid- and early-twentieth century view of cities that is compact and relatively high density, mixed use and less reliant on the automobile.
- The vast majority of new housing subdivisions are developed under some form of zoning or planning, either at the municipal or county level. Real-estate markets—through supply and demand—impose "order" on the timing and general pattern of development.
- Farmers often lose money on their farming operations, but zoning prevents them from developing their property to ease the financial burden (or pay taxes). Conventional smart growth can be a difficult sell because it often requires residents to accept major changes in the character of their own neighborhoods. When smart growth has been successful, the costs have been pushed well into the future, or they have circumvented local political control by going through the state legislature.
- Radical approaches such as regional pooling or planning are unlikely to succeed for several reasons:
 - First, local control is an important principle of governance in Ohio.
 - Second, the problems associated with growth vary by locality, while regional solutions tend to focus on a small number of "magic bullets" (e.g., growth boundaries) that may or may not address the local problem.
 - Third, little consensus exists among researchers about the impact of suburbanization or the benefit of proposed "solutions."

- The value of readily accessible open space — even if that happens to come in the form of a yard — should not be discounted. Pressure to create infill developments in areas that would not otherwise be developed can lead to the removal of open space accessible to the urban population.

. . . *and its Better Alternatives*

- Freeing up land use to more effectively meet consumer demands for more varied housing can be achieved through a number of planning mechanisms, including overlay zoning districts, planned-unit development (PUD), performance-based zoning and market-driven densities.
- Ohio communities can harness the power of real-estate markets and refocus the development approval process on consumers by adopting several specific policies including cluster housing, conservation easements, tax-credit programs and maintaining a robust, profitable agricultural economy.
- The key issue for local policy makers is to prevent the subsidization of one housing choice over another. Among the alternatives for policy makers are full-cost pricing for core infrastructure, on-site provision of infrastructure, special-assessment districts, and the privatization of core infrastructure.
- Ultimately, Ohio's traffic congestion problems can be solved by congestion pricing, high occupancy/toll lanes, expanding existing road capacity, and deregulating public transit.



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Urban Sprawl and Quality Growth in Ohio

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Urban Sprawl and Quality Growth in Ohio

1. Introduction

Across the nation, urban growth has become a key feature of public-policy debate. Many states have adopted statewide growth-management laws in an effort to control growth and its impacts. Even when state legislatures have not acted, cities and regions have adopted policies targeted toward altering the pattern and shape of urban development. While Ohio has yet to join the ranks of states engaging in comprehensive statewide planning, growth and its impacts have generated significant public discussion and controversy.

Indeed, almost every major newspaper has featured a series on growth and so-called “urban sprawl.” Ohio voters approved a \$400 million bond proposal for environmental cleanup in urban areas and open-space conservation in November 2000 in addition to many smaller, more localized parks, recreation, and green-space preservation initiatives. Also in 2000, Governor Taft signed into law a series of proposals to strengthen the Ohio Office of Farmland Preservation, including strong incentives to develop county-level farmland preservation plans and zoning for existing farmland. Thus, many counties are incorporating farmland and open-space elements into their comprehensive plans.

On a more local level, activists in the Cleveland region have created ECO-Cleveland, an effort to promote regional cooperation and direct growth into inner suburban areas. The Sierra Club has also sponsored a series of reports arguing for specific statewide actions to curb land development in suburban areas, including one claiming Cincinnati is the fourth most “sprawl threatened” metropolitan area in the United States.¹ The University of Cincinnati’s School of Planning also presented the results of a six-month study commissioned by the Citizens for Civic Renewal at a public forum to encourage policy makers to adopt measures that limit suburbanization.²

The statewide and local press has been relentless in their criticism of suburban develop-

ment. The mere fact that land is developed for housing is often cited as evidence of “runaway” development and “uncontrolled” growth. The *Toledo Blade*, for example, recently editorialized:

If home ownership is part of the American dream, then its disreputable descendent, urban sprawl, is our national nightmare. And nowhere has the ugliness of sprawl become more evident than on the road to—and from—Ohio’s capital city of Columbus.

In some parts of the Buckeye State, strip mining has left the tell-tale scars of wholesale avarice upon the land, but a trip down U.S. 23 through Columbus’ northern reaches is an excursion through the equally devastating ravages of strip malling.

It’s a soul-less suburban environment—mile after cluttered mile of shopping centers, gas stations, fast-food restaurants, and car dealerships, scattered haphazardly along the roadside with little apparent thought or planning. A wasteland of visual pollution, with endless stop-and-go traffic stretching from light to light.³

The editorial continues, citing farmland loss of 14 acres per day in the four-county Toledo metropolitan area as an example of “runaway” development. “Northwest Ohio is losing land to urban sprawl at a rate four times faster than the population growth,” the editors lament, as if the statistics alone convey some obvious meaning about efficient and inefficient land use. Not too long afterward, the *Blade* labeled urban sprawl a “national shame.”

The *Toledo Blade* editorials, while strident in their rhetoric, are consistent in their message with headlines in newspapers across the state. The *Cleveland Plain Dealer*, for example, spear-headed a series of articles on suburban sprawl with the headline “Sprawl Creates a Region Divided Against Itself.” Additional articles focused on the problems of older cities, including inner suburbs such as Euclid.⁴ Articles then discussed the challenges of the inner suburbs, a central city faced with population decline, and the seemingly inevitable problems associated with new growth in suburbs.⁵ Rarely do the reports focus on the benefits of this new growth, the long-term character of

urban decline and rejuvenation, or a realistic assessment of the costs and benefits of alternative policy approaches to growth-related problems. In fact, public policy is often presented as a discrete choice—do nothing or adopt a heavy handed, top-down approach to regional planning that significantly changes the character of suburban development and limits housing and neighborhood choice. Often, the trade-offs involved in choosing these policy strategies and the complexity of the land-development process are muted or even ignored. In short, the media and other anti-sprawl alarmists focus on the most visible characteristics of Ohio’s changing urban form, not the larger economic, social, and cultural forces that are driving the change or the full range of solutions to growth-related problems.

This policy study begins to address these deficiencies in the public debate about urban growth, sprawl, and public policy by analyzing statewide land-use trends and urban development in Ohio. The study’s main empirical conclusion is that, contrary to headlines, land development is not running unchecked or uncontrolled. In fact, Ohio is experiencing a transformation of its urban landscape consistent with long-term trends in technology, income, and housing choice. While economic growth and land development create new issues and challenges for communities—young and old—policy makers and citizens need to recognize the inevitability of these changes in a system that values freely functioning land markets, housing and neighborhood choice, and rising income growth.

This recognition, however, does not imply *laissez-faire*. An empirical analysis of land-use trends provides an overall framework for evaluating alternative sets of public policies that address specific problems associated with growth while preserving private property rights, freely functioning real-estate markets, innovation in housing, and neighborhood choice. The study concludes with policy recommendations that could enhance the efficiency of land development and city building in Ohio while adding cautionary comments about adopting policies that unduly restrict housing choice or compromise the efficiency of the real-estate market to meet consumer demands.

2. Land and Urban Development in Ohio

The debate over urban sprawl and growth in Ohio mirrors the national debate. While a consistent, commonly accepted definition of urban sprawl has not emerged, the public discussion about growth and suburbanization has evolved into a fundamental discussion about housing, housing choice, and quality of life. In this study, sprawl will be defined functionally as land development beyond the urban boundaries of existing cities, villages, and urbanized rural areas (see box). This differs from other definitions, particularly those used by planners, but is consistent with the political realities of land development policy in Ohio, particularly at the local level.

The debate over land development may, in many respects, be inevitable. Ohio's population tripled from just 4.2 million people in 1900 to almost 12 million people in 2000.⁶ To remain competitive, the state needs to produce jobs and housing that provide a higher quality of life than in earlier decades, and Ohio's cities, like urban America more broadly, have been changing to meet these shifting desires. In many cases, these new housing needs have been met by building entirely new towns and greatly expanding older towns on the periphery. The growth of many of these new towns has been driven by a myriad of factors, including more efficient transportation technologies (e.g., automobiles), higher expectations about our neighborhoods (e.g., personal safety, quality schools), and incomes high enough to afford an increasingly broad range of housing choices.

Federal and local public policies have also influenced housing choice, although the magnitude of their current impact is unknown. As early as the 1930s, however, the federal government consciously encouraged homeownership and created programs that, in effect, subsidized the creation of new housing. In many cases, new housing was cheaper and more cost effective to build on the urban periphery than in inner-city neighborhoods where densities and land costs were significantly higher. Similarly, the expansion of the Interstate highway system in the 1960s and 1970s improved accessibility to new land on the urban periphery, opening up large parcels of land to new development. In the 1970s, federal programs to encourage improvements in water quality subsidized the creation of municipal water systems that enabled large-scale development at urban

densities in rural areas, creating another inducement to suburbanization and decentralization. On the local level, governments using simplistic accounting practices failed to price public services at their full costs, inadvertently lowering the perceived price of new housing and providing yet another subsidy.

While these programs may have accelerated the pace of decentralization and suburbanization, little evidence indicates they were the primary determinant of decentralizing development patterns. In fact, despite the rhetoric surrounding suburban development in the current debate, the most rapid rate of decentralization occurred in the 1920s and 1930s.⁷ Moreover, decentralization in Europe is occurring at rates similar to the United States despite public policies that discourage low-density suburban development, suggesting that suburbanization is not a uniquely American phenomenon.⁸ Nevertheless, since the United States places few restrictions on personal or household mobility, Americans have made their choices known through the real-estate market.

A. Ohio's Changing Real-estate Market

In 1950, the nation's real-estate industry built 1.25 million homes, almost all single-story ranch houses.¹³ Many homes were small, often less than 1,000 square feet. Levittown, New York, for example, one of the nation's first large-scale suburban subdivisions, consisted of four and a half room ranch-style cape-cods. Levittown's homes were criticized as "small, squarish, built on one floor... the true child of the depression."¹⁴ Levittown, however, was a watershed event in U.S. housing history. For the first time, land developers were able to mass-produce homes for the working class.¹⁵

In the late 20th Century, these new towns were primarily bedroom communities dependent on a central-city core for employment. Thus, they were considered sub-urban (hence the term "suburbs"). In Ohio, suburban housing development gave rise to new cities, such as Kettering (east of Dayton), Blue Ash (north of Cincinnati), and Lakewood (west of Cleveland). Suburban migration also grew former farming communities into bustling cities. Euclid, for example, a village south of Cleveland, registered just 2,000 people in 1910. By 1950, it had grown into a thriving community of 41,396 people (well before the Interstate highways were built). By 1970, its population reached its zenith at 71,552 people. Rising post-World War II incomes led to innovations in the

Defining Sprawl

The term “urban sprawl” has become part of the lexicon of public-policy debate throughout the nation. Most major urban newspapers, including all of Ohio’s, have run feature stories on sprawl, and several new laws have been enacted to help combat it. Unfortunately, a clear, commonly accepted definition of the term does not exist.⁹ Even groups fighting sprawl sometimes define it inconsistently. Reid Ewing, a planner who was one of the principal architects of Florida’s growth management law, characterizes sprawl as:

- low density residential development (usually with detached single-family homes on large lots);
- Strip commercial development along major roads;
- Scattered, unintegrated commercial and residential development; and
- Leapfrog development where drivers view long stretches of vacant land between developed areas.¹⁰

While this definition is useful because it describes the characteristics of a certain type of development, it’s rarely the one used in the popular press or by lawmakers as they develop policy.

Farmers concerned about the threat of development to their business define sprawl as the fragmentation of farmland (see the discussion in the next section). From a farmer’s perspective, this definition has an important functional advantage: Housing development that separates large tracts of land limits the use of large-scale production technologies that improve efficiency. But, this definition does not include architectural and urban-design characteristics commonly used by professional planners such as Ewing.

Other definitions abound. Some are blatantly political and rhetorical. Pennsylvania’s 21st Century Environment Commission, for example, “defined” sprawl as the “spreading, low-density, automobile-dependent development pattern of housing, shopping centers, and business parks that wastes land needlessly.”¹¹ The report defined sprawl in its executive summary as “reckless, almost random growth of housing development, strip malls, business parks, and the roads connecting them.”¹² Of course, land development is not random or reckless, and whether it is wasteful is a matter of significant debate within the research community as the following sections of this report show.

As a practical matter, though, the term “urban sprawl” is increasingly defined in Ohio (and elsewhere) as low-density land development beyond the urban boundaries of existing cities and villages. This definition may be overly general, but it is consistent with the overall tenor of the debate and the various “problems”—real and perceived—associated with new growth, such as traffic congestion, air quality, farmland preservation, and cost of government services.

This definition, however, presents a policy dilemma for elected officials and policy makers. If urban sprawl is something that must be controlled, the definition implies that land development outside existing urban boundaries must be prevented. Yet, local officials cannot prevent land development unless they are willing to purchase the land for open space, a proposal requiring significant tax increases which are unpopular among voters (see the final section of this report). Nevertheless, while this definition is problematic, it captures the general sentiment in newspaper headlines and in public-hearing rooms across the state that land development in and of itself is a matter of public concern. The real question centers on what local elected officials and policy makers should do to mitigate any problems or issues that emerge from urban sprawl. This is the focus of the concluding section to this policy report.

housing market as well. Huber Heights, for example, was incorporated in the 1960s as an independent city east of Dayton and garnered national attention as the largest brick-home community in the country. Huber Heights includes thousands of affordable homes catering to the blue-collar workers that formed the core of Dayton's manufacturing economy.

By 2000, however, new homes nationally averaged more than 2,000 square feet and more than half had two floors.¹⁶ The share of homes with more than 2,400 square feet increased from less than 15 percent before 1980 to almost one third in 1998.¹⁷ The proportion of homes with two and a half bathrooms more than doubled during the same period.¹⁸

The vast majority of this new housing was built in suburban areas or in low-density subdivisions serving geographically expanding cities such as San Diego or Columbus. Older neighborhoods close into the downtown typically had high population densities. In Columbus, for example, the Clintonville neighborhood (just north of Ohio State University on High Street) has a population density of 5,000 people per square mile (about the density of the Los Angeles metropolitan area). On Columbus's urban periphery, neighborhoods typically have densities of 1,000 people per square mile or less. (A typical suburban subdivision with a half-acre average lot size would have a population density of 2,500 to 3,000 people per square mile.)¹⁹ These densities are about one-third of those in traditional cities where many neighborhood population densities exceed 7,500 people per square mile.

B. Effects on Central Cities

The movement of families and households to neighborhoods and towns on the urban fringe had important implications for central cities. As families moved to lower density neighborhoods, the relative decline of Ohio's major population centers emerged as one of the more visible effects of these housing choices. The growth of the Columbus metropolitan area is a case in point.

From 1980 to 1990, urban expansion generally followed a pattern of circular outward expansion from the urban core. The central city grew at the highest rate, with nearby and several outlying areas growing as well, but at significantly lower rates. This pattern shifted dramatically in the 1990s (Figure 1). The central city experienced the slowest rates of growth, and communities on the periphery

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grew. The strongest growth appeared in the rural areas of Delaware County, Marysville (home of the Honda manufacturing plants), and Lancaster County. Nevertheless, some areas outside the beltway experienced population loss, and several suburban counties (e.g., near Newark and Heath) experienced relatively modest growth.

With population growth rates breaking from the steady circular outward expansion of the 1980s, another trend became apparent: lower densities. The areas of the metropolitan region with the highest densities also experienced the slowest population growth rates (Figure 2).

This is most notable inside the I-270 beltway, but some suburban locations with high densities (e.g., Newark and Heath) also experienced slow population growth. Population growth is not apparently confined to an outward-spreading central city with thinning density as distance from the city core increases. In fact, some suburban areas are gaining population (and density) while large central cities are becoming less dense. Suburbs and central cities, then, may well be converging toward

Figure 1

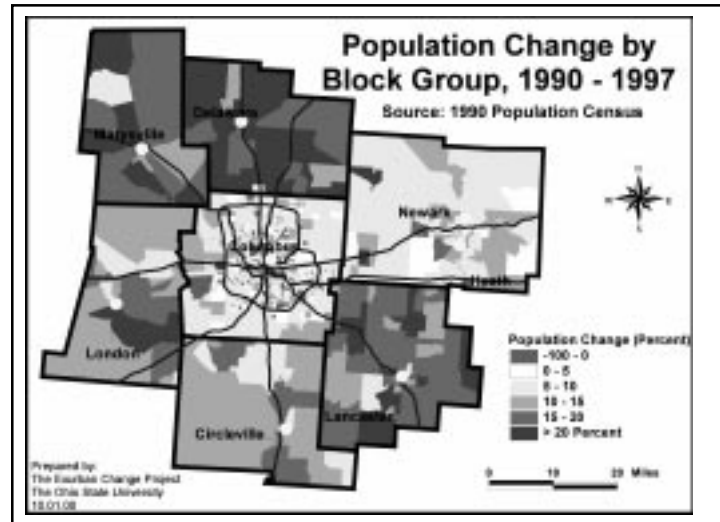
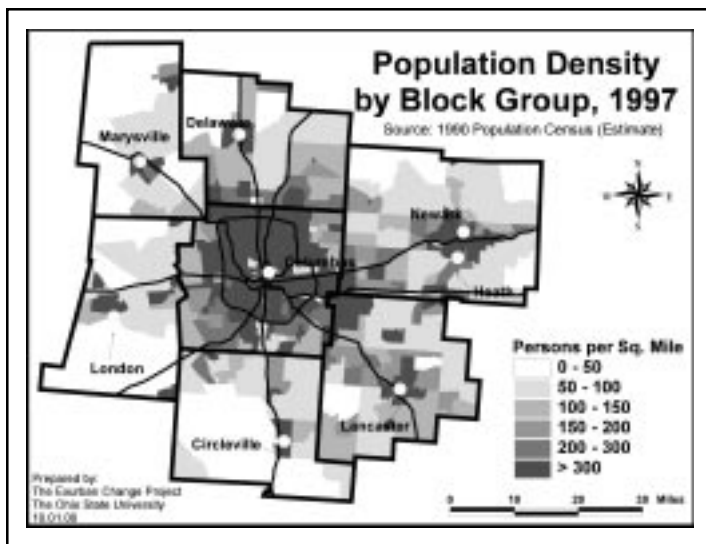


Figure 2



an “optimal” density (or an optimal range of densities) that suit households in the 21st Century more effectively than the old model of a high-density, mixed-use core.

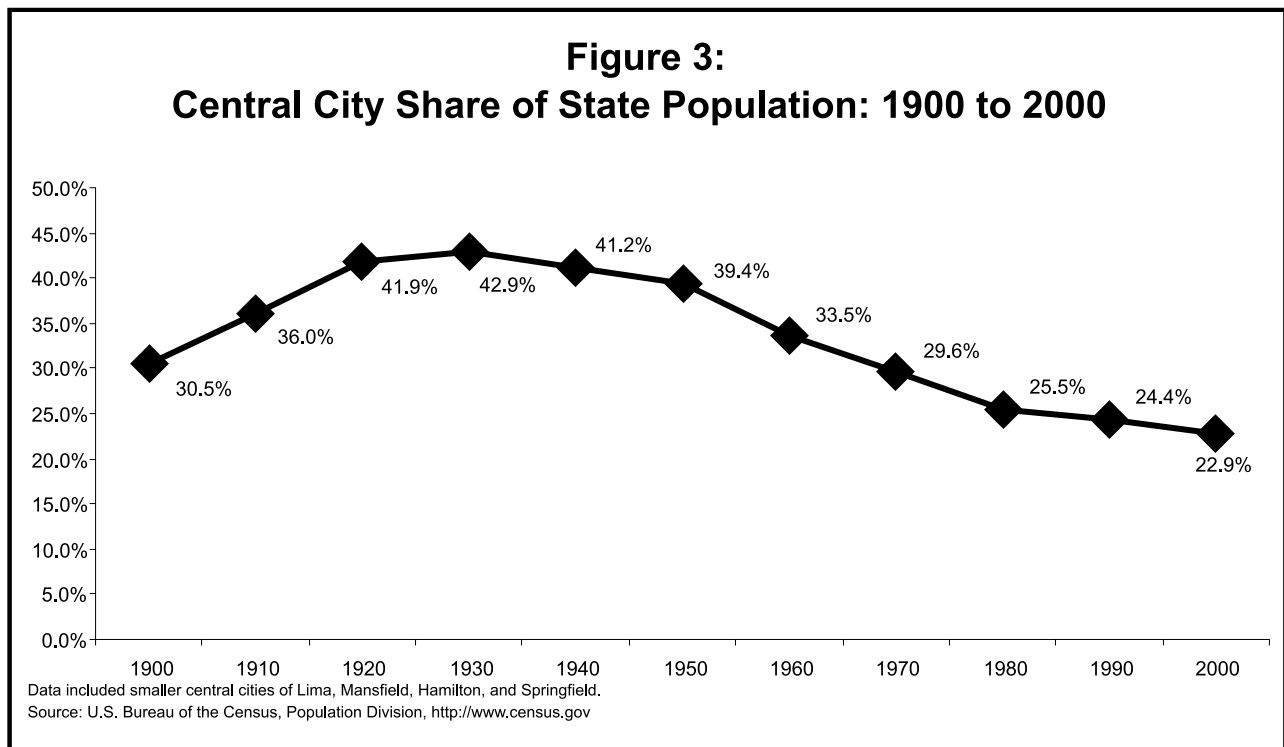
Trends in Columbus, Ohio’s fastest growing major city, reflect broader population shifts. Prior to World War II, Ohio’s major cities captured more than 40 percent of the state’s population. After the War, rapid population growth and

suburbanization began to erode the traditional core city's dominance of Ohio's urban landscape (Figure 3). By 1960, the central-city share of the state's population had dipped to one third. By 1980, its share had fallen to 25.5 percent. By 2000, core city populations were almost half their mid-century levels as more than 658,000 people opted for new homes and neighborhoods on the fringes of the core city.

While the impact of these population losses on land use has been relatively minor (see the discussion below), urban decline is a visible and important part of the changing evolution of Ohio's cities. More specifically, as land developed in less dense suburban areas, many believed suburbanization was a primary cause of central-city decline by reducing the tax base and limiting mobility for the poor and some racial minorities.

C. An Overview of Land Development

With 26.4 million acres of land, Ohio is about the same size as Pennsylvania, bigger than Indiana (by 13.8 percent), but significantly smaller (by about 28 percent) than Illinois and Michigan.²⁰ More importantly, for the purposes of this analysis, the vast majority of Ohio remains rural. Less than



Urban Sprawl and Quality Growth in Ohio

Table 1: States Ranked by Land Developed: 1997

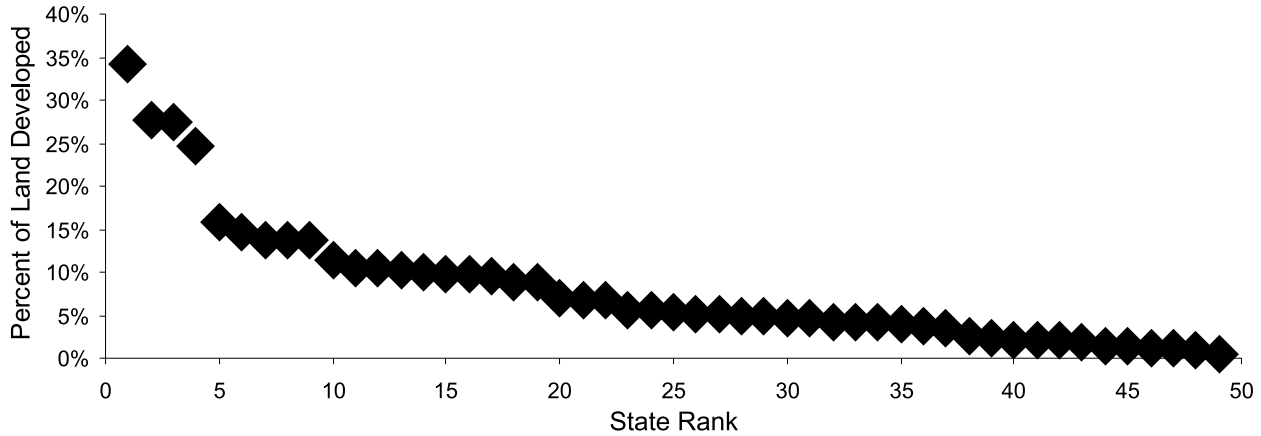
Rank	State	Share Developed
1	New Jersey	34.1%
2	Massachusetts	27.7
3	Connecticut	27.4
4	Rhode Island	24.7
5	Maryland	15.7
6	Delaware	14.7
7	Florida	13.8
8	Ohio	13.7
9	Pennsylvania	13.7
10	North Carolina	11.4
11	Georgia	10.5
12	South Carolina	10.5
13	New York	10.2
14	New Hampshire	9.9
15	Indiana	9.8
16	Virginia	9.7
17	Michigan	9.5
18	Illinois	8.8
19	Tennessee	8.8
20	Alabama	6.9
21	Kentucky	6.7
22	Wisconsin	6.7
23	Missouri	5.6
24	West Virginia	5.6
25	California	5.4
26	Louisiana	5.2
27	Vermont	5.2
28	Texas	5.0
29	Mississippi	4.8
30	Iowa	4.7
31	Washington	4.7
32	Hawaii	4.3
33	Oklahoma	4.3
34	Arkansas	4.1
35	Minnesota	4.0
36	Kansas	3.7
37	Maine	3.4
38	Colorado	2.5
39	Nebraska	2.4
40	North Dakota	2.2
41	Arizona	2.0
42	Oregon	2.0
43	South Dakota	1.9
44	New Mexico	1.5
45	Idaho	1.4
46	Utah	1.2
47	Montana	1.1
48	Wyoming	1.0
49	Nevada	0.5
National Average: 5.1%		
Source: Data exclude Alaska. Summary Report: 1997 National Resources Inventory, United States Department of Agriculture, Natural Resources Conservation Service (Revised December 2000).		

14 percent of the state’s total surface land area is developed (including rural highways and roads), and only about two-thirds of that developed land is urbanized. In fact, more than 43 percent of Ohio’s total surface area is cropland—land used to grow and harvest food.²¹ Another 7.1 million acres, or 26.8 percent, is forest land. The remainder is pasture, range and “other” rural land.

Ohio remains significantly more developed than the nation as a whole. Between 1992 and 1997, Ohio increased the amount of developed land by 11.2 percent to 3.6 million acres.²² Ohio, as the seventh most populous state in the nation, ranks eighth overall in the share of its total land developed, well behind New Jersey (34.1 percent), Massachusetts (27.7 percent), and Connecticut (27.4 percent), and even lags Rhode Island (24.7 percent), Maryland (15.7 percent), Delaware (14.7 percent), and Florida (13.8 percent).

While many may be surprised at Ohio’s relatively high ranking in the total amount of land developed, its industrial legacy created an urban landscape rivaled by few other states. Four metropolitan areas—Cleveland, Cincinnati, Columbus, and Akron-Canton—exceed one million people, and the state boasts a total of ten

**Figure 4:
Distribution of States By Share of Developed
Land in 1997 (NRI, revised estimates)**



Source: Data excludes Alaska. Summary Report: 1997 National Resources Inventory, United States Department of Agriculture, Natural Resources Conservation Service (Revised December 2000).

distinct metropolitan areas. With 24 cities identified by the U.S. Bureau of the Census as “central cities,” Ohio has more large cities than any other state except California, Texas, and Florida.²³ As early as 1890, Cleveland and Cincinnati were among the nation’s top ten cities.²⁴ This commercial and industrial legacy has helped push Ohio to the top of the list among the nation’s most developed states (although still significantly less developed than states in New England).

Despite its large amount of developed land, Ohio’s rate of development lags the nation (Table 2). Ohio increased the amount of developed land by 29.8 percent from 1982 to 1997, ranking it 30th overall. Georgia, in contrast, grew much more quickly, increasing the amount of developed land by 67.2 percent. North Carolina was the next fastest, followed by Florida, Tennessee, and South Carolina. Between 1992 and 1997, developed land increased by almost 13 percent nationwide. In Ohio, the amount of developed land increased by 11.2 percent. In fact, Ohio’s rate of land development has consistently lagged the nation since 1982 (Figure 5).²⁵ In short, the rate of land development in Ohio appears to be consistent with national trends and does not appear to be increasing at unprecedented rates.

Urban Sprawl and Quality Growth in Ohio

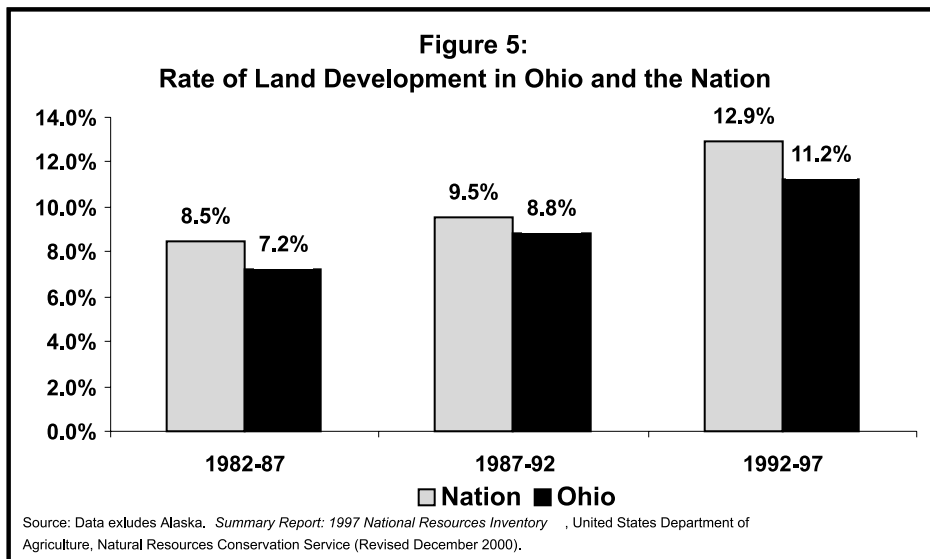
Table 2: Top Ten States in Total Land Development 1982 to 1997

Rank	State	Development
1.	Georgia	67.2%
2.	North Carolina	59.6
3.	Florida	58.5
4.	Tennessee	57.5
5.	South Carolina	55.5
6.	New Hampshire	55.3
7.	Kentucky	51.7
8.	West Virginia	49.6
9.	New Mexico	47.6
10.	Massachusetts	43.1
30.	Ohio	29.8%
	U.S.	34.1%

Source: Data exclude Alaska. Summary Report: 1997 National Resources Inventory, United States Department of Agriculture, Natural Resources Conservation Service (Revised December 2000).

The fact that Ohio's rate of land development lags the nation does not imply that growth does not create problems, or that elected officials and policy makers should not be concerned about current growth trends. Rather, it suggests that current rates of land development are not an immediate threat to total open space at the state level. Rather, the problems associated with growth are local, not state-wide, and may be specific (and sometimes unique) to the character of land development in particular regions and localities.

Even on the metropolitan area level, however, urban development does not appear to threaten open space. The Columbus Metropolitan area again provides a telling example (Figure 6). Despite its role as the most rapidly growing region in the Ohio, Franklin County's urbanized areas are largely



concentrated among the small agricultural communities within the county and interspersed in neighboring, largely rural counties.

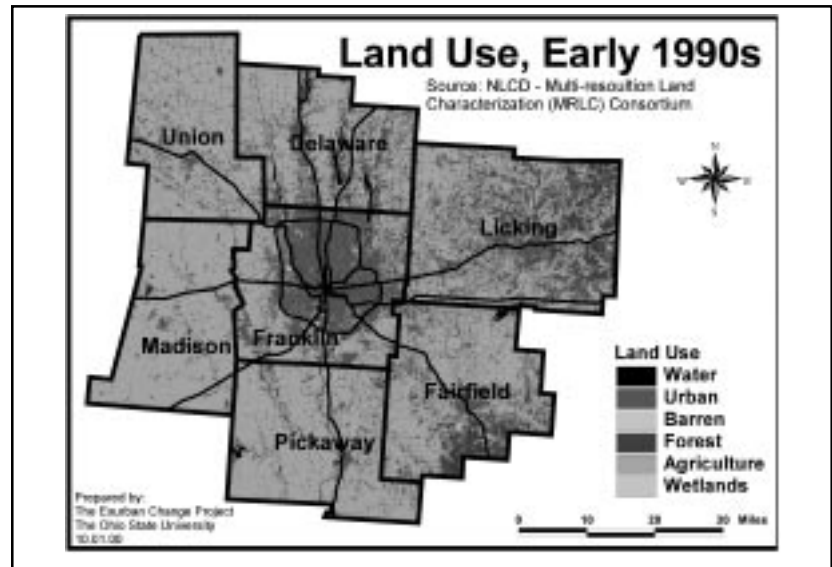
Figure 6

D. Central City Decline and Land Development

While development overall does not seem to threaten the amount of open space in Ohio, many have claimed that suburbanization reflects an abandonment of cities. With the exception of Columbus, all of

Ohio's major urban centers were established during the industrial era of American economic development, and, for the most part, prior to the widespread penetration of the automobile in American culture. Rising incomes, combined with the revolution in mobility brought about by the automobile, gave families more housing choice than any other time in history.

The most visible sign of these changes is the population declines evident in Ohio's major cities. Population growth in Ohio's largest central cities peaked around 1960 (Figure 7) although three cities—Toledo, Cleveland, and Columbus—appear to break from the trend. Toledo's population growth peaked in 1970, while Columbus continues to grow, emerging by 1990 as Ohio's largest city.²⁶



Does Land Development Threaten Our Quality of Life?

Developing land, of course, is not necessarily an indication of a declining quality of life, as many headlines seem to imply. Land development often reflects a significant increase in the quality of life for many families. Suburban communities offer better housing and access to the kinds of amenities many families cannot find in their existing homes or neighborhoods. In some cases, families are searching for a house more suitable to the size and composition of their family. In other cases, they may be looking for a low-density lifestyle that allows them to take advantage of the automobile's flexibility. Regardless of the motivation, limiting housing choices and alternatives has potentially significant implications for economic growth and development, as the concluding section of this report will discuss.

Cleveland, in contrast, appeared to peak earlier (in 1950) and declined precipitously between 1960 and 1980. Population losses in all major central cities leveled off in the 1980s and 1990s. These trends mirror northeastern and Great Lakes cities.²⁷

Population losses have been significant for several cities. The core cities of Cleveland and Youngstown have lost almost half their populations since 1960.²⁹ Dayton and Cincinnati have lost more than one third of their populations, while Akron, Canton, and Lima have each lost more than one-fifth. Toledo's population has remained steady, while Columbus has grown by more than half.

These population losses occurred at the same time some cities expanded their size, usually by annexing adjacent unincorporated and vacant land (Table 4). Columbus has aggressively annexed territory, becoming the state's largest city geographically as well as in total population. Since 1980, the city has added 30 square miles to its jurisdiction, expanding its size by 16.3 percent. Columbus, however, wasn't the only city actively annexing territory. Springfield, Dayton, and Hamilton also added to their boundaries at double-digit rates since 1980 according to the U.S. Bureau of the Census. Overall, Ohio's largest cities added 47 square miles.

The Transportation-Urban Development Link

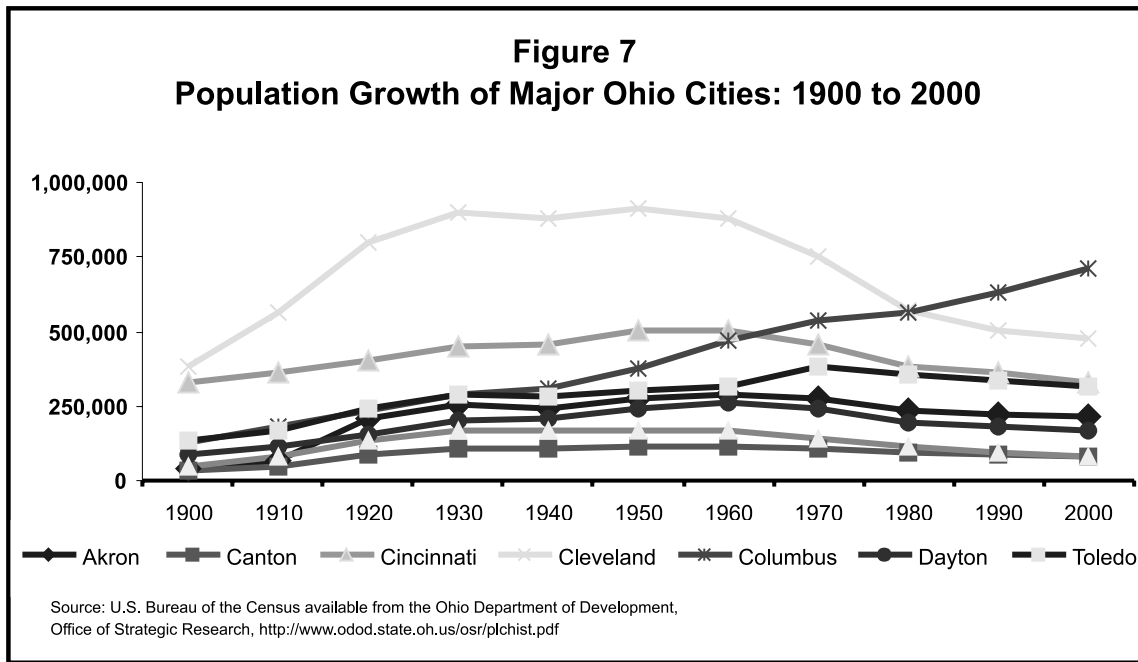
Most of Ohio's population declines began well before the completion of the Interstate highway network. In fact, all declining central cities (with the exception of Toledo) declined *before* significant Interstate highway construction; the City of Columbus has continued to add population despite the creation of its beltway, I-270, suggesting that the conventional wisdom arguing about a direct link between beltway expansion and urban decline may be weak.

Importantly, these trends do not necessarily suggest that transportation policy is unimportant for determining land-development patterns. Quite the contrary, transportation policy strongly influences the location of new investment and housing within metropolitan areas. Further, regions experiencing higher levels of congestion may also experience slower growth as the quality of life for residents declines.

The weak link between population growth and Interstate highway development merely suggests that the role of the Interstate highway as a cause of urban decline may be exaggerated. In fact, decentralization has been occurring for most of the 20th century in the United States.²⁸ The link between transportation and quality of life is discussed in more detail in Section 5.

Urban Sprawl and Quality Growth in Ohio

Ohio’s urban industrial legacy has bestowed it with a rich urban landscape, including several well-developed suburbs. Some of Ohio’s older suburbs actually rank as the state’s largest and most densely populated cities. For instance, Lakewood, a western suburb of Cleveland, is Ohio’s most densely developed city (Table 5). Several high-rise apartment buildings line the shores of Lake Erie, substantially boosting Lakewood’s density. But Lakewood is not alone: three of the five most densely populated cities in Ohio are Cleveland suburbs. Many of these suburban cities qualify as major urban



places in their own right, with a diverse economic base and mix of new and old housing stock. Euclid, Parma, Elyria, and Kettering had populations ap-

proaching or exceeding 70,000 people at one point. As first tier, inner-ring suburbs, they have matured as urban centers in the suburban rings of their respective metropolitan areas, questioning their “suburban” label. In many of these cities, there is very little sub-urban about their economies or neighborhoods.

Most of these inner-ring suburbs have also experienced population declines as children have matured and moved out. Not surprisingly, the decline in Ohio’s major cities—central and suburban—has been accompanied by a decline in population densities. All of Ohio’s major cities that lost population also experienced a decline in population density. The only exceptions were Columbus, which annexed aggressively since 1980, and Mentor, a rapidly growing community outside of Cleveland. In

Urban Sprawl and Quality Growth in Ohio

Table 3: Population Changes for Major Ohio Cities: 1960 - 2000

City	1960	2000	Change	Pct Chg
Akron	290,351	217,074	-73,277	-25.2%
Canton	113,631	80,806	-32,825	-28.9%
Cincinnati	502,550	331,285	-171,265	-34.1%
Cleveland	876,050	478,403	-397,647	-45.4%
Columbus	471,316	711,470	240,154	51.0%
Dayton	262,332	166,179	-96,153	-36.7%
Hamilton	72,354	60,690	-11,664	-16.1%
Lima	51,037	40,051	-10,986	-21.5%
Mansfield	47,325	49,346	2,021	4.3%
Springfield	82,723	65,358	-17,365	-21.0%
Toledo	318,003	313,619	-4,384	-1.4%
Youngstown	166,689	82,026	-84,663	-50.8%
Major City Total	3,254,361	2,596,307	-658,054	-20.2%
Ohio	9,706,000	11,353,140	1,647,140	17.0%

Source: U.S. Bureau of the Census, Population Division

fact, Lakewood experienced a population density decline equivalent to Cleveland during the past decade. An examination of Ohio's major cities reveals that population loss, as well as declines in density, are general trends.

Importantly, almost all of these cities exist in heavily urbanized counties. Declines in population and population density mask increases in population and population density on a regional level. Two-thirds of Ohio's largest metropolitan areas experienced an increase in population density between 1980 and 2000 (Table 7). In some cases, such as fast growing Columbus, population densities increased significantly. Even in Cincinnati, as the City of Cincinnati continued to lose population, the metropolitan area's

density increased by almost 12 percent.

More importantly, falling population densities in central-city counties, which are dominated by mature urban areas, mask dramatic population density increases in some suburban counties. For example, in the Dayton area, while Montgomery County's population density fell by 2.2 percent, Greene County's population density increased by 14.0 percent as suburban communities on the county's west side expanded and matured. Similarly, in the Toledo area, while Lucas County experienced a population density decline of 3.5 percent, suburban Wood and Fulton counties experienced double-digit increases in

Table 4: Land Area of Major Cities: 1980 - 2000

City	Land Area (sq. mi.)			Change 1980-2000
	1980	1990	2000	
Akron	57.5	62.2	62.2	8.2%
Canton	19.5	20.2	20.5	5.1%
Cincinnati	78.1	77.2	78	-0.1%
Cleveland	79	77	77.6	-1.8%
Columbus	180.9	190.9	210.3	16.3%
Dayton	48.4	55	55.8	15.3%
Hamilton	19.4	20	21.6	11.3%
Lima	12.3	12.7	12.7	3.3%
Mansfield	25.5	27.9	27.9	9.4%
Springfield	18.1	19.5	22.5	24.3%
Toledo	84.2	80.6	80.6	-4.3%
Youngstown	34.5	33.8	33.9	-1.7%
Total	657	677	704	7.0%

Source: U.S. Bureau of the Census, Population Divisions

Urban Sprawl and Quality Growth in Ohio

Table 5: Population Density of Major Ohio Cities: 2000

Rank	City	Population	Area (sq. mi.)	Density
1	Lakewood	56,646	5.5	10,208
2	Cleveland	478,403	77.6	6,166
3	Euclid	52,717	10.7	4,923
4	Parma	85,655	20	4,291
5	Cincinnati	331,285	78	4,249
6	Canton	80,806	20.5	3,933
7	Toledo	313,619	80.6	3,890
8	Akron	217,074	62.1	3,497
9	Columbus	711,470	210.3	3,383
10	Kettering	57,502	18.7	3,077
11	Dayton	166,179	55.8	2,979
12	Springfield	65,358	22.5	2,908
13	Lorain	68,652	24	2,858
14	Elyria	55,953	19.9	2,814
15	Hamilton	60,690	21.6	2,808
16	Youngstown	82,026	33.9	2,420
17	Middletown	51,605	25.7	2,011
18	Mentor	50,278	26.8	1,878

Source: U.S. Bureau of the Census, Population Estimates Division.

population density. The only metropolitan areas to experience declines in density for both central city counties and their surrounding suburban counties were Youngstown and Mansfield.

E. Ohio's Shifting Urban Form

One of the most persistent myths surrounding land development in Ohio and elsewhere is that urbanization is consuming open space at unprecedented rates. While this issue will be discussed in more detail later, the development of land outside of traditional central cities is more complex than simply the loss of open space.³⁰

Census data reveal that suburban counties are growing the most quickly, but

they are also becoming more diverse and complex, economically and socially. Indeed, while central-city counties lost population density from 1990 to 2000, suburban counties experienced a significant increase in population density. Much of this new growth and development occurred near highway interchanges, but most population growth occurred in small towns growing into large population centers in their own right.

Taking a closer look at two Ohio cities helps explain how these changes are impacting their future growth potential (Figure 8). In 1970, Cleveland had 18 neighborhoods with population densities greater than

Table 6: Change in Population Density for Ohio's Major Cities

	Population Density 1990	Population Density 2000	Population Change	Land Area Change	Density Change
Lakewood	10,858	10,208	-5.10%	0.90%	-6.00%
Cleveland	6,566	6,166	-5.40%	0.80%	-6.10%
Euclid	5,129	4,923	-3.90%	0.10%	-4.00%
Parma	4,394	4,291	-2.50%	-0.20%	-2.30%
Cincinnati	4,716	4,249	-9.00%	1.00%	-9.90%
Canton	4,166	3,933	-4.00%	1.70%	-5.60%
Toledo	4,131	3,890	-5.80%	0.00%	-5.80%
Akron	3,586	3,497	-2.70%	-0.20%	-2.50%
Columbus	3,315	3,383	12.40%	10.20%	2.10%
Kettering	3,239	3,077	-5.10%	-0.10%	-5.00%
Dayton	3,310	2,979	-8.70%	1.40%	-10.00%
Springfield	3,615	2,908	-7.30%	15.30%	-19.50%
Lorain	2,956	2,858	-3.60%	-0.30%	-3.30%
Elyria	2,925	2,814	-1.40%	2.50%	-3.80%
Hamilton	3,068	2,808	-1.10%	8.10%	-8.50%
Youngstown	2,832	2,420	-14.30%	0.30%	-14.60%
Middletown	2,278	2,011	12.10%	27.00%	-11.70%
Mentor	1,767	1,878	6.20%	-0.10%	6.30%

Source: U.S. Bureau of the Census, data reported at <http://www.demographia.com/db-2000city50kdens.htm>

Urban Sprawl and Quality Growth in Ohio

Table 7: County and Regional Population Densities: 1980 - 2000

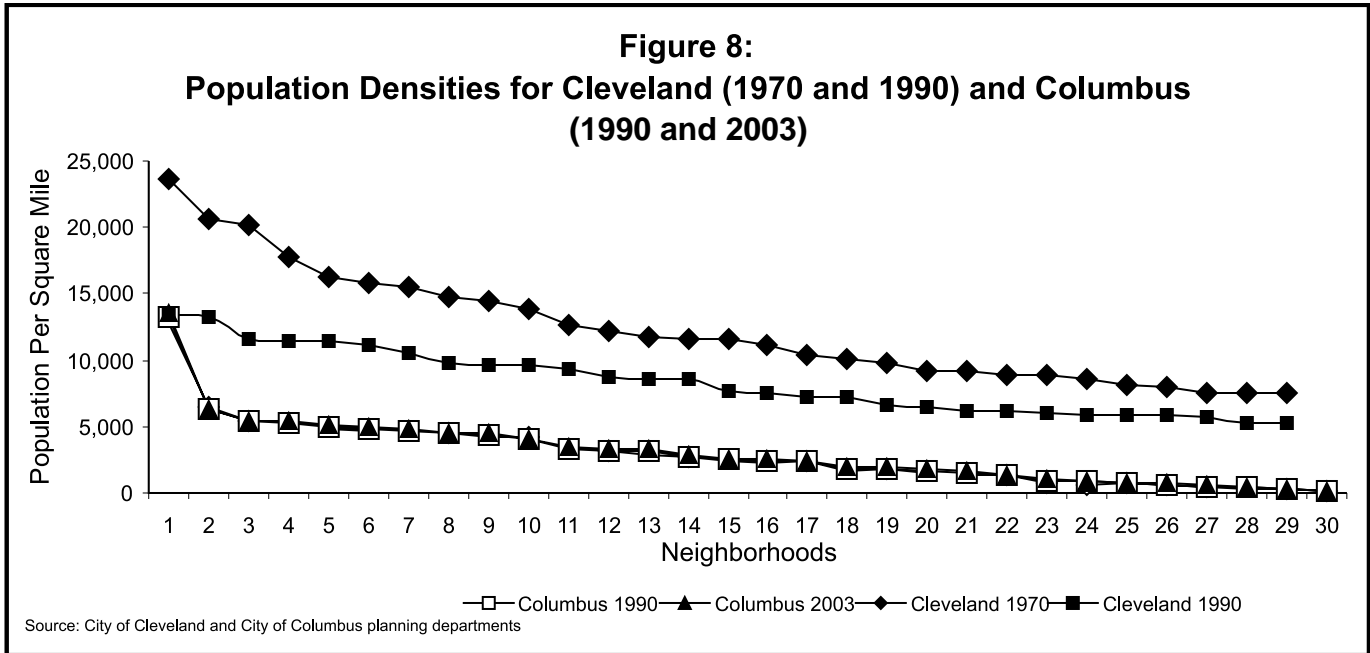
	Density (sq. mi.) Central County	Metro Area	Density Change Central Co.	Metro Area
Akron	1,315	587	3.5%	3.5%
Cincinnati	2,077	701	-3.2%	11.9%
Cleveland	3,044	931	-1.2%	-7.0%
Columbus	1,980	490	23.0%	26.8%
Dayton	1,210	565	-2.2%	0.9%
Lima	268	192	-3.4%	0.2%
Mansfield	259	196	-1.8%	-3.0%
Toledo	1,338	453	-3.5%	0.2%
Youngstown	621	380	-11.0%	-7.8%
Source: U.S. Bureau of the Census				

10,000 people per square mile (the average density of suburban Lakewood in 2000). Cleveland's ground zero in its central city, the Hough neighborhood, was the city's most densely populated area, housing 23,592 people per square mile. Two other neighborhoods—Forest Hills and Glenville—also had population densities exceeding 20,000 people per square mile. By 1990,

however, only seven neighborhoods had population densities exceeding 10,000 people per square mile. The Hough neighborhood's population density dropped to just 9,624 people per square mile, making it the city's tenth densest neighborhood, in just 20-years.³¹

Columbus, on the other hand, is a city that matured much later economically. The city's planning department is forecasting an increase in population density in the early 21st century (although the increases in density are not large). More importantly, only one neighborhood (near Ohio State University) has a population density greater than 10,000 people per square mile. Every other neighborhood in Columbus except one has a population density of less than 6,000 people per square mile. Indeed, fourteen of its neighborhoods have population densities less than 2,000 people per square mile, and many of these are on the fringes of the city limits. Cleveland, in contrast, reports just four neighborhoods with population densities less than 5,000 people per square mile, and these tend to be commercial and industrial districts.

In short, the trend in Ohio is toward more dense metropolitan areas and less dense central cities. On average, population densities in Ohio's metropolitan areas have increased 5.4 percent since 1980, increasing from 522 people per square mile to 550 people per square mile. Suburban counties



are still less than half as dense as urbanized counties with central cities (1,098 people per square mile), but the trend is upward even in these counties.

Thus, Ohio's cities are experiencing an ongoing evolution. Most central cities occupy a small percentage of land in their metropolitan areas, yet they are undergoing significant downsizing in terms of population density. While some argue these trends reflect the decentralization of Ohio's cities, they also reflect the urbanization of suburban communities. Rather than abandoning urban life, Ohioans appear to be refocusing it.

A Note on Efficiency

The analysis in this section provides little insight into whether these trends are socially, fiscally, or economically efficient. Whether decentralizing land-use patterns are efficient is the source of significant debate and discussion in the academic and scholarly literature. Researchers for the Transportation Research Board, for example, identified 42 costs and benefits of suburban sprawl in a survey of more than 475 academic and scholarly studies.³² They found “general agreement” on just 6 of these costs and benefits. “Some agreement” was found for 15 other costs and benefits, and “some disagreement” was found for 16 others. Clearly, simple, overarching conclusions alluding to the negative consequences of low-density development overly generalize a more complex phenomenon.

Nevertheless, efficiency must be considered in the context of the goals (or product) being produced. Efficiency does not mean (or imply) “zero cost.” Efficiency, in its common meaning, refers to the lowest cost for a given level of output for a particular product with a given quality. Thus, an automobile or bus’s efficiency is not determined by the cost of the materials used in its production. This would imply that cars or buses using the least amount of materials would be more efficient than others. Yet, cars and buses represent a “bundle” of different characteristics depending on how they will be used. Charter buses include comfortable seats for long journeys while mass transit are typically furnished with hard plastic bench seats to maximize the number of commuters that can stand in the aisles. Similarly, smaller cars are typically used for short, brief commutes and trips, while cars used to haul large volumes of people and goods (e.g., kids or luggage) are larger and more spacious.

Moreover, in a market economy, efficiency is determined by consumers making decisions about the products they want to buy based on its price. Economic planners do not determine what food consumers will eat, how much they will eat, or how much they will pay. Suppliers make decisions about the most efficient method for producing their product based on consumer decisions in the market place at market prices. Similarly, in the housing market, consumers buy homes based on the characteristics they want in a house and community. In this context, providing a smaller house when a household would prefer to buy a larger one, even if it costs more, would be inefficient.

3. Urban Sprawl, Farmland Preservation, and Ohio Agriculture

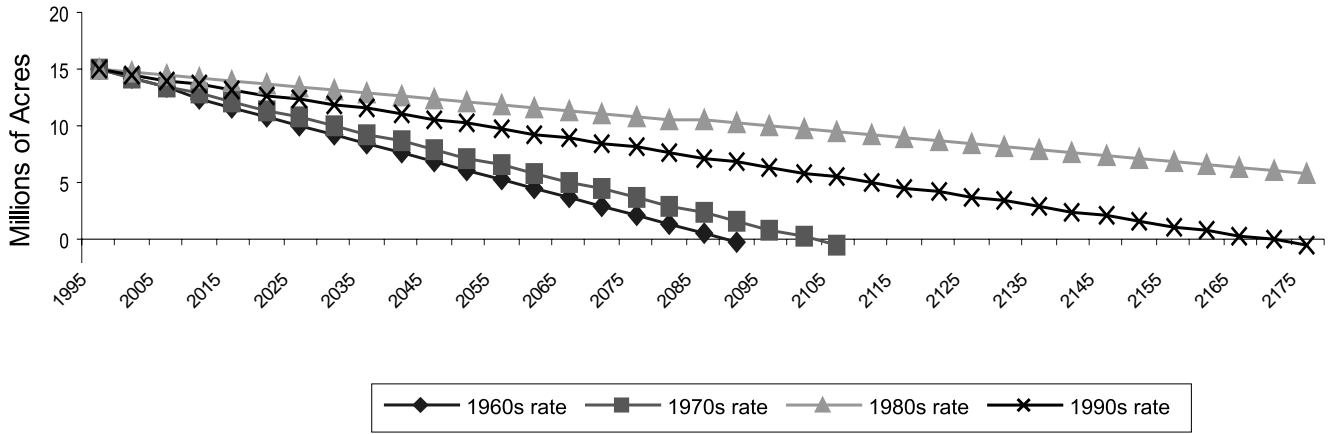
Farmland preservation has become the cornerstone of Ohio's growth-management efforts. Established in 1998, the Office of Farmland Preservation has spearheaded the state's efforts to make farmland preservation an explicit goal of county planning. Support for farmland preservation is rooted in a general concern for the impact of urban development on farmland viability. Ohio, in principle, is particularly vulnerable to urbanization because of its industrial legacy and its reliance on land-intensive, low-value field crops.

At first glance, Ohio's agricultural industry appears to be declining. Net farm income peaked at about \$1.75 billion in 1997, falling in 1998 and 1999.³³ Cash receipts from livestock fell 9.9 percent between 1998 to 1999 while receipts from all crops fell 13.7 percent. The 1999 value of cash receipts for crops was the lowest since 1991. As a result, Ohio agriculture's contribution to the national economy, almost \$2 billion in 1999, was 18.5 percent lower than in 1998. The ailing agricultural economy, then, provides an important backdrop for discussions of land use in Ohio. But few ask the key question: How sensitive is land use and urban development to changes in the agricultural economy?

A. Farmland Trends

Ohio has 14.9 million acres of land in farms according to the U.S. Department of Agriculture.³⁴ Land in farms fell about 100,000 acres per year from 1993 to 1996, then stabilized in 1997.³⁵ Importantly, declines in farmland have moderated, not accelerated, in recent years. In the 1950s, land in farms fell by 11.9 percent.³⁶ In the 1960s and 1970s, the amount of land in Ohio farms fell again, but at a less dramatic pace, falling 8.3 percent and 8.0 percent per decade.³⁷ Declines in farmland moderated even further to just 3.7 percent during the 1980s despite "rampant" sprawl.³⁸ While these trends reversed slightly in the 1990s, the rate of farmland loss for the decade is still about half that of the 1970s.³⁹

**Figure 9:
Potential Loss of Farmland Under
Different Scenarios**

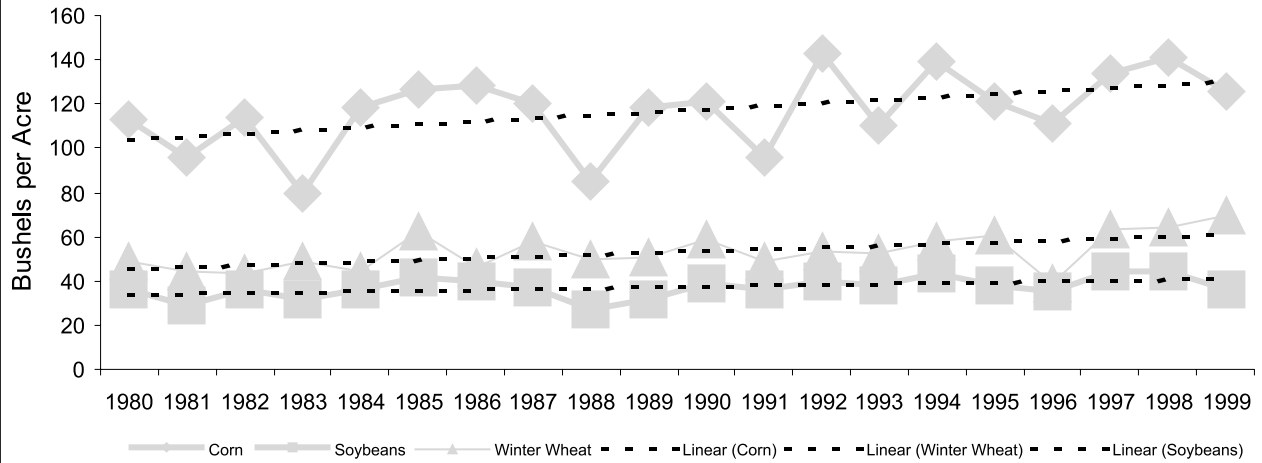


Source: Calculated from data compiled by the U.S. Department of Agriculture

Declining rates of farmland loss have implications for public policy. Beginning with an initial “inventory” of 14.9 million acres of farmland in 1999, farmland loss equivalent to the rates experienced in the 1960s and 1970s would extinguish all farmland in Ohio within 100 years. Moderating farmland loss rates extend the point of zero farmland for more than another 100 years based on the 1980s loss rate and 175 years based on 1990s loss rates.

Zero farmland, however, is a theoretical rather than practical concept. In reality, farmland will not disappear. Ohio’s urban and suburban counties, despite a decade of rapid growth and development, still contain a substantial share of the state’s total farmland despite recent development trends. Ohio’s major metropolitan areas still claim 4.9 million acres of farmland, or about one third of the state’s total. Central-city counties such as Lucas (Toledo), Cuyahoga (Cleveland), Hamilton (Cincinnati), or Franklin (Columbus) contain 1.2 million acres, or about one quarter of the farmland in metropolitan areas. Most of this land is in the smaller central-city counties such as Allen (Lima) or Richland (Mansfield). Yet, Clark County, home to Springfield, maintains more than 172,000 acres of farmland. On average, central-city counties continue to maintain about 123,000 acres of farmland, while suburban counties average about 150,000 acres. Suburban counties retain large swaths of farm and agricul-

**Figure 10:
Productivity of Major Ohio Field Crops: 1980 to 1997**



Source: Ohio Department of Agriculture, <http://www.nass.usda.gov/oh/bull99/table01.htm>

tural land despite supposedly rapid urbanization and farmland conversion. Indeed, this farmland ensures many counties retain a distinctly rural feel and atmosphere.

Nevertheless, given Ohio’s dependence on field crops, maintaining large parcels of farmland is important to ensure efficiency. Often, 500 acres or more of farmland is necessary to operate at maximum efficiency and facilitate the use of industrial-production techniques. Unfortunately, little comprehensive information about the extent of farmland fragmentation exists. Visual inspection is unreliable because lots sold off for houses near roads often obscure hundreds of acres of farmland beyond the housing subdivision that is still cultivated for crops.

Still, a review of crop productivity data reveal that Ohio’s agriculture is at least as productive at the end of the 20th century as it was in 1980, before the current concern over sprawl emerged as a focus of public-policy debate. Yields for corn did not exceed 100 bushels per acre until 1976.⁴⁰ By 1985, however, corn topped 120 bushels per acre.⁴¹ Yields have exceeded 120 bushels per acre in ten different years since 1985, peaking at 141 bushels per acre in 1998 (Figure 10). While productivity increases for other field crops have not been as dramatic, Ohio’s farmers reached a new threshold of 40 bushels per acre of soybeans in 1985 and peaked at 44 bushels in 1997 and 1998. Similar trends

Urbanization and Farmland Fragmentation

One of the more important land-use issues arising during the sprawl debate is farmland fragmentation. The issue is particularly relevant to Ohio given the state's dependence on large field crops such as corn, soybeans, and wheat for agricultural production. Fragmenting farmland—allowing residential and commercial development to split up large parcels of agricultural land—potentially threatens the productivity and the viability of the agricultural industry. Not surprisingly, farmland fragmentation is one of the principal justifications for agricultural zoning and the creation of special agricultural districts that hinder land conversion to non-farm uses such as housing.

Despite the potential importance of farmland fragmentation, little research has estimated its scale or significance. One recent study conducted by The Ohio State University analyzed fragmentation trends in Medina County, a suburbanizing county in the Cleveland metropolitan area just south of Cleveland and west of Akron.⁴⁴ Medina County was the fifth fastest growing county in Ohio during the 1990s, reaching a population of 151,000 by 2000 (see Table 8).⁴⁵ About three-quarters of the county is undeveloped, and residential development accounts for 85 percent of the developed land.⁴⁶

The study found that the rate of land development had increased since 1956, particularly in the years since 1976.⁴⁷ The average size of forested and agricultural areas became smaller, more numerous, and non-contiguous. More importantly, residential development was the primary cause of fragmented land use and had become less clustered and contiguous over time.⁴⁸

Ironically, the researchers found that density was an important factor in determining fragmentation. Areas with lower population densities were likely to experience growth, but residential development was less likely to be found in completely rural areas. "This implies that people prefer to live closer to existing urban areas," they concluded, "presumably because of the services and accessibility that these locations offer, but at the same time dislike higher density areas that may be characterized by congestion and other negative effects of urbanization."⁴⁹ Moreover, large-lot zoning (minimum lot sizes of 3 acres or more) had the likely effect of dispersing residential development even more.⁵⁰

Unfortunately, the study did not analyze the impacts of farmland fragmentation on agricultural productivity. Statewide agricultural productivity does not appear to be threatened by residential development or fragmentation. Nevertheless, farmland fragmentation could impact productivity on the local level, particularly in counties that have experienced rapid development.

are evident for winter wheat and hay.⁴² Thus, long-term data suggest that urbanization has not significantly impacted agricultural productivity for Ohio's major land-intensive field crops.

More important for understanding land development impacts on Ohio agriculture, the most productive areas of the state are rural counties, not heavily urbanized metropolitan areas. Ohio's top ten agricultural counties are Mercer, Darke, Wayne, Licking, Lake, Holmes, Hardin, Putnam, Logan, and Wood. Of Ohio's 88 counties, 52 are rural in character. Even though several of the top agricultural counties are in major metropolitan areas, only one, rural Holmes County (population 38,943) experienced population growth that ranked it in the top ten and it is not located in a metropolitan area (Table 8). The next highest-ranking county, Licking, was the only county of the top ten to experience double-digit population growth. Both Holmes and Licking County have more than one-third of their land in farms. Logan, Wood, Mercer, Hardin, and Putnam counties still devote almost half or more of their land to farmland. In fact, statistically, the relationship between the share of county's total land area in farms and population growth rate is weak.⁴³

While the comparison of population growth to farmland suggests the link is weak on the state level, individual counties may be faced with significant pressure to convert farmland. Union County, for example, on the northwestern fringe of the Columbus metropolitan area, is the third fastest growing county in the state and more than half of its land is currently farmland. This suggests that population growth will put pressure on land markets to convert farmland to urban uses. Nevertheless, with more than half the county's land in farms, the impact on the local agricultural community is likely to be small. In short, the impacts of growth on farmland are likely to be localized and limited to regions of the state already highly urbanized (see box).

Despite visible losses of land in farms, cropland has remained remarkably stable even as Ohio's urban areas have spread out. While harvested cropland for Ohio's five major crops—corn, soybeans, winter wheat, hay, and oats—has declined overall since 1980, it actually *increased* 4.7 percent from 1990 to 1999 (Figure 11).⁵¹ This increase in harvested cropland was primarily the result of a 29.0 percent increase in soybean production as its share of total cropland increased from 3.3 percent in 1980 to 43.6 percent in 1999 for Ohio's five primary crops.⁵² Harvested cropland for corn

Urban Sprawl and Quality Growth in Ohio

Table 8: Population Growth and Share of Farmland by County: 1990 - 2000

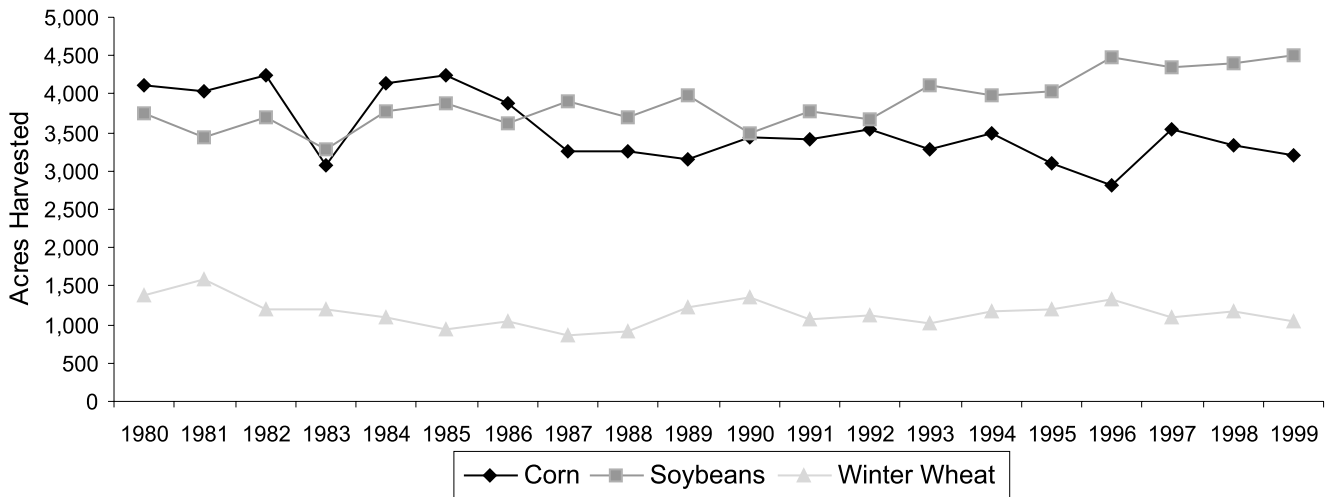
	County	Population 1990 - 2000	Share Farmland		County	Population 1990 - 2000	Share Farmland
1	DELAWARE	64.30%	36.30%	45	MORGAN	5.00%	23.50%
2	WARREN	39.00%	29.60%	46	ATHENS	4.50%	16.30%
3	UNION	28.00%	46.80%	47	AUGLAIZE	4.50%	53.20%
4	NOBLE	24.00%	24.80%	48	GUERNSEY	4.50%	26.40%
5	MEDINA	23.50%	24.70%	49	MERCER	3.80%	56.40%
6	BROWN	20.90%	39.80%	50	ERIE	3.60%	35.20%
7	FAIRFIELD	18.70%	38.90%	51	COLUMBIANA	3.50%	25.90%
8	HOLMES	18.60%	40.60%	52	COSHOCTON	3.50%	30.20%
9	CLERMONT	18.50%	19.50%	53	FAYETTE	3.50%	59.60%
10	VINTON	15.40%	9.00%	54	MUSKINGUM	3.10%	27.10%
11	KNOX	14.80%	39.10%	55	MARION	3.00%	54.60%
12	CLINTON	14.50%	54.20%	56	ASHTABULA	2.90%	21.20%
13	HIGHLAND	14.40%	43.80%	57	STARK	2.90%	23.70%
14	BUTLER	14.20%	28.80%	58	WYANDOT	2.90%	51.50%
15	PIKE	14.20%	17.70%	59	HARDIN	2.70%	52.50%
16	MORROW	14.00%	39.70%	60	PUTNAM	2.70%	60.40%
17	LICKING	13.40%	34.50%	61	OTTAWA	2.40%	41.50%
18	GEAUGA	12.00%	14.70%	62	RICHLAND	2.20%	31.30%
19	FRANKLIN	11.20%	14.70%	63	WASH.	1.60%	23.10%
20	ASHLAND	10.60%	38.70%	64	LAWRENCE	0.80%	13.10%
21	HOCKING	10.60%	11.30%	65	DEFIANCE	0.40%	45.30%
22	FULTON	9.30%	48.50%	66	GALLIA	0.40%	25.00%
23	PICKAWAY	9.30%	53.20%	67	HENRY	0.40%	58.60%
24	HANCOCK	8.80%	52.20%	68	MEIGS	0.40%	19.70%
25	CARROLL	8.70%	28.70%	69	WAYNE	-0.10%	43.40%
26	LOGAN	8.70%	47.70%	70	SANDUSKY	-0.30%	48.80%
27	MADISON	8.50%	56.40%	71	DARKE	-0.60%	54.90%
28	GREENE	8.20%	43.00%	72	PAULDING	-1.00%	50.50%
29	TUSCAR.	8.10%	24.90%	73	ALLEN	-1.20%	46.90%
30	CHAMPAIGN	8.00%	51.70%	74	BELMONT	-1.20%	27.60%
31	JACKSON	8.00%	17.60%	75	TRUMBULL	-1.20%	18.30%
32	PERRY	8.00%	23.60%	76	CUYAHOGA	-1.30%	0.90%
33	ADAMS	7.70%	33.30%	77	HARRISON	-1.40%	27.10%
34	WOOD	6.90%	49.30%	78	SCIOTO	-1.40%	16.80%
35	SHELBY	6.70%	49.40%	79	LUCAS	-1.60%	23.40%
36	PORTAGE	6.60%	17.80%	80	SENECA	-1.80%	53.10%
37	MIAMI	6.10%	47.30%	81	CLARK	-1.90%	43.00%
38	WILLIAMS	6.00%	48.20%	82	CRAWFORD	-1.90%	56.40%
39	HURON	5.80%	47.00%	83	MONROE	-2.00%	24.00%
40	ROSS	5.80%	36.50%	84	HAMILTON	-2.40%	7.20%
41	LAKE	5.60%	8.40%	85	MONTGOM.	-2.60%	22.90%
42	PREBLE	5.50%	46.40%	86	VAN WERT	-2.60%	57.90%
43	SUMMIT	5.40%	4.20%	87	MAHONING	-2.70%	17.70%
44	LORAIN	5.00%	26.50%	88	JEFFERSON	-8.00%	17.40%

Source: Census of Agriculture 1997, U.S. Department of Agriculture, and U.S. Bureau of the Census.

has dropped since 1990, but corn still accounts for 31 percent of the total acreage for these crops.⁵³ In fact, harvested cropland varies significantly from year to year, irrespective of larger trends in urbanization.⁵⁴

Moderating farmland loss rates have occurred during Ohio’s most rapid period of urbanization and land development, but most of Ohio’s farmland and cropland is outside of rapidly growing areas. The important lesson from these trends is that farmland loss rates change from year to year, sometimes significantly; farmland trends are likely driven by factors other than urbanization, particularly on the state level. In fact, land-development trends seem to have little impact on either state agricultural productivity or farmland loss. These trends suggest that the link between farmland loss and urbanization at the state level is much weaker than conventional wisdom suggests, even at the county level. Thus, the impact of farmland loss on agricultural productivity is localized and geographically focused, not regional or statewide. These data, however, say little about the causes of farmland loss, a topic that will be discussed more fully in the next section.

**Figure 11:
Harvested Acres of Major Ohio Field Crops: 1980 to 1999**



Source: Ohio Department of Agriculture, <http://www.nass.usda.gov/oh/bull99/table01.htm>

B. Urbanization and Farmland

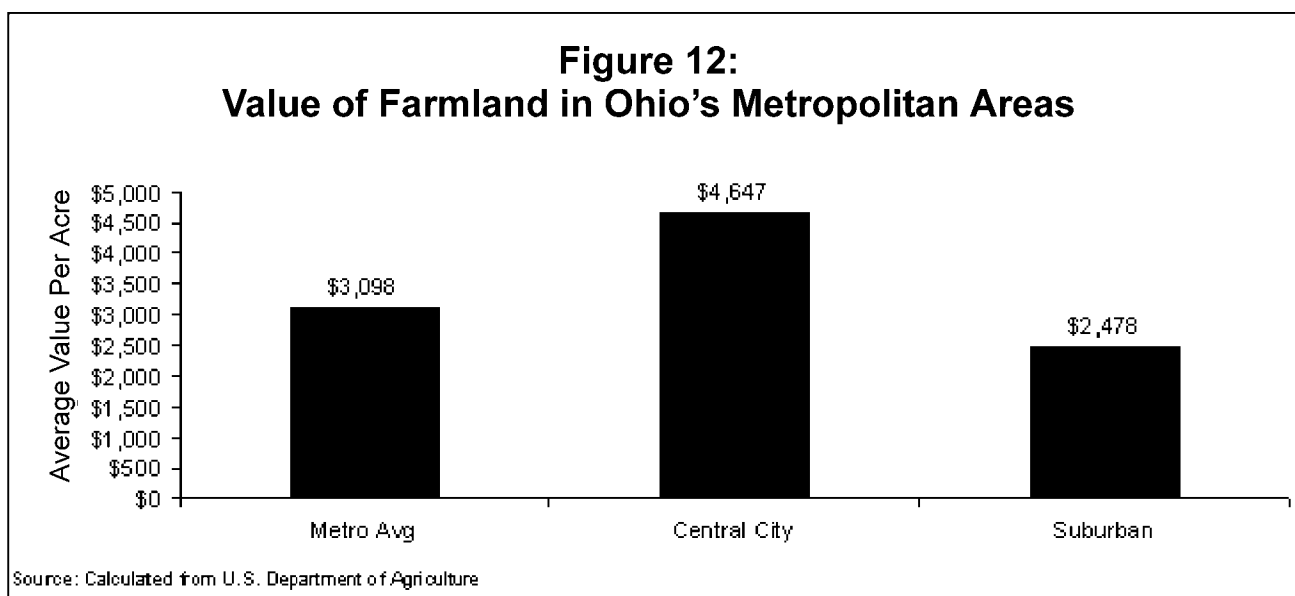
Shifts in crop production reflect changes in the national agricultural economy. Less than 1 percent of the nation’s prime farmland has been lost to development, but productivity has increased steadily. The nation’s farm output has risen more than 17 percent since 1980 and by almost 50 percent since 1970.⁵⁵ As a result, the United States exports almost half of its rice, more than 40 percent of its wheat, more than one-third of its cotton, and 16 percent of its corn.⁵⁶ Ross Korves, Deputy Chief Economist for the American Farm Bureau Federation, observes that world agricultural yields are expected to increase by about 1.5 percent per year into the foreseeable future while annual world population growth is expected to fall from 1.2 percent in 2005 to 1 percent by 2015.⁵⁷ Not surprisingly, the U.S. Department of Agriculture’s Economic Research Service concluded recently: “Losing farmland to urban uses does not threaten total cropland or the level of agricultural production which should be sufficient to meet food and fiber demand into the next century.”⁵⁸

The nation’s agricultural industry is changing significantly. As agriculture becomes more productive, less land is needed to produce food and other products. In fact, land is generally becoming

less important in agricultural production.⁵⁹ Thus, agricultural productivity is freeing up land for other uses.

In addition, many farms are not financially independent. More than half of Ohio's farms are small, under 100 acres.⁶⁰ Three quarters of Ohio's farms earn less than \$50,000 per year from the products they grow and send to market.⁶¹ Even more telling, 54.8 percent of farmers are part-time; 43.4 percent work more than 200 days each year at other jobs.⁶² While some of these part-time farmers may want to become full-time, others are "hobby" farmers—people that choose farming for lifestyle rather than commercial purposes.⁶³

Urbanization plays a far less important role in farmland loss than newspaper headlines suggest.



Ohio State University agricultural economist Luther Tweeten estimates that weak demand for cropland (because of improvements in agricultural productivity) is far more important than the demand for urban land in explaining cropland loss.⁶⁴ An analysis of cropland trends by Tweeten found that just 4 percent of Ohio's cropland loss could be attributed to economic demand for urban land.⁶⁵ Of course, all these efforts presuppose that Ohio's farmland and open space is, in fact, threatened.

This is more clearly evident through an analysis of the economics of land conversion on the urban fringe. Farm real estate averages about \$2,250 per acre statewide and is increasing at about 5 percent per year.⁶⁶ Farmland prices in Ohio's metropolitan area's average \$3,098 per acre for build-

ings and land (Figure 12).⁶⁷ In counties with large urban centers, farmland values average \$4,647 per acre. These counties currently have more than 1.2 million acres in farmland.⁶⁸ In areas with high development potential, the market value for vacant land can reach \$50,000 per acre or more. Clearly, this puts significant pressure on farmers to sell their land since the value of the land for uses other than farmland is so great. Not surprisingly, on the margin of urban areas, farmland is most likely to be converted to urban uses.

The bottom line is that agriculture's rising productivity allows farmland to be used for other purposes. While some of this land may be used for housing, shopping centers, and office parks, most converted farmland will probably go to forest or pasture. Indeed, Ohio's forests have benefited from higher agricultural productivity: From 1949 to 1992, Ohio's forests grew faster than development.⁶⁹ According to the most recent Natural Resources Inventory (NRI), about half of the decline in Ohio's cropland since 1992 reverted to pasture, forest, and range, not development.

Moreover, little evidence on the national level suggests urbanization or residential development in rural areas threatens the nation's food supply or cropland. More than three-quarters of the nation's population lives on just 3 percent of the total land area. "Urbanization and the increase in rural residences do not threaten the U.S. cropland base or the level of agricultural production at the present or in the near term," observes a report from the U.S. Department of Agriculture.⁷⁰ Other land such as forest, pasture, and range can be shifted into cropland if necessary, and crop yields per acre continue to increase. "For these reasons," the authors continue, "the U.S. cropland base should be sufficient to meet food and fiber demands (both domestic and foreign) for the foreseeable future."⁷¹

C. Conclusion

The conventional wisdom about the relationship between farmland and urbanization may be incorrect. Most land taken out of production is a result of the changing economics of the agricultural industry, not development pressure from urban areas. Thus, while half of Ohio's cropland loss reflects a reversion to urban development, the causes of cropland decline are driven more by increasing productivity in the agricultural industry and weak demand for cropland than strong demand for urban

uses. Even if farmland is converted to urban uses, real-estate markets suggest the social costs of preventing this conversion are potentially very high. Land prices in some suburban areas reach \$50,000 or more per acre, indicating that the value of land for other uses, particularly housing, is higher than its continued use as farmland.

Thus, one way to look at the conversion of farmland to urban uses is through a cost-benefit lens. In the real-estate market, these costs and benefits are registered through land prices. Developers buy land from farmers based on their ability to develop the property and sell the land (and house) for a price exceeding the costs. If the estimated demand for housing on the urban fringe is not high, developers are unlikely to develop the property for urban uses (residential or commercial). Clearly, in a market system, one way to prevent farmland conversion is to bolster the value of existing farms by increasing their agricultural productivity.

Ironically, Gov. Bob Taft visited a Greene County goat farm (near Dayton) in March, 1999 to highlight support for farmland protection. The goat farm occupies a former corn field. Traditional farming couldn't compete with other uses on the urban fringe, so the property owners focused on products that produced high value per acre: goat farming. The goat farm is a product of market forces, not farmland preservation efforts. Other high-value agricultural products common in metropolitan areas include nurseries, cultivated flowers, and even Christmas trees.

A related issue, however, is the extent urbanization might affect other aspects of quality of life not directly tied to agriculture such as open space, scenic views, habitat protection, and wetlands. These uses have value as well, but they will be discussed more fully in the section discussing the environment. The sole effect of protecting open space, however, may not be to ward off urbanization. If the intent is to generally protect open space, farmland protection may or may not be an important policy goal. By permanently protecting land in a way that excludes agriculture, general open space protection might also preclude the adoption of more efficient agricultural technologies, or the adoption of high-valued added crops or products, thus compromising the productivity and profitability for the industry. In addition, open space protection may inhibit large-scale farming by fragmenting land.

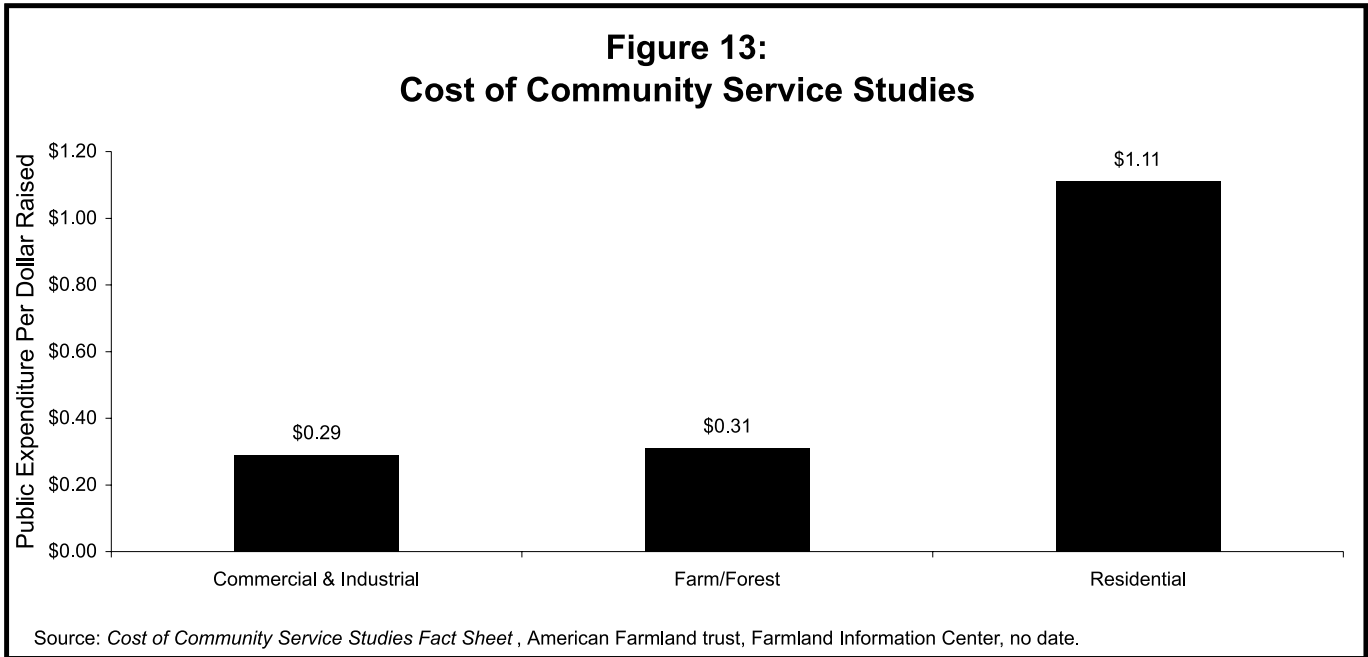
4. Development and Infrastructure Costs

Citizens and elected officials are also concerned about land development's impacts on local-government costs. Each new house requires sewer, water, and roads—public services provided largely by local governments. As well, each new household has the potential for adding a new child to the local public school district. Many communities are concerned that population growth will drive up the cost of government.

Two sides exist to the development ledger. Costs are just one column — revenues and benefits make up the other. The broader issue is whether local revenues will cover the costs of new expenditures for public services. For many, if development “paid its way,” the issue of development costs would largely be solved. The “average” school district in Ohio, for example, spends about \$6,000 per student. Most new homes will not generate sufficient revenues to cover the costs of one additional student, let alone two. A key issue, however, is which costs new development should be responsible for covering. Local communities and the state traditionally provide resources to educate Ohio's children. While population growth may effect the costs of public education, land-use patterns have relatively little direct impact. In contrast, other public-service costs for core infrastructure such as roads, sewers, water, or stormwater systems are directly related to land use and the pace of development.

A. Cost of Community Services Studies

At first glance, these concerns seem to be verified by evidence. Several attempts have been made to determine whether one type of land use, such as commercial development, “pays its way” based on the public services they demand. The most widely cited studies are probably the Cost of Community Service (COCS) reports published by the American Farmland Trust (AFT) and other groups concerned about the fiscal impact of development on their communities. Cost of Community Services studies, the trust says, try to “reorganize local financial records” to determine the net impact of different land uses on a local governments resources over a specified period. Most commonly,



COCS studies compare costs and revenues from residential land uses, commercial and industrial uses, and farm, forest and open land sectors to provide a snapshot of the financial contributions each land use makes to the local government.⁷² “The costs of providing new residents with services such as education, police and fire protection, road maintenance and ultimately public sewer and water,” the AFT says in their summary of the method and intent, “must be evaluated along with the gross contribution to the tax base.”⁷³

AFT has directly completed or provided the framework for the completion of numerous studies throughout the United States, including several in the Midwest and Ohio. In each case, the studies found that farmland and open space provided net revenues (revenues exceeded the costs of services provided) and residential development was a net drain on communities (Figure 13). On average, the AFT and others find that residential uses require local communities to pay \$1.11 in services for every dollar they take in tax revenues. Commercial and industrial uses, on the other hand, generate more than three times the revenues necessary to cover the public services they use.

COCS studies, while widely used, have come under intense scrutiny and criticism for an approach that seems to ignore many important factors which ought to play a role in land use policy

decisions. For example,

1. Gary Wolfram, a professor of economics at Hillsdale College, analyzed a COCS study completed in Scio Township near Ann Arbor, Michigan. Scio Township is a largely rural but “rapidly urbanizing area that contains Ann Arbor and the University of Michigan.”⁷⁴ The Scio Township study concluded, consistent with the majority of COCS studies, that residential land is a net tax drain for local communities. Wolfram determined that the study’s reliance on education biased its conclusions. “Schools are funded by a separate governmental unit, school districts,” Wolfram noted. “These districts levy taxes separate from the township, have a separate elected board, and have different governmental boundaries.”⁷⁵ Further, while the study includes education expenditures, it makes no mention of revenue, ignoring the fact that each child brings to the area a sum of state dollars.⁷⁶ Thus, state education aid can significantly offset the local costs of development. In Ohio, the state now contributes more than half of the total spending on students in most school districts. Moreover, local communities provide an education to every child whether they live in an apartment, house, or condominium. School costs are driven by population growth, not land development *per se*.
2. COCS studies ignore how land-use patterns themselves impact costs. Ohio State University researchers Elena Irwin and David Kraybill point out that “All else equal, the per capita costs of servicing a population that is more dispersed (vs. concentrated) will be higher because more miles of streets and public utilities will be required to reach them.”⁷⁷ But, local residents may be willing to tax themselves at higher rates to provide those services if they believe the services will enhance their quality of life. Moreover, land development occurs in a myriad of shapes, sizes, and specifications, and the impacts on the costs of development vary within land use types as well as between them. Thus, higher density single-family housing may save costs by reducing the amount of roads but increase costs by adding sidewalks, curbs, and other design features. General statements about the costs of development attributed to general land-use categories are thus inappropriate.
3. Age, income, and preferences all impact the demand for public services, but demographics are ignored in COCS studies.⁷⁸ This is especially important with regard to education expenditures,

since they account for the bulk of residential costs in COCS studies. New subdivisions targeted toward mature couples without children, or “empty nesters,” will have different public-service demands than traditional subdivisions or apartment buildings with larger concentrations of young people. Thus, extrapolating average expenses for new development targeted largely at retirees does not present a true picture of development’s impact on the local government bottom line.

4. Increased development can potentially benefit the community by stimulating growth overall.

Growth, in time, can increase property values and generate higher revenues in later periods. “[T]he supply of total land within a given community is fixed,” notes Wolfram. “So that, as population and demand for housing increase, the price of residential land will also increase.”⁷⁹ Wolfram takes this a step further, contending that property values are actually a better measure of whether residents are receiving the optimal mix of land uses and services because they also account for government expenditures. Whether the expenditure side of the equation is appropriate is a factor completely left out of COCS analyses:

[L]andlords would like their local government to spend on local government services as long as the increased value of property that occurs from this expenditure offsets the decreased value that occurs from the property tax burden associated with the expenditure . . . an indication that residential development costs more in expenditures than it adds in revenues can just as easily reflect expenditures on local government services that are not optimal as that there is an excess amount of residential development.⁸⁰

5. COCS studies typically find that industrial and commercial development is a net tax benefit for the community, and, in fact, generates more revenues than farmland or residential development. “The policy conclusion from the study shouldn’t be that farmland be preserved,” states Wolfram, “but rather that incentives should be given to convert farmland to commercial/industrial property.”⁸¹ On the whole, COCS studies ignore the mix of land uses in the overall public finance picture. On average, residential property contributes about half of a community’s total property valuation. Commercial and industrial property contributes the remainder, even though they do not have the same level of demand for public services but they may receive equally important benefits. The

local grocery store, for example, does not send children to school, yet the store benefits from an educated work force and effective schools that attract families into the community (and, potentially, enlarging its own market). Thus, a portion of the cost of public services is born by families and businesses that do not directly benefit from the service. Moreover, by taxing industrial and commercial properties, property tax rates can be kept lower than would be necessary if residential development had to pay the full costs of all public services. Ultimately, all forms of property development must be considered together, as an integrated tax base, because they are interdependent.

6. COCS studies focus on average costs, not marginal costs, to determine optimal land-use allocations.⁸² That is to say, each new unit of housing must be judged independently for its contribution and cost to the community's tax base. The first acre of housing or commercial space, for instance, may have quite a different fiscal impact than the second, or the third. Once a water treatment plant has been built, for example, the marginal or "extra" cost of adding a housing unit may be smaller due to economies of scale. Similar savings and differences in service levels and quality might exist among developments and projects located in different geographic areas of a city (e.g., development on a hillside versus a flat field).⁸³ Irwin and Kraybill make a similar point, stating that "the costs of providing public services are not constant but rather will vary on the existing population and public service capacity in the community."⁸⁴

Thus, COCS studies provide much less information than would appear at first glance. In fact, they may do more to distort the relationship between land development and public-service costs and the trade-offs they imply than clarify the impact of new growth on a community. At the root of the controversy over development and public-service costs is the issue of subsidy—existing residents do not want to subsidize new residents, particularly when these new residents often have higher incomes. Moreover, businesses often look at taxes using the "benefit principle": taxes are acceptable as long as they pay for specific services and products that benefit them. Thus, if new development is subsidized, tax rates will be higher than necessary to pay for services that are not directly provided to the entire

community or specific users, making the local community less competitive and attractive.

B. Lake County, Ohio

In October of 1993, the American Farmland Trust released its first major Midwest COCS study in Madison, Ohio. This remains the largest and most significant AFT study done in Ohio to date, and, as expected, it found that “the Lake County COCS findings were consistent with those of AFT’s previous studies. The demand for residential services far outweighed the income residential taxes raised.”⁸⁵ The report determined the following ratios for every dollar received in revenue to every dollar spent on services in Madison Village and Township:

The methodology and conclusions of this report suffer from the same flaws of the other COCS studies. For instance, the use of educational expenditures is highly question-

Cost of Community Service Results for Lake County, Ohio

	VILLAGE	TOWNSHIP
Residential	1 : 1.67	1 : 1.40
Commercial / Industrial	1 : 0.20	1 : 0.25
Farm, Forest & Open Land	1 : 0.38	1 : 0.30
Source: American Farmland Trust		

able. According to the study, “The only state aid we discovered for Madison was in the form of the local government revenue assistance fund and the local government fund.”⁸⁶ State education funds are not considered aid, as explained earlier in their report: “State aid to education went directly to the school district, so it was not considered a direct revenue to the village or township.”⁸⁷

This is significant. In 1997, for example, Madison local schools spent \$19 million to educate their children (\$5,682 per pupil). More than half, \$3,210 per pupil, came from the state government. Thus, almost \$11 million in revenues were excluded from the COCS evaluation.

So, while it would seem that educational dollars are a separate issue handled by school districts, and therefore ought not be addressed within the framework of their study, the authors chose to include education expenditures and place them entirely under one land use category. “Expenditures from property taxes, tangible personal property and manufactured homes for education were distrib-

uted at the county level. Using the disbursement sheets, *the total amount of expenditures for Madison Local School District, Auburn Joint Vocational School, Lakeland Community College and the Lake County Finance District was allocated to the Residential category*” (emphasis added).⁸⁸ The authors chose to completely ignore school-based revenue but nonetheless fully account for education expenditures handled through school districts and not the municipalities.

Regardless, as the study’s own calculations show, farmland and open space do not compete with commercial and industrial land in the creation of a surplus for local government. The conclusion might just as well be to encourage commercial and industrial development. This argument, however, receives short shrift in the report.

[W]hile existing commercial and industrial land uses are providing far more in revenues than they demand in services, unplanned growth in these areas may not solve the fiscal imbalance. If new commercial and industrial development does not meet the needs of local residents, and does not reflect local skills, values and resources, it is likely to be followed by increased demand for new housing, traffic congestion, pollution and other factors that typically accompany urbanization.⁸⁹

In other words, any new development would be considered a drain on the community. Ironically, the implication is that marginal analysis is necessary when planning future industrial and commercial development, but not when evaluating the fiscal impact of different land uses in the present. This tool is now brought to light in order to justify a stance against further development in the face of the stated ratios in the report. Marginal analysis, however, is missing as a rationale explored when the ratios for residential and farmland conform to the American Farmland Trust’s mission “to protect the nation’s agricultural resources” and “stop the loss of productive farmland.”⁹⁰

In addition, the authors presume commercial and industrial capacity, rather than farmland preservation, will lead to housing development and congestion when research suggests the opposite might be true. AFT’s recommendation: “[G]iven the findings of this study and the other cultural and economic values of agriculture, public farmland protection efforts might prove a valuable long-term

investment in both Madison Village and Township.”⁹¹ This presumes, of course, that farmland protection will result in broad-based open-space preservation. In fact, most farmland represents separate parcels that are often poorly integrated. Farmland preservation efforts typically focus on preserving specific farms or specific plots of land, not generally prohibiting development in all rural areas.

Farmland protection efforts may also have the unintended effect of encouraging fragmented land development. In her study *Explaining Sprawl in Exurban Areas: The Role of Open Space*, Ohio State University economist Elena Irwin explains:

[L]and with more open space around it is more likely to get developed than a similar parcel of land that has less open space around it. Policies that only target open space preservation may even have perverse effects. For example, a policy that ensures the provision of open space by protecting targeted areas of farmland could actually encourage more development around the edges of the protected open space area than would otherwise occur. The reasoning is simple: If people value open space and a policy is put in place to ensure that an open space area will be preserved, then households can act with greater assurance that the land will remain in open space. All else equal, the land next to protected open space will be higher valued as a residential location and conversion is likely to occur sooner around these protected areas (emphasis original).⁹²

Farmland preservation may have other negative implications. While farmland and open space require few public services (unless farm families have children in the local public schools), farm uses contribute a very small fraction of total revenues. This is even more likely to be true in Ohio where agricultural land is given preferential tax treatment to encourage farming. State law allows farmland to be taxed based on its value in its current use, not its market value. The result is that the taxable value of agricultural real estate in Ohio is just one quarter its value if assessed at its market value.⁹³ Nonagricultural land is typically much higher value per acre, generating higher tax revenues as a result. In Scio Township, Michigan, the farming community’s contribution to local revenues was just 1.4 percent.

Statewide, agricultural property valuation in Ohio is just 4 percent of the total.

Essentially, the use of COCS studies to either support or oppose a development project should be viewed with skepticism. “COCS studies provide insufficient information and are often misleading as a guide for decision-making regarding the desirability of new residential growth within a community,” note economists Irwin and Kraybill.⁹⁴

C. Is Sprawl Subsidized?

Whether development pays its way is crucial to the opposition to new development, particularly in formerly rural areas. Unfortunately, limited academic research exists on the subject. The views of both developers and county engineers, however, suggest few subsidies occur. If they do, they are specific to the cities, counties, or jurisdictions extending infrastructure. The lack of consensus suggests that development projects must be examined on a case-by-case basis.

The Ohio Public Expenditure Council (OPEC), for example, analyzed development fees and infrastructure costs for new development in two communities for the Ohio Homebuilders Association in 1999.⁹⁵ Eden Meadows is a 73-unit single-family residential housing project in Sugarcreek Township, east of Dayton in Greene County, with home prices ranging from \$280,000 to \$823,000. OPEC estimated that the developers incurred expenses of about \$1.2 million for infrastructure such as streets, storm water, sewer, and water lines.⁹⁶ Another \$41,506 went to local governments for park dedication, plan review, and county inspection fees.

Overall, however, property taxes, sales taxes, and development fees directly generated \$516,243 for local governments. Importantly, 60.9 percent of these revenues were from the property tax. In contrast, the same property generated just \$4,130 in property taxes before construction began.⁹⁷

Of particular importance is the impact of growth on schools. Eden Meadows also generated \$5,380 in local property taxes per pupil during the first four years of construction, exceeding the local school district’s districtwide per pupil spending during the same period.⁹⁸ In other words, the study found, “Eden Meadows not only paid for the students that lived in Eden Meadows, but also

‘paid’ the local expenses for approximately an additional 20 students.’⁹⁹

When the authors of the study extended their analysis to look at trends in tax rates, they found that effective millage had decreased in both Eden Meadows and another new development, North Ridgeville. In the case of Eden Meadows, new construction was responsible for 53 percent of the increase in property value in the Sugarcreek Township.¹⁰⁰ Even in more moderately priced North Ridgeville, new residential development was responsible for more than one third of the growth in property values.¹⁰¹ This is likely a result of the fact that the new homes were more highly valued than the average in the township. “New developed neighborhoods,” the OPEC study concludes, “have the propensity to possess higher property values than many existing homes, hence providing the commu-

Accounting for Development’s Costs and Benefits

Although citizens and elected officials increasingly focus on the costs of development, accounting for all the costs and benefits is difficult and problematic. Local governments commit to providing public services to their residents, and allocating expenditures based on development patterns is plagued with ambiguity and difficulty.

Education is a good example. The number of students added to the local school system is difficult to predict. If the residential development is higher income or targeted toward “empty nesters” (households with grown children), the fiscal impact on local schools is likely to be negligible. Similarly, growing communities with aging neighborhoods may find that new student growth in new neighborhoods may be offsetting declines from established neighborhoods. Thus, existing homes may contribute a substantial portion of local revenues, but require less in public services as these households become empty nesters, or homes are sold as “starter homes” to newly married couples without children. In short, public expenditures on schools are a function of the number of households with children, not the land-use pattern *per se*, making estimates of service costs linked to land development problematic. Costs for more narrowly defined infrastructure, such as sewer and water, are more clear cut.

Unfortunately, while critics of growth focus on their costs, many fail to recognize the benefits. Some of these benefits can be assessed quantitatively. Eden Meadows, the new subdivision in rapidly growing Greene County (see text), transformed a vacant field generating about \$4,000 in property taxes annually to a neighborhood generating more than \$500,000 for local governments. Similarly, as more people move into a community, consumer markets develop that enable a wider range of services and products, usually provided more cheaply, to exist.

Local elected officials and citizens should focus on the *net benefits* of new development before developing public policies that constrain growth.

nity with more property tax revenue per unit.”¹⁰²

Eden Meadows and North Ridgeville are not unique. Many communities require new development to “pay its way.” “Developers are responsible for widening roads in front of a development as well as everything within,” says Steve Mitchell, president of Mitchell Development. “The federal and state government then subsidizes any interchanges or highway expansion planned in response.”¹⁰³ Moreover, many developers install the infrastructure to city specifications and then transfer ownership of the utilities to the local community. “New developments pay for infrastructure and improvements,” says Rob Meyer of Dominion Homes, which typically do not “have the same maintenance requirements [as older areas] when turned over [to the municipality] new.”¹⁰⁴ Often, local communities require developers to pay for the installation of water, sewer, and road infrastructure (including curbs, sidewalks, and landscaping buffers), and pay tap-in fees for each unit added to the main sewer or water line. “No municipality pays for any development on our projects,” says Charlie Ruma of Virginia Homes. “The developer pays it all, gives it over to the city and pays a sewer maintenance fee as well.”¹⁰⁵

This perspective is similar to the views of many county engineers across Ohio. Jim Bower, Lucas County engineer, notes “general improvements are paid for in a new subdivision [by developers].”¹⁰⁶ A similar policy is in force in Franklin County.¹⁰⁷ Summit County provides an example of how counties negotiate with developers in the context of stormwater runoff and disposal. “Developers are assigned an allotment fee they pay for an 8-year period for stormwater concerns. These funds are pooled for the later costs which are the township’s expense.”¹⁰⁸ Often, development project approval is contingent on meeting county standards, and developers are required to secure a bond to guarantee the provision of infrastructure in the event of bankruptcy or other event that prevents the completion of the project.¹⁰⁹

D. Conclusion

While the data is sketchy and anecdotal, land development appears to be covering its direct costs. In areas where development is not covering its costs, local communities clearly have the

ability to ensure they do, as the case of Eden Meadows, North Ridgeville, and interviews with local officials demonstrate. This is not to say that subsidization does not occur. In principal, when a county decides to widen a road, or extend a sewer line adjacent to undeveloped land, property owners benefit as their land becomes more valuable. In fact, the benefit of accessible infrastructure is widely recognized as an important determinant of land development patterns.¹¹⁰ Solutions do exist to eliminate the occurrence of subsidies (some of these will be discussed later in this report), however certain communities may nonetheless feel that such activities are an important tool in attracting new development.

5. Transportation, Land Development, and Mobility

With more major cities than any other state except Texas, California, and Florida, Ohio has emerged as one of the largest transportation centers in the nation. Although it is just 35th largest geographically, Ohio claims the fifth largest Interstate highway system, the seventh largest population, and the ninth largest overall highway system.¹¹¹ In addition, Ohio has the nation's fifth highest volume of truck traffic. Ohioans log more than 100 billion miles on their vehicles each year, 63 billion in urbanized areas. Ohio also maintains more than 4,000 miles of urban highways carrying 7,147 vehicles per lane on an average day. By most accounts, these numbers are growing. With more than 8 million licensed drivers on the roads, more than two-thirds of them in metropolitan areas, traffic has surfaced as an important issue in the debate over sprawl, land development, and growth management.

Not surprisingly, congestion has become a galvanizing issue. National and regional representatives of the Sierra Club have been some of the most vocal. "Because sprawling development means that our homes, shops, and jobs are spread out," writes the Club's Cincinnati-based Midwest representative, "everyone is forced to drive further to commute and do everyday errands."¹¹² Bolstering the Sierra Club's case are studies that purport to show that building or expanding new highways encourages more automobile use, ironically, by reducing congestion on existing roadways.

Thus, elected officials seem to be caught in a catch-22 driven by land development: If they build more highways, congestion will fall and people will be encouraged to live even further away from their jobs, thus increasing the amount of traffic and congestion. These problems are made worse by the deteriorating state of Ohio's roads. The Ohio Department of Transportation (ODOT) estimates that 27.7 percent of the state's freeway system already operates at a letter grade of D or F in terms of level of service.¹¹³ "Clearly," ODOT concludes, "congestion will be growing in Ohio as traffic trends continue."¹¹⁴

Rising concerns about congestion have also prompted transportation planners in the Cincinnati, Cleveland, and Columbus metropolitan areas to propose dramatic expansions of their mass-transit systems. These plans vary in their degree of comprehensiveness, but most, if not all, involve two

major components:

- A major restructuring of how public transit agencies provide their services, usually moving to a more decentralizing, suburban hub system for buses;
- Major investments in a traditional hub-and-spoke rail system, where the downtown serves as a collector for commuters coming in from the suburbs.

Smaller transit agencies have also moved toward major restructuring of their services. The Miami Valley Regional Transit Authority, for example, embarked on an innovative suburban-hub concept several years ago. ODOT has also identified transit as a key component of managing Ohio's congested roadways. While acknowledging transit alone will not eliminate congestion, "transit can be very important" on key urban corridors.¹¹⁵

Unfortunately, little systematic analysis of public transit's role in solving congestion problems, or the importance of expanding existing highway capacity, has been done. While regional planning agencies have developed long-range transportation plans, almost all of the solutions revolve around expanding transit systems even as they claim they will have little impact on rising congestion. The key question, then, is whether Ohio's traffic problems warrant a major refocusing of transportation.

A. Ohio's Road Capacity

Ohio maintains a network of 116,218 miles of roads, linking rural hamlets and farms to major urban areas.¹¹⁶ Only about 1 percent of the total mileage, however, consists of Interstate highways (maintained by ODOT). Combined with state routes and roads, ODOT maintains and controls 16.8 percent of the state's road network (Table 9). Townships maintain more than one-third of the state's road network. ODOT spends more than \$1 billion each year building, expanding, and maintaining the state's network of highways.¹¹⁷

Although townships maintain the largest proportion of roads, most highway traffic occurs in urban areas. Thus, individual cities and their surrounding environments maintain substantial road systems. Cleveland and Cincinnati host more than 5,000 miles of roadway, and Columbus includes almost 3,500 miles. The most "well served" metropolitan area appears to be the smaller urbanized

Table 9: Ohio's Road Network

State highways and freeways	19,542.5 miles
County highways and roads	29,199.4 miles
Township roads	40,460.9 miles
City roads	24,484.9 miles
Other (e.g., parks)	2,511.2 miles
Total	116,218.8
Source: Ohio Department of Transportation Fact Book, Ohio Department of Transportation, Columbus, Ohio, Table 8.1, p. 64	

area Canton, which maintains 6.2 miles of roads for each citizen (Table 10). Cleveland has one of the least well-developed road systems when judged according to the amount of roads per capita.

More importantly, Ohio's urban road network carries substantial volumes of traffic. Cleveland, not surprisingly, logs the largest volume, generating almost 40 million miles of travel, or vehicle miles traveled (VMT), on a

daily basis (Table 11).¹¹⁸ Cincinnati is close behind, generating about 33 million miles of daily traffic, followed by Columbus (24 million daily VMT), Dayton (16 million VMT), Akron (13 million VMT), and Toledo (12 million VMT).

Freeways are burdened with carrying the largest share of traffic, and, as such, become the primary means for mobility in Ohio's metropolitan areas. Almost half of the daily traffic generated in the Columbus urban area is carried on its freeway system despite the fact that freeways only account for 4.4 percent of Columbus' total road system (Table 11). The burden is even greater in Cincinnati, where 47.6 percent of the urban area's traffic is funneled onto just 3.2 percent of the total road system. Only Youngstown

Table 10: Traffic Volumes in Major Ohio Urbanized Areas: 1999

	Total Roadway Miles	Miles of Roadway Per Person
Cleveland	5,525	3.1
Cincinnati	5,362	4.5
Columbus	3,418	3.7
Dayton	3,095	5.1
Akron	2,628	5.0
Toledo	2,118	4.3
Youngstown-Warren	1,820	4.8
Canton	1,540	6.2
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Highway Policy Administration, Highway Statistics 1999.		

and Canton carry less than one-third of their daily traffic volume on freeways. Thus, one very important element of Ohio’s congestion problem revolves around the concentration of traffic—most traffic is funneled into a very small portion of a large, complex network.

Table 11: Traffic Volumes in Major Ohio Urbanized Areas: 1999

	Total Daily Travel (VMT)	Freeway Share of Total Roads	Share Served by Freeways	Daily Miles Traveled per Freeway Lane
Cleveland	38,631,000	4.1	44.7%	13,723
Cincinnati	32,742,000	3.2	47.6	16,201
Columbus	24,297,000	4.4	48.2	14,185
Dayton	16,226,000	3.0	35.3	12,254
Akron	13,055,000	3.2	40.2	12,417
Toledo	11,721,000	3.3	32.5	11,931
Youngstown-Warren	7,294,000	2.5	21.5	8,101
Canton	5,085,000	2.1	26.7	10,051
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Highway Policy Administration, Highway Statistics 1999.				

This has important implications for congestion and road maintenance. Despite traffic volumes, on an average daily basis, the local freeway systems are not overloaded. The rule of thumb is that a freeway lane can carry about 20,000 VMT each day before it reaches capacity or “heavy congestion.” On average, all of Ohio’s major metropolitan areas fall well below this threshold when traffic volume is tracked throughout the entire day. The only urban area that comes close is Cincinnati, where average daily volume is three quarters of the maximum.

In fact, most urbanized areas are well below the maximum capacity threshold when traffic volume is calculated by daily traffic per freeway lane. The only metropolitan area on the national level exceeding the maximum is Los Angeles, where average daily VMT per freeway lane is 22,000.¹¹⁹ Interestingly, the Los Angeles metropolitan area has among the nation’s least developed freeway systems relative to its size: their freeway lanes per capita are the lowest of any other metropolitan area, including New York-Northern New Jersey.¹²⁰

Nevertheless, congestion has become a major political issue, and the sources of public discontent are important for policy makers to address. Even though Ohio's major highways and interstates are not congested on average, rising commute times and an increasing number of bottlenecks at intersections and interchanges create real costs if mobility is an important goal of Ohio's transportation and development policy. In fact, these costs can easily range into the billions of dollars. For policy makers, the key issue is what solutions are most appropriate and cost effective given long-term development trends in Ohio. More importantly, perhaps, the key to Ohio transportation policy is to frame concerns within the context of the relevant data on traffic volumes presented in this section: Ohio's freeways are congested at specific times of the day when highway traffic exceeds capacity. The issue is not necessarily expanding highway capacity, but rather using underutilized highway times more efficiently and adopting public policies that encourage shifts in travel behavior to non-peak driving times.

B. Congestion, Highways, and Sprawl

Congestion has emerged as one of the most salient concerns about sprawl. Unfortunately, little data has been collected consistently to track trends in congestion among the nation's cities. More than a decade ago, however, the Texas Transportation Institute (TTI) at Texas A&M University began a study of traffic trends and congestion in 68 of the nation's metropolitan areas. While the data are regional and not specific to individual cities, and the sample is relatively small, TTI's study is the most comprehensive and consistent effort underway grappling with these issues.

TTI's analysis indicates that the costs of traffic congestion can be staggering. TTI found congestion rising in every metropolitan area it studied between 1982 and 1999, and concluded the lost productivity from being "stuck" in traffic amounts to more than \$78 billion per year (Table 12).¹²¹ While all metropolitan areas in Ohio were not covered, TTI estimates imply that the combined costs to travelers, commuters, and businesses in Cincinnati, Columbus, and Cleveland reach almost \$2 billion each year. Almost half of Cincinnati's daily travel occurred under congested conditions, generating economic costs in excess of \$700 million.¹²²

More importantly, congestion is rising. TTI measures congestion by examining the relationship

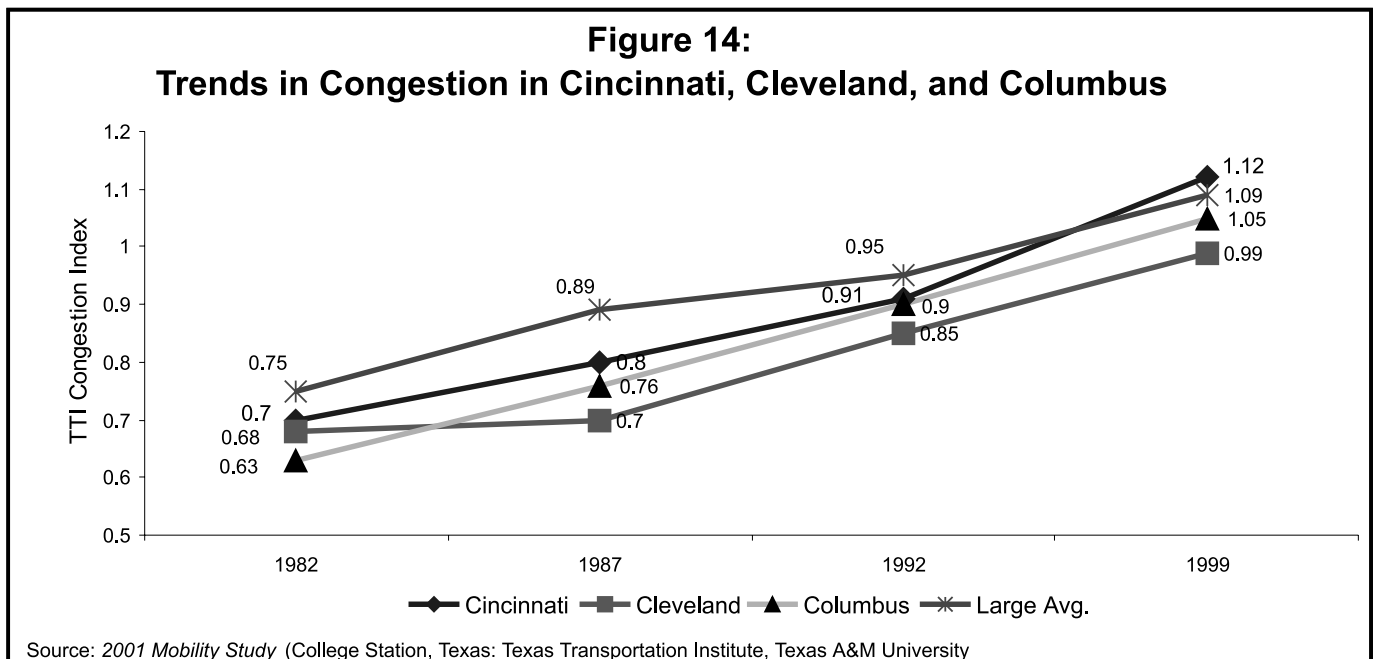
Table 12: Annual Cost of Congestion: 1999

	Person Hours Delay	Cost Per Person	Total Cost
Cincinnati	32	\$575	\$735 million
Columbus	29	\$500	\$515 million
Cleveland	20	\$350	\$655 million
Total TTI Cities	36	\$625	\$77,775 million
Total Large Cities	34	\$590	\$29,028 million

Source: Texas Transportation Institute, Texas A&M University, 2000.

between traffic volume and service levels of the road network. An index number of one suggests traffic volumes match the capacity of local roads to handle them. If the index is less than one, highway and road capacities exceed existing traffic levels—roads

are uncongested and freely flowing almost the entire day. If traffic volumes exceed the road network's capacity, the index exceeds one, and the urban area experiences periods of very congested travel. The TTI data show that traffic volume in Cincinnati, Cleveland, and Columbus were well below congested levels in 1982 (Figure 14). Ten years later, traffic volumes matched road capacity in Columbus and Cincinnati. By 1999, Cleveland had reached capacity while Cincinnati and Columbus exceeded existing service levels. Only Cincinnati, however, experienced congestion increases that exceeded the average for the other large cities in the TTI study.



Despite these costs, which are rising, congestion is still lower in major Ohio metropolitan areas compared to their peers. On average, commuters spent 36 hours in congestion each year, amounting to an average of \$625 per person each year for the 68 cities in TTI’s study. In other words, eliminating congestion would give a family of four the equivalent of \$2,500 per year in free time, increased productivity, and lower out-of-pocket costs for items such as gasoline and vehicle maintenance. Among the large cities—the classification that included Cincinnati, Cleveland, and Columbus—the average commuter spent 34 hours, equivalent to almost \$600 per person, on congested freeways. These average costs are significantly lower than in other cities in the study. TTI estimated that the average Cleveland commuter spent just 20 hours in congested traffic on average, about 58 percent of the time (and estimated cost) spent by the commuter in the average large city.

These results seem consistent with data on traffic volume on major freeways collected by the federal and Ohio departments of transportation. A limited access freeway such as I-75 or I-71 could accommodate 15,000 vehicles per day at an average speed of 60 miles per hour (Table 13). The freeway would experience “moderate” congestion once volume exceeded 17,500 vehicles per day, slowing speeds down to an average of 45 miles per hour. “Heavy” congestion kicks in at 20,000 vehicles per day, slowing traffic to under 40 miles per hour. None of Ohio’s major cities reach the

“heavy congestion” peak on an average day.

When compared to other cities in the TTI study, Cincinnati, Cleveland, and Columbus fare relatively well. Daily traffic has growing

Table 13: Texas Transportation Institute Traffic Volume Maximums for Congestion Ratings

	Daily traffic volume		Average (speed mph)	
	Freeway	Local/Arterial	Freeway	Local/Arterial
Free-flow	15,000	5,500	60	35
Moderate congestion	17,500	7,000	45	30
Heavy congestion	20,000	8,500	38	27
Severe congestion	25,000	10,000	35	23
Extreme congestion	>25,000	>10,000	32	21

Source: 2001 Urban Mobility Study (College Station, Texas: Texas Transportation Institute, Texas A&M University), Appendix B, Methodology for 2001 Annual Report, n.p

the most quickly in Cincinnati, averaging 3.1 percent each year on average, faster than Cleveland and Columbus as well as many other cities in the study (Table 14). This helps explain why Cincinnati’s traffic congestion increased faster than any other Ohio city, and ranked eighth overall in the

Table 14: Traffic Volume on Freeways and Arterials (Texas Transportation Institute)

	Daily Vehicle Miles Traveled		Per Lane Mile
	Freeway Lane (000)	Arterial Street (000)	Annual Growth Rate (%)
Cincinnati	15,980	5,190	3.1
Columbus	14,355	6,735	2.4
Cleveland	13,745	5,640	2.1
Average TTI Cities	14,210	6,160	2.5
Average Large Cities	15,000	6,130	2.9
Source: Texas Transportation Institute, Texas A&M University, 2000.			

TTI study. This traffic growth helped push the average daily traffic volume in Cincinnati above the “free flow” maximum of 15,000 vehicles per day, but well short of the heavy congestion threshold. On average, other Ohio cities are well below the maximum thresholds for congestion.

Average daily traffic volume, however, says little about peak-hour congestion. Many commuters are faced with long, uncertain delays in slow moving or even stopped traffic in all of Ohio’s major cities. Nevertheless, the data suggest that Ohio’s congestion is less related to overall highway capacity than managing the existing flow of traffic at peak times.

Some analysts have blamed freeways and beltways for creating congestion. In fact, the ongoing shift into low-density suburban areas has relieved congestion for most people, and even commuters. A recent survey of academic research by researchers for the Transportation Research Board found 42 costs and benefits associated with sprawl. “Sprawl has improved travel by spreading out origins and destinations and utilizing the capacity of suburban roads and highways,” the authors wrote.¹²³ “The shift to suburban destinations has relieved traffic on the routes to the city center.” In fact, this conclusion was one of just six consensus issues researchers found in a survey on urban sprawl published by the Transportation Research Board.

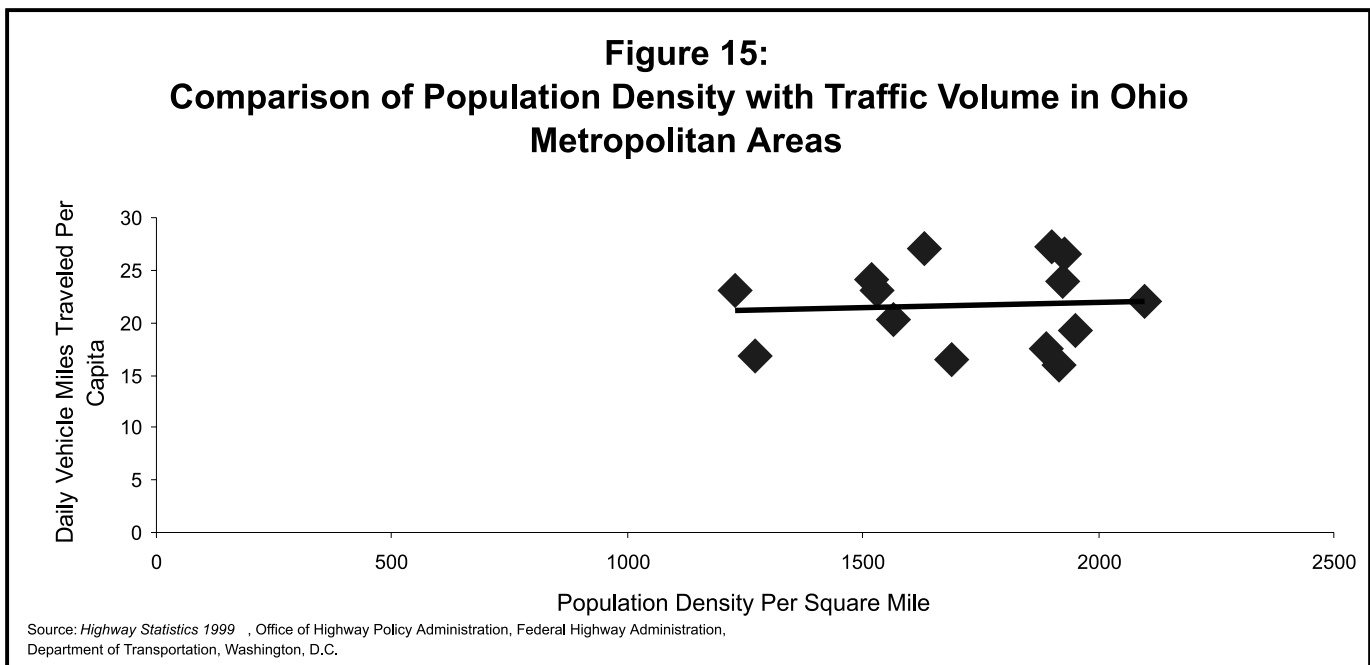
Beltways, however, might have a different impact. Many have argued that building beltways

has encouraged development further out on the urban fringe, creating new demand for travel and automobile use. In addition, some have argued that by expanding highway capacity and, ironically, reducing congestion, more people are encouraged to use cars (induced traffic) rather than public transit.

Table 15: Impact of Alternative Scenarios on Traffic Congestion in Charlotte

	Base Year	7 -yr Trend	Growth Boundary	No Expansion
Growth of Urbanized Area	299 sq. mi.	+25.6%	+5%	+25.6%
Population Growth	572,000	+28.3%	+28.3%	+28.3%
Employment	797,000	+19.2%	+19.2%	+19.2%
Total VMT	16,580	+50.4%	+43.7%	+50.4%
Traffic Density*	6,598	+25.8%	+34.7%	+24.0%
Freeway Density**	14,459	-11.0%	-12.6%	-13.1%
Interstate Density***	104,564	+24.8%	+27.9%	+24.8%
*: VMT per mile **VMT per freeway lane ***VMT per Interstate mile				
Source: David T. Hartgen, Beltways, Traffic and Sprawl: The Empirical Evidence, 1990- 1997 (Charlotte, NC: Center for Transportation Studies, University of North Carolina at Charlotte, September 2000)pp. 20-21.				

To test this theory, David Hartgen at the University of North Carolina-Charlotte analyzed



beltway construction and traffic volumes in 66 urban areas, including several in Ohio. Hartgen could not find a “clear relationship between beltway availability and traffic growth.”¹²⁴ Shifts in employment were far more important. For example, a 30 percent increase in employment translated into a 17.3 percent increase in traffic density (or congestion). In contrast, increasing road mileage by 30 percent resulted in a 23 percent decrease in traffic density (since larger networks allow traffic to spread out over more miles).¹²⁵ More importantly, Hartgen’s analysis found that increases in population density could increase traffic density, or congestion.¹²⁶ In fact, the relationship was almost one-to-one: If population densities increased by 10 percent, freeway traffic density also increased by 10 percent. Adding beltways could induce a higher level of traffic, as critics of highway construction suggest, but the impact was modest. A 10 percent increase in beltway completion led to just a 1 percent increase in freeway traffic density after seven years.¹²⁷ In short, congestion relief depended more on increasing road capacity and the distribution of employment than redirecting residential growth.

Hartgen then estimated the impacts of population and employment growth on traffic volume and density under different growth-management scenarios (Table 15). The 7-year trend assumed nothing changed, and population continued to grow at the same pattern along a constant growth path. The second scenario assumed the Charlotte area would impose a growth boundary that limited its geographic expansion to just 5 percent over seven years. The third scenario assumed current growth trends, but also assumed the highway system would not be expanded to accommodate new traffic growth.

While the growth boundary led to a smaller increase in total traffic volume, it significantly increased traffic density. In other words, there was more traffic per mile of roadway. This occurred primarily because more cars were concentrated on a smaller amount of land, increasing the number of vehicles per square mile. Thus, while the volume of traffic per freeway lane is lower, the density (cars per road mile) on Interstate highways is higher. Adopting policies that dramatically restricted new suburban development or prevented new beltway construction would not slow the growth in traffic volume or congestion. Hartgen’s results are consistent with TTI’s study. Congestion grew more slowly in cities that expanded their highway and road capacity to match growing demand. “In areas where the

rate of roadway additions were approximately equal to travel growth,” they wrote, “travel time grew at about one-fourth to one-third as fast as areas where traffic volume grew much faster than roads were added.”¹²⁸

Hartgen’s results are also consistent with another conclusion from the TTI study: Increasing regional densities apparently has no impact on overall traffic volumes. In fact, an examination of 14 Ohio metropolitan areas found no statistical evidence that higher population densities are associated with more or less traffic volume

Table 16: Transportation Mode Share for Major Ohio Cities: 1990

	Drive Alone	Walk Telecommute	Public Transit	Transit Share
Akron	72,281	1,833	2,982	3.3%
Canton	25,197	1,816	778	2.4%
Cincinnati	105,011	12,306	17,445	11.2%
Cleveland	115,131	11,061	24,998	14.1%
Columbus	244,066	19,113	14,912	4.7%
Dayton	50,677	4,739	5,178	7.3%
Springfield	21,637	1,958	319	1.1%
Toledo	112,322	5,798	4,180	3.0%
Youngstown-Warren	23,312	1,280	758	2.6%
Ohio	3,889,043	275,318	122,014	2.5%
Source: U.S. Bureau of the Census, http://www.census.gov .				

(Figure 15).

TTI, however, warns that expanding road capacity will not solve congestion problems. Most urban areas have the space and financial where-with-all to fund the expansions, however, it is often politically difficult to do so. The TTI report notes that only half of the road capacity needed to fully mitigate rising congestion was added between 1982 and 1999. Transit, the study suggests, may be part of the solution to mounting congestion, less as a result of its effectiveness than due to its political expediency.

C. The Role for Transit

At first glance, the rising costs of congestion appear to provide an important opportunity for mass transit, whether publicly or privately provided. As congestion on freeways rises, so does the demand for practical alternatives to sitting in traffic. In fact, Hartgen's analysis of traffic volume in urban areas suggests the need for a growing role for transit.¹²⁹

State level 2000 Census data on commuting behavior, unfortunately, had not been released when this study went to press. Nevertheless, data from the 1990 census combined with recent ridership information from the Federal Transit Database provide a glimpse at public transit's role. In 1990, less than 3 percent of all commuters in Ohio used public transit (Table 16). Indeed, statewide more than twice as many people walked or telecommuted to their jobs than used public transit. While public transit is more heavily used in large cities, telecommuting and walking are still more popular ways to commute to work. More people walked or telecommuted from their homes than used public transit in Columbus, where local transit authorities comprise just 4.7 percent market share. Most other major cities show similar overall trends.

Commuting behavior in Cleveland and Cincinnati differs from the rest of the state. Cleveland residents report the highest transit use (14.1 percent), more than double the amount that work out of their home or walk. These cities also have higher population densities and more mixed land uses which serve to make transit more viable. Moreover, while transit use is high in central cities, its share of commuting trips is still very small on a regional basis. Even if public transit would double its market share, it would make little impact on the dominance of the automobile as the principal means of transportation.

Some, of course, have argued that citywide and regionwide estimates are inaccurate indicators of transit's potential to carry significant numbers of riders. Instead of focusing on total market share, analysts attempt to identify "transit competitive" corridors. These are routes where people live and work within reasonable commuting distance from a transit stop. In other words, walking five miles to a transit stop is unreasonable, and in this scenario transit should not be considered a viable alternative. The rule of thumb in transportation research is that transit has its maximum impact when people live

Table 17: Transit Ridership Trends for Major Ohio Cities

		Average Weekday Trips		Change	%
		1996	1999		
Cincinnati*		86,500	93,279	6779	7.8%
Cleveland					
	Bus	155,571	187,192	31,621	20.3%
	Heavy Rail	28,052	21,683	6,369	-22.7%
	Light Rail	16,947	15,395	-1552	-9.2%
Columbus*		59,993	62,410	2,417	4.0%
Dayton*					
	Bus	38,514	37,999	-515	-1.3%
	Trolley Bus	11,202	9,225	-1,977	-17.6%
Toledo		16,292	16,311	19	0.1 %
*Data available through 1998 only. Source: Unlinked trips only. National Transit Database, http://www.ntdprogram.com .					

and work within a quarter mile (one fifth of a square mile or about 125 acres) of a transit stop.¹³⁰

D. Conclusion

“Ohio cannot build its way out of congestion,” says ODOT. “The cost and environmental impacts, such as neighborhood disruption, are too great.”¹³¹ To some degree, this is true, but not for the reasons many might

think. In fact, doing the opposite—investment in transit at the expense of expanding highway capacity—could make congestion worse.

Spreading Out

Hartgen’s analysis provides additional insight into possible solutions. Since population density is a key factor in determining traffic density (and hence rising congestion), cities can mitigate these effects by spreading out. “If an urbanized area is projected to experience a 20 percent increase in employment over the next decade,” he writes, “it could also expect to increase its Interstate traffic density by about 16.4 percent. But if the region also increases in size by 25 percent, the increased traffic density would be less, 12.7 percent. So, increasing the area of a region actually mitigates the effect of the employment increase on Interstate traffic.”¹³² Hartgen’s research provides a powerful insight into the relationship between transportation policy and urban form.

Increasing employment and increasing geographic size work in opposite directions: increasing employment increases traffic, while the increasing size of the region actually

decreases traffic density. The combined effect is generally increasing Interstate traffic density, even as cities grow. The casual citizen, of course, sees the overall effect in the form of increased traffic at specific locations, but does not see that traffic would have been even worse if that growth were constrained to a smaller geography... Instead, he is drawn to the false impression that the development (sprawl) created the localized traffic.¹³³

End of an Era

In addition, Ohio's traffic congestion problems may be mitigated by other factors. From 1970 to 1990, average daily traffic volume increased by 27.7 percent per year as the baby-boom generation matured, created new households, and moved to the suburbs.¹³⁴ During the 1990s, traffic growth slowed to just 2 percent per year. Similarly, the number of licensed drivers increased by 10.4 percent on average between 1970 and 1990, but just 1.4 percent between 1990 to 1997.¹³⁵

Building Out

In the long run, solutions to congestion problems will come from three sources. The first is somewhat obvious: build more roads and freeways. TTI, while not disparaging a role for transit, was explicit: Expanding roadway capacity at a rate equivalent to traffic growth slowed congestion growth by one-fourth to one-third. New highways, funded through boothless electronic tolling technology, could divert significant amounts of interstate truck and automobile traffic. One option would be to build new parkways in rural areas using Transportation Improvement Districts to sell bonds to build the highways. In Cincinnati, for example, a self-financing highway could start north of Dayton, cross I-70, and shoot south through rural parts of Preble, Butler, and Hamilton Counties, intersecting I-275 to route traffic around the downtown.

Congestion Pricing

Most Ohio metropolitan areas have plenty of total highway capacity; they suffer from a shortage of highway capacity *at specific times of the day*—rush hour. Currently, delays and frustration are the primary ways drivers bear the costs of congestion, but a more efficient and effective solution exists

through “congestion pricing.” With this alternative, one or two freeway lanes are reserved for those willing to pay a toll (assessed electronically at highway speeds) that changes with the level of congestion. The toll regulates traffic, giving drivers the choice of opting for a less congested lane of traffic by paying the toll. Several states are experimenting with this concept (also called HOT lanes) which is used by drivers of all income groups.

Suburbanization

The third source of congestion relief will be continued suburbanization. Contrary to the rhetoric of pro-transit advocates, the research on land-use and transportation patterns shows that moving to less dense areas reduces congestion for most people. In fact, this conclusion was one of just six consensus issues researchers found in a survey on urban sprawl published by the Transportation Research Board. “Sprawl has improved travel by spreading out origins and destinations and utilizing the capacity of suburban roads and highways,” the authors noted.

Ultimately, congestion will lessen when policy makers focus directly on its primary source: managing the volume of traffic. While an important source of mobility for thousands, transit’s potential for moderating congestion for everyone except a very small minority of travelers is limited. Instead, policy makers will need to focus on designing transportation alternatives that accommodate people’s commuting preferences. Moreover, they must weigh the relative costs of alternatives to ensure they get the most effective results for each dollar spent.

6. Urbanization and the Environment

“Open space” has emerged as a driving force behind growth-management efforts in Ohio and across the nation. Support for urban growth boundaries, for example, is often driven by a desire to protect rural land and vistas from encroaching urban development. In Ohio, farmland fragmentation has emerged as key issue since it has the potential to effect productivity. Many view farmland fragmentation as an unintended consequence of suburban development, requiring strong land-use planning and development controls to reduce its impact. Thus, rural communities (or areas experiencing significant growth pressure) enact either growth boundaries or minimum lot sizes of 5 acres or more to protect the rural character of land. Open space concerns are compounded by air-quality issues, which many believe are directly related to urbanization and automobile use in Ohio’s metropolitan areas. Taking a step back from the heated arguments and allowing for a broader perspective on environmental quality may allow for a fresh perspective on potential solutions to environmental problems.

A. Environmental Benefits of Suburban Development

Ohio’s cities and metropolitan areas have been decentralizing in a pattern similar to other cities in the United States as Section 2 pointed out. Most housing development occurs in communities and subdivisions with much lower densities than their predecessors. Importantly, ongoing migration to low-density suburban locations, and away from high density urban areas, reflects an environmental choice. While some migration is due to a large gap in the quality of public services—schools, traffic, fire and police protection—a desire for larger homes and yards also drives the decision of many households to move away from the core city. Many believe that low-density cities and suburbs accommodate their housing preferences more effectively, offering more environmental amenities than other neighborhoods.¹³⁶ Rather than walking to a park, neighbors use expansive yards to host social events, pickup football games, or simply enjoy outdoor activities. Most American families and households aspire to owning their own home with a yard that buffers them from their

neighbors with open space.

The preference for a home with a yard is well established in survey research. When the National Association of Homebuilders surveyed American households in 1999, more than three quarters said they would rather live in a home with its own yard than in a townhouse or condominium. More broadly, communities routinely reject housing developments because they are too dense, rather than not dense enough. But, most importantly, consumers register this choice everyday in the housing market.

A 1995 survey of household moves in the Columbus metropolitan area found homeowners moved from their previous neighborhood for several reasons: 1) improve their immediate neighborhood, 2) improve personal safety, 3) increase the resale value of their home, 4) live near better quality and safer schools, 5) buy a larger home, 6) buy a newer home, and 7) avoid the high levels of traffic congestion in their old neighborhood.¹³⁷ In short, families believed they could improve their quality of life by moving to a new urban environment. According to Greg Delosier of the New Jersey Association of Realtors, the exact amount by which a home's value increases with proximity to open space varies by community. But several studies have shown that, in general, homes located adjacent to trails, parks, and even golf courses sell more quickly, are assessed at higher values, and are more likely to increase in value than homes not near open spaces.¹³⁸

Portland, Oregon provides an important example of how open space impacts property values. The Portland region, following a statewide growth-management law, adopted a regional growth boundary to prevent the further development of farmland on the urban fringe in 1979. The growth boundary has been largely successful at containing development inside the boundary, although the consequence has been less open space inside the boundary.¹³⁹ As a result, lot sizes declined by more than 25 percent during the 1990s as land became increasingly expensive and densities increased.¹⁴⁰ Currently, the region's planning agency has established a maximum lot size of 8,500 square feet (less than one-fifth of an acre).

Portland's experiment with the growth boundary provides a unique environment for assessing the importance of different housing characteristics on property values. Reed College economist

Noelwah Netusil and her colleagues investigated how proximity to open space impacted 16,402 homes in the Portland metropolitan area in the early 1990s and found that the closer a home was located to a public park or golf course, the higher the house value. In fact, the impact on home values being near open space ranged from 3 percent to 6 percent of the total value of the home.¹⁴¹ More interestingly, perhaps, the study found that a home's lot size had a significant impact on property values as well.¹⁴² The analysis suggests that each additional square foot is equivalent to adding \$0.21 to the price of a house.¹⁴³ Thus, adding a quarter-acre of land to a private lot would add about \$2,287 in 1990 dollars. In 2000, after adjusting for inflation, adding a quarter acre would be equivalent to \$3,065.¹⁴⁴ These results may underestimate the true value of private open space. The growth boundary did not become binding until the 1990s, and the housing values do not reflect the dramatic drop in average lot sizes during the latter half of the decade. Now, with a cap on lot sizes, the value of additional land for a lot is likely much higher.

A 1990 study on the effects of clustered housing—where private lot sizes are reduced to allow for larger areas of community-maintained open space in new developments—“found that clustered housing with open space appreciated at a higher rate than conventionally-designed subdivisions.”¹⁴⁵

According to Bob Cooper, Director of the San Diego County Department of Parks and Recreation, “One developer in San Diego County found he could increase the sale price of his houses by 25 percent by scaling back his development 15 percent and adding natural open space corridors visible from every home.”¹⁴⁶ Chris Monson, a developer from rapidly-expanding Arizona agrees:

People will pay a premium for an environmentally well-thought-out community. Sometimes less is more, so we increased densities, clustered housing, and preserved open space. We think this makes our development look attractive. It also makes the units easier to sell.¹⁴⁷

Similarly, Richard Harrison, an urban designer based in Minneapolis, has developed the concept of coving which maximizes the scenic character of suburban communities by using lengthy and creative set backs and meandering roads to create more visual open space.¹⁴⁸ Developers in Ohio are

no strangers to these market signals.¹⁴⁹ Accordingly, many developers make people who purchase homes adjacent to open space pay a premium. “Anything that adds a little bit of distinction increases value,” says Ben Corcoran of the Columbus-based Appraisal Group.¹⁵⁰ One developer of affordable homes in central Ohio observes that lot prices can increase by \$1,000 to \$5,000 if they are next to open space or woods.¹⁵¹ Similarly, apartments facing water or woods will rent for 10 percent to 15 percent more than apartments with less aesthetically pleasing views.¹⁵²

Thus, real-estate markets clearly do value open space. Ohio State University economist Elena Irwin explains that “Whether it’s because of the lack of congestion or the scenic views, surrounding open space increases the value of a parcel as a residential location, all else equal.”¹⁵³

B. Suburbanization and Air Quality

Air quality is another concern motivating growth-management policy on the state and regional

level. Given Ohioans’ preference for personal mobility, and the fact automobiles are propelled by burning gasoline, many people presume that automobiles are the primary contributor to the deterioration in air quality. Ironically, just as Ohioans have become concerned about land-use trends and air quality, virtually all long-

Table 18: Air Quality Trends in Ohio Metropolitan Areas: 1988-1997

	Carbon Monoxide	Lead	Nitrogen Dioxide	Ozone	Particulate Matter	Sulfur Dioxide
Akron	-30%	-43%	**	-31%	-29%	-20%
Canton	**	**	**	-38	-24	-36
Cincinnati	-29	-67	0	-18	-28	-27
Cleveland	-39	-77	-13	-18	-19	-45
Columbus	-60	-50	**	-27	-10	-50
Dayton	-25	-50	**	-18	-25	-17
Hamilton	**	**	**	-18	0	-30
Lima	**	**	**	-11	**	-50
Toledo	**	-22	**	-27	-39	-56
Youngstown	**	**	**	-27	-30	-43
United States	-38%	-67%	-14%	-19%	-26%	-39%
Source: U.S. Environmental Protection Agency, National Air Quality and Emissions Trends Report, 1997, reported in David W. Riggs and Daniel Simmons, Urban Growth: Volume 1: Air Quality, Automobiles, and Suburban Development (Washington, D.C.: Competitive Enterprise Institute, 2000), p. 71.						

term data suggest air quality is improving.

On a national level, air quality has been improving steadily since the 1970s. Since 1978, carbon monoxide concentrations have declined by 60 percent, lead by 97 percent, and ground level ozone by 30 percent.¹⁵⁴ These declines occurred at the same time vehicle miles traveled increased by 125 percent at the national level, and, as previous sections indicated, congestion was increasing in almost all of the nation's metropolitan areas.

Ohio's metropolitan areas experienced similar improvement in air quality. Most major categories of air pollutants declined in every metropolitan area. Carbon monoxide has fallen by 25 percent or more in every major metropolitan area since 1988 (Table 18). Sulfur dioxide has fallen by 50 percent or more in Columbus, Lima, and Toledo. In some cases, air-quality improvements from 1988 to 1997 exceeded national averages:

- *Cleveland* and *Columbus* exceeded rates of decline in carbon monoxide;
- *Cleveland* exceeded the national decline in lead;
- *Akron, Canton, Columbus, Toledo,* and *Youngstown* experienced reductions in ozone faster than the nation;
- *Akron, Cincinnati, Toledo,* and *Youngstown* experienced declines in general particulate matter that exceeded national trends; and
- *Cleveland, Columbus, Lima, Toledo,* and *Youngstown* exceeded national rates of decline in sulfur dioxide

Widespread improvements in air quality are attributed to a number of factors:

- The economic shift to cleaner manufacturing processes;
- A 98 percent reduction in pollution from the average new car by 1998;
- Suburbanization which increased commute speeds and reduced congestion through less stop-and-go traffic;
- Greater environmental protection through public policy, citizen action, and general consumer preferences for a cleaner environment.

Ohio's legacy of urban and built up land has not compromised its ability to improve air quality.

Some researchers have found that, on average, metropolitan areas with higher population densities have longer and more severe air quality problems.¹⁵⁵ When examined in more detail, however, no relationship appears to exist between population density and major sources of air pollution on a regional level.¹⁵⁶ Thus, the “more driving-more smog” thesis fails to hold up under empirical analysis.

C. Conclusion

Despite rapid land development and suburbanization during the latter half of the 20th Century, most environmental indicators suggest Ohio’s air and water quality are improving, not deteriorating. Ohio still maintains substantial amounts of open space, particularly in rural areas, and real-estate markets are increasingly adapting to consumer preferences for higher quality environmental amenities. In fact, research has shown that open space (including a yard) is an important source of value for homes. Moreover, air quality has been improving in Ohio’s metropolitan areas despite several decades of rapid suburbanization and rising automobile use. Thus, land development and urbanization is not necessarily a threat to the environment or the quality of life of most Ohio residents. This does not necessarily imply that public policy should adopt a laissez-faire approach to land development. As the next section points out, several policy reforms could help empower real-estate markets to meet the environmental goals and desires of Ohio residents.

7. Ohio, Smart Growth, and the Pursuit of Quality Growth

Sprawl, smart growth and regional planning have all become policy buzzwords at the federal, state, and local levels. Despite the term's pervasiveness, however, "Smart Growth" has little substantive meaning.¹⁵⁷ For those most interested in preserving open space, Smart Growth can simply mean anything that prevents the further development of vacant land. For those interested in housing, the term may mean increasing housing opportunities and diversifying housing choice. For others interested in promoting transit, Smart Growth may mean increasing public-transit options, irrespective of costs.

Moreover, Smart Growth proposals are not always embraced by policy makers or the general public. Well-publicized initiatives in Colorado and Arizona, for example, were defeated by significant margins at the ballot box in November 2000.¹⁵⁸ The initiative which ought to give policy makers the greatest pause came out of Oregon, a state that many consider to be a leader in growth-control legislation. There, voters passed a ballot initiative that requires "the state or local government to pay property owners if their land lost value from growth boundaries or other land use actions."¹⁵⁹ Such a measure has the potential to drain the Oregon state budget of billions of dollars per year.¹⁶⁰

Nevertheless, "Smart Growth" has emerged as the label used most often to characterize growth-management policies aimed at restraining land development on the local and state level. While a consensus definition of Smart Growth does not exist, most plans adopt a more prescriptive rather than evolutionary view of cities and urban development. Rather than letting consumers decide where they want to live, most Smart Growth plans implicitly accept a mid- and early-twentieth century view of cities that is:

- Compact and relatively high density;
- Mixed use; and
- Less reliant on the automobile.

Most Smart Growth proposals also significantly increase the role of public participation in the planning process and political control over land use, irrespective of its potential costs.

The Sprawl Index and Quality of Life

Unfortunately, too often sprawl is presented as “yes/no” proposition—a community can either permit it, or not. For example, critics of sprawl often point out that Ohio has developed land at four times its rate of population growth. This statistic has little meaning, although the implication is that somehow population growth and land development should be linked. Yet, this standard is unworkable and problematic. Holding to this standard at the end of World War II would have put Ohio cities and metropolitan areas at a stunning disadvantage economically and in terms of quality of life.

For example, suppose that eight families live in a four-floor apartment building, with each family occupying half of a floor, in the hypothetical Sierra City.¹⁶⁴ The apartment building sits on a 5,100 square foot lot, translating into a “net” population density of about 174,923 per square mile.¹⁶⁵ As their incomes increase, these families naturally look for better housing, and part of their decision involves moving into a less dense living environment.

Now, they choose (because they can’t afford a separate, detached house with a yard) to move to a new townhouse developed on the next block. The developer has just built eight units, and, for simplicity, all the families move in at once. The new townhouses are the same size as the old units (about 1,500 square feet of living space) although each one has its own yard (750 square feet). The townhouse development would require building out, rather than up, thus consuming more land. In this example, the eight new townhouses (with private yard) plus the apartment building now consume 22,950 square feet. Because this is a growing city, each family is replaced by a new family lower on the economic scale. While they can only afford an apartment (which is also cheaper now because the building has depreciated), they are interested in improving their housing soon, too. So, now the combined population of Sierra City (apartment plus townhouses) is 64 people. The population has doubled, but land development has expanded by four times the rate of population growth.¹⁶⁶ Population density has plummeted 55 percent in Sierra City to 77,744 people per square mile (which is still higher than Manhattan’s population density).

So, here is the scenario. By moving from an apartment to a townhouse, housing new families required quadrupling the amount of land developed, resulting in a 55 percent reduction in density. The families in the new townhouses are clearly better off, but this result violates the implied Smart Growth standard that land development should somehow track with population growth in percentage terms. In other words, densities should remain at 177,000 people per square mile.

This exercise is not strictly hypothetical. In fact, this process occurred throughout the first half of the twentieth century on a scale not significantly different from this hypothetical example. Indeed, the fastest rate of decentralization and suburbanization occurred in the 1920s and 1930s, precisely due to the scenario described above. Adopting a land development rule limited to population growth implies that conditions have changed in such a dramatic way that freedom of housing choice should be constrained.

The evidence from the previous sections clearly shows that:

- Ohio’s rate of land development lags the nation, despite its urban legacy;
- Urbanization does not significantly threaten farmland;
- The American city is transforming itself from higher densities to lower densities largely as a result of consumer choice and the preference for a single-family detached house, with a yard;
- Recent trends in the housing industry suggest that consumers are willing to trade-off smaller private yards for access to larger amounts of public open space, contributing to a decline in the median private lot size of about 10 percent in the 1990s;¹⁶⁴
- Most Ohioans prefer the mobility and flexibility of the automobile;
- Congestion issues are largely isolated to specific times of the day;
- Air quality has been improving steadily since the 1970s in all major Ohio metropolitan areas;
- Most development “pays its way,” and in the cases where it doesn’t, local governments have the tools to ensure it does in the future;
- The real-estate market values open space.

The primary difference between the early twentieth century and the early twenty-first century is the scale of the change. For many families, the decision is not moving from a neighborhood with population densities over 150,000 per square mile to 70,000 people per square mile. Rather, the choice is moving from low-density apartment buildings, duplexes, townhomes, and small homes to larger homes on their own lots often with a buffer of open space separating their neighbors (the yard).

Urban sprawl, then, is a much more complex phenomenon than simply a crude metric of comparing urbanization to population growth. In Ohio, as in other parts of the country, the definition (like the policy response) shifts based on which perspectives dominate the growth debate. For farmers, sprawl is often considered in the context of its impact on farming—the fragmentation of farmland. Farmers are thus more interested in public policies that will keep large swaths of land available for farming. For people living a large semi-rural estate lots, sprawl is the continuing encroach-

ment of housing, or the development of commercial and retail development in formerly residential or rural areas. These people will support policies that mandate large lot sizes (e.g., five acres or more) to maintain the rural character they prefer even though five-acre lots may be inappropriate for other people. For many others, the operating definition of sprawl is simply any development beyond existing city boundaries. These people will advocate for urban-growth boundaries to prevent any new development outside existing urban areas.

In other cases, definitions of sprawl are purely rhetorical and have little, if any, real content. Statewide news outlets often adopt the Sierra Club's newsy but largely useless definition—haphazard, uncontrolled development that inefficiently uses up land. While this definition may rally interest groups to oppose new land development, it has little grounding in empirical evidence and does not reflect the reality of the land-development process in Ohio or elsewhere. Land development is already very controlled, albeit highly politicized. The vast majority of new housing subdivisions are developed under some form of zoning or planning, either at the municipal or county level. And real-estate markets—through supply and demand—impose “order” on the timing and general pattern of development. Sprawl critics might not like the outcome, but land development in Ohio and elsewhere is the result of an ordered, controlled process.

What groups such as the Sierra Club and newspaper editorialists are really objecting to is residential and community lifestyles which they, 1) do not approve of, or 2) believe should not be replicated (even when they have chosen it for themselves).

Ironically, the planner's definition of sprawl—low density residential development that is automobile oriented—has little practical applicability in the political debate over growth-management policy, particularly one that is driven by issues such as open space, congestion, and rising infrastructure costs. The definition is too specific, too detailed, and too arcane to become a principal guideline for public policy. In fact, many residential communities in existing cities, even some older inner-city neighborhoods, would be considered sprawl by some planning definitions. Not surprisingly, developing public policy becomes problematic when the nature of the goals is so diffuse and abstract.

Is Portland, Oregon Leading the Way?

Sometimes, mere allusions to growth controls as “solutions” to sprawl simply represent sloppy analysis. “For example,” the Sierra Club of Ohio states, “nearly thirty years ago, Oregon enacted urban service areas to protect farms and slow sprawl. As a result, the population of Portland grew by 8 percent between 1970 and 1990, but there was no consequent sprawl.” In fact, Oregon experienced a prolonged economic recession during the 1980s which is largely responsible for slowing the rate of land development and housing. While growth boundaries have been responsible for limiting development in rural areas *outside* the boundary, the impacts of the growth boundary become evident in the land market only in the mid-1990s. Moreover, while some innovative projects have emerged—Orenco Station, Fairview Village, Gresham Town Center—most development continues to follow the standard pattern of low-density, single-family residential development on increasingly smaller lots.

Significant increases in population density occurred only when the Oregon economy recovered from the recession and the Portland area experienced a wave of high-technology investment and job creation in the mid-1990s. Since then, lot sizes have fallen by more than 25 percent, single-family homes have become a shrinking sector of the housing market, and housing prices have risen dramatically. Portland has been transformed from one of the more affordable housing markets to one of the least affordable housing markets on the West Coast. The growth boundary has impacted housing costs, although the precise magnitude of the effect is subject to debate.

More importantly, the growth boundary has become a political football. Several advocacy groups have argued against expanding the boundary, and some have sued the regional-growth management authority, Metro, over its decisions to add land to the boundary. The anti-growth organizations have argued that simply by requiring even higher densities (maximum lot sizes are now limited to less than one-fifth of an acre), the region’s population growth boundary could be accommodated within in the existing boundary. Thus, the pursuit of increasingly higher densities by some interest groups has transformed the growth boundary into a politically immovable line in the land.¹⁶⁵ In addition, Portland appears to be limiting housing choice to advance its transportation policy. Metro is attempting to greatly expand its transit system. In order to maximize the transit system’s ridership, it is requiring high-density development and cutting funding for road building. As a result, congestion is expected to triple, even if the transit expansion is implemented completely.

Quality Growth and Public Policy

The solution to Ohio's growth problems is not "doing nothing." On the contrary, the elevation of the sprawl debate to the state level, and its pervasiveness on the local level, suggests growth-management issues are important to Ohioans at all levels of policymaking. Rather than ignoring growth issues, public policy should focus on specific growth-related problems. These solutions should also be grounded in evidence or a realistic understanding of the land development process and its impacts.

Policy recommendations come with trade-offs, although many of them are not clearly spelled out in the debate. Unfortunately, newspapers and advocacy organizations will often point to solutions without examining the actual impacts of the programs or the trade-offs they imply. The Ohio Chapter of the Sierra Club provides a case in point. "Sprawl can be slowed," it states on its web site, noting "11 states have enacted Smart Growth, including Tennessee, Minnesota, and Maryland." These laws will lower development costs and protect open space and parks by directing development into existing communities where the infrastructure already exists.

In most states, however, statewide growth management laws are new, and their impacts on congestion, land development, and land use have not been evaluated. Tennessee, for example, passed its law in 1998 requiring cities and counties to adopt urban growth boundaries. The growth boundaries, however, were not adopted by cities and counties until the end of 2000, and some jurisdictions are still negotiating with the state.

The Sierra Club, however, arguably could be considered a biased source. Its primary focus is protecting the environment, and this goal has usually minimized the impacts of land development in improving the quality of life of people. The Sierra Club's position complements those taken by elected officials and the news media who often accept uncritically Smart Growth "successes" in other states, or accept the simplistic notion that almost any law that restrains housing development will somehow control urban sprawl.

While the news media often highlights efforts to control sprawl in other states, less attention is given to the rising backlash against various Smart Growth initiatives. Maryland, for example, passed

statewide growth management legislation that strongly discourages development outside politically designated growth areas. The state will not fund infrastructure to new development outside the growth area. Now, farmers in rural parts of Carroll County, one of the state's fastest growing, are balking under the growth restrictions. In 1999, Carroll County commissioners approved a 425-acre golf course development in an open attempt to challenge the state law.¹⁶⁶ Lines are drawn politically (Republican local officials against a Democratic governor) in a case that is challenging fundamental notions of local control. The state government is intervening directly into local decision making authority over zoning and planning.

Similarly, residents of Arlington, Virginia, an inner suburb of Washington, D.C., turned down a proposal to increase its population density, a key ingredient of most Smart Growth strategies. In Berkeley, California, a recommended comprehensive plan amendment that would have increased density was also withdrawn after strong public opposition because it would change the character of the city.

The politics of resistance is fairly straightforward and applicable to Ohio. Increasingly, traditional farming is no longer viable. Farmers, in fact, often lose money on their farming operations, but zoning prevents them from developing their property to ease the financial burden (or pay taxes). In the case of Carroll County, farms in developing areas can fetch \$75,000 per acre.¹⁶⁷

Conventional Smart Growth, then, can be a difficult sell, often because it requires residents to accept major changes in the character of their own neighborhoods. When Smart Growth has been successful, the costs have been pushed well into the future (e.g., the case in Oregon), or they have circumvented local political control by going through the state legislature (e.g., Tennessee).

A. Ohio's Smart Growth Efforts

Smart Growth efforts in Ohio have been building, but a coordinated effort has not emerged on the scale or level experienced in states such as Tennessee, Washington State, Florida, or Oregon. Most of Ohio's proposals have been ad hoc and focused on narrow issues such as farmland preservation. In November 2000, Ohio voters approved a \$200 million bond to finance open space and

farmland preservation efforts at the state level. This measure is little more than a drop in the bucket for serious land conservation. The proposed bond could buy about 15,000 acres of vacant land statewide per year, or 150,000 acres over a ten year period.¹⁶⁸ Yet, Ohio has about 14.9 million acres of farmland.¹⁶⁹ Thus, after ten years, the state could “preserve” about 1 percent of Ohio’s farmland. If the program successfully leveraged local dollars, about 2 percent of the state’s farmland would be preserved. These funds, however, are not restricted to farmland purchases. Ohio has another 8 million acres in forests that might also be eligible. Thus, the state could “preserve” about one half of one percent of the state’s open space over ten years (about 1 percent if local dollars are leveraged).¹⁷⁰ This is a trivial amount of land if the goal is to protect land from urban development. In fact, if Ohioans wanted to protect half of the state’s farmland and forests, mimicking New Jersey’s efforts in 1998, they would have to spend at least \$15.3 billion.¹⁷¹ Clearly this is fiscally unrealistic.

Many policy makers have been urging more regulatory approaches. The Office of Farmland Preservation, for example, is encouraging counties to explicitly adopt farmland preservation strategies in their comprehensive plans, as well as adopt agricultural zoning to discourage residential development. Organizations in most Ohio cities have also invited national experts, most notably urban policy analysts David Rusk and Minnesota State Representative Myron Orfield, to discuss ways to use regionalism to redistribute income and wealth from newer suburbs to older core cities and suburbs. In addition, urban-growth boundaries are advocated as ways to literally draw a “line in the land” beyond which development will not be allowed.

These more radical approaches are unlikely to succeed for several reasons. First, local control is an important principle of governance in Ohio. Top-down regional planning would require legislative authority and agreement among participating jurisdictions. This is highly unlikely since legislative efforts in recent years have focused on strengthening local government, particularly townships, not weakening them. Moreover, regional planning and transportation initiatives remain controversial.

Second, the problems associated with growth vary by locality. Thus, the nature of the issue and problem is a moving target, and the approach needed to remedy the problem changes as well.

Regional solutions tend to focus on a small number of “magic bullet” solutions (e.g., growth boundaries) that may or may not address the problem. In fact, some of them may make these problems worse. For example, increasing density might limit the demand for developing land on the urban fringe, but, by concentrating more households and cars in a smaller amount of land, it will likely make congestion worse and reduce open space inside the boundaries.

Third, the evidence about the impacts of sprawl on local areas is still largely unsettled. Despite the rhetoric, little consensus exists among researchers about the impact of suburbanization or whether policy recommendations will have clear beneficial impacts. In many cases, support for various Smart Growth proposals masks other agendas that are more directly anti-growth. This is the case for many so-called farmland preservation programs. Many are in reality thinly veiled attempts to prevent development on land adjacent to existing homes.

B. Market-Oriented Growth Management

Ohioans need a more creative approach to growth management that respects the importance of a dynamic housing market, meets the housing needs of its families and future residents, and recognizes the limits of public policy. This approach also needs to acknowledge that growth brings specific problems that need specific solutions. In some cases, resolving these issues will necessitate more coordination among local and regional governments. In other cases, the solutions may require deregulating the existing land market to allow for a more fluid, dynamic real-estate market to match consumer preferences for housing more effectively. In still other cases, local governments may have to change the way they do business, ensuring that the full costs of development are incorporated into the decision to build new homes and subdivisions.

Efficient Land Use

Andres Duany, a national planning expert who pioneered New Urbanism recently told a Columbus audience that the market should decide whether innovative urban designs should survive or fail.¹⁷² Mr. Duany’s commitment to free market ideals in housing might be questionable, but his comment prompts a fundamental question: Do markets decide most land-issues? Local zoning regula-

tions often dictate elements of design, layout, density and pattern. Little room is left for adjustment to market signals.¹⁷³ Moreover, this micromanagement of the land market is increasing. New Urban developments, for example, require detailed control over building location and design in order to maintain a sense of order and place. In addition, cities and towns are adopting historic district ordinances that place significant design and renovation burdens on existing property owners. These ordinances often require any outside improvements to a house be reviewed by a local government committee made up of residents who may or may not live in the district.

Ironically, zoning is becoming more prevalent and detailed even as criticism mounts. “Zoning, as a tool for doing the best we can do, is an utter, complete failure,” says Harrison Smith, a zoning attorney who has spent his life working proposals through the maze of codes. “[It] has produced mostly mediocrity.”¹⁷⁴ Innovations such as clustered housing, coving and mixed-use zoning fall by the wayside as rule after rule is added to the codes, all with the apparent intention of improving livability. “Individual regulations are like snowflakes,” according to Jack Lucks, developer of the successful Victorian Gate apartment complex in Columbus’ Short North district. “Sooner or later, these snowflakes become a blizzard.”¹⁷⁵

The end result is a complicated series of hoops to jump through that discourages the very types of development that may prevent elements of what many call sprawl. Columbus’s Victorian Gate neighborhood, for example, was originally illegal under regulations in effect at the time of its conception. So too would such popular Columbus areas as Clintonville and German Village “because of small lots, nearby shops, a mix of houses and apartments and other traits that make [them] desirable to people, but undesirable to zoning codes.”¹⁷⁶ Columbus trade and development director Mark Barbash states that he has learned just “how cumbersome this system can be.”¹⁷⁷

Many planners seem to be trading one type of micromanagement for another, but the solution may be indirectly freeing up the real-estate market to adjust more efficiently and quickly to consumer wants and preferences. Currently, zoning is the most common method for regulating land use in Ohio cities. When a city or community adopts zoning, it creates a set of districts that permit some land uses and exclude others. In a residential district, for example, only a certain type of housing

(i.e., single-family homes on large lots) would be permitted. Commercial uses or multifamily housing would be excluded. Moreover, zoning districts are typically very specific in how land can be developed, establishing minimum densities, set-backs, height limitations, minimum lot sizes, and even minimum square footage for homes. Thus, zoning typically imposes a “one size fits all” approach to housing development: each home must sit on a certain size lot, so many feet from the road, and cover only a certain proportion of the lot. These requirements make innovation difficult in a real-estate market increasingly catering to individualized preferences for housing. For example, a single-family residential zone might require a minimum lot size of a half-acre, when new homebuyers may be willing to trade off a smaller private lot for access to more parklike open space near their home.

Freeing up land use to more effectively meet consumer demands for more varied housing can be achieved through a number of planning mechanisms, including:

- **Overlay zoning districts.** Communities that have recognized that the specificity of the zoning code discourages efficient land development have turned to overlay zoning districts that provide more choice over densities and urban design and allow more proposals to be reviewed administratively to streamline the approval process. The zoning district would typically broaden the number of permitted uses while also providing outcome-based urban design criteria. For example, rather than requiring each house to have a half-acre lot, the overlay zoning district might specify an overall density for an area and leave the specific mix of densities (e.g., small lot, large lot, single family, or multifamily) up to the developer. These are increasingly popular among cities that are attempting to encourage high-quality design and allow for mixed uses (e.g., a mix of residential, neighborhood retail, office, etc.) Overlay zoning districts, however, should expand choices and options, not narrow them, and avoid the tendency to centrally direct land uses. Similarly, mandating overlay districts runs the risk of stifling innovation. A true market test is when one alternative is selected among many after the trade-offs have been evaluated by consumers.
- **Planned-unit development (PUD).** Like overlay zoning districts, PUDs also give developers more freedom to implement innovative urban designs that could include landscaping,

open-space buffers, parks, and mixed uses (residential and commercial). Developers often use PUDs because they allow for more flexibility than conventional zoning codes. Unlike overlay zoning districts, PUDs consider each project individually, and typically subject proposals to the uncertainty of the public hearings and discretionary review. While overlay zoning districts allow for legally permitted uses throughout the district, PUDs require a negotiated outcome between the developer, the planning board, and the city council. The flexibility of the PUD, then, must be balanced against the increased uncertainty associated with the review process.

- **Performance-based zoning.** Performance-based zoning shifts the focus of development approval toward outcomes—impacts—and away from detailed regulation by zoning district or of site plans. Rather than have districts that specify in detail what uses, densities, or other characteristics are permitted, development approval is based on whether the proposed project generates tangible impacts on neighbors and existing residents such as increased traffic, stormwater runoff, excessive noise, nuisances, etc. By focusing on impact, developers and builders have more leeway to use innovative design techniques to mitigate those impacts. Thus, a mixed-use project may be able to accommodate higher densities because its pedestrian-oriented design might reduce local traffic flow. Similarly, projects that generate significant increases in traffic or congestion can be required to mitigate these effects (e.g., through street widenings, turn lanes, etc.) before they are approved. With performance-based measures in place, more development applications can be processed administratively, avoiding the inevitable uncertainty and micromanagement of site plans inherent in public hearings. Communities that have used performance-based zoning have streamlined development review, often cutting weeks off the approval process.
- **Market-driven densities.** Market trends are already pushing toward higher densities as suburbs densify and become more diverse and families demand smaller private yards with more access to large expanses of open space. Unfortunately, these market tendencies are

often stymied by local zoning codes that adopt prescriptive, one-size-fits all density standards. In many Ohio communities, for example, half-acre minimum lot sizes are citywide standards. Yet, many of Ohio's communities can accommodate market-driven, higher density development on existing infrastructure. By adopting performance-based standards that mitigate spillover impacts and nuisances, communities can also permit a wider variety of housing and density as a legal entitlement through zoning. In short, communities could allow markets to determine densities for particular sites, facilitating their natural and likely inevitable evolution into more mature cities. In more mature urban environments, a wide variety of land uses for a range of densities is appropriate, but current zoning and planning practice prevent this more efficient use of land. Adopting a principle of letting real-estate markets determine densities as long as the spillover impacts and potential nuisances are mitigated could be an important step toward more rationally managing growth.

Open Space and Farmland

Much of the debate surrounding "open-space preservation" is based on subjective definitions of what the phrase truly means. Open to broad interpretation, select groups can use open space as a policy consideration for largely the benefit of themselves, and in the process possibly cause hardship on others under even the best-intentioned proposal.

If the reasons for migrating out of the city revolve around high crime, poor schools and other concerns associated with public services, then restricting mobility may place those least advantaged at greater risk. Such measures have the effect of benefiting those who have already left and now reside in the outlying areas, maintaining an artificially depressed density.

Similar considerations come into play when growth boundaries are proposed. Pressure to create infill developments within the boundary in areas that would not otherwise be developed can lead to the removal of open space accessible to the urban population while protecting it for those living near the edge.¹⁷⁸ Since counties with large cities are nonetheless often composed of large portions of croplands, grasslands, pasture and forest, the possibility exists of developing prime land near urban

settings while preserving less-than-prime land on the outskirts.¹⁷⁹

The value of readily accessible open space — even if that happens to come in the form of a yard — should not be discounted. Randall O’Toole, author and senior economist at the Thoreau Institute in Oregon writes:

Under the Oregon compromise, the planners prevent sprawl by limiting growth to the area within urban growth boundaries. The realtors and homebuilders are guaranteed a lively housing market by continual rezoning of areas within the boundary to higher densities. While neither are entirely satisfied with this compromise, it has become the dominant paradigm in Oregon. What gets lost, of course, are the desires of individual families and consumers for such things as open space, large lot sizes and low-density housing. Since home ownership and the equity that comes with it are among the best ways to escape from poverty, the result is another barrier to economic mobility.¹⁸⁰

Ohio communities can harness the power of real-estate markets and refocus the development approval process on consumers by adopting several specific policies, including:

- **Cluster housing**, where smaller private lots are “clustered” in one section of a proposed development while preserving the remainder as open space and maintaining overall densities. By allowing one-quarter acre lots rather than one-half acre lots, half of a development can be preserved as open space while maintaining an average density of one-half acre. Developers can satisfy overall density requirements while configuring lots to maximize the value of environmental characteristics and benefits, including open space, habitat, and wetland protection.
- **Conservation easement** programs can secure large parcels of open space and farmland. Conservation easement programs pay property owners for not developing land, and can be established for set periods of time. Conservation easements allow land to remain on the tax rolls and ownership to remain private. Moreover, many easements eventually expire, creating flexibility that does not exist when land is permanently removed from the land market.

- **Tax-credit programs**, similar to Michigan’s program, give property owners a property tax incentive to keep their land in open space or farming uses. Like conservation easements, the agreement can cover varying periods, from ten years to 99 years. This approach would complement economic development programs which already exist at the state level. Unlike businesses, which are mobile and can leave the state once the credits expire, land is immobile.
- **Maintaining a robust, profitable agricultural economy** will preserve farmland. Ultimately, open space will remain farmland as long as it is economically profitable to use it for crops or other farm uses.

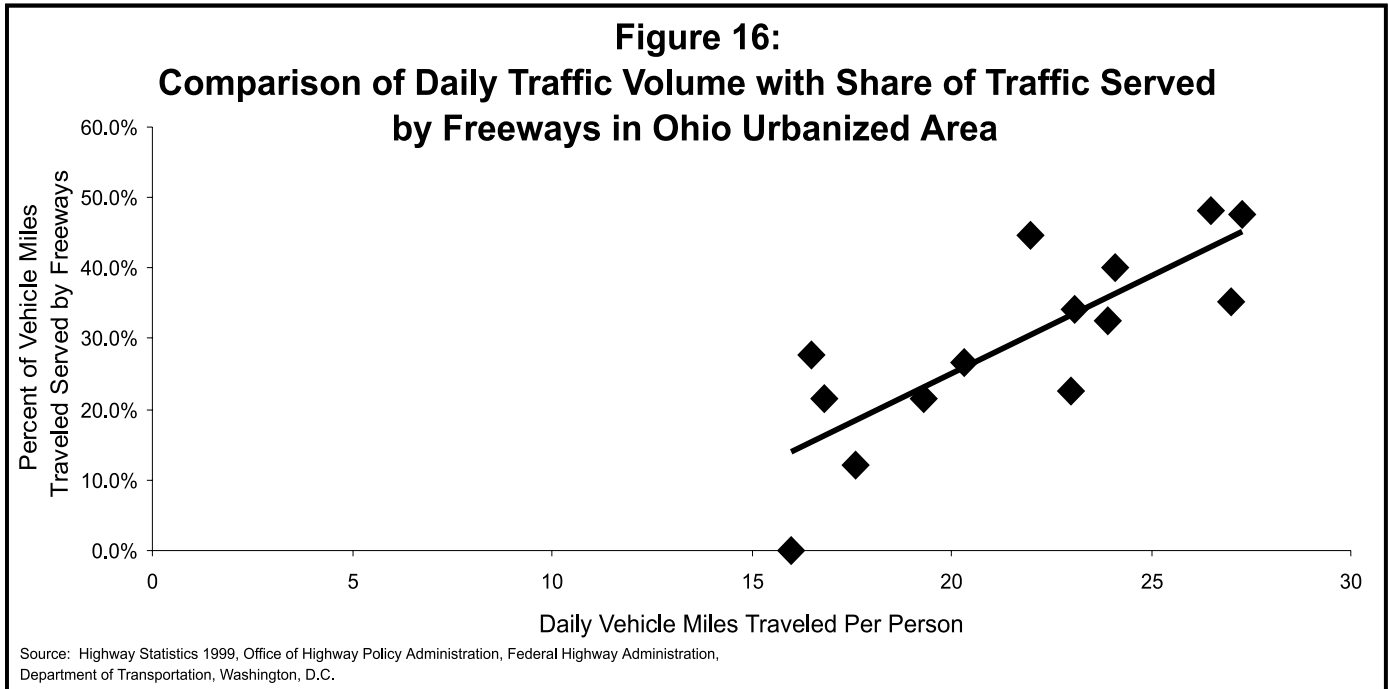
These policies would help ensure that no land is developed before its time.

Infrastructure

Support for growth controls in Ohio counties and rural areas stem from a desire to limit higher spending for infrastructure. The logic is simple: by encouraging more compact development, less piping (for sewer and water) and roads must be built. Therefore, it is more “efficient” to develop compact development patterns.

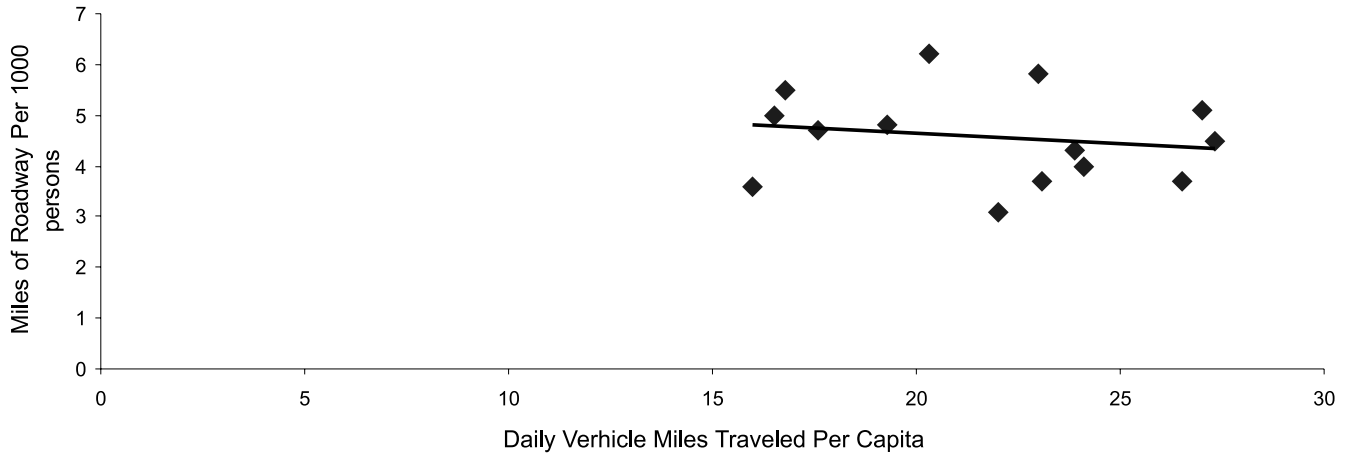
“Efficiency,” however, must be compared to the service rendered. Spending less on a car, for example, is not efficient if the qualities of a car someone wants (better safety restraints, more storage space, air conditioning, etc.) are not available at that price. Similarly, infrastructure costs must be compared to the quality of housing people want. Providing core public services to houses on larger lots may be more expensive, particularly the initial capital outlay, but the higher cost is not necessarily evidence of inefficiency. It only becomes inefficient if the services are provided at a higher cost than consumers are willing to pay. Housing choice is much more complex than an engineer’s calculations about the costs of extending utilities to a new subdivision or housing project.

The key issue for local policy makers is to prevent the subsidization of one housing choice over another. In other words, consumers should make their decision based on full information about the costs of providing the service. This is easier to achieve than many may think. Among the alternatives for policy makers are:



- **Full-cost pricing for core infrastructure**, particularly water and sewer, assesses all the costs of providing the service—debt, capital facilities, operations, etc.—as a user charge based on the amount of the service used. This is similar to the way private utilities such as private cable, telephone, and electric utilities bill their customers. A relatively small tap-in fee could be used to cover the costs of the initial hook-up to the system.
- **On-site provision of infrastructure** ensures that existing residents do not subsidize the extension of existing infrastructure to new residents. The provision of water, sewer, roads, and other infrastructure should be considered a cost of new housing. As such, these costs should be included in the total price of a new house in the same way other features of the lot and building are (e.g., roof, landscaping, driveway, garage, etc.). Local governments should ensure that new residents pay for the for cost of extending infrastructure to new housing while also ensuring new residents do not subsidized existing residents. This is most efficiently accomplished by requiring developers and builders to pay for the extensions of this infrastructure directly. In addition, communities should also consider giving developers flexibility to incorporate innovations in infrastructure design and engineering as a way to

**Figure 17:
Relationship Between Traffic Volume and Roads Per Capita in
Ohio Urbanized Areas**



Source: Highway Statistics 1999, Office of Highway Policy Administration, Federal Highway Administration, Department of Transportation, Washington, D.C.

enhance the uniqueness of their developments (as long as they are compatible with existing infrastructure capacities and design).

- **Special-assessment districts** for new subdivisions allows the costs of developing and providing infrastructure to be assessed on the new development. The special assessment district could be a vehicle for giving developers a wide range of choices in providing infrastructure and standards, with provisions (negotiated with a local government) for the future dedication of utilities to the relevant utility provider or local government.
- **Privatization of core infrastructure** ensures that the full-costs of development are incorporated into housing choice. Private companies cannot afford to subsidize their customers in the long term.

Transportation and Congestion

Ultimately, Ohio's major urban areas will need to expand the capacity of their road networks to meet the challenges of congestion. An important element of this is recognizing that freeways are a vital source of mobility for Ohioans. A fairly direct relationship exists between the availability of

freeways and daily traffic volume in Ohio's major urbanized areas. The larger the proportion of total traffic served by freeways, the more traffic there is (Figure 16).¹⁸¹ Thus, the sprawl critics are correct in their argument that cities that accommodate cars by allowing them to move more freely also encourage the use of the automobile. In fact, this is both intuitive and logical; automobiles are the most efficient, effective, and economical way for most people to get from point A to point B.¹⁸² Moreover, in most cases, including low-density residential environments, automobiles reduce travel times. Reducing freeways, however, has the real potential impact of reducing overall mobility for Ohioans in metropolitan areas. More specifically, as David Hartgen found, beltways become instrumental tools for managing existing traffic volumes.

The relationship is still more complex, however. A comparison of traffic volume with the size of the road network suggests that simply increasing the amount of road capacity doesn't necessarily induce more overall traffic. In fact, urban regions with more road miles per person have slightly lower average traffic levels than metropolitan areas with fewer roads per capita (Figure 17).¹⁸³ Los Angeles, with the most congested roads of any metropolitan area, has the least amount of roads per person among the 68 regions studied by Texas Transportation Institute.

Ultimately, Ohio's congestion problems can be solved by:

- **Congestion pricing** where boothless tollroads using new transponder technology assess tolls for vehicles based on the level of congestion and time of day. This provides a mechanism for financing the maintenance and expansion of existing highways by transforming highway finance to a user pays system.
- **High Occupancy/Toll Lanes (HOT)** where automobile users are given a choice of remaining in congested lanes or paying a toll to use a lane that regulates use via congestion pricing. The most practical way to implement this concept is by converting underutilized High Occupancy Vehicle (HOV) lanes.
- **Expanding existing road capacity**, particularly arterials and local highways. On the local level, congestion solutions can only be practically addressed by expanding road capacity.

- **Deregulate public transit**, by allowing alternative private providers to offer transit services in direct competition with existing transit agencies. This will encourage innovation and provide alternatives to driving.

End Notes

¹ See <http://www.ohio.sierraclub.org/cincy/>.

² *Region in Crisis: Smart Growth Alternatives for Cincinnati*, University of Cincinnati, School of Planning, 2001.

³ “Ugly Road to Urban Sprawl,” *toledoblade.com*, June 21, 2001.

⁴ Thomas Ott and Martin Stolz, “Sprawl Creates A Region Divided Against Itself,” *The Plain Dealer*, June 3, 2001.

⁵ “Mark Vosburgh and Christopher Quinn, “Over Half of Clevelanders Feel Unsafe at Night, Poll Finds,” *The Plain Dealer*, June 3, 2001; Thomas Ott, “Old Suburb Battles Decline and Exodus,” *The Plain Dealer*, June 3, 2001; Martin Stolz, “Building Boom Brings New Set of Problems,” *The Plain Dealer*, June 3, 2001.

⁶ U.S. Bureau of the Census, Population Division, Population Distribution Branch, http://www.census.gov/population/www/estimates/st_stts.html

⁷ Peter Mieszkowski and Edwin C. Mills, “The Causes of Metropolitan Suburbanization,” *Journal of Economic Perspectives*, Vol. 7, No. 3 (September 1993), pp. 135-147, <http://www.urbanfutres.org/j55971.html>.

⁸ See the discussion in Robert Bruegmann, “Urban Density and Sprawl: An Historic Perspective,” in *Smarter Growth: Market-based Land-Use Strategies for the 21st Century*, eds Randall G. Holcombe and Samuel R. Staley, pp. 155-200 (Westport, CT: Greenwood Press, 2001).

⁹ For a discussion, see Samuel R. Staley, *The Sprawling of America: In Defense of the Dynamic City* Policy Study No. 251 (Los Angeles, California: Reason Public Policy Institute, 1999), pp. 5-9.

¹⁰ Reid Ewing, “Is Los Angeles-Style Sprawl Desirable?” *Journal of the American Planning Association*, vol. 63, no. 1 (Winter 1997), pp. 108-109.

¹¹ *Report of the Pennsylvania 21st Century Environment Commission*, Harrisburg, Pennsylvania, September 1998, p. 9.

¹² *Ibid.*, p. 2.

¹³ Rosalyn Baxandall and Elizabeth Ewen, *Picture Windows: How the Suburbs Happened* (New York: Basic Books 2000), p. 133.

¹⁴ Quote from *Architectural Forum* cited in Baxandall and Ewen, *Picture Windows*, p. 132.

¹⁵ Baxandall and Ewen, *Picture Windows*. William Levitt often characterized his production techniques as the housing industry’s response to assembly-line production pioneered by Henry Ford.

Rather than assemble all the houses in one factory, Levitt took the assembly line to the home site. See also the review of *Picture Windows* and critics of the suburbs in Sam Staley, "Room to Grow," *Reason* (February 2001), pp. 48-54.

¹⁶ National Association of Homebuilders, <http://www.nahb.com>.

¹⁷ Ibid.

¹⁸ Ibid.

¹⁹ Assuming 2.8 person per household on average and 25 percent allowance for infrastructure such as roads.

²⁰ U.S. Department of Agriculture, Natural Resources Conservation Service, *Summary Report 1997 National Resources Inventory* (Revised December 2000), Washington, D.C., Table 1. The use of data from the National Resources Inventory is controversial. Several analysis have questions is accuracy, noting significant discrepancies between the NRI numbers and data collected by other sources such as the Census of Agriculture. The USDA withdrew the original NRI estimates which were released in 1999 and published revised estimates in 2000. State level estimates have remained in public circulation, but estimates for counties have been rescinded. When this publication went to press, the revised metropolitan area estimates of land use had not been released. Even at the state level, however, data inconsistencies raise troubling questions about the NRI's accuracy. For example, the Census of Agriculture found that farmland in Pennsylvania fell by 22,000 acres from 1992 to 1997, but the NRI estimated a drop of 571,000 acres. For Ohio, the Census of Agriculture estimates a loss of 145,000 acres while the NRI estimates a loss of 613,000 acres. For other states, see the calculations made by Wendell Cox at <http://www.demographia.com/db-nriagc.htm>. Nationally, the NRI reported 13.1 percent less agricultural land than the Census of Agriculture. For a comparison, readers are encouraged to consult <http://www.demographia.com/db-nricrop97.htm>. Another source of data on urban land is the U.S. Census, but these data are available only for 1990 as this study wen to press. For a surveys of the controversy surrounding the NRI data, see Samuel R. Staley, "An Overview of U.S. Urbanization and Land-use Trends," in Randall G. Holcombe & Samuel R. Staley, eds., *Smarter Growth: Market-based Strategies for Land-use Planning in the 21st Century* (Westport, Conn.: Greenwood Press, 2001), pp. 7-10; Wendell Cox and Ron Utt, *Flawed Federal Land Use Report Encourages Unnecessary Spending*, Backgrounder No. 1368 (Washington, D.C.: The Heritage Foundation, May 2000), <http://www.heritage.org/library/backgrounder/bg1368.html>; and the statement by Wendell Cox at <http://www.demographia.com/d-new.htm>.

²¹ Ibid., Table 2.

²² Ibid, Table 1, p. 15.

²³ The U.S. Bureau of the Census defines a "central city" as a city or urbanized place with 50,000 people or more in an urbanized area of at least 150,000 people. Commuting patterns determine whether a city or place is considered a central city. For a complete list of central cities in metropolitan areas organized by state, see <http://www.census.gov/population/estimates/metro-city/acency.txt>

²⁴ Cleveland and Cincinnati were ranked tenth and ninth in 1890, and seventh and tenth in 1910. U.S.

Bureau of the Census, <http://www.census.gov/population/documentation/twps0027/tab12.txt>

²⁵ Given Ohio's relatively large share of developed land compared to other states, these slower growth rates are not surprising. With a larger base, a large number of acres could be developed without impacting the overall growth rate. Still, Florida, now about as developed as Ohio, grew almost twice as fast. Similarly, North Carolina's and Georgia's share of developed land was slightly lower than Ohio's but grew at almost twice Ohio's rate.

²⁶ Importantly, much of this population growth, even in the 1950s and 1960s, may be due to annexation, not growth from population densification or reinvestment in older neighborhoods. Toledo, for example, doubled its size from 1950 to 1990 while adding 80,000 people to its total population.

²⁷ Fannie Mae Foundation report on city growth.

²⁸ See the discussion in Peter Mieszkowski and Edwin C. Mills, "The Causes of Metropolitan Suburbanization," *Journal of Economic Perspectives*, vol. 7, no. 3 (September 1993), pp. 135-147, <http://www.urbanfutures.org/j55971.html>.

²⁹ Youngstown's population peaked at 170,002, but hovered around 166,000 or higher until 1960 after which the city experienced its steepest population decline.

³⁰ Ideally, we could analyze data on the local level to show what land has been converted to what use. In general, NRI data is suitable for this kind of analysis. At the time of this writing, unfortunately, state and county-level data were not available.

³¹ The neighborhood's total population fell from 48,326 to 19,715 during this period according to the City of Cleveland. The neighborhood consists of about two square miles of inner-city Cleveland.

³² Robert W. Burchell, Naveed A. Shad, David Listokin, et al. *The Costs of Sprawl—Revisited*, Report 39, Transit Cooperative Research Program, Transportation Research Board (Washington, D.C.: National Academy Press, 1998).

³³ *1999 Ohio Farm Income, E.S.O. 2578*, Ohio State University Extension Service, http://ohioline.ag.ohio-state.edu/eso-fact/2578/2578_0.html.

³⁴ Estimates for 1999.

³⁵ See *Farms and Land in Farms: Final Estimates 1993-1997*, Statistical Bulletin No. 955 (Washington, D.C.: U.S. Department of Agriculture, Economic Research Service, January 1999), p. 7.

³⁶ National Agricultural Statistics Service, Washington, D.C., September 1998, cited in Samuel R. Staley, "The Sprawling of America: In Defense of the Dynamic City," *Policy Study No. 251* (Los Angeles, California: Reason Public Policy Institute, January 1999), Appendices B and C, pp. 70-72.

³⁷ Ibid.

³⁸ Ibid.

³⁹ Ibid. Based on year-to-year trends from 1990 through 1997, the farmland loss rate for the decade should be about 4.6 percent.

⁴⁰ Based on data going back to 1955. Ohio Department of Agriculture, Historical Agricultural Statistics, <http://www.nass.usda.gov/oh/bull99/table01.htm>.

⁴¹ Ibid.

⁴² Ibid.

⁴³ The correlation coefficient calculated for the 20 fastest growing counties and share of land in farms is 0.119. The correlation coefficient is a statistical measure of how strongly a variable is related to another. In this case, the relationship is positive: higher population growth rates are associated with higher shares of farmland, but the relationship is weak.

⁴⁴ Carmen Carrion, *A Spatial Economic Model of Land Use Change*, Master's Thesis, Department of Agricultural, Environmental, and Development Economics, The Ohio State University, 2001.

⁴⁵ U.S. Bureau of the Census.

⁴⁶ Carmen Carrion and Elena Irwin, "Understanding the Spatial Pattern of Urbanization in Medina County, Ohio," *TwinLine*, (June 2001), newsletter of Ohio Sea Grant.

⁴⁷ Ibid.

⁴⁸ Ibid. Although commercial and industrial development became more clustered.

⁴⁹ Ibid.

⁵⁰ Ibid.

⁵¹ *1999 Ohio Department of Agricultural Annual Report and Statistics*, Columbus, Ohio, Table 1, <http://www.nass.usda.gov/oh/bull99/table01.htm>

⁵² Ibid.

⁵³ Ibid.

⁵⁴ See the discussion of U.S. Department of Agriculture data in Staley, *The Sprawling of America*, p. 23.

⁵⁵ Samuel R. Staley, *The "Vanishing Farmland" Myth and the Smart Growth Agenda*, Policy Brief No. 13 (Los Angeles, California: Reason Public Policy Institute, January 2000), <http://www.rppi.org>

⁵⁶ Ibid.

⁵⁷ Ross Korves, "Population, Productivity, Prices, and Policy," American Farm Bureau Federation, November 1999, unpublished paper. See also discussions in Jefferson G. Edgens and Samuel R. Staley, "The Myth of Farmland Loss," *FORUM for Applied Research and Public Policy* 14, no. 3 (Fall 1999), pp. 29-34; Staley, *The "Vanishing Farmland" Myth and the Smart Growth Agenda*.

⁵⁸ *Agricultural Resources and Environmental Indicators, 1996-97*, U.S. Department of Agriculture, Economic Research Service, Washington, D.C., July 1997, p. 13.

⁵⁹ Two-thirds of agriculture's productivity is attributed to capital, technology, and equipment. Less than 20 percent is attributed to land, and the importance of land is declining. See Luther Tweeten, *Farm Policy Analysis* (Boulder, Colorado: Westview Press, 1989), Table 1.4, p. 9

⁶⁰ 1997 Census of Agriculture, U.S. Department of Agriculture. (<http://www.econ.ag.gov/epubs/other/usfact/oh.htm>)

⁶¹ Ibid.

⁶² Ibid. Table 6.

⁶³ The impact of hobby farming on land-use policy has been significant. In Oregon, for example, hobby farmers have emerged as one of the more influential antigrowth interest groups. See Gerrit Knaap and Arthur C. Nelson, *The Regulated Landscape: Lessons on State Land Use Planning from Oregon* (Cambridge, Massachusetts: Lincoln Institute of Land Policy, 1992), pp. 145-153.

⁶⁴ Luther Tweeten, "Competing for Scarce Land: Food Security and Farmland Preservation," paper presented at the American Agricultural Law Association, Minneapolis, Minnesota, October 17, 1997. Dr. Tweeten has updated and clarified his analysis of the data in "Cropland Conversion and Urban Development in Ohio," Department of Agricultural, Environmental, and Developmental Economics, Ohio State University, unpublished paper.

⁶⁵ Luther Tweeten, "Competing for Scarce Land: Food Security and Farm Preservation".

⁶⁶ See the *Farm Real Estate Report*, Ohio Farm Real Estate, <http://www.nass.usda.gov/oh/realest.htm>.

⁶⁷ Calculated from *Farms and Land in Farms*, p. 7. The estimates are based on 1997 values on the county level and include the following metropolitan areas: Akron, Canton, Cincinnati, Cleveland, Columbus, Dayton, Lima, Mansfield, Toledo, and Youngstown. These figures probably underestimate the current development potential of land in suburban areas. First, inflation has probably pushed up the value of land. Second, farmland preservation trusts report average values greater than \$4,000 in areas under development pressure. For example, suburban land averages about \$4,000 an acre in Philadelphia. See Tom Daniels, "Farm Follows Function" *Planning* (January 2000), p. 17.

⁶⁸ Of course, the amount of land purchased could still be significantly lower. Land prices in some suburban areas reach \$50,000 or more per acre.

⁶⁹ *Major Land Uses (1945-1992)*, U.S. Department of Agriculture, Economic Research Service reported in “Tree Sprawl: Ohio Wilderness Grew Faster than Development, 1949 to 1992,” *Policy Note* (Columbus, Ohio: The Buckeye Institute for Public Policy Solutions, November 1999).

⁷⁰ Marlow Vesterby and Kenneth S. Krupa, *Major Uses of Land in the United States, 1997*, Statistical Bulletin No. 973 (Washington, D.C.: U.S. Department of Agriculture, Economic Research Service, 2000), p. 22

⁷¹ *Ibid.*, pp. 22-23.

⁷² *The Cost of Community Services in Madison Village and Township, Lake County, Ohio*, American Farmland Trust and the Lake County Soil and Water Conservation District, October 1993, p. 1.

⁷³ *Ibid.*, p. 14.

⁷⁴ Samuel R. Staley, *The Sprawling of America: In Defense of the Dynamic City*, Policy Study No. 251, Reason Public Policy Institute, 1996, p. 34.

⁷⁵ Gary Wolfram, *An Analysis of ‘A Cost of Community Services Study of Scio Township’*, Hillsdale Policy Group, Ltd., May 1997, p. 2.

⁷⁶ *Ibid.*, p. 4.

⁷⁷ Elena Irwin and Dave Kraybill, *Costs and Benefits of New Residential Development*, The Ohio State University, August 1999. Presented at the “Better Ways to Develop Ohio” conference, sponsored by the Ohio State University Extension, Columbus, OH, June 24-25, 1999.

⁷⁸ *Ibid.*

⁷⁹ *Ibid.*

⁸⁰ Wolfram, p. 6.

⁸¹ *Ibid.*

⁸² Wolfram, p. 3.

⁸³ *Ibid.*

⁸⁴ Irwin and Kraybill, *Costs and Benefits...*

⁸⁵ *The Cost of Community Services in Madison Village and Township . . .*, p. 12.

⁸⁶ *Ibid.*, p. 23.

⁸⁷ Ibid., p. 6.

⁸⁸ Ibid., p. 24.

⁸⁹ Ibid., p. 14.

⁹⁰ Ibid., p. 1.

⁹¹ Ibid., p. 15.

⁹² Elena G. Irwin, *Explaining Sprawl in Exurban Areas: The Role of Open Space*, December 1999.

⁹³ According to the Ohio Department of Taxation, agricultural real estate and property was valued at \$2.6 billion in 2000 and covered 16 million acres of farmland. Its “highest and best use” would have generated an assessed value of \$9.7 billion. See “Current Agricultural Use Value,” Tax Data Series, Table PD-32, No. 19, Ohio Department of Taxation, Columbus, Ohio, April 19, 2001.

⁹⁴ Irwin and Kraybill, *Costs and Benefits...*

⁹⁵ *Does Development Pay for Itself?* Columbus, Ohio: Ohio Public Expenditure Council, December, 1999).

⁹⁶ Ibid., p. 6.

⁹⁷ Ibid., p. 5.

⁹⁸ Ibid., p. 10.

⁹⁹ Ibid.

¹⁰⁰ Ibid., p. 21.

¹⁰¹ Ibid., p. 23.

¹⁰² Ibid., p. 26.

¹⁰³ Steve Mitchell, Mitchell Development, phone interview, May 21, 2001.

¹⁰⁴ Rob Meyer, Dominion Homes, phone interview, May 21, 2001.

¹⁰⁵ Charlie Ruma, Virginia Homes, phone interview, May 21, 2001.

¹⁰⁶ Jim Bower, Lucas County Engineer’s Office, phone interview, May 28, 2001.

¹⁰⁷ Developers are required to pay for roads, water, sewer, the design process, road widening,

property grading, and even traffic signals if the project warrants it. Interview with Warren Diehl, Franklin County Engineer's Office, via phone, May 28, 2001.

¹⁰⁸ Andy Dunchuk, Allotment Engineer, Summit County Engineer's Office, phone interview, May 28, 2001.

¹⁰⁹ "They [the developers] pay for the Infrastructure, we review the terms of our standards, and if it does not meet them it cannot be approved." Mike Ridge, Delaware County Engineer's Office, phone interview, May 28, 2001.

¹¹⁰ For a discussion of how infrastructure planning can impact land-use patterns, see Randall G. Holcombe, "Growth Management in Action," in *Smarter Growth: Market-based Strategies for Land-Use Planning in the 21st Century*, ed. Randall G. Holcombe and Samuel R. Staley, pp. 146-153 (Westport, CT: Greenwood Press, 2001).

¹¹¹ Ohio Department of Transportation (ODOT), *Transportation Facts Book*, Columbus, Ohio, January 2001.

¹¹² Glen Grand, "Which City Should We Emulate, Portland or L.A.?" *Cincinnati Business Courier*, June 15, 2001.

¹¹³ Ohio Department of Transportation, *State of the Transportation System 2000*, Columbus, Ohio, p. 53.

¹¹⁴ Ibid.

¹¹⁵ Ibid., p. 55.

¹¹⁶ *Fact Book 2000*, Ohio Department of Transportation, Columbus, Ohio, Table 8.1, p. 64

¹¹⁷ *State of the Transportation System 2000*, Ohio Department of Transportation, Columbus, Ohio, p. 79

¹¹⁸ ODOT, *Fact Book*, Table 8.5, p. 79.

¹¹⁹ *2001 Mobility Study* (College Station, Texas: Texas Transportation Institute, Texas A&M University).

¹²⁰ Ibid.

¹²¹ Ibid.

¹²² The Institute's definition of congested is not the popular one used in newspaper headlines. Congested does not mean traffic is stopped; rather it is slowed below optimal speeds. Free flow traffic was estimated at 60 miles per hour during uncongested times. During extreme congestion, speeds were assumed to average 32 miles per hour, slightly less than the average of 35 miles per hour for free flowing arterials. During severe congestion, travel speeds on freeways were assumed to average 35

mph, under heavy congestion, 38 mph, and 45 mph under moderate congestion.

¹²³ Robert W. Burchell, Naveed A. Shad, David Listokin, et al. *The Costs of Sprawl—Revisited*. Transportation Research Board Report 39 (Washington, D.C.: National Academy Press, 1998), p. 69

¹²⁴ David T. Hartgen, *Beltways, Traffic and Sprawl: The Empirical Evidence, 1990- 1997* (Charlotte, NC: Center for Transportation Studies, University of North Carolina at Charlotte, September 2000), p. 12.

¹²⁵ *Ibid.*, p. 15.

¹²⁶ *Ibid.*, p. 17.

¹²⁷ *Ibid.*, p. 17.

¹²⁸ The “Short Report” of the *2001 Urban Mobility Study* available at http://mobility.tamu.edu/2001/study/short_report.stm.

¹²⁹ Hartgen, *Beltways, Traffic, and Sprawl*, see pp. 16-17.

¹³⁰ A circle with a half mile radius is equivalent to 0.196 square miles or 125.4 acres.

¹³¹ ODOT, *State of the Transportation System 2000*, p. 55.

¹³² Hartgen, *Beltways, Traffic and Sprawl*, p. 19.

¹³³ Hartgen, *Beltways, Traffic, and Sprawl*, p. 21.

¹³⁴ *Fact Book*, Ohio Department of Transportation, p. 85.

¹³⁵ *Ibid.*

¹³⁶ Jeff Sharp and Elena Irwin, *Overview of Central Ohio Growth and Change*, presented at the Simply Living Conference, session on “Creating Sustainable Communities,” October 21, 2000, Ohio State University.

¹³⁷ *Ibid.*

¹³⁸ Dana Ulrich, “Put a value on open space”, Recorder Publishing Company April 25, 1996. Cited in *The Economic Benefits of Open Space*, Bibliography: Property Values, The Trust for Public Land, 1996.

¹³⁹ See the discussion in Samuel R. Staley, Jefferson G. Edgens, and Gerard C.S. Mildner, *A Line in the Land: Urban-growth Boundaries, Smart Growth, and Housing Affordability*, Policy Study No. 263 (Los Angeles, California: Reason Public Policy Institute, 1999), pp. 11-24.

¹⁴⁰ Samuel R. Staley and Gerard C.S. Mildner, “The Price of Managing Growth,” *Urban Land* (February 2000), p. 20.

¹⁴¹ B. Bolitzer and N.R. Netusil, “The Impact of Open Spaces on Property Values in Portland, Oregon,” *Journal of Environmental Management* 59 (2000), pp. 185-193; Margo Lutzenhiser and Noelwah R. Netusil, “The Effect of Open Spaces on a Home’s Sale Price,” *Contemporary Economic Policy*, in press.

¹⁴² Lutzenhiser and Netusil, “The Effect of Open Spaces on a Home’s Sale Price,” Table 4. The lots in Portland are much smaller than in the Midwest, averaging just 7,040 square feet in the study. Portland lot sizes are now subject to an 8,000 square feet maximum. The houses analyzed in the study included older homes in dense, urban neighborhoods as well as newer homes in lower-density areas of the metropolitan area.

¹⁴³ Electronic correspondence to Samuel R. Staley from Noelwah Netusil, economist at Reed College, July 11, 2001.

¹⁴⁴ This likely underestimates the full impact because housing prices have increased much more quickly than the Consumer Price Index in Portland, and Metro has implemented a conscious policy of reducing lot sizes, increasing the value of existing lots. See the discussion in Staley, Edgens, and Mildner, *A Line in the Land*, and Staley and Mildner, “The Price of Managing Growth.”

¹⁴⁵ *The Economic Benefits of Open Space*, Bibliography: Property Values. Citing Jeff Lacy, “An Examination of Market Appreciation for Clustered Housing with Permanently Protected Open Space.” Center for Rural Massachusetts Monograph Series, Amherst, Massachusetts, August 1990.

¹⁴⁶ Mike McAliney (ed.), *Arguments for Land Conservation: Documentation and Information Sources for Land Resources Protection*, Trust for Public Land, Sacramento, California, December 1993. Cited in *The Economic Benefits of Open Space*, Bibliography: Property Values.

¹⁴⁷ *The Economic Benefits of Open Space*, p. 8.

¹⁴⁸ See Rick Harrison Site Design at <http://www.rhsdplanning.com> and the discussion in Donald R. Leal, “The Market Responds to Smart Growth,” in *A Guide to Smart Growth*, eds. Jane S. Shaw and Ronald D. Utt, pp. 107-118 (Washington, D.C.: The Heritage Foundation and Political Economy Research Center, 2000).

¹⁴⁹ The growing trend in Ohio is to acknowledge consumer demand for more open space and developers are rewarded for doing so. For example, Rob Meyer of Dominion Homes stated in a May 21, 2001, telephone interview that “We tend to have open space allotments in virtually all of the developments we do. A lot adjacent to water or open space will have a premium attached to it.”

¹⁵⁰ Ben Corcoran, The Appraisal Group, telephone interview, May 28, 2001.

¹⁵¹ Interview with the Buckeye Institute, June 2001.

¹⁵² Ibid.

¹⁵³ Elena G. Irwin, *Explaining Sprawl in Exurban Areas: The Role of Open Space*, December 1999.

¹⁵⁴ Data from the Environmental Protection Agency reported in David W. Riggs and Daniel Simmons, *Urban Growth: Volume 1: Air Quality, Automobiles, and Suburban Development* (Washington, D.C.: Competitive Enterprise Institute, 2000), p. 71.

¹⁵⁵ Randal O'Toole, *ISTEA: A Poisonous Brew for American Cities*, Policy Analysis No. 287 (Washington, D.C.: Cato Institute, 1997), Table 2.

¹⁵⁶ Kenneth Green, "Air Quality, Density, and Environmental Degradation," in *Smarter Growth: Market-based Strategies for Land-use Planning in the 21st Century*, ed. Randall G. Holcombe and Samuel R. Staley (Westport, Connecticut: Greenwood Press, 2001), pp. 82-96.

¹⁵⁷ See the discussion in Samuel R. Staley, "Smart Growth, Markets and the Future of the City," *Michigan Forward* (November 2000), pp. 7-11.

¹⁵⁸ Michelle Ames and Todd Hartman, "Growth-control Amendment Fails," *Denver Rocky Mountain News*, 8 November 2000, and Catherine Reagor, "Voters Snub Proposed Growth Boundaries; Plan to Preserve Land Trailing," *The Arizona Republic*, 7 November 2000.

¹⁵⁹ Peter Grant, "The Debate Over Sprawl Has Only Just Begun," *The Wall Street Journal*, 8 November 2000. These economic losses are also called "regulatory takings" since regulation is used as the primary mechanism for using private property for a public purpose.

¹⁶⁰ "The measure poses a potentially huge financial impact. State analysts estimate it would cost state and local governments about \$5.4 billion annually, an amount about equal to the entire state general fund budget for a year," Charles Beggs, "Property Compensation Measure passes," *Oregon Live*, 8 November 2000.

¹⁶¹ See also Samuel R. Staley, "Sprawl Statistics Meaningless If They Oversimplify," *Houston Chronicle*, July 22, 2001, <http://www.rppi.org/072201.html>.

¹⁶² These calculations are based on "net" density, excluding sidewalks, driveways, roads, etc. The building is also assumed to be 60' by 50' with a 25' by 30' yard. Thus, the lot is 5,100 square feet. To calculate the density based on "gross density," we would add about 30 percent to the total land area, bringing the total to 6,630 square feet. This translates into about 212 people per acre, or 135,915 people per square mile.

¹⁶³ Developed land has increased by 20,400 square feet to 25,500 square feet. This is four times greater than the original lot.

¹⁶⁴ National Association of Homebuilders, <http://www.nahb.com>.

¹⁶⁵ See the discussion in Staley, Edgens, and Mildner, *A Line in the Land*, pp. 19-23.

¹⁶⁶ Justin Brown, "Where Urban Sprawl Has Some Backers," *Christian Science Monitor*, June 22, 2001.

¹⁶⁷ Ibid.

¹⁶⁸ Calculations based on farmland value data from the U.S. Department of Agriculture, Economic Research Service, *1997 Census of Agriculture*. Alternatively, the state could purchase the development rights to the land, which would reduce the total outlay per acre. Unfortunately, reliable data on the value of development rights is not available. In many cases, however, the price may be higher than this metropolitan average since the land will likely be in highly desirable areas of a county. In rural Lancaster County, Pennsylvania, for example, land prices have been driven to \$12,000 per acre. See the discussion in Keith Wiebe, Ababayehu Tegene, and Betsy Kuhn, *Partial Interest in Land: Policy Tools for Resource Use and Conservation*, Agricultural Economic Report No. 744 (Washington, D.C.: U.S. Department of Agriculture, Economic Research Service, November 1996), p. 13.

¹⁶⁹ In 1997, Ohio had 14.9 million acres in farms. Land in farms fell about 100,000 acres per year from 1993 to 1996, then stabilized in 1997. If the state continued to lose about 100,000 acres per year in 1998 and 1999, Ohio would have about 14.7 million acres of land in farms. See *Farms and Land in Farms: Final Estimates 1993-1997*, Statistical Bulletin No. 955 (Washington, D.C.: U.S. Department of Agriculture, Economic Research Service, January 1999), p. 7.

¹⁷⁰ Currently, the Conservation and Reinvestment Act (H.R. 701) is winding its way through Congress. The legislation would make almost \$3 billion available to states for land conservation efforts. About \$54 million is slated to go to Ohio annually if the legislation passes. Even if the legislation passes, the amount of land capable of being preserved is small compared to general land use trends in the U.S. See Greg VanHelmond and Angela Antonelli, "Why CARA is Fiscally Irresponsible and A Threat to Local Land use Decisions," *Backgrounder No. 1370* (Washington, D.C.: Heritage Foundation, May 9, 2000), p. 7.

¹⁷¹ Based on \$1,333 per acre; 14.1 million acres of farmland, 8 million acres of forest.

¹⁷² Brian Williams, "Back to the future of 'new urban' homes," *Columbus Dispatch*, December 11, 2000, A1.

¹⁷³ Samuel R. Staley, "Reforming the Zoning Laws," Jane S. Shaw and Ronald D. Utt, eds., *A Guide to Smart Growth: Shattering Myths, Providing Solutions*, The Heritage Foundation and The Political Economy Research Center, 2000, p. 61.

¹⁷⁴ Brian Williams, "Some say zoning is bad for good neighborhoods," *Columbus Dispatch*, December 11, 2000, A1.

¹⁷⁵ Ibid.

¹⁷⁶ Ibid.

¹⁷⁷ Ibid.

¹⁷⁸ "John Charles, environmental policy director for the Cascade Policy Institute in Portland, notes, 'growth boundaries cause such a shortage of land that developers will eventually do in-fill projects on

odd-shaped parcels and other lands that would not ordinarily become developed. This loss should not be minimized because vacant lots have almost as much value as parklands for many urban residents,” Samuel R. Staley, *The Sprawling of America*, p.56.

¹⁷⁹ “In fact, to meet Metro’s density requirements, ‘Metro is planning on the complete destruction of nearly all farmland inside the growth boundary,’” *Ibid*.

¹⁸⁰ Randall O’Toole, *Why Metropolitan Planning Doesn’t Work*, The Thoreau Institute.

¹⁸¹ This is true when comparing daily traffic volume to the percentage of traffic served by freeways and the amount of roads per person in metropolitan areas. Pearson correlation coefficients, which measure how strongly two variables are related to each other statistically, show a very strong positive relationship. (A coefficient of one represents perfect correlation: traffic volume would match freeways capacity exactly. A coefficient of zero would represent no relationship.) When daily VMT is correlated with the share of traffic served by freeways, the correlation coefficient is 0.87, indicating a very strong correlation. When daily VMT is correlated with the amount of roads per capita, the correlation coefficient is 0.80.

¹⁸² This is recognized in the research. See the discussion in Burschell, Shad, and Listokin, *The Costs of Sprawl—Revisited*, pp. 68-72.

¹⁸³ The relationship, however, is not strong. The Pearson Correlation Coefficient between roadway per 1,000 population and daily VMT per person is -0.18 .

About the Authors

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Sam Staley is director of the Quality Growth Initiative at The Buckeye Institute for Public Policy Solutions. He also directs the Urban Futures Program for the Reason Public Policy Institute, a national think tank based in Los Angeles. From September 1990 through March 1995, he was a full-time economics professor at Wright State University teaching at graduate and undergraduate levels. He has also been a research consultant to local government, university-based research centers, and independent think tanks since 1987.

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Dr. Staley formerly served as a trustee for The Miami Valley School, an independent college preparatory school in Dayton, Ohio. His other community activities include serving as a member of the City of Bellbrook (Ohio) Planning Board, former chair of Bellbrook Charter Review Commission, and former member of the Bellbrook Board of Zoning Appeals and Property Review Commission. His professional memberships include the American Economic Association, the American Planning Association, the Urban Affairs Association, and the Ohio Association of Economists and Political Scientists.

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