

IV. The Costs of Growth

Local, State, and Federal governments and the public they represent incur costs from development, some of which are borne directly by the land uses replaced. However, many of the costs of growth are apparent only after the development is in place. The consequences of growth for the communities and the benefits of retaining rural lands also need to be accounted for in judging the need for measures to control growth.

Poorly planned, extensive low-density, fragmented patterns of settlement impose a variety of direct and indirect costs on individuals and society. These costs can be approached in two ways. First, it is important to enumerate the costs imposed by new development in previously rural areas—real impacts and their monetary and nonmarket costs that accompany the replacement of rural landscapes with more developed ones. Second, urbanization has hidden costs because it causes us to forgo the benefits previously enjoyed from rural landscapes. Because low-density development is so common, we also examine possible benefits of low-density settlement patterns that may act as incentives or motives for that kind of growth.

Costs Imposed by Growth

There is a general consensus in the planning literature that low-density development costs more than compact development. For example, compared with more compact forms of development, low-density “sprawl” can result in (Burchell et al., 1998):

- Greater capital costs associated with building new infrastructure;
- Greater vehicle miles traveled and, consequently, higher levels of automobile emissions;
- More adverse fiscal impacts when annual tax revenues from residential uses are inadequate to cover the annual costs of providing public services;
- Higher rates of conversion of prime agricultural lands and lands with fragile environments.

The following reviews key findings synthesized by Axelrad (1998) from three major research investigations on this topic completed by Frank (1989); Duncan (Florida Community Case Studies, 1989); and Burchell (NJ, Michigan, City of Lexington, Delaware Estuary, South Carolina Studies 1992-1997). For counter-argu-

ments, however, see Gordon and Richardson (Winter 1997, Spring 1997) and Peiser (1989).

Infrastructure Costs

The capital cost per dwelling unit of providing public services and infrastructure for new residential development varies by density, lot size, type of dwelling unit (single-family versus multifamily, detached versus attached), proximity to service areas, population characteristics, and utility capacity utilization. In a landmark study based on the characteristics observed in numerous developments using different patterns, Real Estate Research Corporation constructed hypothetical communities of 10,000 housing units in patterns ranging from low-density “sprawl” to high-density planned developments (RERC, 1974). They found that “sprawl” created 74 percent greater capital costs than high-density planned development, primarily due to higher land, residential construction, road, and utility costs. Public capital costs for streets and utilities were 120 percent greater for “sprawl” than for high-density planned development. Operating and maintenance costs were 13 percent higher with “sprawl.”

Windsor (1979) recalculated these impacts for standardized 1,200-square-foot units in different housing types (figure 13). The RERC study has been criticized in part because assumptions relating to population and the sizes of dwelling units across community types influenced the results. In a comprehensive review of major studies conducted to determine the costs imposed by “sprawl” in various parts of the country, Burchell et al. (1998) found that infrastructure costs for “sprawl” development were 5 to about 25 percent higher than for compact development. (An exception is a study by Peiser (1984), which found that road infrastructure costs were lower with unplanned versus planned development.) Burchell et al. also found that school and municipal operating costs may be 2-5 percent less annually under compact development.

These calculations capture the inevitable economies of scale lost with low-density development: a fire hydrant serving a block with 20 families is more cost efficient than one serving a block with 5 families (U.S. House, 1980, p. 6). A more subtle cost not included above is the opportunity cost of leaving existing urban capital underutilized and losing support for maintaining exist-

ing urban institutions like schools, public facilities, and churches.

In five studies of managed growth in New Jersey, Michigan, South Carolina, Lexington, KY, and the Delaware Estuary Region, low-density development generally resulted in greater public capital and operating costs for infrastructure (Axelrad, 1998; figure 14). Costs of providing local roads were about 25 percent higher, new schools were about 5 percent higher, and utilities were about 20 percent higher than for planned development. Overall, capital and operating costs for public infrastructure are from 5 to 63 percent lower with planned development than with "sprawl" (figure 14). The annual costs required to provide services and infrastructure to a new dwelling unit are 20-30 percent of total annual costs (annual capital plus annual operating and maintenance costs).

Low-density development incurs private capital costs, both because it increases the cost of building housing, and because demand for higher-density housing is reduced. Burchell found that private housing savings with more compact development ranged from 2.5 to 8.4 percent of costs under "sprawl" development.

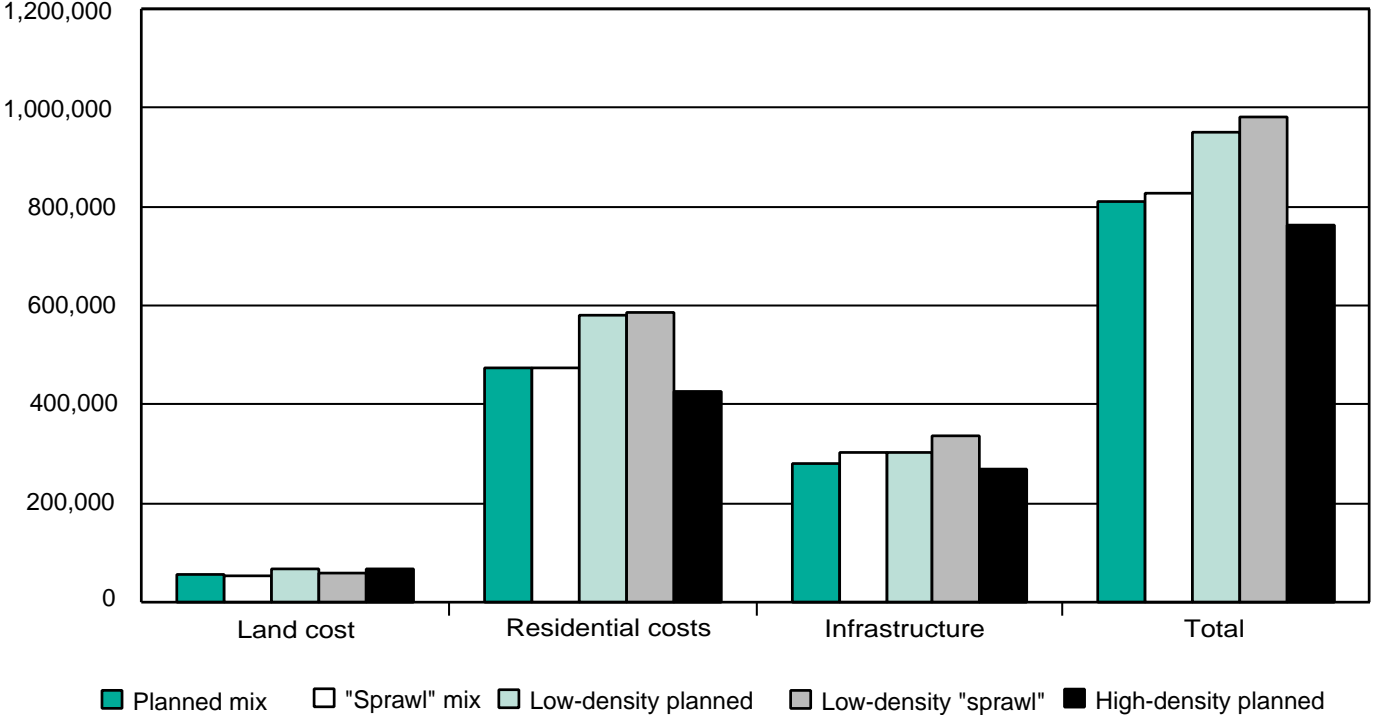
That low-density development results in higher capital costs is not necessarily a public policy concern, unless these costs are borne by all the citizenry, instead of just the new residents of these developments. In a study of the incidence of costs from a 200-acre development near Lexington, KY, less than 1 percent of more than \$100,000 in increased costs was paid by the new residents (Archer, 1973). Local governments are increasingly using development exactions to force developers, and their eventual customers, to internalize infrastructure costs of roads, sewers, water supply, and other investments, rather than pass them on to existing residents (Fischel, 2000, p. 412; Altshuler et al., 1993; Babcock, 1987). However, such exactions have been imposed only on relatively large developments that are subject to considerable planning and site review.

Transportation

Quantitative data show a strong relationship between low-density development and increased transportation and travel costs. Less compact development generates more vehicle miles traveled (VMT) than more compact forms of development. HUD reports VMT nationwide increased sixfold between 1950 and 1998 and by 25

Figure 13
Private and public capital costs by community type

Costs, thousands of 1996 constant dollars



Source: Windsor, 1979.

percent in the last 10 years (HUD, 2000). Daily trips per household were up 35.2 percent between 1977 and 1995 and vehicle miles were up by 38.1 percent. Low-density development creates longer distances traveled and increases dependence on the automobile—two of the three primary factors behind the trend to increased VMT nationally (the third is changing demographics). The expansion of commuter distances and traffic volumes further taxes rural roads and leads to highway expansion. Some argue that new roads lead to “induced travel demand” and that a better solution to congestions is to shift travel behavior, travel mode, route, and time of day (U.S. HUD, 2000). In addition, low-density development leads to a less cost-efficient and effective public transit. These findings are repeated across the country:

- Household transportation expenditures ranged from 17 to 22 percent of household spending in the 10 most “sprawling” cities, according to a study by the Surface Transportation Policy Project. Households in 7 of the 28 cities studied that had the greatest “sprawl” spent at least 20 percent more on transportation than households in the 7 cities with the least “sprawl” (Surface Transportation Policy Project/Center for Neighborhood Technology, 2000).
- Based on a 1994 study of 28 California communities (controlling for levels of transit service and vehicle ownership), a doubling of residential density was

associated with a 16-percent decline in vehicle miles of travel (Holtzclaw, 1994).

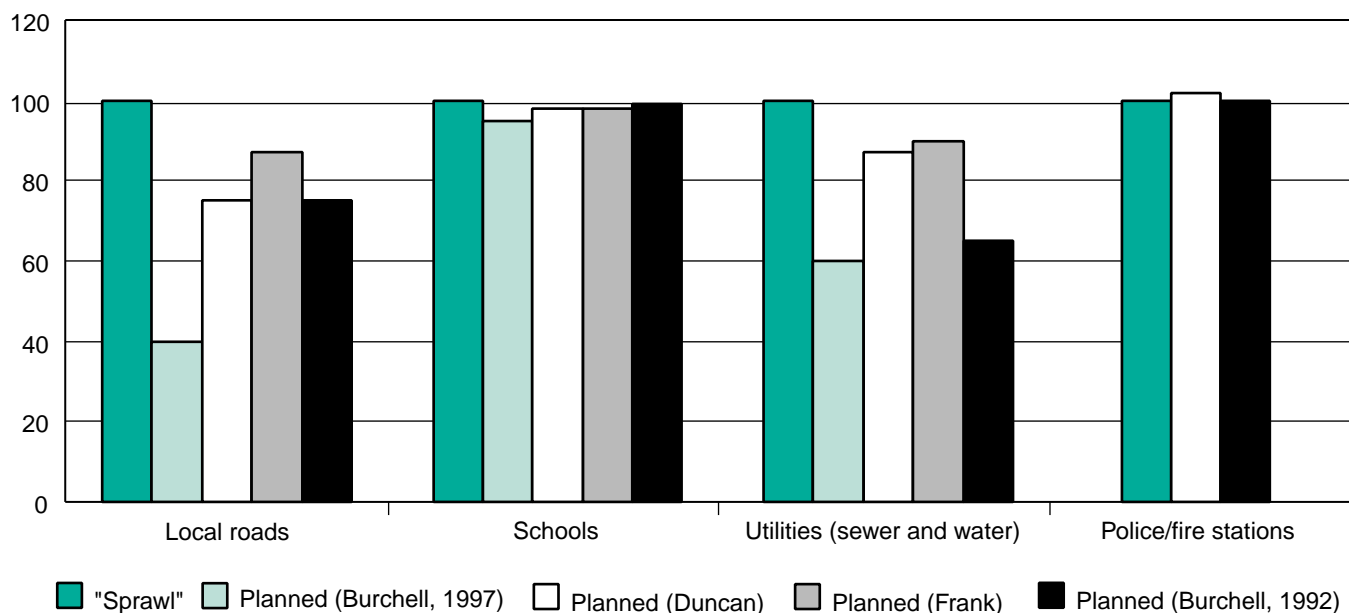
- A simulation comparing future growth patterns in Portland, Oregon, found that a “growing out” pattern (with new development continuing at current types and densities) resulted in an estimated 15 percent higher average daily VMT than in a “growing up” pattern that kept all growth within the existing urban growth boundary by reducing lot sizes and introducing more multi-family housing (Portland Metro, 1994).
- Between 1970 and 1994, under the prevailing low-density trends in development, the Chesapeake Bay area population grew by 26 percent while VMT increased by 105 percent (Chesapeake Bay Commission, 1996, cited in Axelrad, 1998).
- An econometric study using 1995 data from the Nationwide Personal Transportation Survey showed a statistically significant 24- to 60-percent increase in household vehicle mileage in metropolitan areas compared with the central city (Kahn, 2000).

Impacts on Taxpayers

Concern about development includes its relationship to taxes and the costs of providing services. New development is a “shock,” whose effects ripple through the economic, fiscal, environmental, and social fabric of a community, influencing employment, income, govern-

Figure 14
Relative capital costs of public infrastructure

Percent relative to sprawl



ment tax revenues, quantity and quality of public services, and nonmarketed “public” goods related to the quality of life and the environment. Increasingly sophisticated and expensive methods can be used to estimate more or less of the fiscal and economic effects of urban development. These methods include Cost of Community Service studies (COCS), fiscal impact analysis, and cost/benefit analysis (see box, “Methods for Estimating Growth’s Economic Impact”).

Costs of Community Services

In recent years, COCS has been widely applied, in part because of its relatively low-cost, straightforward methodology, and the intuitive appeal and ease in understanding the results. The American Farmland Trust developed this approach in the early 1980’s and conducted a large number of studies (AFT, 1986 a and b, 1991, 1992, 2000; Hartman and Meyer, 1997).

The more than 80 cost-of-community-services (COCS) studies conducted across the country found that residential development provides less tax revenue than it consumes in public service expenditures. According to these studies, farm and open space lands contribute more to tax revenues than they use in public service expenditures, but contribute much smaller proportions of total community tax revenues than does residential development (6.4 percent vs. 66 percent).

The ratio of service expenditures per dollar of revenue generated by residential land is greater than 1 (figure 15). The studies conclude that farmland and open space lands consistently make a positive net contribution to community budgets, even though agricultural lands generate relatively little tax revenue. A large proportion of the disparity in service costs between residential and farmland uses is attributable to the costs of educating children. Public schools account for 60-70 percent of spending in typical communities, constituting the single largest expenditure category (Prindle and Blaine, 1998).

COCS studies do not provide a full picture of the costs and benefits of urban growth, and consequently are subject to criticism (see box, “Methods for Estimating Growth’s Economic Impact”). New residents do not just pay taxes and demand services; they contribute to the economic base of the community. Population changes affect the local labor force, which in turn changes employment, income, income taxes, business activity, and property and sales taxes. This economic multiplier effect, not captured in COCS studies, can generate significant revenues in the form of additional sales and services.

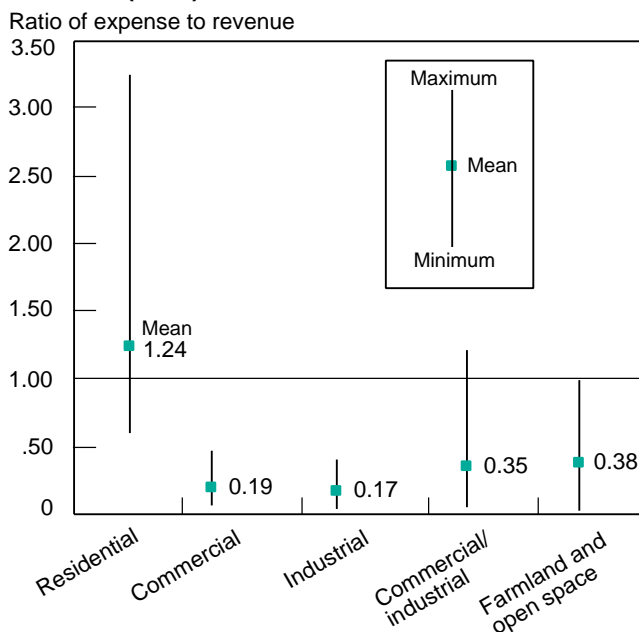
Further, COCS studies take a “cost theory” of taxation, which does not consider how growth increases individual wealth through increases in property values. Given that the supply of land is fixed, increased demand for land due to growth increases land values, and thus the total property tax revenue. If growth brings increased public expenditures that increase services and the quality of life, then the benefits of this higher quality of life will also be capitalized in land values. Of course, negative effects of growth (e.g., loss of landscape amenities and sense of community, increased congestion, and reduced air and water quality) also change land values.

Fiscal Impacts

Fiscal impact analysis focuses on the net cash flow to the public sector from new development, including those indirect or secondary effects discussed above (see box, “Methods for Estimating Growth’s Economic Impact”). Fiscal impact analysis requires projections of changes in the local economy, tax revenues, and the cost of public services, which COCS studies do not make.

Studies find that for relatively low annual growth rates, local per capita government spending does not increase rapidly (Kelsey, 1993; Kelsey, 2000, Lincoln Institute, 1993; Esseks et al., 1998). For higher growth rates, however, per capita spending begins to increase dramatically. Whether increases in per capita spending reflect

Figure 15
Ratio of community service costs to tax revenues (n=85)



Source: American Farmland Trust, 2000.

Methods for Estimating Growth's Economic Impact

Cost of Community Services—COCS studies allocate a community's current budget to the category of land use that generated the tax revenues and consumed the public services. Revenues include taxes and nontax fees; costs include the local share of expenditures for education, social programs, public health and safety, highway maintenance, other public works such as sewer and water, and local government. The local government's income and expenses are allocated to various land use categories, usually residential, commercial/industrial, and farmland and open space, for a recent year. To trace the flow of tax revenues and public service expenditures to their associated land uses, the analyst must reorganize local financial (budget) records at a point in time. Conclusions drawn from COCS studies implicitly assume current infrastructure and services, thus the results are community-wide averages. Deller maintains that though the results are consistent, the implications drawn from the results may be wrong. Results can be affected by allocation of costs between States (or other regional authorities or the Federal Government) and the local jurisdiction being studied. The size of the government being studied and whether it includes commercial and industrial enterprises that support the residential development also affect the results. Timing of major capital purchases is also important. Further, the ratios reflect average community revenues and expenditures at a point in time, not marginal costs and revenues, which are particularly affected by capacity and congestion considerations. Deller cites the following methodological and theoretical flaws associated with COCS studies:

- **Aggregation across land use types**—The residential group makes no distinction between important residential categories including mobile homes, single-family dwellings, apartments, or retirement homes.
- **Intensity of manufacturing**—There is no distinction between low-intensity manufacturing and large-scale industrial uses.
- **Basis measure bias**—COCS uses a gross dollar basis to make comparisons, and thus predetermines the outcome of the study. If the basis of ratio comparison was “per acre” rather than “per dollar,” commercial and industrial uses would advance in importance.
- **Capacity to add development is ignored**—Whether existing public utilities have excess capacity is crucial to determining the impact of any development.

- **Economies of scale ignored**—The high fixed cost of many public services means that spreading that cost over more residents will lower the per resident costs.

- **Nature of public goods ignored**—COCS treats public goods (those with nonrival, nonexcludable characteristics) as if they were private goods.

Fiscal Impact Analysis—Fiscal impact studies take the perspective that residential developments create economic changes that are not reflected in existing community budgets. New residents contribute to a community's economic base in ways that are not captured by COCS studies. In essence, fiscal impact studies attempt to incorporate the multiplier effect that is associated with any new economic activity generated by the new residential development. In general, fiscal impact studies are of two forms: one that is project specific, such as a new housing development or new industry, and one that takes an area-wide perspective. In either case, fiscal impact studies project public costs and revenues under alternative land development scenarios, but remain focused on the local government budget, not the full social cost of the new economic activity.

Costs and Benefits—Fiscal impact analysis does not account for an array of nonmarket costs and benefits that change when farmland is converted to urban development. These nonmarket effects are not reflected in changes in government expenditures and revenues, nor in land values or other market price signals. Many of the costs are related to externalities including environmental degradation, traffic congestion, and loss of open space. Other intangible costs include noise, crime, and changes in community character. If additional development changes the quantity or quality of these nonmarket characteristics of the rural environment, then consumers' willingness to pay to preserve positive characteristics and avoid negative ones should be accounted for in a complete analysis. Such complete cost/benefit analyses depend on estimating nonmarket impacts so the cost of such studies is often prohibitive. Studies of this kind must rely upon expensive nonmarket valuation techniques, such as hedonic price analysis, travel cost models, or stated preference surveys. Sometimes results from a limited study are “transferred” to other or broader applications using what are called “benefits transfer” procedures.

purchases of higher quality services is not clear. Ladd (1994, p. 661) concludes that they do not:

“Higher growth-related per capita spending primarily reflects the combined effects of greater density and increased local spending shares. In sum, established residents in fast-growing areas may experience declines in service quality, as well as rising local tax burdens.”

As described above, low-density development results in greater public capital and operating costs for local roads, schools, and utility infrastructure (Windsor 1979, RERC 1974). At typical urban-suburban densities, per capita infrastructure costs fall as densities rise. At very low densities, the use of septic systems, open drainage, and unpaved rural streets without curbs and sidewalks may result in low costs, but the equally low quality of such services becomes evident as development increases and these services prove inadequate.

Impacts on Landscape, Open Space, and Sense of Community

Growth involves more than traffic congestion, infrastructure costs, and altered public finances. It alters the landscape, the natural environment, and other factors important to quality of life. For example, low-density development consumes open space in the surrounding countryside, so residents who once had pleasant views of nature now have views of other suburban houses and shopping centers. In some cases, growth can destroy the very scenic amenities that once attracted people. This section draws, in part, on the comments of local government and business representatives from eight nonmetropolitan counties experiencing growth over the last two decades (Reeder et al., 2000).

Community Spaces—The loss of open space can stymie local recreation and cultural activities. For example, a publicly used lake or beach may become fenced off private property. A place known for hunting or fishing may be closed off to public access. Many communities use undeveloped lands for public activities, such as county fairs and other local festivals. Other such open spaces may be the sites of historic events, such as civil war battlegrounds. The pressure of development can consume these sites and, in the process, obliterate local historical landmarks.

Retail Relocation—The relocation of key retail businesses and services (such as the post office) to open

space on the periphery can drain the vitality of the town’s center, or create center-less communities. Retail restructuring has negative effects on some downtown businesses, while creating congestion problems in the fringe. For example, Tim Sheldon, of the Economic Development Council of Mason County, Washington (near Seattle), noted that “Wal-Mart and other national chains had moved into the fringe area of new development, emptying the county’s downtown area, where small businesses were hurting” (Reeder et al., 2000). However, over time many town centers in growing communities eventually redevelop with tourist and specialty shops. Brenda Johnson, with the Gilmer County Chamber of Commerce (north of Atlanta, Georgia) said “Gilmer’s new Wal-Mart in a strip mall on the fringe was causing incredible congestion at the existing intersection; and the new retail on the fringe of town had killed a few downtown stores, but the county’s downtown area had become a thriving tourist and specialty shop area with smalltown charm.”

Sense of Community—In extreme cases, development can make it difficult to tell where one town ends and another begins. When town boundaries are obscured, the sense of community, which is important in generating civic pride, volunteerism, and support for local public services and community activities, may be diminished. The sense of community may also be impaired when developments are not open to the public. Gated communities are often developed at low densities, and may be well-planned and provide some of their own infrastructure and services. However, these communities often differ in demographic characteristics from the outside community, typically wall out their neighbors, and often think and act as if they are a community in themselves. This can create a significant divide with the surrounding town on public policy issues such as schools and economic development.

Environmental Changes

Growth poses numerous environmental challenges. Because the environment is linked to other aspects of society, such as public health and the economy, environmental implications from growth can have various adverse impacts on local communities and require many and diverse policies to prevent or mitigate these impacts (table 2).

Land Use and Soil Quality—Studies of land consumption associated with low-density growth show that greater land consumption stems from three characteristics:

Table 2—Growth-related issues, impacts, and possible solutions

Growth issue	Environmental issue	Impacts	Possible solutions
Haphazard expansion of suburban communities	Water runoff	Increased pollution of streams, rivers, and marine environments Increased flooding Loss of biodiversity in streams Soil erosion Decreased recharge of aquifers Lower drinking-water quality	Coordinated land use planning More compact communities Greenspace buffers and preservation Watershed protection
Poor land use planning	Consumption of open spaces	Loss of contiguous greenspaces Loss of natural habitats for native species Stressing of endangered species Loss of wetlands Fragmentation and loss of forestland Increased flooding Increased mountain mudslides and slope collapses Increased prevalence of non-native, invasive species Health impacts from proximity to wild animals and confined-animal feeding operations Loss of open space Less access to recreation areas Higher temperatures or “heat islands” in metropolitan areas Reduced plant photosynthesis	Land preservation Priority development areas Growth boundaries Purchased development rights Urban revitalization and infill development Higher impact fees for developers Expand open spaces in urban and suburban areas Strengthened zoning Consistency in zoning based on comprehensive plan Public education
Traffic congestion	Air pollution	Increased smog and other pollutants Increased health impacts, such as asthma Noncompliance with Federal standards and limits on new road construction	Improved transportation, land use planning Mixed-use development Urban revitalization Mass transit Telework
	Public safety	Increased response times for fires and medical emergencies Road rage	Traffic congestion relief efforts Public education
	Energy use	Wasted petroleum	Improved transportation planning Flexible work hours and telework
Urban depopulation	Contaminated land and buildings	Increased human exposure to toxic substances	Brownfields development projects
	Public infrastructure	Decreased maintenance and greater service interruptions for water, sewer, road repair, and waste disposal	Urban revitalization and increased growth Revenue sharing with suburbs Stronger regional planning

After Hirschorn, 2000, p. 12

- low density of settlement;
- unlimited outward extension of growth;
- “leapfrog” or fragmented development pattern (Axelrad, 1998).

Low-density development results in a greater loss of agricultural lands than more compact development. However, studies have shown that, nationwide, the amount of prime and class I-IV cropland lost in urbanizing areas was proportional to the amount of those soils found in the area (Heimlich and Bills, 1997; Heimlich and Krupa, 1994; Vesterby and Krupa, 1993; Vesterby et al., 1994). Low-density patterns of development result in a greater loss of sensitive environmental lands, including wetlands, flood plains, critical habitat, aquifer recharge areas, stream corridors, and steep slopes.

Better planned, more compact settlement patterns can often avoid converting such lands, incorporating them into open space and environmental protection zones. Studies by Burchell (1992-97) and Landis (1995), summarized in Axelrad (1998), estimated such land consumption savings (figure 16).

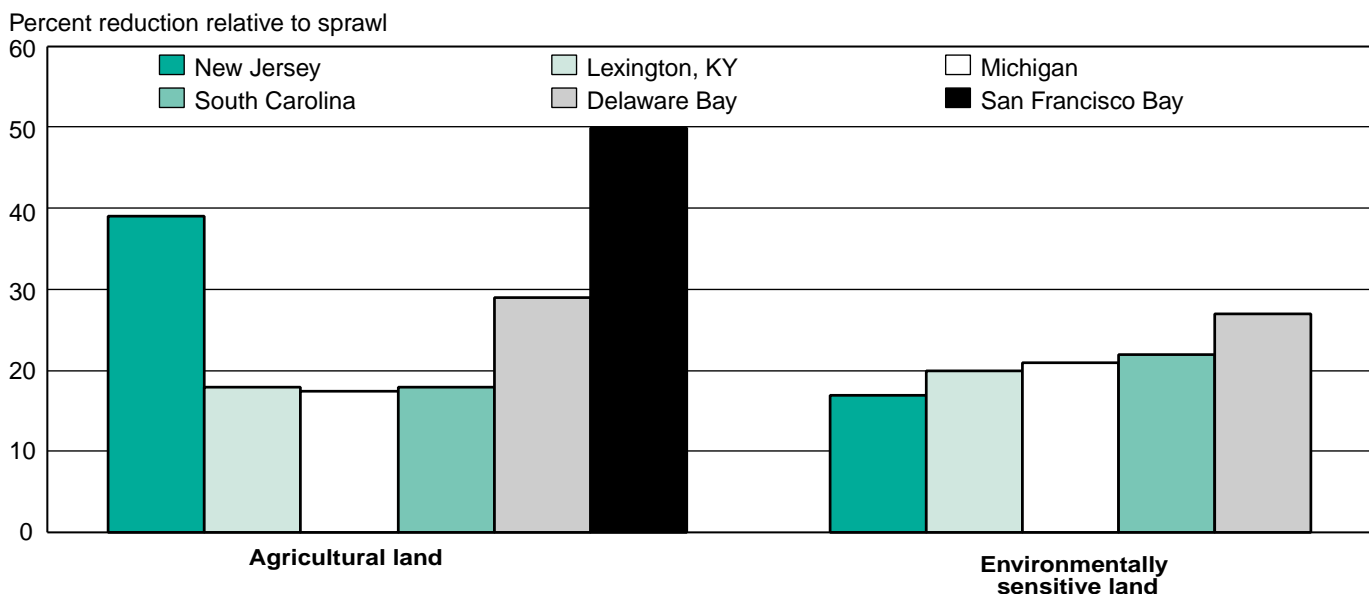
Wildlife Habitat—Development disturbs, pollutes, and destroys the natural habitats for various native species when it consumes wetlands, forests, alpine, and desert terrain. Insecticides and fertilizers used on lawns can

have significant negative effects on wildlife. In some cases, Federal or State governments will cause communities to restrict development and related activities to protect wildlife. For example, Bob Fink, of Mason County’s planning office, noted that “because of a new series of endangered species announcements covering several species of fish, his county may change its development regulations.” However, not all wildlife effects are bad. For example, some types of developments provide protected green space or parkland that creates mini-ecosystems where habitat-generalist species and those that can fly between fragments can flourish (Lovejoy et al., 1984, Whitcomb et al., 1981).

Growth seriously fragments wildlife habitats. Habitat fragmentation is often singled out as a principal threat to the preservation of biodiversity (Harris and Gallagher 1989; Wilcox and Murphy 1985; Noss and Cooperrider 1994). The negative effects of fragmentation on biodiversity are numerous, and can be grouped into four major categories:

- Reduction in total habitat area. Habitat remnants support fewer species and smaller populations of the same species than larger swaths;
- Loss of wide-ranging, low-density, and habitat-specialist species. Mountain lions, which have ranges that can exceed 1,000 square kilometers (Hemker et al. 1984) are now extinct in a recently isolated habitat

Figure 16
Savings of agricultural and environmentally sensitive lands, compact growth versus "sprawl"



Sources: Studies reported in Axelrad, 1998.

fragment in Orange County, California. Habitat interior dwellers, such as some forest birds, may be locally extinct from fragments of 1 square kilometer as studies in eastern North American deciduous forests have shown (Whitcomb, 1977; Wilcove et al., 1986);

- Increased “edge effects,” or the microclimatic changes that occur along power line corridors, roads and urban development which favor exotic species often at the expense of native and interior species (Newmark, 1987); and
- Increased extinction risk from demographic, environmental, and genetic variances (Menges, 1992).

Urban development is one of the principal causes of wetland loss. In 1985, 85 percent of Maine’s wetlands were visible from a road or within 2,000 feet of a road, and thus of limited habitat value. Of Maine’s 2,700 lakes, 200 have been harmed by development, and 300 are at risk (Maine State Planning Office, 1997).

Between 1982 and 1992, the National Resources Inventory showed that 89,000 acres of wetlands were lost to urban uses per year, 57 percent of total gross wetland loss (Heimlich et al., 1998).

Development of roads in formerly rural areas creates increased opportunities for collisions between wildlife and new urban residents. The Humane Society and the Urban Wildlife Research Center estimate that more than 1 million large animals are killed annually on U.S. highways. Roadkills usually increase with traffic speeds and volumes. Studies in the state of Florida indicate that road kills are the primary cause of death for most large mammals, including several threatened species. Some animals have an aversion to roads, which may affect their behavior and movement patterns. For example, black bears cannot cross highways with guardrails. Other species become accustomed to roads, and are therefore more vulnerable to harmful interactions with humans. By forming a barrier to species movement, roads and development fragment and isolate wildlife populations, preventing interaction and cross breeding between population groups of the same species. This reduces population health and genetic viability. Development and road construction and use introduce a variety of noise, air, and water pollutants. Loss of habitat, invasion of exotic species, alteration of watershed hydrology through changes in water quality and water quantity, stream channels, and groundwater all accompany development, as does increased access

by hunters, poachers, and irresponsible visitors (Litman, 1999).

Water—Many of development’s health-related issues involve water. For example, much of the development in the countryside involves homes with on-site septic systems, which often cause greater water pollution problems than municipal sewage systems. While many of the bigger developments are hooked up to municipal or county water and sewer systems, these systems can sometimes overflow, particularly during heavy storms, causing significant pollution problems. Some developers build their own wastewater treatment plants, and these systems sometimes prove to be inadequate. “These private developer-built systems sometimes prove to be unacceptable in quality. This happened recently in Lyon County (Nevada), and the county ended up having to pay for upgrades and repairs to these systems to meet public standards,” according to Mark Clarkson, manager of Lyon County’s Utilities Division.

The type of land use, and particularly its density and the amount of impervious surface, affects the amount of pollutants in storm water runoff. More intense uses engender more pollutants, and large impervious surfaces lead to greater volumes of runoff and more pollution. The original “Costs of Sprawl” report (RERC, 1974) estimated that low-density “sprawl” generated the most sediment, biological and chemical oxygen demand, nitrogen and phosphorus runoff, and suspended solids and fecal coliform bacteria of any development pattern.

A New Jersey study of different urban development patterns found that compact development would generate significantly less pollution than low-density development for all categories of pollutants (Burchell, 1992). The reduction ranged from over 40 percent for phosphorus and nitrogen to 10 percent for lead (figure 17). The study noted that, in some places where development is particularly dense, water quality will deteriorate, but in general water quality will be better with planned growth than with unplanned development.

Another problem, particularly in the West, involves limited or declining water supplies. Many new homes in the countryside use on-site wells for water, and in some cases underground water supplies are declining. This problem is exacerbated by less natural replenishing of underground water due to increased water runoff caused by increased area of impervious surfaces, such

as roofs, roads and parking lots, and the building of sewers.

Floods and fires can become more significant concerns as more people move to the countryside (Esseks et al., 1998). For example, Rob Nesbitt, of the Lamoille County Planning Commission (near Burlington, Vermont) reported that "Lamoille County has had a history of floods. None of our water bodies have flood control dams on them." Development not only raises the stakes of life and property loss, it may also help cause or aggravate floods and fires. For example, construction often causes erosion which fills up streams and increases the likelihood of floods, and the increased area of impervious surface increases flood peaks. Development may add to heat retention, eliminate wetlands, and result in reduced forestland management, resulting in increased fuel and adding to the threat of fires.

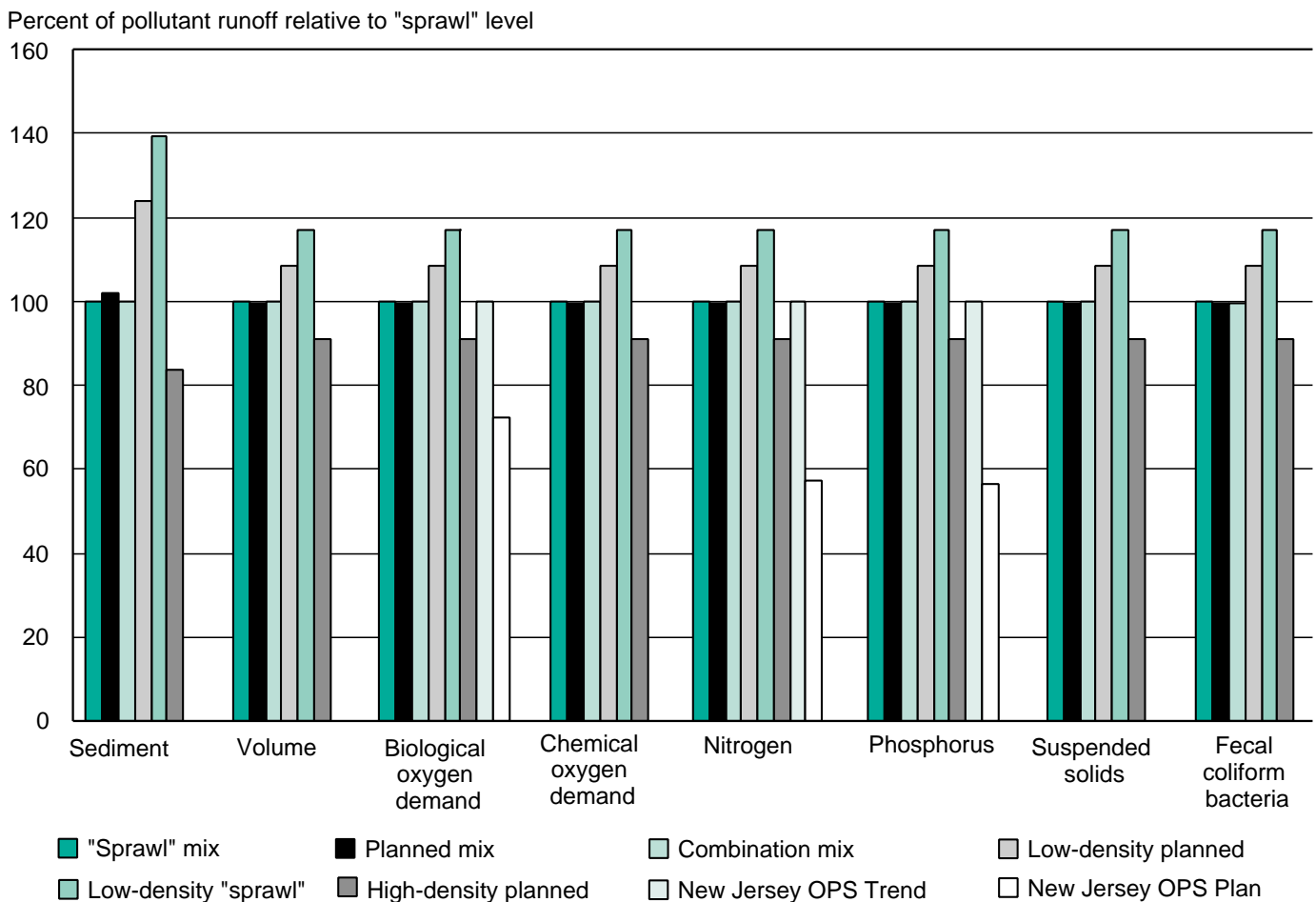
Air Quality—Air pollution is sometimes an important environmental issue in areas with high rates of commuting, where ground level ozone (smog) emitted from autos creates significant health concerns. When the level of air pollution exceeds EPA standards, Federal law requires that planning be aimed at reducing air pollution levels, or the State may be penalized by reductions in Federal highway aid.

Other Quality of Life Issues

Aside from traffic congestion, other quality of life issues affected by growth are the quality of education and the affordability of housing.

Education—Many are drawn to these rapidly growing areas by the perception that schools are of better quality than those in the central cities. However, newcomers

Figure 17
Water quality impacts by community type



Sources: RERC, 1974; Burchell, 1992
New Jersey Office of State Planning Trend was for existing mix of development; Plan was for greater density.

often demand improvements after they arrive. In addition, the influx of new students is so rapid and unplanned that schools can quickly become overcrowded. Even in places that plan well ahead for the incoming school populations, some problems remain for schools in growing areas. For example, according to Pete Kelly, school superintendent for Citrus County, Florida, “Many schools are already built in the developing areas, however there are too many developing areas to build high schools in every one. With the population spread far and wide, long bus trips are required to transport students to the high schools.”

While demands for schools and other services are increasing, many growing communities experience slower growth in tax base and expendable revenue, due to the tendency of commercial and industrial development to lag behind residential growth. Without concurrent growth in the commercial and industrial tax base, schools often must make cuts in current spending per pupil. In addition, because most of these places find that their new student population is above the poverty level, State and Federal aid does not grow proportionally with student populations. As a result, many school systems in growing communities are constantly playing catch-up in school construction, and are hard pressed to come up with sufficient tax revenues to maintain education quality.

Affordable Housing—Affordable housing is another issue of concern. Though single-family housing may be cheaper on the fringe than in central cities or the inner suburbs, not much housing is available at prices that low-income individuals or families can afford. In some cases, local zoning provisions exacerbate this situation by requiring more expensive large-lot development. For example, Commissioner John Metli of Elbert County, Colorado (near Denver), said “Elbert County’s average home costs \$225,000—up from \$150,000 just 5 years ago, and this lack of affordable housing is self-inflicted, because regulations are more stringent on the 5-acre lots, making it more economical to buy and build on a 60-acre lot than on a 5-acre lot in a high-priced development.”

Although the lack of affordable housing may not be perceived as a problem by most local residents, it becomes a problem for low-wage industries, including retail and services. It is also a problem for the children of long-term residents who may lack the incomes to be able to afford new housing in the area. Consequently, local governments often must require that developers build some affordable housing.

Despite these negative aspects, it would be wrong to conclude that the quality of life declines in all respects for places experiencing low-density development. For example, the retail and commercial growth that follows residential growth provides local residents with a greater diversity of goods and services to purchase, as well as a growing supply of jobs. While it is true that many of these jobs are low paying compared with some traditional rural jobs (such as mining and manufacturing), many provide part-time or seasonal employment that is critical for supplementing family income. For example, farmers have come to rely on this form of off-farm employment to maintain their standard of living in the face of weak agricultural markets.

An Economic Interpretation of the Demand for Low-Density Development

The worst consequences of unplanned, low-density development are not the result of some vast conspiracy by ruthless capitalists known as “developers.” Walt Kelly’s famous cartoon character Pogo correctly observed that, “We have met the enemy, and he is US” (Walt Kelly). Millions of individual choices by consumers and businesses which are aimed at creating a better way of life designed to garner the benefits of low-density development outlined above instead result in patterns of development that often have negative consequences for new and old residents alike in loss of rural amenity, traffic congestion, and environmental degradation. How can consumers, businesses, and communities so consistently fail to anticipate the results of their actions with regard to development?

Economists usually attribute such unanticipated results to market failure. While the markets for housing and commercial real estate work efficiently, the market for “lifestyles,” including landscape or rural amenities either fails to exist or fails to deliver the anticipated benefits. This market failure can be understood as arising from interactions among the following factors:

- Markets for positive externalities from agricultural production, such as open space and rural amenities, do not exist. Therefore, these attributes in the landscape are neither permanent nor even necessarily long-lived when development begins to occur. Housing construction does not impose negative spillover effects (externalities) in this regard, it removes positive spillovers that were in place from the previous economic activity, farming.

- Negative spillovers from housing consumption, such as traffic congestion, destruction of visual amenities, and crowding, are not priced in the cost of the housing or other development. If the cost of the landscape amenities were accurately included, “housing” costs would be much higher and demand lower. For example, fully planned communities with carefully controlled land uses and landscape amenities such as open space, lakes, and recreational facilities included are more expensive than nearby developments without these amenities.
- Imperfect information creates a market failure because consumers do not anticipate future development patterns and do not weigh them perfectly in current housing purchase decisions.
- Absence or failure of planning and zoning in local communities contributes to this failure because there is no information about the institutional framework within which future development can take place. When future development is dealt with on a piecemeal or ad hoc basis, neither consumers nor developers can adequately anticipate what development will occur on surrounding parcels.
- Developers, who generally have a good grasp of future development potential, have no incentive to inform housing consumers who value open space and other rural amenities that they are likely to be developed.

Other sources of failure in the “lifestyle” market derive from the nature of development and land-use change. Development results from the cumulative impacts of many small decisions, with the rare exception of a large, planned, “new town,” such as Columbia, Maryland, Reston, Virginia, or Irvine Ranch, California. Markets proceed on the basis of many small decisions, which when taken without an overall context, produce results that can be neither envisioned by nor anticipated by consumers and developers (Kahn, 1966). There is no problem when consumers of corn or soap fail to anticipate the resultant changes in supply and demand that result from their atomistic consumption decisions because corn and soap producers respond quickly and

seamlessly to small variations in supply and demand in very short order. However, the cumulative effects of similar decisions in land use can result in significant disamenity over time (CEQ, 1997; Spaling and Smit, 1993). Specifically:

- Individual developers’ decisions, which produce negative spillovers for existing land users, are generally small in scale relative to the entire landscape, occurring subdivision by subdivision, or even house by house (Fischel, 1999, p. 411).
- Consumers’ decisions on housing consumption, which produce negative spillovers for each other from consumption, are made one house at a time.
- Both developers’ and consumers’ decisions are irreversible over time scales of a lifetime, providing little scope for adjustment except to move to a “clean canvas” in another rural setting (Tiebout, 1956; Hamilton, 1975).
- Efficiency in the real estate market increases property values as development proceeds in desirable new neighborhoods, creating greater incentives to develop (Lafferty and Frech, 1978; Burnell, 1985; Speyer, 1989).
- Negative spillovers from development do not create a drag on property values in the real estate market until disamenities are quite high.

In summary, there are substantial costs imposed by allowing low-density development, both at the fringe of existing urban area and farther out in the rural countryside. People recognize substantial benefits from maintaining and conserving rural land uses in farming, grazing, and forestry. While some communities actively address growth control issues, private market forces often operate with minimal intervention from fragmented land-use control authorities at the State and local levels and cannot recognize and avoid these costs, nor capitalize on the benefits. Land-use issues are primarily local in nature, and, under our constitutional system, authority over them rests with State and local government. But the consequences of development are being felt all across the Nation, in almost a third of the country.