Article 49

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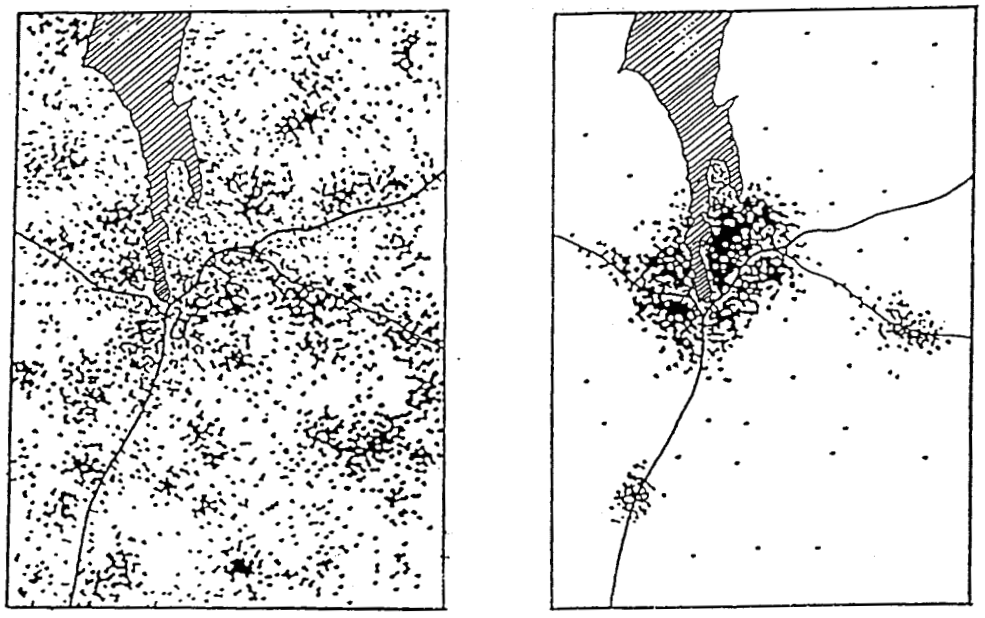
The Economics of Urban Sprawl

Sprawl simply happens. In our time, it has become a ubiquitous feature of our nation's landscape. Low-density suburban development has inexorably crept across the rural landscape, steadily transforming farms, forests and fields into residential subdivisions, strip shopping centers and roads. In just a few decades, growing communities find that dozens of square miles of rural land have been converted into impervious cover and turf. At the same time, residents discover that roads are congested, schools are overcrowded, and the sense of place that originally attracted them has diminished.

Urban sprawl is also increasingly recognized as a primary factor reducing the quality of streams, lakes and wetlands in many watersheds. A growing body of research clearly documents that the creation of impervious cover accompanying new growth causes a predictable and profound decline in critical elements of aquatic ecosystems (see Schueler, 1994). What is most disturbing about this research is that impacts start to occur at a relatively low level of impervious cover—about 10%. To put this number in perspective, it's roughly equivalent to the amount of impervious cover produced by large-lot residential development.

An implication of this research is that sprawl is not only likely to degrade the quality of individual watersheds, but is also likely to degrade a larger number of watersheds than a more compact development pattern. A defining feature of sprawl is that it spreads out development over a much wider area than would otherwise occur. The potential effect of sprawl on a region's watersheds is illustrated in Figure 1, which compares a dispersed sprawl pattern with a more compact development form.

Planners have been proposing more compact growth patterns for many years. Regional plans for "smart



The left panel shows the dispersed pattern of low-density sprawl, while the right panel shows a more compact development pattern concentrated in existing growth centers. At a regional scale, compact development produces less impervious cover, and subjects fewer watersheds to possible degradation.

Figure 1: Dispersed Versus Compact Development at a Regional Scale (Wells, 1994)

growth" have been forged to respond to the problems of sprawl by concentrating new growth around existing development centers or regions served by suburban transit. By accommodating growth strategically compact development can preserve prime agricultural land and sensitive natural areas while also reducing costly construction of new infrastructure. Burchell and Listokin (1995) have defined planned growth as "an attempt to maximize development resources and limit costs by containing most growth within locations that are more efficient to service."

While few people celebrate sprawl, many perceive that its unpleasant side effects are compensated by the economic growth that it creates. This may help to explain why sprawl patterns persist despite thousands of studies, meetings, commissions and conferences that have tried to manage, control, redirect or eliminate it. In this article, we review the economics of sprawl development, and critically examine the conventional wisdom about its effect on the local economy, government budgets, land property values, and the community at large.

Impact on the Local Economy

A healthy regional economy is an interconnected web built on diversification, with each sector relying on the others in the system. Just as the environmental effects of sprawl development can be felt throughout the ecological system, so too are the economic effects of sprawl felt throughout the economy. These detrimental effects may be masked temporarily in a "hot" real estate market, but in all likelihood they will eventually emerge.

Because sprawl development has adverse impacts on traditional local industries such as agriculture, fisheries, forestry and tourism, it can weaken economic diversity in the overall regional economy. For example, low density sprawl is projected to result in the fragmentation and loss of 12% of agricultural land in California which, in turn, will reduce the value of agricultural products grown in the Central Valley by $2.1 billion annually by the year 2040. "That would be the equivalent of wiping out the entire agricultural production of New York, Virginia, Oregon, or Mississippi," according to American Farmland Trust (1995). The indirect loss of sales to businesses such as fertilizer and equipment suppliers and food processors would reach about $3.2 billion a year. The loss in income for growers and workers would amount to $2.7 billion over the same period. The American Farmland Trust (AFT) study concludes that managed growth could save Central Valley agriculture revenues of about $72 billion by the year 2040.

The consequences of activity by agriculture, tourism and other local industries are felt in the economy through what are termed *multiplier effects*. Multiplier effects can be described as the increased buying power of a dollar as it moves through the economy. There are different multipliers for various market sectors and regions of the country. Generally speaking, however, each dollar spent by a tourist will create as much as $1.50 as it moves through the local economy. This increased purchasing power of money spent in a market sector can have a dramatic effect locally, particularly if one sector of the economy is suddenly lost. The loss of the fishing industry, for example, can be felt in other closely allied sectors of the local economy such as boat building and marine supplies, but the effects ripple through other sectors as diverse as grocery stores and personal service providers.

Impact of Sprawl on Local Government Budgets

One assumption about sprawl is that by promoting residential development, local tax revenues are increased, which ultimately lowers everyone's property taxes. Although new development certainly increases the local tax base of the community, new homes and businesses also increase the cost of municipal services: roads, schools, sewage treatment, water supply, fire services, libraries, and parks and recreation. Sprawl development traditionally brings both residential and commercial development. Residential development is usually a tax negative, as single-family detached homes cannot pay their full way for services. While commercial development can be an initial tax positive, it tends to attract more residential development as people move to homes closer to where the jobs are located.

Several reasons explain why sprawl development increases the cost of services. Since sprawl development is located away from established centers, new homes and businesses cannot utilize existing services and infrastructure. New infrastructure must be built, often over longer distances. This means more miles of roads, sewers and water lines are needed, driving up service costs. Large-lot development means fewer taxpayers support higher infrastructure costs per household. In addition, more and smaller sewage plants, schools, libraries and other improvements are often built to serve the new, spread-out, low-density communities. Such inefficiencies lead to higher costs to treat a gallon of sewage or educate a student (Burchell and Listokin, 1995).

A number of economic studies have detailed the differences between sprawl and compact growth patterns (Duncan *et al.*, 1989; Frank, 1989; Burchell, 1992). These studies have compared costs for suburban "sprawl" versus more dense, mixed-use growth. While both growth patterns typically result in the same number of people and jobs, compact growth protects a greater share of farmland, forests and natural areas. Together, the three studies show that planned develop

ment consumes about 45% less land, costs 25% less forroads, 15% less for utilities, 5% less for housing, and 2% less for other fiscal impacts (Burchell and Listokin, 1995).

When translated into absolute dollars, these savings are significant. As one example, Burchell (1992) found that the state of New Jersey could save $1.4 billion (in 1992 dollars) over 20 years by encouraging compact growth rather than allowing current sprawl to continue.

Another way to express the costs of sprawl is to examine the cost of providing service to a single dwelling unit. Frank's 1989 study reviewed 40 years of fiscal impact studies, and found that it costs two to three times more to service homes in low-density developments located far from public service centers (Table 1).

When public services are extended out to new developments, funds must be raised for the infrastructure through increased property taxes, impact fees, or other means. According to Brett Hulsey (1996), Wisconsin towns estimate that each $1 million in new residential construction costs adds $30 to each property tax bill to pay for more police, fire, sewer, schools and other services. In another Wisconsin town, it was estimated that it costs taxpayers $1,060 to service new residential development, compared to each $1,000 the new owners will pay in tax revenue.

In Culpeper County, Virginia, a 1988 study concluded that an "average new residential unit can be expected to produce a deficit in the county budget of $1,242—an annual 'bottom line' negative balance of capital and operating expenditures over revenues" (Vance and Larson, 1988). In addition, tax bills for all residents in the county would need to rise by as much as 80% to offset the costs of new developments. In Prince William County, Virginia, another fast-growing bedroom community, officials estimate the costs of providing public services to a new residential home exceeds what is brought in from taxes and other fees by $1,600 per home (Shear and Casey, 1996).

Unlike residential development, farms, forests, open space and commercial development provide a net tax benefit to the community. Studies across the East and Midwest have analyzed the costs of servicing various land uses (Vance and Larson, 1988; AFT, 1994 and 1992; Hulsey, 1996). On average, these studies show that public services cost only 32% of taxes received for commercial development, and 37% of taxes received for agricultural, forest and open space. This is why it makes sense to pay farmers for development rights so that they can continue farming and the community can keep its property tax rate down. Table 2 shows the costs of services as a percentage of taxes received from three different land uses in 10 communities.

Impact of Sprawl on the Landowners and Homebuyers

Sprawl also has economic consequences for individual property owners. Two groups need to be considered in discussing the effects of sprawl on property owners: those already owning property and home buyers seeking affordable homes. Sprawl development eventually increases local property taxes in order to meet increased demand for services. This results in higher taxes for existing property owners who can least afford it: the poor and elderly residents on fixed incomes. In some communities, the higher property taxes can displace long-term residents.

Sprawl development also tends to drive up the cost of new homes, since more infrastructure needs to be constructed for each unit. The needed infrastructure includes increased costs for longer roads, storm sewers, sewer and water lines, and other utilities. In most subdivisions, infrastructure service costs can amount to half the total cost of development (CH2M-Hill, 1993). Since infrastructure costs incurred by the developer are often directly passed along to the homebuyers in the form of a higher sales price, this can reduce the supply of affordable housing. In addition, sprawl development increases impervious cover, generating more runoff, and consequently higher costs for storm drainage and treatment systems. The higher cost to build large-lot development is usually counterbalanced by the much lower cost of land at the suburban edge. Indeed, the price and supply of low-cost land are often the prime engine driving sprawl development patterns.

Still, there is a strong market for low-density residential development. Many home buyers do have a deeply rooted preference for suburban housing patterns that can accommodate their mobile lifestyle. Market surveys

Table 1: Comparison of Capital Cost of Services for a Single Dwelling Unit (Frank, 1989)

Development Pattern	Capital Cost (1987 Dollars)
Compact growth	$18,000
Low-density sprawl	$35,000
Low-density sprawl, 10 miles from existing development	$48,000

Table 2: Cost of Servicing Different Land Uses As a Percentage of Tax Revenue Received

Study Location	Residential Development	Commercial Development	Farmland, forest, and open space
Culpeper County, VA [a]	125 %	19 %	19 %
Connecticut average [b]	106	47	43
Massachusetts average [b]	112	42	33
New York average [b]	124	24	35
Town of Dunn, WI [c]	106	29	18
Lake Elmo, MN [d]	107	20	27
Independence, MN [d]	103	19	47
Farmington, MN [d]	102	79	77
Madison, OH [d]	167	20	38
Madison Township, OH [d]	114	25	30
Average	**116 %**	**32 %**	**37 %**

Sources: [a]Vance and Larsen, 1988 [b]American Farmland Trust, 1992 [c]Hulsey, 1996 [d]American Farmland Trust, 1994

have consistently shown that consumers prefer residential subdivisions to denser, mixed-use choices. Two surveys by *Builder* and *Professional Builder* magazines indicated a majority of new home buyers preferred less dense and more homogenous development patterns to denser ones. A Florida study found that over two-thirds of 1,400 households surveyed preferred detached suburban lots to townhouses located closer to the urban core, even when this choice was directly linked to longer commutes and driving times (Bookout, 1992).

While consumers do prefer the suburbs, this does not necessarily imply they are satisfied with conventional large-lot subdivisions. Developers have found well-designed cluster and traditional urban-style neighborhoods are very attractive to new home buyers. In addition, surveys have shown that residents will pay a premium to live next to natural areas or in a park-like setting, as described in detail in the next feature article. Finally, as environmental awareness has grown among consumers, the market for environmentally-friendly compact developments has expanded. Recent market surveys have tracked the ascendance of this preference for "green development."

Sprawl and the Environment

As noted earlier, watersheds are particularly vulnerable to the impacts of sprawl. Even though sprawl produces relatively little impervious cover, it has a profound influence on stream ecosystems.

The rapid and striking decline in stream quality that can occur in a single generation of sprawl development is illustrated in a recent analysis of 1,300 stream miles in the Occoquan Basin (Schueler and Claytor, 1997). By tracking changes in subwatershed impervious cover, it was possible to forecast the shifts in stream quality as a result of past and future development patterns (Figure 2). As can be seen, streams classified as sensitive (0 to 10% impervious cover) declined from 60% of total stream miles in 1989 to a total of only 19% by the year 2020. In contrast, "non-supporting" streams (defined as having poor biological diversity, channel instability and high bacteria levels) grew from a mere 9% in 1989 to a projected 39% in the year 2020.

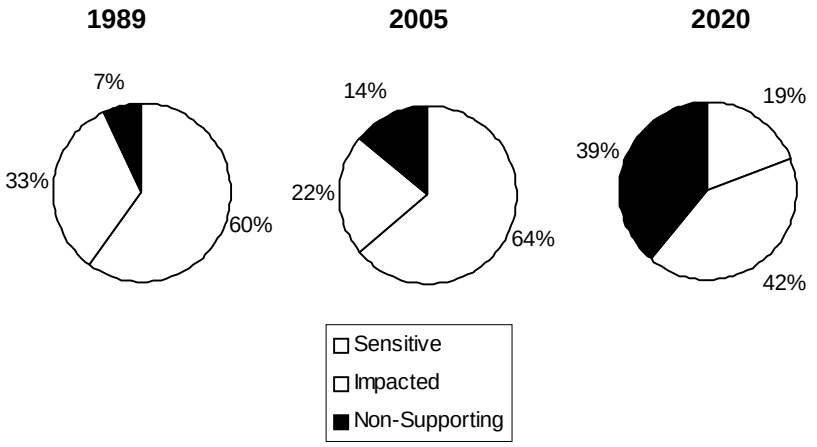
Sprawl also degrades the quality of the rural landscape by fragmenting fields, forests and wetland habitats. This can produce a loss in tourism income, as land rentals for hunting, fishing, recreation and other tourism activities all diminish.

Communities may be required to expend significant sums to repair or restore habitat degraded by sprawl. For example, the cost of restoring degraded water quality and habitat in the Anacostia watershed is estimated at $400 to $1,600 per acre and will require two decades, without any assurance that it can ever be completely restored (Schueler, 1995). Many coastal communities in New England that had not effectively regulated sprawl development in the past are now finding that the costs of efforts to reopen shellfish beds are very high, and have limited success.

Impact on the Community

Sprawl can also lead to a reduced quality of life for local residents. As a Bank of America study points out, sprawl leads to higher costs for businesses and leaves workers caught in long and exhausting commutes. It plays a strong role in air quality problems, severe farmland loss, and "abandonment of people and investments in older communities." Critics of sprawl (Lincoln Institute of Land Policy, 1995) have described a number of its negative social consequences:

- Poverty is concentrated in dense urban areas (setting the stage for decline and loss of future economic development opportunities).
- Society is resegregated along economic and racial lines, creating disparities through residential patterns that produce unequal access to education and other services.
- Public investment in schools, public safety, and mass transit systems becomes unfeasible.
- Increased automobile dependence undermines or nullifies efforts to improve air and water quality and to conserve energy.



Stream quality classification is projected to decline in the Occoquan Basin as imperviousness increases from 1989 to 2020.

Figure 2: Projected Stream Quality in the Occoquan Basin (Schueler and Claytor, 1997)

The Balance Sheet: Sprawl as an Economic Drain

The economic and environmental impacts of sprawl are summarized in the "balance sheet" in Table 3. After several decades of study, it is apparent that sprawl development imposes significant short-term and long-term costs on local government, business, property owners, developers and the environment.

Of course, sprawl won't disappear just because it doesn't make a lot of economic sense. Indeed, prior zoning has often granted development rights over much of the countryside, leaving local communities with few tools to prevent sprawl from gradually unfolding. These tools include designation of growth boundaries, farmland preservation and targeting of new public infrastructure investments. The last tool is growing in popularity, as state and local governments are electing to spend scarce funds on new roads, sewers, and other infrastructure only within existing developed areas or specially designated growth areas. More communities now recognize that public investments should be spent to contain sprawl rather than promote it. Educating the public and their elected officials about the economic and environmental consequences of sprawl is a first step toward better local choices about growth management.

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Table 3: The Balance Sheet—Economic and Environmental Impacts of Sprawl Development

Economic Player	Positive Impacts	Negative Impacts
Local Government	(+) Increased property tax revenues	(–) Increased demand/cost for services (–) Residential development doesn't pay for itself
Local Economy	(+) Increase in building/service sectors	(–) Decline in farm, fishery and/or forest sectors
Existing Property Owners	None	(–) Higher property taxes (–) Greater traffic congestion (–) Conflicting land uses
New Home Buyers	(+) Affordable housing (only if land costs are low)	(–) Higher property taxes (–) Higher infrastructure costs for new homes
Environment	None	(–) Degradation of water resources including wetlands (–) Decline in air quality (–) Fragmentation of green space (–) Higher costs for environmental restoration (–) Creation of high input turf
Developer	(+) Land costs are lower (+) Developer has complete choice where to build and less restrictions on size and scale of development	(–) Construction costs inflated by local codes (–) Higher costs for stormwater/wastewater treatment

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