



Public policies for managing urban growth and protecting open space: policy instruments and lessons learned in the United States

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Abstract

The public sector in the United States has responded to growing concern about the social and environmental costs of sprawling development patterns by creating a wide range of policy instruments designed to manage urban growth and protect open space. These techniques have been implemented at the local, regional, state and, to a limited extent, national levels. This paper provides a systematic review of the extensive literature that describes these public policies and their implementation. The main public policy instruments for managing urban growth and protecting open space at various governmental levels are identified and briefly described, including public acquisition of land, regulatory approaches, and incentive-based approaches. Key lessons are gleaned from the literature on the implementation of growth management policies. Our assessment of lessons found: (1) a lack of empirical evaluations of growth management policies, (2) administrative efficiency and other details of policy implementation—rather than the general type of policy—are critical in determining their effectiveness, (3) the use of multiple policy instruments that reinforce and complement each other is needed to increase effectiveness and avoid unintended consequences, (4) vertical and horizontal coordination are critical for successful growth management but are often inadequate or lacking, and (5) meaningful stakeholder participation throughout the planning process and implementation is a cornerstone of effective growth management. Faced with a growing population and increasingly land consumptive development patterns, more effective policies and programs will be required to stem the tide of urban sprawl in the United States. We conclude with a discussion of potential federal roles in managing development and coordinating state, regional, and local growth management efforts. © 2003 Elsevier B.V. All rights reserved.

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1. Introduction

Urban sprawl may be characterized as relatively low-density, noncontiguous, automobile dependent,

residential and nonresidential development that consumes relatively large amounts of farmland and natural areas (Burchell et al., 1998). Many Americans are ambivalent about sprawl, holding conflicting and changing preferences (Myers and Gearin, 2001). The ideal of a single-family home on a large lot in the suburbs is still preferred by most (Malizia and Exline, 2000). Sprawl provides a variety of private benefits

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to new residents, developers, and other stakeholders, as well as potential social benefits such as more affordable housing costs from building farther out (e.g. Kahn, 2001).

But sprawl is increasingly viewed as a significant and growing problem that entails a wide range of social and environmental costs. Although the process of suburbanization in the United States dates from the early years of the 19th century, widespread apprehension about the impacts of sprawling development patterns did not emerge until the boom in suburban growth following World War II (Jackson, 1985). Concern about the environmental and social costs of urban growth grew in the 1960s and 1970s with the rise of the modern environmental movement and in recent decades has increased dramatically. A variety of social indicators point to this increase. For example, the remarkable growth in the number of state and local referenda on smart growth and open space preservation in the late 1990s indicates a surge in anxiety about the impacts of sprawl and interest in managing growth (Myers, 1999; Myers and Puentes, 2001). A recent study by the Surface Transportation Policy Project and Center for Neighborhood Technology (2000) found that in many sprawling US cities such as Houston and Atlanta, residents paid more for transportation than shelter. Attitude surveys provide another indicator of the public's increasing concern (e.g. Pew Center for Civic Journalism, 2000). Even traditional development interests have begun to voice alarm that the costs of sprawling development patterns have begun to outweigh the benefits, such as a Bank of America report claiming that "unchecked sprawl has shifted from an engine of California's growth to a force that threatens to *inhibit* growth and degrade the quality of life" (Bank of America, 1995, p. 1, emphasis in original).

The public sector response to growing concern about the undesirable impacts of sprawl has been the creation of a wide range of policy instruments designed to manage urban growth and to protect open space from development.¹ These policies have been

implemented at the local, regional, state and, to a limited extent, national levels. Local governments have traditionally managed development through the basic planning and regulatory tools of comprehensive plans, zoning ordinances, subdivision regulations, and capital improvement programs (Porter, 1997). But the increasing social and environmental costs of sprawl have prompted local governments to adopt an array of additional tools.

Interest in the role of regional entities in growth management has increased in recent decades (Weitz and Seltzer, 1998). Regional agencies have been created to manage growth and protect open space on a larger scale and coordinate the fragmented efforts of individual municipalities and counties. For example, one of the early regional planning agencies in the US was the Minneapolis–St. Paul Metropolitan Council, created by the state legislature in 1967 in response to problems associated with rapid urban growth (Johnson, 1998). A number of substate and bistate regional growth management agencies have been created across the US. These regional entities have experimented with a wide range of innovative policy instruments.

State growth management efforts have developed in about a dozen states over the past 40 years, typically in areas that have experienced rapid urban development and its associated problems (Weitz, 1999). State growth management has evolved from an early emphasis on environmental concerns during the "quiet revolution" in state land-use management in the 1960s and 1970s (Bosselman and Callies, 1971) to a much broader set of social goals and related policy tools in the current era of smart growth (Gillham, 2002).

Even as state involvement in growth management has expanded, the federal government continues to play a minor role due to the lack of a national land-use policy and a long tradition in the United States of local authority in managing land use and development. But many national policies have significant *indirect* impacts on urban growth and sprawl (Marsh et al., 1996b; US GAO, 1999). The main finding of a survey of urban experts asked to rank the top 10 influences on the American metropolis over the last 50 years was the overwhelming impact of federal policies that intentionally or unintentionally promoted suburbanization and sprawl (Fishman, 2000).

¹ The term "open space" is used broadly in this paper to refer to natural resource lands such as farmland and timberland, environmental resources such as wildlife habitat and wetlands, and a variety of other socially valued landscapes such as scenic sites, wilderness areas, historic and cultural resources, and recreation areas.

Regardless of the governmental level at which they are applied, public policies for managing growth and protecting open space are at the center of the issue of sustainable development, i.e. making growth and development economically, environmentally, and socially sustainable. Growth management has been defined in many ways, but essentially it consists of government actions "... to guide the location, quality, and timing of development" (Porter, 1997, p. vii). A wide range of important issues are closely tied to growth management policies, including environmental conservation, quality of life, taxpayer protection, efficient urban form, transportation planning, urban revitalization, environmental justice, affordable housing, and others. A better understanding of the range of policy instruments available and the lessons that have been learned about designing effective growth management programs is therefore vital for planners and policy makers.

The objectives of this paper are two-fold. The first objective is to describe the main policy instruments that have been proposed and utilized for managing urban growth and protecting open space at various governmental levels. Given the number of policy instruments, the individual growth management techniques are not described in detail. Instead, this review briefly summarizes the main techniques and points to the extensive literature that describes them in much greater detail. We include both policies for managing urban growth and protecting open space because they are two sides of the same coin. It has long been realized that urban planning and open space preservation are part of the same process (Hollis and Fulton, 2002), and that the most effective way to protect open space is by effectively containing and managing urban growth (Alterman, 1997).

A second objective is to glean the key lessons learned from the literature on the implementation of growth management techniques, i.e. what has been learned about the effectiveness of growth management policies and programs? How can policy makers and planners design growth management programs that are effective in accomplishing their goals?

The methodological approach of this study is a multidisciplinary literature review and assessment of the diverse literature on public policies for managing urban growth and protecting open space. Many

academic fields are relevant for such a multidisciplinary review, including economics, environmental law, evaluation studies, geography, landscape architecture, landscape ecology, planning, policy analysis, political science, sociology, urban studies, and others. We systematically reviewed recent books, journals, and "gray literature" (e.g. government technical reports, conference proceedings), in addition to the websites and online reports of policy and conservation organizations that focus on issues related to growth management and open space protection.²

In order to keep our review manageable given the magnitude of the literature, we limited our search in several ways. First, we focused on public sector policies for managing urban growth and protecting open space. Private and nonprofit organizations have also developed innovative programs and initiatives, but they are beyond the scope of this review. Second, only policy instruments applied in the United States were examined, to the exclusion of many novel and useful policies developed for the institutional contexts of other countries. Finally, this review focused primarily on relatively recent policies—typically proposed or implemented since the early 1980s—rather than dwelling on earlier policies that often had a much more limited set of objectives.

Before proceeding, we first provide a broad categorization of public policy instruments relevant for growth management and protecting open space. Such a framework for understanding policy instruments is needed to structure our review and to make sense of the large and diverse literature.

2. A classification of public policy instruments

Public policy instruments may be defined as "the set of techniques by which governmental authorities wield their power in attempting to ensure support and effect or prevent social change" (Vedung, 1998, p. 21). Policy analysts have proposed many classifications of policy instruments, ranging from minimalist two-part classifications to long, unstructured lists of specific instruments. This paper employs a three-part classification that has the virtues of simplicity,

² Contact the authors for a list of journals and websites reviewed.

mutually exclusive categories, and is exhaustive of the domain of public policy instruments for managing urban growth and protecting open space. The broad categories are (1) public ownership and management, (2) regulation, and (3) incentives.³

The first category, public ownership and management of some asset or activity, is often justified on the basis of the public goods characteristics of the asset and the failure of markets to adequately respond to the demand for such public goods. Non-exclusive property rights and indivisibility of consumption (i.e. use of the good by one person does not reduce the amount available for others) characterize public goods. Examples include national defense, interstate highways, public education, and many types of open space. Public provision of goods such as these reflects a social decision that they should be managed for the benefit of the general public.

A second broad type of public policy instrument is regulation. The defining characteristic of regulation is its obligatory nature—regulation involves an authoritative relationship between the individuals or groups being regulated and the government (Stone, 1982). Regulation is often backed by negative sanctions or the threat of sanctions. Incentive-based approaches are a third broad category of policy instruments, which involve either the handing out (incentives) or taking away (disincentives) of monetary or non-monetary material resources in order to change behavior. The distinguishing characteristic of incentive-based approaches is that no one is obligated to take a particular course of action. For example, a government subsidy for compact development does not require developers to build more compactly; the incentive simply makes it less expensive to do so.

³ A fourth type of policy instrument is informational or educational campaigns: “Information as a public policy instrument covers government-directed attempts at influencing people through transfer of knowledge, communication of reasoned argument, and moral suasion in order to achieve a policy result” (Vedung and van der Doelen, 1998, p. 103). Information campaigns have been widely used as a public policy instrument with mixed success (Weiss and Tschirhart, 1994; Rice and Atkin, 2001). While transfer of information is certainly a part of growth management efforts, coordinated information campaigns carried out by the public sector have been lacking in the United States, and we therefore do not include this policy instrument in our review.

3. Public policy instruments for managing urban growth and protecting open space

As shown in Table 1, the commonly used public policy instruments for managing urban growth and protecting open space can be categorized by the three broad types of policy instruments and by the level of government (indicated in parentheses) at which they are typically applied. This list is not comprehensive; the toolkit of public policy instruments is large and growing, and innovative tools are being added on a regular basis, especially at the local level (e.g. National Association of Counties, 2001; Smart Growth Network, 2002; US EPA, 2002b). The policy instruments listed in Table 1 and described in the following sections are simply the most commonly discussed techniques.

3.1. Public acquisition of land for managing urban growth

Public acquisition of land is most often carried out for the primary purpose of protecting open space. But in and around urban areas, land acquisition almost always serves multiple goals and plays a significant and often overlooked role in shaping metropolitan form and managing urban growth (Hollis and Fulton, 2002; Ruliffson et al., 2002). Nineteenth century urban planners advocated systems of regional urban parks, parkways, and nature preserves. Today’s urban and landscape planners advocate public investment in green infrastructure that shapes metropolitan form as surely as investment in gray infrastructure such as roads, sewers, and water lines (Benedict and McMahon, 2002). The popularity of this approach in the United States is indicated by the fact that 30 of the largest 50 metropolitan areas—and hundreds of smaller communities—have regional green space plans or are developing them (McMahon, 1999). Public land acquisition helps provide a framework for urban growth and can define where not to grow.

3.2. Regulatory approaches for managing urban growth

Regulatory approaches for managing urban growth include diverse strategies that have been used mainly at the local level (Table 1). A development morato-

Table 1
Public policies for managing urban growth and protecting open space

Policies for managing urban growth

Public acquisition

Fee simple public ownership of parks, recreation areas, forests, wildlife refuges, wilderness areas, environmentally sensitive areas, greenways, etc. (local, regional, state, national)

Regulation

Development moratoria, interim development regulations (local)

Rate of growth controls, growth-phasing regulations (local)

Adequate public facility ordinances (local, state)

Upzoning or small-lot zoning, minimum density zoning (local)

Greenbelts (local, regional)

Urban growth boundaries (local, regional, state)

Urban service boundaries (local, regional)

Planning mandates (regional, state)

Incentives

Development impact fees (local)

Development impact taxes, real estate transfer taxes (local)

Infill and redevelopment incentives (local, state)

Split-rate property tax (local)

Brownfields redevelopment (local, state, national)

Location efficient mortgages (local)

Historic rehabilitation tax credits (state, national)

Policies for protecting open space

Public acquisition

Fee simple public ownership of parks, recreation areas, forests, wildlife refuges, wilderness areas, environmentally sensitive areas, greenways, etc. (local, regional, state, national)

Regulation

Subdivision exactions (local)

Cluster zoning (local, regional)—incentives also sometimes used

Downzoning or large-lot zoning (local)

Exclusive agricultural or forestry zoning (local, state)

Mitigation ordinances and banking (local, state)

Nontransitional zoning (local)

Concentrating rural development (local)

Incentives

Right-to-farm laws (local, state)

Agricultural districts (local, regional, state)

Transfer of development rights (local, regional)

Purchase of development rights, conservation easements (local, state, federal)

Use-value tax assessment (state, national)

Circuit breaker tax relief credits (state)

Capital gains tax on land sales (state)

rium is a drastic growth management policy—usually implemented through a prohibition on the issuance of building permits—that is sometimes used in rapidly growing communities to buy time needed for planning long-term solutions to growth-related problems (Owens, 1990). Short of a moratorium, communities may adopt interim development regulations, or stop-gap ordinances, as another temporary solution to severe problems associated with rapid growth. This allows some forms of development to continue but postpones development that is causing problems until solutions have been studied and long-term regulations enacted (Zovanyi, 1998).

Other regulatory approaches sometimes used in communities experiencing very rapid development are rate of growth controls and growth-phasing regulations (Kelly, 1993; Nelson and Duncan, 1995). Rate of growth controls are typically ordinances that put an upper limit on the number of building permits issued annually. Growth-phasing regulations also impose development caps, but the timing of development is linked to the scheduled timing of public improvements needed for development (e.g. sewers, drainage, major roads, parks, and fire protection). In essence, growth-phasing programs translate the availability of public facilities into a maximum number of building permits in a given year.

Adequate public facility ordinances (APFOs) also require the availability of urban services and facilities needed for development, but they do not impose development caps. Instead, APFOs require that developments not be approved unless it is demonstrated—on a case-by-case basis—that adequate public facilities are available or will be available when the impacts of new development occur (Weitz, 1997). Local governments implement APFOs, but several states have included adequate public facilities requirements in their growth management programs. Florida was the first state to require all local governments to adopt APFOs for selected local services and facilities. This policy is referred to as “concurrency” in Florida because it requires public facilities to be available concurrently with the impacts of development.

Zoning is a core technique in urban growth management. In many cases, urban land may be zoned such that more dense development is prohibited. Small-lot zoning or upzoning allows small lots in urbanizing areas in order to encourage more intense development

(Nelson and Duncan, 1995). Upzoning is generally locally implemented but can be state initiated. Extensive upzoning occurred in urban areas throughout Oregon in the 1970s and 1980s as part of its statewide growth management program (Knaap and Nelson, 1992).

Three types of urban containment policies are identified in Table 1. Greenbelts, urban growth boundaries, and urban service boundaries (Pendall et al., 2002). A greenbelt refers to a physical area of open space—farmland or other green space—that surrounds a city or metropolitan area and is intended to be a permanent barrier to urban expansion. Greenbelts are typically created through public or nonprofit acquisition of open space or development rights, although they may be enforced by strict regulation of private property. The city of Boulder, CO has the longest running and most widely discussed greenbelt in the United States (Pollock, 1998; Lorentz and Shaw, 2000). Greenbelts have rarely been used in the United States but are common in some other countries (e.g. Hall, 1973; Bae, 1998).

In contrast to greenbelts, an urban growth boundary (UGB) is not a physical space but a dividing line drawn around an urban area to separate it from surrounding rural areas. Zoning and other regulatory tools are used to implement an UGB. Areas outside the boundary are zoned for rural uses, and inside for urban use. Unlike greenbelts, an UGB is typically drawn to accommodate expected growth for some period of time, and is periodically reassessed and expanded as needed. Oregon's Land Conservation and Development Act of 1973 required, among other things, the delineation of urban growth boundaries around all of the state's cities and around the Portland metropolitan area (Pendall et al., 2002).

Urban service boundaries also consist of a line drawn around a city or metropolitan area, but they are even more flexible than UGBs. An urban service boundary delineates the area beyond which certain urban services such as sewer and water will not be provided. They are often linked with adequate public facilities ordinances that, as described above, prohibit development in areas not served by specific public services and facilities. Some metropolitan areas using urban service boundaries use tiering systems that attempt to direct public infrastructure into new areas in a particular sequence.

Finally, at the regional and state levels, planning mandates have been used to require local governments to prepare and adopt comprehensive plans to guide land-use decisions. Hawaii was the first state to require land-use planning by local governments in 1961 (Callies, 1992). Land-use planning is now required in about half of all states, although the state role varies widely (Nelson and Duncan, 1995). Some states have a strong, interventionist state role in local planning that requires locally prepared plans be consistent with state land-use policies and goals, while others have a weak, noninterventionist state role. Metropolitan or regional planning mandates are also used in many areas. For example, all local governments in Minneapolis–St. Paul, MN are required to prepare comprehensive plans consistent with the Twin Cities Metropolitan Council's plans for highways, sewers, transit, airports, and regional parks (Johnson, 1998).

3.3. Incentive-based approaches for managing urban growth

Development impact fees are one of several types of development exactions—assessments levied on developers requiring them to contribute land, facilities, or funding to help pay for off-site capital improvements that benefit the contributing development (Peddle and Lewis, 1996). The main purpose of impact fees is to help finance off-site impacts and infrastructure costs of development, but they can be used to encourage more efficient development patterns. Jurisdictions can discourage development through higher impact fees in areas without infrastructure, and encourage development through lower fees in areas already served by public facilities (Nelson and Duncan, 1995). Development impact fees are sometimes classified as a regulatory tool because, unlike taxes, they derive from the police power of the state. In practice, however, they function as an incentive-based approach.

Tax policy has a powerful influence on land use and therefore may be an important tool for growth management. Development impact taxes, or improvement taxes, and real estate transfer taxes are used in some jurisdictions to help make development pay its own way. Like impact fees, revenues collected with these taxes are typically earmarked to provide public facilities and services made necessary by new development (Nelson and Duncan, 1995).

Incentives to encourage infill and redevelopment are needed to make urban containment policies effective. A variety of infill and redevelopment incentives have been used by cities in an effort to direct development into areas that are already urbanized. For example, the Smart Growth Initiative of Austin, Texas includes a waiver of development fees in a desired development zone to promote infill development (Lorentz and Shaw, 2000). Incentives used in other communities include subsidized land costs, tax exemptions or reductions, improvements to infrastructure, reduction of development fees, low-interest loans, assistance in securing zoning changes, and others (Nelson and Duncan, 1995; Porter, 1997). Some states have also included infill and redevelopment incentives in their growth management programs. For example, a central element of Maryland's Smart Growth Program is a policy to direct development into priority funding areas by offering state funding, including development loans and grants, for projects in these areas before development in other areas in the state (Gillham, 2002).

A split-rate or two-rate property tax is another approach that has been proposed to promote infill and redevelopment in urban areas (Gihring, 1999). Under such a system, a higher tax rate is applied to land values and a lower rate for improvement values such as buildings. This reduces the tax burden on land-intensive uses (e.g. apartments) and increases the tax burden on land-extensive uses (e.g. parking lots). A split-rate property tax would have the goals of (1) providing the incentive of lower taxes for capital investment in building improvements, and (2) taxing away the speculative value of holding undeveloped property within the urban growth area, thus promoting infill and redevelopment. Experience in several communities in Pennsylvania indicates that a split-rate property tax can be an effective tool to stimulate central city revitalization (Hartzok, 1997), but effective regulatory mechanisms are needed to prevent unintended consequences such as premature land conversion in outlying areas (Gihring, 1999).⁴

⁴ Additional incentive-based approaches for encouraging infill and redevelopment include brownfields redevelopment (Simons, 1998; Miller et al., 2001), location efficient mortgages (Blackman and Krupnick, 2001), and state and federal historic rehabilitation tax credits (Beaumont, 1999).

3.4. *Public acquisition of land to protect open space*

Public acquisition and management is the policy instrument with the longest history of use for protecting open space in the United States. Public acquisition of open space occurs at local, regional, state, and federal levels, and is used for the creation or expansion of such diverse landscapes as parks, recreation areas, forests, wildlife refuges, wilderness areas, environmentally sensitive areas, greenways, and others. Public acquisition continues to be an important policy instrument for protecting open space, as demonstrated by the recent growth in state and local referenda on open space preservation (Myers and Puentes, 2001). Acquisition is the most certain public policy instrument for protecting open space, but it is also the most expensive (Kelly, 1993). Many techniques have been used to finance open space acquisition, ranging from various types of long-term bonds to lottery proceeds (Myers, 1993). Partnerships between nonprofit organizations and government agencies at all levels have become an increasingly important part of public acquisition of open space (Endicott, 1993).

Some authors categorize "partial rights" approaches such as purchase of development rights (PDR) as a land acquisition strategy (e.g. Kelly, 1993; Porter, 1997). But from the landowner's perspective, a PDR program provides an incentive to maintain open space. Hence, we include the acquisition of partial rights as an incentive-based approach to protect open space (discussed below).

3.5. *Regulatory approaches to open space protection*

A range of regulatory approaches has also been used for protecting open space. At the local level, subdivision exactions require developers to set aside environmentally sensitive areas (such as steep slopes, floodplains, and buffers around wetlands and streambeds) and areas for parks and playfields. Subdivision exactions are perhaps the most widely used regulatory approach to protecting open space (Porter, 1997). The land that has been set aside may be managed by a community association or by the local jurisdiction implementing the regulations. State and federal regulations that prohibit building in wetlands

and require development setbacks from wetlands, protect endangered species, and protect areas of critical environmental concern preserve open space as well as achieve other environmental goals (Gillham, 2002).

Cluster zoning or clustered development is another regulatory technique that has been used for decades at the local level for protecting open space, reducing the cost of development, and in some cases keeping land such as farmland and forest in existing use. Cluster zoning ordinances allow or require houses to be concentrated together on small lots on a particular part of a parcel of land, leaving the remainder in open space (American Farmland Trust, 1997). The undeveloped land may be owned by the developer, a homeowner's association, the local government, or a private non-profit organization, and may be protected under a restrictive covenant. In some cases, incentives—such as permitting the construction of more houses than would otherwise be allowed—have been offered to developers to encourage clustered development (Porter, 1997).

Downzoning or large-lot zoning is an approach to protecting open space that stands in sharp contrast to cluster zoning. Rather than concentrating development on small lots, downzoning in rural areas requires minimum lot sizes large enough to discourage residential development (Nelson and Duncan, 1995). A key to effective use of this approach is to set lot sizes sufficiently large. Lot sizes have ranged from 20 acres (8 ha) per house in the eastern US to 640 acres (259 ha) per house in the West (American Farmland Trust, 1997). If minimum lot sizes are set too small to discourage residential development, the result will be fragmented parcels too small for commercial agriculture or forestry. Downzoning has often been used in efforts to preserve community character rather than protecting open space, and it may be purposefully exclusionary by increasing the cost of purchasing land or a home in a community (Gillham, 2002).

Exclusive agricultural or forestry zoning, or agricultural protection zoning, has been used widely at the local and state levels across the US to protect resource lands. Land is zoned only for agricultural or forestry use—usually on the basis of soil quality or locational factors—and other types of land uses are restricted or not allowed (American Farmland Trust, 1997). Large-lot zoning is typically a part of agricultural protection zoning. A problem with this policy

instrument is that it generally creates a reduction in property values for which property owners have not been compensated. It is therefore sometimes combined with various types of compensation for landowners (Gillham, 2002).⁵

3.6. Incentive-based approaches to open space protection

Aldo Leopold recognized the importance of conservation incentives and the need for innovative incentive-based policy instruments in a 1934 essay (Leopold, 1991, p. 202). A large number of incentive-based policies for protecting open space have been developed and implemented in recent decades. Right-to-farm laws, for example, provide an incentive to farmers and ranchers to keep land in agriculture by protecting them from nuisance lawsuits that may arise as residential development encroaches into rural areas and suburban homeowners are exposed to odors, noises, and other impacts from farm operations (Bradbury, 1986). Without this protection from liability, farmer's operating costs would increase and agricultural practices would be restricted or prohibited. All 50 states have at least one right-to-farm law, and some local governments around the nation have enacted their own, stronger laws (American Farmland Trust, 1997). Although right-to-farm statutes help support the economic viability of agriculture, it is unclear whether they have been effective at maintaining the land base.

Agricultural districts—also known as agricultural preserves, agricultural incentive areas, and other names—are legally recognized geographic areas designed to keep land in agricultural use. They differ from exclusive agricultural zoning areas because enrollment in them is voluntary (Heimlich, 2001). Farmers who join an agricultural district may receive a variety of benefits, such as differential tax assessment, limits on eminent domain and annexation, protection against nuisance lawsuits, and eligibility for conservation easement programs (American Farmland

⁵ Additional, less commonly discussed regulatory techniques for protecting open space include mitigation banking and ordinances (Marsh et al., 1996a), the use of nontransitional zoning (Nelson and Duncan, 1995), and concentrating rural development (Porter, 1997).

Trust, 1997). Agricultural districts have been created at the local, regional, and state levels.

Several approaches have been developed to protect open space through acquisition of development rights to land that is near urban areas and threatened by development, including transfer of development rights (TDR) and purchase of development rights or conservation easements. These approaches are based on the idea that ownership of land involves a bundle of rights—such as mineral rights, surface rights, air rights, development rights, etc.—that can be separated (Wiebe et al., 1997). Transfer of development rights allows the sale and transfer of development rights from a particular parcel of land to other properties. Future use of the original parcel is then protected from development by means of a permanent conservation easement or deed restriction prohibiting development. TDR programs may be mandatory but more often are voluntary in nature. They provide a means of compensating landowners for regulatory restrictions that reduce property values (Porter, 1997). There are, however, challenges with TDR programs, including administrative complexity and resistance from residents in areas designated to receive the transferred development rights and hence denser development. Economists have proposed market-driven TDR programs as a more efficient alternative (Thorsnes and Simons, 1999).

Purchase of development rights has become a popular approach for protecting open space by federal, state and local governments, and by a large number of private land trusts (Gustanski and Squires, 2000). The landowner voluntarily sells the development rights but retains title to the land, and a permanent conservation easement then prohibits future subdivision and development. Landowners may also donate development rights in exchange for tax benefits. Buckland (1987) and Daniels (1991) discuss the pros and cons of PDR programs for the purpose of preserving open space. The main disadvantage can be their relatively high cost in areas where land values and development pressures are high, although PDR can be a much cheaper option than outright purchase where costs and development pressures are low. Heimlich and Anderson (2001) estimate the cost for voluntary easements on all US cropland influenced by urban development at US\$ 130 billion. Federal support of PDRs and conservation easements has increased in

recent years. For example, the US Department of Agriculture (USDA) Forest Service's Forest Legacy Program is a partnership with states that encourages and supports acquisition of conservation easements on private forestland (USDA Forest Service, 2002).

Like PDR programs, the idea behind use-value tax assessment (also called preferential or differential tax assessment) is to provide landowners with an incentive to maintain their land in its current use rather than sell it for development. Land is taxed at a lower agricultural or forestry value rather than the higher values associated with developed uses (American Farmland Trust, 1997; Williams et al., 2004). Use-value assessment laws are enacted by states and implemented at the local level. Every state except Michigan has an agricultural use-value tax program. These programs typically include requirements that the owner be actively engaged in farming and have rollback provisions to recover lost tax revenues if the land is developed (Heimlich, 2001).⁶

4. Lessons learned

This section attempts to draw some key lessons from the literature with regard to questions about public policies for managing urban growth and protecting open space: What has been learned from formal and informal evaluations of the array of policy instruments? How can growth management and open space protection policies and practices be made more effective? What works and what does not work? While the following lessons are at a high level of generality due to the quantity and breadth of the literature, they offer insights for future policy directions.

4.1. Lesson 1: a lack of evaluations

Few empirical evaluations of policy effectiveness and impacts have been conducted (Howe, 1994; Nelson and Moore, 1996; Weitz, 1999). As a recent Brookings Institution report stated, the growth management literature tends to focus on describing policy

⁶ Other incentive-based techniques for protecting open space include circuit breaker tax relief credits (American Farmland Trust, 1997) and capital gains tax on land sales (Daniels et al., 1986; Nelson and Duncan, 1995).

instruments and programs rather than evaluating their impacts (Hollis and Fulton, 2002). There have been a few ambitious evaluations, such as various assessments of Oregon's growth management programs (e.g. Abbott et al., 1994) and Burby and May's (1997) evaluation of the effect of state comprehensive planning mandates on local government land-use policy and management. But such evaluations have been rare and are typically narrow in their focus, such as Burby and May's topical focus on natural hazards planning.

The lack of impact evaluations is surprising at first glance because growth management techniques have been employed for many decades and the stakes are high, judging by the apparent costs of sprawl (Burchell et al., 1998) and the high level of public concern about its impacts (Pew Center for Civic Journalism, 2000). But there are several reasons for the shortage of evaluations related to inherent challenges in evaluating government programs and policies. First is the lack of knowledge of the counterfactual, i.e. something must be known about what would have happened in the absence of a policy or program in order to evaluate its effectiveness or impacts. Growth management policies are but one of many factors that influence land use and development patterns (e.g. the rate of economic growth, changes in preferences for housing, government policies intended to achieve other goals, and so on). Distinguishing between the effects of these and other factors from the effects of a growth management policy is a thorny task for evaluators.⁷ An analyst may attempt to econometrically control for all the factors influencing land use change over time, but inability to identify all relevant factors and lack of high-quality data—or even reasonable proxy variables—will likely confound the policy evaluation (Heimlich, 2001).

Second, policies for managing urban growth often take years to implement and have impacts over long periods of time, and therefore short-term evaluations may be unable to detect the effects. Howe (1994, p. 284) observes that even for the Oregon land-use planning program, one of the longest-running state-level efforts, "... the true impact of the program

in containing growth and protecting resource lands may not be apparent for several generations."

Third, the issue of scale is a factor. Policies for managing growth and protecting open space have been implemented at a variety of often overlapping spatial scales and jurisdictions. The policies in one area affect other areas, making it difficult to sort out the effects of a particular policy from that of policies at other spatial scales or in neighboring areas.

Finally, many growth management programs do not include explicit goals or targets, which makes evaluation difficult if not impossible. Determining whether or not a program has been effective in accomplishing its goals requires clarity regarding the goals and objectives. In addition, the goals and mix of policy instruments used in growth management programs typically evolve over time, further complicating policy evaluation (Innes, 1993). Despite the challenges, there is a need for careful *ex post* evaluation of the effectiveness and impacts of growth management efforts.

4.2. Lesson 2: implementation is critical

As with any public policy instrument, the specific details of how growth management is implemented—rather than the general type of policy—are critical in determining effectiveness and impacts. For example, Pendall et al. (2002, p. 31) conclude, "... the impact of urban containment policies depends largely on their implementation." An urban growth boundary that is tightly and rigidly drawn around existing development will differ in its effectiveness at containing growth and its impact on land prices, housing affordability, and other factors, than one that encompasses more than enough land to accommodate future growth or is frequently expanded. Similarly, an adequate public facilities ordinance that is carefully and continuously monitored by a local jurisdiction will likely be more effective at increasing the density of development than an identical APFO in a community that lacks the capacity to monitor. This obvious point is likely to hold for every type of growth management policy due to the large number of variables related to implementation that can determine effectiveness. Porter (1997) points out that even growth management techniques that appear conceptually simple may be difficult to successfully execute in practice.

⁷ The changing social context also complicates evaluation in another way if, as often happens, the original goals of the growth management program become irrelevant: "An evaluation could reveal that the program was an adequate response to the original needs, but, contextual changes might make the program irrelevant in meeting current and/or future needs," (Howe, 1994, p. 283).

A critical aspect of implementation is administrative efficiency. Nelson and Duncan (1995) identified the administration of growth management programs as the key to effectiveness. Poorly administered growth management efforts often frustrate desirable development and make a community unattractive for developers. The result may be development leapfrogging to distant communities at higher environmental and social costs, exactly the opposite of what growth management seeks to achieve. Nelson and Duncan suggest that basic principles of administrative efficiency for growth management programs include streamlined permitting for development, nondiscretionary standards for approving development permits, and rational review of urban expansion.

4.3. Lesson 3: packages of complementary policy instruments

One of the clear lessons from the growth management literature is that the use of multiple, reinforcing policy instruments is far more effective than relying on a single technique. As Porter states, “The hallmark of *effective* growth management. . . is that these individual techniques are interlinked and coordinated in a synergistic manner rather than applied incrementally and individually” (1997, p. 13, emphasis in original). In fact, relying on a single technique may produce perverse results. For example, in the absence of zoning and other techniques to protect open space, purchase of development rights or conservation easements will likely result in a patchwork of protected lands that will be a magnet for development on unprotected adjacent lands (American Farmland Trust, 1997; Bowers, 2001).

Oregon’s program to preserve farmland from urbanization is a good example of the use of reinforcing policy instruments. The program includes exclusive farm zones, farm tax deferral, right-to-farm laws, and urban growth boundaries. An evaluation of Oregon’s program—comparing farmland protection in Oregon to Washington State and to the rest of the nation—concluded that Oregon’s policies have been effective in protecting farmland from urban encroachment due to the way in which the policies reinforce and complement each other (Nelson, 1992). The evolution of smart growth strategies in recent years—based on a set of diverse and reinforcing

principles—is an implicit recognition of this lesson. Smart growth efforts typically integrate planning, incentives, regulations, public acquisition of open space, and educational programs (Ducker and Owens, 2000). Maryland’s Smart Growth Program, for example, utilizes an array of policy approaches including programs to encourage growth in existing developed districts (e.g. priority funding areas, brownfields redevelopment, live near your work, job creation tax credit, and expanded-transit programs) and programs to protect open land (e.g. the Rural Legacy and GreenPrint Programs) (Gillham, 2002).

4.4. Lesson 4: vertical and horizontal coordination

The first law of ecology, according to Commoner (1971), is that you cannot change just one thing because everything is connected to everything else. Extending Commoner’s law from ecosystems to urban systems, the policies of one community affect and are affected by the policies of other communities, regions, states, and the nation. Therefore, successful growth management efforts must take into account and coordinate with the policy actions of others. The task of coordinating the actions of many levels of government, agencies, and non-governmental actors is at the heart of growth management (Innes, 1993).

Two dimensions of coordinating growth management and open space protection may be distinguished: vertical coordination between policies at different governmental levels, and horizontal coordination among neighboring communities, regions, or states.⁸ With regard to vertical coordination, Nelson and Duncan (1995) state that growth management is most effective within a statewide context, so that each level of government coordinates their plans with other governmental levels. Horizontal coordination is needed to help avoid situations in which growth management policies in one jurisdiction undermine policies or create burdens in neighboring communities. For example, the unilateral actions of Boulder, CO in creating its urban greenbelt have led to development leapfrogging over the greenbelt and creating sprawl in nearby areas (Pendall et al., 2002).

⁸ Innes (1993) adds time as a third dimension, i.e. coordinating development with infrastructure availability.

Both vertical and horizontal coordination of growth management efforts are often inadequate or lacking. Depending on how state growth management is defined, only about a dozen states have such programs and not all of these have effective coordination mechanisms (Weitz, 1999). Some states, including Oregon and Florida, require consistency between state land development plans and local plans. In other states, the state role in the review of local comprehensive plans is weak or nonexistent and consistency between state and local plans is not enforced. States also differ widely in the degree of coordination across state agencies with land use related responsibilities and in requiring their actions to be consistent with state growth management goals and programs (Innes, 1993; Weitz, 1999).

Many authors have suggested that the involvement of regional entities is a key to vertical coordination and the effectiveness of growth management (e.g. Ndubisi and Dyer, 1992; Nelson and Duncan, 1995; Porter, 1997; Gillham, 2002). But the role of regional bodies in coordinating growth management remains modest at best (Innes, 1993). Some form of regional governance and coordination is needed to transcend local boundaries and serve as a bridge between local communities and state government. A number of different types of regional organizations participate in growth management, including regional planning councils or districts, metropolitan transportation planning organizations, regional public service authorities, consolidated city/county governments, county planning organizations, and others (Porter, 1997).

4.5. Lesson 5: stakeholder participation

Finally, participation by citizens and other stakeholders has often been identified as a vital element for success of growth management and open space protection efforts: “The cornerstone of any effective growth management policymaking process is citizen involvement” (Nelson and Duncan, 1995, pp. 144–145). Meaningful, grassroots participation from the outset of the planning process and throughout implementation of plans is needed if community goals and concerns are to be incorporated and local land-use plans are to have legitimacy with those affected by the plans. Innes (1992) analyzed participatory group processes in three growth management states and found that they have been useful for a vari-

ety of important tasks, including framing the problem of growth management, placing the issues on the public agenda, writing growth management legislation, turning general policies into specific strategies, providing oversight and review of growth management laws as they are applied, and negotiating differences among conflicting stakeholders.

An effective approach to support and facilitate public involvement is to build it into each level in state growth management programs. In Oregon, for example, citizen advisory committees exist at the state, regional, county, and city level (Nelson and Duncan, 1995). Long-term stakeholder collaboration is also important. Public participation in growth management should be a continuing role that extends throughout the entire implementation process. Citizens and groups should be able to challenge land-use decisions and plan amendments. Watchdog groups, such as the many “1000 Friends” organizations, have often been effective at ensuring that policies are properly implemented and changes to plans are consistent with state growth management goals (e.g. Oliver, 1992; Liberty, 1996).

5. Concluding comments

The challenges planners and policy makers face in managing urban growth and protecting open space in the 21st century are daunting. A recent US General Accounting Office report on growth issues stated, “Faced with a projected 50-percent increase in the US population in the next 50 years, communities across the nation must address the challenges of planning for and managing growth” (US GAO, 2000, p. 5). Other projections of US population growth suggest a 50% increase by the year 2030 (US Census Bureau, 2000). In addition to the prospect of a burgeoning population, metropolitan areas are using significantly more land per person as they expand than was the case a few decades ago (Fulton et al., 2001). Innovative and effective policies and programs will be required to stem the tide of increasingly land-consumptive development. Public sector responses to sprawl—mainly at the local and state levels in the past—will have to be reconsidered.

A recurring suggestion to improve the effectiveness of growth management in the US is to advance a federal role in coordinating state, regional, and lo-

cal efforts. Land-use planning and policy have long been the domains of local governments in the US, but the time may be right for change. Local communities have been found to support changes in the federal role regarding coordination of growth management (US GAO, 2000). Some have suggested a federal role modeled after the federal Coastal Zone Management Program (e.g. Nelson, 1999; Rylander, 2000). Management of coastal areas under this program appears to be an effective approach (Hershman et al., 1999) and a model that could be used to improve the management of urban growth and protection of open space. Distinguishing features of the coastal program include: (1) a national level role of administration and oversight, and (2) a voluntary approach in which incentives in the form of grants are used to generate federal/state/local cooperation and coordination.

Potential federal roles in managing development include helping to increase planning capacity; coordinating local, regional, and state efforts; coordinating federal development activities and growth management goals; and providing greater funding of incentives for open space protection and infill development (Heimlich and Anderson, 2001). The US Environmental Protection Agency has also suggested a federal role that would include providing information, developing model programs and analytical tools for communities, removing federal barriers to smart growth, and creating new incentives to encourage smart growth (US EPA, 2002a). The beginnings of a new federal role can be seen in a variety of smart growth initiatives from the US Environmental Protection Agency, the President's Council on Sustainable Development, the Livability Agenda (Rylander, 2000), and similar efforts.

This paper has described the US public policy response to growing concern about the social and environmental impacts of sprawling development patterns. A panoply of policy instruments has been developed and experimented with in communities across the nation. The importance of holistic approaches and the reality that managing urban growth and protecting open space are two sides of the same coin are increasingly recognized. Whether or not these efforts—even with an enhanced federal coordination role—will be sufficient to make development environmentally and socially sustainable remains to be seen.

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