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TAMING THE SUBURBAN AMOEBIA IN THE ECOSYSTEM AGE: SOME DO'S AND DON'TS

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Tame—changed from the wild or savage state¹

Suburb—a district lying immediately outside a city or town²

Amoeba—a microscopic, one-celled animal consisting of a naked mass of protoplasm constantly changing in shape as it moves and engulfs food³

Ecosystem—a system formed by the interaction of a community of organisms with their environment⁴

INTRODUCTION

Urban central cities present a host of environmental problems including, but not limited to, industrial pollution, brownfields, smog, and environmental injustice. Rural and agricultural areas also experience environmental degradations such as pesticide runoff, wetlands conversion, and overgrazing. Between these different bands of lifestyle and land use lie the suburbs,⁵ which present their own set of environmental policy issues.

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1. THE RANDOM HOUSE COLLEGE DICTIONARY 1342 (1973).

2. *Id.* at 1311.

3. *Id.* at 44.

4. *Id.* at 419.

5. According to the United States Bureau of the Census, the world consists of urban/rural divisions and metropolitan/nonmetropolitan divisions. An urban area comprises an incorporated place and surrounding densely populated area that together exceed 50,000 in population. RUTHERFORD H. PLATT, LAND USE AND SOCIETY: GEOGRAPHY, LAW, AND PUBLIC POLICY 23 (1996). A metropolitan statistical area (MSA) includes a core area of one or more urban areas, the county or counties (town and city clusters in New England) in which the urban area or areas are located, adjoining counties with over 50% of their population in the urban area, and additional counties based on specified requirements of commuting to the urban area. *Id.* at 19. Many planners prefer to divide land uses into urban, suburban, exurban, or rural categories. See Judy S. Davis et al., *The New 'Burbs': The Exurbs and Their Implications for Planning Policy*, 60 J. AM. PLAN. ASS'N 45, 46 (1994). Suburban

This Article focuses on one of those problems: the growth of suburban land area and what it means for emerging notions of ecosystem management and sustainable development at the local land use scale. Part I of the Article provides the demographic and legal background of the suburban and ecosystem phenomena that are sweeping America today. These are both forces of tremendous magnitude, but have ambiguous parameters. Part II of the Article provides some suggested guidelines for the difficult task of designing law and policy to manage these forces in concert. Because these guidelines are based on my personal experiences, they might be criticized as biased. However, coldly objective rationalism will not work in this realm; indeed, that approach may be what has caused the problems we now face. The issue of suburban growth in the ecosystem age is one of deep human and environmental consequences, and the law must take those dimensions into account. Hence, rather than being fixed principles, my proposals are offered as invitations for others to subjectively re-examine where law and policy must lead suburban growth in the ecosystem age.

I. DEFINING THE PROBLEM, POLICIES, AND LAW—SUBURBAN GROWTH AND THE HEALTH OF ECOSYSTEMS

A. *Problem: The Suburban Amoeba Meets the Ecosystem Age*

The fastest growing slice of life in America is the suburbs.⁶ The suburbs grow by combining two inputs, one from each of the other land uses. Suburbs are created by populating rural land with people from urban areas.

areas fall mainly outside core urban areas but within metropolitan areas, whereas exurban areas lie mainly outside metropolitan areas. *Id.* Exurban areas are characterized by a more pro-rural, anti-urban attitude than is found in suburbia. *Id.* However, for purposes of this article the suburban and exurban bands of land use are treated the same as they represent the same threats to ecosystem integrity.

6. Beginning in the 1950s, suburban population growth in the United States exploded in comparison to its prior historical growth as well as to rural and urban populations. Between 1950 and 1966, the population of the nation's central cities increased by 7,400,000, where the suburban population grew by 36,500,000. Paul Davidoff et al., *Suburban Action: Advocate Planning for An Open Society*, 36 J. AM INST. PLANNERS 12, 13 (1970). During that period, 80% of new metropolitan area jobs landed in the suburbs, and 70% of new housing starts were in the suburbs. *Id.* Central city and suburban populations were about equal in 1960, at 59 million each. PLATT, *supra* note 5, at 22. By 1980, central city population was 68 million and suburban population was 101 million. Although differences in the way countries define "urban" make comparisons difficult, under any definition the urbanization trend in other countries is even more extreme. For example, the United Nations projects that by 2015 North America will have the smallest urban population of any continent. WORLD RESOURCES INSTITUTE ET AL., WORLD RESOURCES 1996-97 8-9 (Leslie Roberts et al. eds., 1996) [hereinafter WORLD RESOURCES].

The effects of that process are that central city populations are growing slowly, or even shrinking.⁷ Many central city land areas are boxed in by outlying jurisdictions, allowing only high-density infill development to meet any central city building need.⁸ Suburban land areas are the only portion of urban America increasing in size.⁹ Meanwhile, rural land areas are

7. From 1960 to 1990, the central city population increased 15.2% while suburban population increased 71.1%. PLATT, *supra* note 5, at 305-06. By far, the fastest growing areas were centered around core central cities of under 250,000 in population. *Id.* at 306. These smaller, fast growing urban centers, known variously as "mushburbs," "new cities," "urban villages," or "edge cities," are becoming the office and retail centers of the nation and magnets for new suburban growth, and thus are increasingly independent of larger urban central cities. *See id.* at 136-41 (discussing trends in mushburbs and edge cities); JOEL GARREAU, *EDGE CITY: LIFE ON THE NEW FRONTIER* (1991) (describing the edge city concept); Christopher B. Leinberger, *Metropolitan Development Trends of the Late 1990s: Social and Environmental Implications*, in HENRY L. DIAMOND & PATRICK F. NOONAN, *LAND USE IN AMERICA* (1996) (discussing "urban villages") and James C. Nicholas, *The Costs of Growth: A Public vs. Private Sector Conflict or a Public/Private Responsibility*, in URBAN LAND INSTITUTE, *UNDERSTANDING GROWTH MANAGEMENT* 43, 44-45 (David J. Brower et al. eds., 1989) (discussing the new city phenomenon). By contrast, in the developing world's cities, urbanization has remained compact in many instances because of less developed communication and transportation infrastructures. WORLD RESOURCES, *supra* note 6, at 9.

8. High-density infill is by no means limited to core central cities. Even suburban areas which initially experience discontinuous low-density development eventually must move to high density infill options once the growth fringe has moved beyond their borders, that is, if they wish to facilitate population growth within their boundaries. *See* Richard B. Peiser, *Density and Urban Sprawl*, 65 *LAND ECON.* 193, 203 (1989). As early as the 1950s, some planners outlined two "urban frontiers," one of deterioration from the inner suburban zone inward to central city cores, and the other of growth from the periphery of built-up metropolitan areas outward. *See* Anthony Downs, *Alternative Forms of Future Urban Growth in the United States*, 36 *J. AM. INST. PLANNERS* 3, 4 (1970). There is some optimism that inner cities can redefine their roles in the larger metropolitan area by reemphasizing sports and entertainment attractions, but most analysts concede the suburbs have become the nation's magnet for people and wealth. *See* Haya El Nasser, *New Approaches to Building Cities: Entertainment Centers A Big Draw*, *USA TODAY*, Dec. 27, 1996, at 1A.

9. All the new people, jobs, and homes takes up space. In 1982, urban areas of the nation took up 47 million acres, or only two percent of the total U.S. land area. PLATT, *supra* note 5, at 18. However, the rate of growth of suburban land use area has been dramatic. In 1920, there were 131 urban areas taking up 6318 square miles with an average density of 6160 people per square mile. *Id.* at 23. In 1960, there were 269 urban areas covering 24,111 square miles at a density of 4090. *Id.* In 1990, there were 396 urban areas taking up 61,014 square miles at a density of 2589. *Id.* In other words, the suburban phenomenon in the United States manifests itself in lower density growth and thus an increasing rate of land consumption proportional to population increases. The problem in other world regions is even more intense. Although urbanization in developing regions takes place at higher densities, the higher volume of people requires that each relatively compact city expand its land area substantially. The result is that in developing nations, almost one half million

shrinking, even though there is still plenty of rural land remaining.¹⁰ Moreover, whether we count suburbs as urban or rural for purposes of the census and other reporting measures, the reality of the matter is that they are sociologically, politically, culturally, recreationally and in almost every other way different from urban and rural life. Managing environmental

hectares of arable land are converted to urban land uses each year. WORLD RESOURCES, *supra* note 6, at 59. In particular, China's arable land is being lost to urban land uses at the rate of over 400,000 hectares annually. Roy L. Prosterman et al., *Can China Feed Itself?*, SCI. AM., Nov. 1996, at 90. Nevertheless, only about 1% of the world's land area is devoted to urban land uses. WORLD RESOURCES, *supra* note 6, at 58.

10. Between 1981 and 1993 the amount of land in the United States devoted to crops, pasture, and forest uses fell by about 1.2%. WORLD RESOURCES, *supra* note 6, at 217. The proportion of built up central city and suburban land area in the nation is so small that suburban growth does not present a serious threat to the total land area devoted to agricultural, ranching, and other rural land uses. If all of the people of the lower 48 United States were distributed in four person households on one acre lots, just 3% of the total land area would be used. Peter Gordon & Harry W. Richardson, *Are Compact Cities a Desirable Planning Goal*, 63 J. AM. PLAN. ASS'N 95, 96 (1997). It is not surprising, therefore, that even by applying liberal estimates of urbanization growth, it is unlikely that the built up land area will exceed 4% of the nation's land area by the year 2000. See John Fraser Hart, *Urban Encroachment on Rural Areas*, 66 GEOGRAPHICAL REV. 3, 15 (1976). The physical impact of that growth, however, is "magnified by the fact that it is most intense and most visible precisely near those cities and along those highways where it may be observed by the greatest numbers of people." *Id.* at 17. Indeed, although the urban land area of the nation is only 2%, the area designated as MSAs is close to 20%. See STATISTICAL ABSTRACT OF THE UNITED STATES 1995, 38 (1995). This means that at least 15% of the nation's land area is nonurban in land use, but located within an MSA. Areas of this description contain over one-third of the nation's prime farmland. Thomas L. Daniels, *Where Does Cluster Zoning Fit in Farmland Protection*, 61 J. AM. PLAN. ASS'N 129, 129 (1997). Hence, suburban land area growth is often framed in terms of its impact on agricultural land located in or on the edges of MSAs. Empirical studies demonstrate that in areas where agricultural land is highly productive, and thus high in price, rural land tends to be more resistant to suburban infiltration. Jan K. Brueckner & David A. Fansler, *The Economics of Urban Sprawl: Theory and Evidence on the Spatial Sizes of Cities*, 65 REV. ECON. & STAT. 479, 481 (1983). Nevertheless, the market for suburban land seems always to creep high enough to swallow nearby agricultural land. For example, in the six county Willamette Valley in Oregon, which contains the cities of Portland and Salem, agricultural land area dropped by 20% between 1964 and 1978, while the population grew by 23%. Greg C. Gustafson et al., *The Oregon Land Use Act: Implications for Farmland and Open Space Protection*, 48 J. AM. PLAN. ASS'N 365, 367 (1982). The highly visible impact of urbanization on high quality agricultural land lying at the urban fringe has led several states to implement narrowly focused farmland protection laws. See William R. Bryant & Howard E. Conklin, *New Farmland Preservation Programs in New York*, 41 J. AM. INST. PLANNERS 390, 390 (1975); Thomas L. Daniels & Arthur C. Nelson, *Is Oregon's Farmland Preservation Program Working?*, 52 J. AM. PLAN. ASS'N 22, 22 (1986) and George E.H. Gay, *State Solutions to Growth Management: Vermont, Oregon, and a Synthesis*, 10 NAT. RESOURCES & ENV'T 13, 13 (1996).

issues in the suburbs, therefore, may require a different approach from what has been employed in rural and urban areas.

Indeed, the unique and most dynamic characteristic of the suburbs, that they alone are consistently growing in land area, presents their most pressing environmental issues. As suburbs spread urban dwellers across the landscape, they are chewing up what remains of the wildlife habitat that central city pavement and rural agriculture has not already converted to their own uses.¹¹ Should this be of concern to environmental policy? At one time, the response to that question might have been ambivalence stemming from the belief that we could plan around the issue. People believed that they could work in a park or a greenbelt, sprinkle open spaces and golfcourses, maintain big landscaped back yards, and the wildlife would find homes among human neighbors.¹² However, the emergence of the "new" science of conservation biology and ecosystem management has shattered that model. We now realize that the ecosystems into which suburbia encroaches, mostly privately owned, support a vitally important diversity of biological and physical attributes.¹³ The impact of suburban

11. In fairness, it is indisputable that far more natural areas are lost worldwide to agricultural activities, forestry, and grazing than to urbanization. WORLD RESOURCES, *supra* note 6, at 59. In the lower 48 states, for example, about 38% of the land is forested, 29% is rangeland or grassland, and 23% is agricultural land. Thomas R. Loveland & H.L. Hutcheson, *Monitoring Changes in Landscapes from Satellite Imagery*, in UNITED STATES DEPARTMENT OF THE INTERIOR, OUR LIVING RESOURCES 469 (1995).

12. See Judy L. Meyer, *The Dance of Nature: New Concepts Ecology*, 69 CHI-KENT L. REV. 875, 884 (1994) and William Stolzenburg, *Building a Better Refuge*, NATURE CONSERVANCY, Jan./Feb. 1996, at 18.

13. For example, coastal ecosystems in many developing regions of the world are threatened principally by urban expansion. WORLD RESOURCES, *supra* note 6, at 60-62. Indeed, this is the history of many large coastal cities in the United States. Of the almost 81,000 hectares of coastal marshes that once fringed San Francisco Bay, for example, 80% have been lost to urban development. *Id.* at 62. Along the Gulf of Mexico shoreline, coastal wetlands in the growing metropolitan areas of Galveston Bay, coastal Louisiana, Mobil Bay, and Tampa Bay have experienced significant wetlands losses since 1950, largely as a result of industrial and urban land development. James B. Johnston et al., *Gulf of Mexico Coastal Wetlands: Case Studies of Loss Trends*, in OUR LIVING RESOURCES, *supra* note 11, at 269. Similarly, one study estimates that over 90% of the species listed under the Endangered Species Act as endangered or threatened have some or all of their habitat on nonfederal lands—73% of those have over 60% of their habitat on nonfederal lands, and 30% are completely dependent on nonfederal lands. U.S. General Accounting Office, *Endangered Species Act, Information on Species Protection on Nonfederal Lands 4-5* (1994). Another study demonstrates that a mere 7% of the land area of the United States is home to 50% of plant and animal species listed under the Endangered Species Act, and that the "hot spots," within which many different at risk species appear in clusters, are often located near areas experiencing suburban expansion. See T. Adler, *Mapping Out Endangered Species' Hot Spots*, 150 SCI. NEWS 101, 101 (1996). Hence, although the built up land area is not a large

development can also be felt far outside the development fringe. Inhabitants import resources from outlying areas and export pollution in return.¹⁴ Most ecologists are now convinced that preserving ecosystem integrity, ensuring that the mix of biota and physical traits is sustainable, means preserving many large, contiguous, undisturbed chunks of land.¹⁵ In other words, we are not talking just of playgrounds and golf courses anymore.¹⁶

proportion of the total national land area, it so happens that further expansion of the built up area poses a serious threat to many endangered species and sensitive ecosystems. On a worldwide level, estimates are that as much as 34% of the world's natural coastal areas are at high risk of degradation, largely as a result of urbanization and port activities. WORLD RESOURCES, *supra* note 6, at 248. The three countries with the highest numbers of endangered mammals—Indonesia, China, and India—account for 43% of the world's population and are among the most densely populated nations. Rodger Doyle, *By the Numbers: Threatened Mammals*, SCI. AM., Jan. 1997, at 32.

14. For example, the vast majority of Nevada's 1.4 million residents live in two metropolitan areas covering less than 1% of the state's land area. An additional 3% of the state is devoted to agricultural uses. That 4% of total land cover, however, draws massive amounts of water from the Colorado River, making its presence felt at considerable distances. See Paul R. Ehrlich & Anne H. Ehrlich, *Biodiversity and the Brownlash*, DEFENDERS, Fall 1996, at 6-8. See generally ANDREW GOUDIE, *THE HUMAN IMPACT ON THE NATURAL ENVIRONMENT* (4th ed. 1994) (providing a comprehensive discussion of the direct and indirect effects of human population on the environment).

15. A focal point of conservation biology research has been to demonstrate the often pernicious effects of habitat fragmentation. It appears to be indisputable, for example, that a circular preserve of 1000 contiguous acres offers more ecological value to many species than would 10 unconnected preserves of 100 acres each. Smaller preserve structures increase the total linear "edge" of preserve boundaries, presenting opportunities to predators. See Denis A. Saunders et al., *Biological Consequences of Ecosystem Fragmentation: A Review*, 5 CONSERVATION BIOLOGY 18, 24 (1991). Many species depend on a minimum "patch size" of habitat in order to carry out essential breeding, feeding, and sheltering functions. *Id.* Often the adverse effects of fragmentation exhibit themselves without warning and thereafter are difficult to reverse. See Kimberly A. With & Thomas O. Crist, *Critical Thresholds In Species' Responses to Landscape Structure*, 76 ECOLOGY 2446, 2446 (1995). While these factors may be difficult to measure in specific species contexts, it seems widely agreed in the scientific community that they exist in general and pose significant challenges for preserve design and management for many species.

16. Indeed, conservation biology has led to the emergence of the new discipline of landscape ecology, which involves the planning of subdivisions and other land uses with greater attention to spatial design issues such as compactness, land conservation balances, and regional preserve networks. See, e.g., RANDALL G. ARENDT, *CONSERVATION DESIGN FOR SUBDIVISIONS* (1996); WENCHE E. DRAMSTAD ET AL., *LANDSCAPE ECOLOGY PRINCIPLES IN LANDSCAPE ARCHITECTURE AND LAND-USE PLANNING* (1996). By focusing on the "how to" aspects of balancing urbanization with ecosystem integrity, it may well turn out that the landscape ecology discipline supplies the answers to the questions conservation biologists keep raising. For example, in March 1996, a consortium of 20 environmental, golf, and governmental organizations unveiled the "Environmental Principles for Golf Courses in the

On the other hand, we cannot seriously be talking about the end of the suburban growth trend either. One of the recurrent criticisms of conservation biology is that it rarely offers an answer to the question of how much is enough. More specifically, the conservation biology literature, which is laden with normative orientations and political agendas, seldom offers an end point to its basic mantra that more preservation means better ecosystems.¹⁷ In other words, efforts to harmonize land use and environment are an anathema to many conservation biologists.¹⁸ Unless the powerful demographic trends of the past several decades reverse themselves soon, the most important thing that we will need from conservation biology is an answer to how to achieve patterns of land use and land conservation that are both socially and environmentally meaningful.

United States." See Paul Parker & Meredith Miller, *Redefining How Golf Shapes the Landscape*, NATIONAL WETLANDS NEWSLETTER, Sept.-Oct., 1996, at 13. Golf courses are not going away; there are 15,000 in the United States today. *Id.* Approximately 255 new golf courses, representing about 40,000 acres, are being added each year. *Id.* Only through collaborative, interdisciplinary efforts can we hope to achieve sustainable development that both accommodates and manages this and other realities of suburban growth.

17. The typical policy prescription in conservation biology circles is to say simply that "maintaining as much wild land as possible is the most viable option." Michael J. Samways, *The Art of Unintelligent Tinkering*, 10 CONSERVATION BIOLOGY 1307, 1307 (1996). Some conservation biologists concede, however, that this is not a very helpful policy guideline as it suggests no end boundary to preservation. See John M. Hagan, *Environmentalism and the Science of Conservation Biology*, 9 CONSERVATION BIOLOGY 975, 975 (1995). The central problem in defining such a boundary is that "the relationship between socioeconomic factors and biodiversity loss is not well understood." Deborah J. Forester & Gary E. Machlis, *Modeling Human Factors That Affect the Loss of Biodiversity*, 10 CONSERVATION BIOLOGY 1253, 1253 (1996). Hence, "[p]resently there is no method to determine how much land should be protected to maintain an ecosystem's integrity." Steven R. Beissinger et al., *Null Models for Assessing Ecosystem Conservation Priorities: Threatened Ecosystems in South America*, 10 CONSERVATION BIOLOGY 1343, 1344 (1996). In any event, the United States already has over 130,000 hectares of federal land qualifying for the World Conservation Union's totally and partially protected categories, which is more than any other nation, and ranks in the top 25 in terms of the percent of total land area in that status. WORLD RESOURCES, *supra* note 6, at 262-63, 270. Over 620 million acres of the nation's approximately 2.3 billion acres are managed by four federal agencies—the Forest Service, the Bureau of Land Management, the Fish and Wildlife Service, and the National Park Service—and over 43% of that land is protected by conservation restrictions. UNITED STATES GENERAL ACCOUNTING OFFICE, INFORMATION ON LAND OWNED AND ON ACERAGE WITH CONSERVATION RESTRICTIONS, 24-35 (1995).

18. See, e.g., Bill Willers, *Sustainable Development: A New World Deception*, 8 CONSERVATION BIOLOGY 1146 (1994).

B. Policy: Designing Sustainable Development for the Local Scale

Much of the recent policy discussion regarding this balance of social and environmental goals focuses on the now familiar theme of sustainable development. The literature attempting to define what sustainable development means and how to implement it as a coordinating policy principle is burgeoning.¹⁹ So far, a consensus over a meaning has not been reached. Neither is a framework in place to install sustainable development principles at relevant planning levels. While progress is being made in both regards, it has been more at international and national levels than at the local scale. However, if sustainable development is ever to mean anything more than a lofty principle, it is at the local level where it must be addressed.

The prevailing definition of sustainable development at the international level comes from the 1987 Brundtland Report of the World Commission on Environment and Development. The World Commission defines sustainable development as, a process in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations.²⁰ More recently, international consensus has explained that this goal requires that a change in consumption patterns, particularly in industrialized countries, towards those which can be attained by all within the bounds of the ecologically possible, has to be a central component in the drive for sustainable development.²¹ The President's Council on Sustainable Development describes what this process will mean for the United States as follows:

A sustainable United States will have a growing economy that provides equitable opportunities for satisfying livelihoods and a safe, healthy, high quality of life for current and future generations. Our nation will protect its environment, its natural resource base, and the functions and viability of natural systems on which all life depends.²²

Sounds great, doesn't it? After all, objecting to that goal would be tantamount to objecting to democracy, the free market, and the

19. See ENVIRONMENTAL ISSUES AND SUSTAINABLE FUTURES: A CRITICAL GUIDE TO RECENT BOOKS, REPORTS, AND PERIODICALS (Michael Marien ed., 1996) (abstracting 450 books and identifying 170 periodicals dealing with sustainable development and related topics).

20. WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT, OUR COMMON FUTURE 8-9 (1987).

21. AGENDA 21: THE EARTH SUMMIT STRATEGY TO SAVE OUR PLANET 38-43 (Daniel Sitarz ed., 1993).

22. THE PRESIDENT'S COUNCIL ON SUSTAINABLE DEVELOPMENT, SUSTAINABLE AMERICA: A NEW CONSENSUS (1996).

environment all at once. But what is a local planning authority supposed to do?

The answer does not lie in superficially adapting the international and national policy statements to local levels, as in a process in which the *local* exploitation of resources, the *local* direction of investments, the *local* orientation of technological development and institutional change are all in harmony. That approach does not advance the ball at the local level for any practical purposes. Nor do trite slogans such as “think globally and act locally” help. Those are fine for bumper stickers, but they do not imply any particular policy.²³ The problem is that many of the issues that motivate discussion of sustainable development at the international level, including climate change, depletion of stratospheric ozone, persistent organic pollutants, loss of biodiversity, ocean degradation, and the like, are truly worldwide in scale and require worldwide response. The case for local involvement in those solutions is strong,²⁴ but many local issues of sustainability either have nothing to do with those global and national issues or will benefit little from the worldwide and nationwide dialogues. In other words, the United Nations and the President’s Council on Sustainable Development are unlikely to develop a universally workable blueprint for local policy.

The observation that a universally workable blueprint for local policy will not be drafted is not intended to detract from the national and international efforts. The analogy is to how broad notions of democracy or justice are translated from generalized national and international principles to local policies. We do not demand detailed “definitions” of democracy and justice in order to agree that they are useful concepts that should be expressed as national and international goals. Nor do we demand that national and international bodies implement these principles at local levels or define precisely how local bodies should do so. Rather, national and international bodies are best equipped to define the bounds of what fits into

23. The *Sustainable America* report of the President’s Council on Sustainable Development is an important first step in the process of translating such “slogans” into national policy. The report begins with a platitudinal, 16 point “We Believe” statement. *See id.* at v-vi. It then transforms into 10 more fully articulated “national goals.” *See id.* at 11-23. The report continues by devoting the remaining 142 pages to placing concrete policy proposals on each goal. *See id.* at 25-168. Still, specific local policies do not abound in the report.

24. *See generally* Donald A. Brown, *Thinking Globally and Acting Locally: The Emergence of Global Environmental Problems and the Critical Need to Develop Sustainable Development Programs at State and Local Levels in the United States*, 5 DICK. J. ENVTL. L. & POL’Y 175 (1996).

these concepts, leaving it largely to state and local bodies to implement them according to local culture, economy, environment, and context.²⁵

What is the best method for local bodies to implement this broad goal of sustainable development? Because a uniform blueprint does not seem to exist, the approach of local decision making must be one which is at all times sufficiently flexible to respond to the dynamic nature of land use and the environment. It must also be permanently locked on the long range goal of sustainability as the target—an approach called adaptive management. Kai Lee offers the metaphor of a compass and a gyroscope to explain what this means: the compass implies continuous rechecking and, if necessary, altering of the immediate direction being taken; the gyroscope implies stability towards the long-term goal.²⁶ In this sense, adaptive management does not suggest any particular decision outcome, only a way of making decisions. The question still remains whether our legal framework for local decision-making facilitates the adaptive management method.

C. Law: The Emerging Legal Framework of Local Ecosystem Planning

Whatever it encompasses in terms of economy and infrastructure, sustainable development in the suburban population growth context must also mean biological sustainability of the ecosystems into which suburbia expands. Several legal models and initiatives have been used in the past two decades to confront this and other special environmental issues of the suburbs. Known ubiquitously as “land use planning,” “growth management,” or “growth control,” this legal framework emerged slowly but now operates vigorously at every level of government, albeit without much in the way of coordination across and between levels.²⁷ The richest

25. Perhaps the best evidence that this process is unfolding is that an increasing amount of literature about sustainable development is devoted to translating the message to different scales of planning and impact. See generally Simon Fairlie, *Sustainable and Low Impact Developments in the Countryside*, 1996 J. PLAN. & ENVTL. L. 903 (examining British national land use policy); James Longhurst et al., *Towards Sustainable Airport Development*, 16 ENVIRONMENTALIST 197 (1996) (applying sustainable development principles to the level of a single airport development); Sergio Marchiso, *Mediterranean Sustainable Development in International Law*, 26 ENVTL. POL'Y & L. 260 (1996) (focusing on the Mediterranean region); Jon Chandler, *Regional Growth Means Achievable Growth*, 7 NAT. RESOURCES LAW INST. NEWS, Summer 1996, at 11 (discussing Portland city policies); Monique Ross, *Sustainable Forest Management on Alberta's Private Woodlots: Defining a Role for Government*, RESOURCES, Fall 1996, at 1 (identifying Alberta provincial policy for private logging).

26. KAI N. LEE, COMPASS AND GYROSCOPE: INTEGRATING SCIENCE AND POLITICS FOR THE ENVIRONMENT vii (1993).

27. At its broadest application, “[g]rowth management is a land use control program that seeks to regulate the rate, location and character of urban growth and development.” Quintin Johnstone, *Government Control of Urban Land Use: A Comparative Major Program*

tradition in this regard has been at the local level. There is a long history of cities and towns imposing zoning and other forms of development restrictions, often connected in some way to land conservation objectives.²⁸ Beginning in the 1970s, a number of state governments enacted state wide coordinated development planning mandates designed to bring order and certainty to the often fragmented local planning processes.²⁹ The approaches

Analysis, 39 N. Y. L. SCHL. REV. 373, 416 (1994). It may go too far, however, to refer to growth management as a "program." Rather, the multi-layered jurisdictional framework for land use regulation in the United States has caused one commentator to conclude that "the American federalist system of land use controls . . . is barely a system No principle of administrative rationality, constitutional entitlement, economic efficiency, or even ideological predisposition truly determines the governmental locus of decisions." Frank J. Popper, *Understanding American Land Use Regulation Since 1970*, 54 J. AM. PLAN. ASS'N 291, 299 (1988). On the other hand, a strong case can be made that by dispersing decision making power to many different decision makers at several different levels of government, and by integrating a variety of decision making criteria versus just one overriding factor (e.g., economic efficiency), the result is indeed a system far more adaptable to chaotic forces in development and population trends than would be a centralized, single criterion system. See J. B. Ruhl, *The Fitness of Law: Using Complexity Theory to Describe the Evolution of Law and Society and Its Practical Meaning for Democracy*, 49 VAND. L. REV 1407, 1475 (1996).

28. New York City started this movement with its adoption of the first comprehensive zoning ordinance in 1916. See Gay, *supra* note 10, at 13. Some commentators distinguish between zoning and growth management, on the basis that zoning is designed to lock in existing land uses, whereas growth management has a more forward looking focus designed to comprehensively integrate economic, housing, transportation, employment, and environmental concerns in planning long term urban growth. See James H. Wickersham, *The Quiet Revolution Continues: The Emerging New Model for State Growth Management Statutes*, 18 HARV. ENVTL. L. REV. 489, 498-505 (1994). For the most part, however, "[z]oning is . . . being co-opted in many places as one of the control devices of growth management." Johnstone, *supra* note 27, at 417. Besides zoning, the approaches local authorities have used to facilitate growth control include subdivision regulation, impact fee exactions, support and enforcement of private deed restrictions, long-term local growth plans, building or utility moratoriums, programs for transfer of development rights, restriction of building in floodplain, wetland, and other critical natural areas, and direct land acquisition. See PLATT, *supra* note 5, at 251-342. For a comprehensive analysis of these forms of local growth control regulation from the "law and economics" perspective, see Robert C. Ellickson, *Suburban Growth Controls: An Economic and Legal Analysis*, 86 YALE L.J. 385 (1977).

29. State growth control management efforts have emerged in two "waves" of initiatives, and generally follow one of two models. The first wave occurred in the 1970-75 time frame, as Vermont (1970), Florida (1972), California (1972), Oregon (1973), Colorado (1974), and North Carolina (1974) enacted state laws requiring specified growth planning or regulation actions by state, regional, or local agencies. The two models that emerged from that series of initiatives were the state-level case-by-case project review step, represented by Vermont's law, and the state-level oversight of local decision making, represented by Oregon's law. The second wave of laws, which began in the mid-1980s and ran its course in the early 1990s, includes both revisions to laws enacted in the first wave (e.g., Florida (1985)

taken in state programs differ fundamentally from zoning and other tools of local management, presenting some potential advantages with respect to environmental protection goals.³⁰ Finally, although the federal government does not say it is in the business of land use control,³¹ it very much is. Though complex and seemingly haphazard in configuration, a web of federal legislation, including the Endangered Species Act, Clean Water Act, Clean Air Act, and Coastal Zone Management Act, to name just a few, has direct consequences at the local land use decision making level.³² Land

and Vermont (1987)) and states enacting new laws (e.g., New Jersey (1985), Maine (1988), and Maryland (1992)), and has generally followed the state level oversight model. See PLATT *supra* note 5, at 345-67; John M. DeGrove, *Growth Management and Governance*, in UNDERSTANDING GROWTH MANAGEMENT, *supra* note 7, at 23-42; Dennis E. Gale, *Eight State-Sponsored Growth Management Programs: A Comparative Analysis*, 58 J. AM. PLAN. ASS'N 425, 432-33 (1992); Gay, *supra* note 10, at 14-16, 73-74 and Wickersham, *supra* note 28, at 524-26. These state growth management laws present complicated substantive and procedural issues for legal practitioners. See Richard Grosso, *Florida's Growth Management Act: How Far We Have Come, and How Far We Have Yet to Go*, 20 NOVA L. REV. 589, 591 (1996). Arguably, a third wave of state land use planning legislation has unfolded in the mid 1990s, in the form of state laws designed to compensate property owners for diminution of land values resulting from, among other things, growth control regulations. See John Martinez, *Statutes Enacting Takings Law: Flying in the Face of Uncertainty*, 26 URB. LAW. 327, 341 (1994); Nancy E. Stroud & Thomas G. Wright, *Florida's Private Property Rights Act—What Will It Mean for Florida's Future?*, 20 NOVA L. REV. 683, 689 (1996).

30. For example, state programs introduced the use of development "moratoriums" and "permit caps," which directly limit the number of new housing units in a designated area. See Wickersham, *supra* note 28, at 509-12, 537-45. Other mechanisms include the "growth boundary" device, through which local governments are required to designate the peripheral limits of urban growth for specified time frames and impose intensive land use controls and the "concurrency" requirement, through which local authorities can approve new development only when it is demonstrated that utility and other infrastructure already is in place at levels sufficient to satisfy the demands of new growth. *Id.* A few state laws address environmental concerns more directly through the use of "critical area" planning requirements, through which development in or potentially affecting designated sensitive environmental areas is sharply restricted. *Id.* at 515-17.

31. The federal government has never enacted a comprehensive land use planning statute applicable to state, local, and private development outside of federal lands. Every attempt to do so has been highly controversial. See Gay, *supra* note 10, at 13. As the eminent geographer Gilbert H. White once commented, "[t]he term 'land use planning' with its connotation of encroachment on private property rights became anathema to powerful sectors of the electorate, with the result that its direct support at the federal level is muted." Gilbert F. White, *Environment*, 209 SCIENCE 183, 186 (1980).

32. These federal laws act, at the very least, indirectly as land use controls by "chang[ing] the mix of property rights and social mechanisms affecting land use." White, *supra* note 31, at 186. Of course, many federal laws have direct land use consequences as they often divest state and local authorities of decision making power and constrain property owners' range of options, albeit in the context of environmental protection programs more

conservation is routinely given as a reason for public support of such programs at all levels of government.³³ Hence, although there is no comprehensive federal law dealing with sustainable land use, and few state or local programs are specifically directed at that goal, the stage is set for growth management regulation to evolve into a more coordinated effort aimed at sustainable development.³⁴

There is no uniform agreement that such a development would be desirable, or even that the present state of growth management regulation is in all ways beneficial to society.³⁵ There is strong evidence in many contexts that growth management exacerbates low density sprawl outside

narrowly defined than the broad agenda of growth control. See generally PLATT, *supra* note 5, at 393-477; J. B. Ruhl, *Biodiversity Conservation and the Ever-Expanding Web of Federal Laws Regulating Nonfederal Lands: Time for Something Completely Different*, 66 U. COLO. L. REV. 555 (1995) [hereinafter Ruhl, *Biodiversity Conservation*]. One land use policy analyst quipped that "when it comes to acting locally, the federal government is like a bulldozer." John Friedmann, *Planning, Politics, and the Environment*, 55 J. AM. PLAN. ASS'N 334, 337 (1989).

33. See Charles E. Connerly & James E. Frank, *Predicting Support for Local Growth Controls*, 67 SOC. SCI. Q. 573, 584 (1986); Elizabeth Deakin, *Growth Controls and Growth Management: A Summary and Review of Empirical Research*, in UNDERSTANDING GROWTH MANAGEMENT, *supra* note 7, at 7-11 and M. Gottdiener & Max Neiman, *Characteristics of Support for Local Growth Control*, 17 URB. AFF. Q. 55, 65 (1981).

34. Banta suggests that for this to happen "[e]cosystem concepts must be communicated at the project-by-project scale" and the concept of sustainable development must "place energy-efficient, resource-conserving growth in a positive context." John S. Banta, *Environmental Protection and Growth Management*, in UNDERSTANDING GROWTH MANAGEMENT, *supra* note 7, at 134-35 (1989). Although the extremism often represented in conservation biology literature to date may represent a phase that was necessary in order to coalesce the discipline, it is difficult not to view that element of the movement as an impediment to fulfilling Banta's two conditions.

35. For one of the most sweeping critiques of growth management as it has been implemented thus far in the United States, see James A. Kushner, *Growth Management and the City*, 12 YALE L. & POL'Y REV. 68, 72-78 (1994). Kushner contends that growth management programs by and large have failed to address transportation efficiency, affordable housing, employment development, racial segregation, and other fundamental factors of urban design. *Id.* His proposed solution includes the promotion of planned transportation corridors, development of magnet schools and neighborhoods, and greater attention to job-housing-transit coordination. *Id.* at 78-91. A similar barrage of criticism is leveled against growth management and the very notion that "sprawl" is necessarily bad in Peter Gordon & Harry W. Richardson, *Are Compact Cities a Desirable Planning Goal?*, 63 J. AM. PLAN. ASS'N 95 (1997) (discussing how the idea of "compact cites" is not a good approach).

of planning jurisdictions,³⁶ inefficiently increases housing costs,³⁷ adds transportation inefficiencies,³⁸ and even poses opportunities for insidious racial and class discrimination disguised as environmental protection.³⁹ Ecosystem protection goals require that more land be preserved, which increases land values near preserves, concentrates local tax burdens in a reduced stock of developable land, and forces development to spread out even more. These problems may only become worse. Hence, growth management must be carried out carefully with the understanding that it has the potential for revealing a dark side.⁴⁰

A significant hurdle in that regard, however, is the chaotic nature of the subject matter. Despite over two decades of experience under such legal frameworks for active growth management, much remains to be understood about the dynamics of land use and land markets at the so called urban fringe, their effects on ecosystem integrity, and which management approaches work.⁴¹ Development in the urban-suburban-exurban-rural

36. See William A. Fischel, *Good for the Town, Bad for the Nation?—A Comment*, 57 J. AM. PLAN. ASS'N 341, 341-42 (1991).

37. See William A. Fischel, *What Do Economists Know About Growth Controls?: A Research Review*, in UNDERSTANDING GROWTH MANAGEMENT, *supra* note 7, at 66-72.

38. See Alan E. Pisarski, *Issues In Transportation and Growth Management*, in UNDERSTANDING GROWTH MANAGEMENT, *supra* note 7, at 123.

39. See Paul L. Niebanck, *Growth Controls and the Production of Inequality*, in UNDERSTANDING GROWTH MANAGEMENT, *supra* note 7, at 105. Some commentators point to local zoning practices as the main culprit of exclusionary racial and income effects and offer state growth management programs as the solution. See, e.g., Note, *State-Sponsored Growth Control Management As a Remedy for Exclusionary Zoning*, 108 HARV. L. REV. 1127, 1132 (1995). However, even they concede that the record of state programs to date has been exclusionary in effect. *Id.* at 1132. In general, one of the most difficult and unanswered challenges of growth management has been ensuring that aesthetic, transportation, and environmental protection goals are met in the suburbs without creating highly restrictive housing prices, tax structures, and neighborhood settings. See Timothy J. Choppin, *Breaking the Exclusionary Land Use Regulation Barrier: Policies to Promote Affordable Housing in the Suburbs*, 82 GEO. L.J. 2039, 2039-40 (1994). To do so, many experts in the field advocate turning away from command-and-control style regulation, and instead, recommend adopting policies designed to use market forces to bring about desired growth patterns, a proposition that is the subject of intense debate today. See, e.g., *The Economics of Sprawl*, ENVTL. FORUM., Nov./Dec. 1996, at 38.

40. Some communities that once actively promoted growth control regulation, today contain high numbers of citizens who are dissatisfied with the results of their "success." See Deakin, *supra* note 33, at 13.

41. As one commentator has observed, "[m]anaging growth so as to mitigate its impacts on natural resources systems is a major challenge due to the complex behavior of these systems, the diverse intergovernmental programs for environmental protection, and the fragmented state of knowledge about linkages between growth and natural resources." Banta, *supra* note 34, at 134; see also H. James Brown et al., *Land Markets at the Urban Fringe*,

phase transitions is unpredictable and elusive. It does not lend itself well to easy market-based management solutions or fixed sets of generalized legal rules.⁴² The trick is to tame the amoeba and bring the amorphous suburban growth process under control, without killing it. Hence, more important than the question of which level of government should be primarily responsible for managing this realm, is the question of the content and style of the legal and planning framework for whatever system is chosen. Content and style, not the political framework, are my subjects. My aim is to set down some key general principles that will improve the chances that the legal system, associated with growth management, will help create a sustainable development scenario for suburban population growth.

II. TEN GUIDELINES FOR LAW'S ROLE IN SUSTAINABLE SUBURBAN SYSTEMS—LESSONS LEARNED FROM ONE LOCAL EXPERIENCE

I have developed the following "Top Ten" list of sustainable suburban development guidelines primarily from my experience as a practicing attorney and community member in the city of Austin, Texas during the 1980s and 1990s. The so called "Hill Country" of central Texas, within which Austin sits, offers an abundance of biological and physical diversity.⁴³

47 J. AM. PLAN. ASS'N 131, 131 (1984) (noting "relatively little is known about who owns rural land at the periphery of growing metropolitan areas and how these landowners behave"); Deakin, *supra* note 33, at 12 (identifying "broader questions of effectiveness, such as whether the programs are working as intended, are scoped appropriately, and have reasonable benefit-cost ratios, remain largely unaddressed"); John D. Landis, *Do Growth Controls Work?: A New Assessment*, 58 J. AM. PLAN. ASS'N 489, 503 (1992) (recognizing "[m]any questions about the efficacy of local growth controls still remain to be answered").

42. The land development process, particularly the decisions of land developers, is largely ad hoc, unsystematic, and based often on developers' experiences and "gut feel." See George A. McBride & Marion Clawson, *Negotiation and Land Conversion*, 36 J. AM. INST. PLANNERS 22, 25 (1970). As a result, the land development process becomes highly adaptable to whatever is thrown in its path. A classic example comes from Vermont, where a state law designed to mitigate the adverse community and environmental impacts of large-scale developments simply led to a proliferation of small-scale projects designed to avoid the effects of the law. Thomas L. Daniels & Mark B. Lapping, *Has Vermont's Land Use Control Program Failed?*, 50 J. AM. PLAN. ASS'N 502, 502 (1984). Growth control programs in general have thus been criticized as being too narrow in problem specification, overly optimistic in expected compliance, and inattentive to the potential for unintended responses and results. See Deakin, *supra* note 33, at 13-14.

43. One of the most current and comprehensive descriptions of Austin's social, physical, and biological surroundings that can be found in a single volume is in the environmental impact statement prepared in March 1996 to accompany an application the City and County submitted to the United States Fish and Wildlife Service to authorize regional development under the Endangered Species Act. The regional permit would create

The physical beauty of the area also has not gone unnoticed by developers and homebuyers, as the Austin MSA (Metropolitan Statistical Area) population more than doubled from 1970 to 1995, reaching almost one million. Most of the population increase has occurred outside of the incorporated limits of the city of Austin.⁴⁴ During this rapid conversion of relatively undisturbed land forms to low density suburban sprawl, environmental protection policy battles, many concerned with land use decisions, reached a fever pitch by the late 1980s and have since burned unabated. The key legal players in this ongoing drama have been local watershed protection ordinances,⁴⁵ federal endangered species regulations,⁴⁶

the Balcones Canyonlands Preserve (BCP), a system of interrelated preserves designed to provide habitat for several endangered animal and plant species, in return for authorization to allow suburban development elsewhere in the species' habitat areas. See UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE & REGIONAL ENVIRONMENTAL CONSULTANTS, FINAL ENVIRONMENTAL IMPACT STATEMENT/HABITAT CONSERVATION PLAN FOR PROPOSED ISSUANCE OF A PERMIT TO ALLOW INCIDENTAL TAKE OF THE GOLDEN-CHEEKED WARBLER, BLACK-CAPPED VIREO, AND SIX KARST INVERTEBRATES IN TRAVIS COUNTY, TEXAS (1995) [hereinafter BCP-EIS]. The BCP-EIS explains that Austin sits on a transition zone between two major physiographic regions—the Edwards Plateau to the west and the Blacklands Prairie to the east—the meeting of which has led to an unusual collection of geologic, hydrologic, and biologic conditions. *Id.* at 3-1 to 3-115. For example, the extensive surface water features of the area have acted on the limestone geology of the Edwards Plateau so as to create a complex subterranean network of karstic caves and features and water flows; these conditions in turn have led to a remarkable degree of speciation of over 700 karst dwelling species; but the isolation of the karst geology and hydrology has in turn led to a high degree of endemism among those species. *Id.* at 2-16 to 2-18, 3-9. Similar conditions can be found at the surface, where, for example, the exclusive nesting habitat of the Golden-Cheeked warbler is found, *id.* at 2-15 to 2-17, and many biologists believe numerous distinct species of salamanders inhabit different surface spring outflows, *id.* at 3-10 to 3-11.

44. The Austin MSA population was 585,000 in 1980 and 846,000 in 1990, see STATISTICAL ABSTRACT OF THE UNITED STATES 1995, *supra* note 10, at 40, whereas the Austin City population was 345,000 in 1980 and 465,000 in 1990. See BCP-EIS, *supra* note 43, at 3-76. In the time period that the City population grew by 120,000, population in the non-City portion of Travis County grew by 40,000. See *id.* Thus, MSA population beyond the Travis County line grew by over 100,000. This population expansion led to a doubling of housing units in Travis County in the 1980s, and a 27.6% growth in total jobs in the County, *id.* at 3-77- 3-81. The Austin Urban Area (within the Austin MSA) covered 127,386 acres in 1993 and only 10,199 acres was open space. *Id.* at 3-87 to 3-88.

45. Austin has enacted a series of watershed protection ordinances that overlay the traditional subdivision ordinance administered in the City. The watershed ordinances regulate impervious cover and, in effect, require that runoff after development does not exceed runoff quality and velocity before development. The ordinances also define critical water quality zones within floodplains within which development is strictly restricted. See generally BCP-EIS, *supra* note 43, at 3-86, 3-109 to 3-114. The most stringent of the

and the more recent arrival of state ground water aquifer protection regulations.⁴⁷ In short, the Austin area presents a classic laboratory for

ordinances, known as the SOS Ordinance, Austin Ordinance No. 920903-D (named for the Save Our Springs environmental protection advocacy organization), applies to development in the sensitive Barton Springs aquifer recharge zone, and has been the subject of intense legislative and judicial challenges. *See id.* at 3-113.

46. Thirteen species that the United States Fish and Wildlife Service has designated as endangered pursuant to the Endangered Species Act, as well as several dozen other "species of concern" according to federal or state authorities, are found in or have the potential to be found in Travis County. *See id.* at 3-17 to 3-23. Development has been identified as the principal threat to many of these species. *See, e.g., id.* at 2-15 (noting that for the Golden-Cheeked warbler, "habitat loss is accelerating as suburban developments spread into the largest remaining blocks of warbler habitat"). The Endangered Species Act can impose severe development constraints within the habitat of designated endangered animal species. *See Babbitt v. Sweet Home Chapter of Communities for a Great Or.*, 115 S. Ct. 2407 (1995). *See generally* Albert Gidari, *The Endangered Species Act: Impact of Section 9 on Private Landowners*, 24 ENVTL. L. 419 (1994). When these restrictions impede development throughout growing urban areas, it has become the practice of federal, state, local, and private entities to compile region wide habitat conservation plans that can provide the basis for approval under the Endangered Species Act of region wide development permits. *See generally* William E. Lehman, *Reconciling Conflicts through Habitat Conservation Planning*, ENDANGERED SPECIES BULL., Jan-Feb. 1995, at 16; Albert C. Lin, *Participants' Experiences with Habitat Conservation Plans and Suggestions for Streamlining the Process*, 23 ECOLOGY L.Q. 369 (1996); Lindell L. Marsh, *Conservation Planning Under the Endangered Species Act: A New Paradigm for Conserving Biological Diversity*, 8 TUL. ENVTL. L.J. 97 (1994); Robert D. Thornton, *Searching for Consensus and Predictability: Habitat Conservation Planning under the Endangered Species Act of 1973*, 21 ENVTL. L. 605 (1991). The endangered species regulatory background that led Austin and Travis County jointly to submit the Endangered Species Act permit application described in the BCP-EIS, *see supra* note 43, is discussed in a series of law journal articles, each dealing with a different phase of the saga. *See* J. B. Ruhl, *Regional Habitat Conservation Planning Under the Endangered Species Act: Pushing the Legal and Practical Limits of Species Protection*, 44 SW. L.J. 1393, 1395 (1991) (first phase); Melinda E. Taylor, *Promoting Recovery or Hedging a Bet Against Extinction: Austin, Texas's Risky Approach to Ensuring Endangered Species' Survival in the Texas Hill Country*, 24 ENVTL. L. 581, 581 (1994) (second phase); Ruhl, *Biodiversity Conservation*, *supra* note 32, at 555 (third phase).

47. The Texas Natural Resources Conservation Commission has adopted regulations governing development over the Edwards Aquifer recharge zone, which extends roughly from Austin to San Antonio and includes a significant portion of the Austin MSA. *See* 21 Tex. Reg. 12,125 (Dec. 17, 1996) (codified at 30 TEX. ADMIN. CODE § 213 West 1996). These rules, as well as commitments from other Texas state agencies to promote water quality and quality conservation measures in certain areas of the Austin MSA, led the Fish and Wildlife Service to withdraw a proposed rule to list a salamander species as endangered under the Endangered Species Act, *see* 61 Fed. Reg. 46,608 (1996), a decision preceded and followed by intense controversy, *see* *Save Our Springs v. Babbitt*, No. MO-96-CA-168 (W.D. Tex. Mar. 25, 1997). In ongoing litigation challenging the withdrawal decision, the court for the

studying the dynamics of an expanding suburban blob, its consequences for ecosystem integrity, and the political and legal framework for managing both.

Notwithstanding Austin's classic circumstances, the ten guiding principles for law that facilitate sustainable suburban development apply anywhere the same mix of development and ecosystem ingredients appear. This is because they derive from a set of even broader principles that do not require an extensive legal explanation. The first of these general principles is that planning is important, but eventually a decision must be made. The eventual decision requires a sense of direction from the start of the planning process. The goal of sustainable development can provide that purpose. The second broad principle is that the framework that emerges from the planning process must be adaptable, flexible, and willing to accept uncertainty. Suburban growth is as unpredictable and nonlinear as ecosystem dynamics. Any planning framework based on the premise that rigid long-term rules will produce long-term certainty is destined to fail. The last broad principle is that the human factor must play a large role at every stage of sustainable development policies. A sustainable development program for suburban growth management that does not integrate the local culture, politics, economics, and basic human needs, will not succeed in the long run. With these broad principles in mind, the following ten guidelines serve as concrete and practical sustainable development maxims for the suburban growth setting.

A. Principle One: Think Beyond Traditional Borders

Growth regulation aims at adjusting the pure market-derived equilibrium between development and conservation, and thereby forces developers to take regulations into account before making decisions about when, where, and what to build. However, despite regulations, development will respond partially to market forces. Recognizing that growth regulation thus bifurcates decision making by developers, the renowned land use scholars, Benjamin Chinitz and William Fischel, have debated whether growth management prompts developers to flee areas where regulation predominately controls open space areas beyond the regulated urban fringe.⁴⁸ The result of this "leapfrog" effect could be the very sort of

Western District of Texas held that the Secretary's decision to withdraw the salamander was within his discretion, but the secretary failed to follow proper procedures under the ESA.

48. Compare Benjamin Chinitz, *Growth Management: Good for the Town, Bad for the Nation?*, 56 J. AM. PLAN. ASS'N 1, 7 (1990) (arguing that developers are as likely to move to inner city and suburban locations where infill is possible as to rural areas), with Fischel, *supra* note 36, at 341-42 (arguing that developers are more likely to flee to rural areas).

sprawling intrusion into ecosystems that growth regulation increasingly is designed to avoid.

The leapfrog effect will only occur, however, when local growth control boundaries are sharp and the differences in regulatory effect between local jurisdictions are pronounced. To some extent, federal and state growth control statutes may be viewed as ameliorating those two conditions. However, leapfrogging is unlikely to be prevented through federal or state controls unless the law imposes rigid controls throughout the relevant area. Such an approach is unlikely to gain the support of state authorities if conducted at the federal level, or of local authorities if conducted at the state level. Indeed, the dynamics of leapfrogging are complex, and it may very well be that unless local authorities are directly and substantially involved in identifying and addressing its manifestations, it will not be adequately resolved. Hence, regardless of whether the center of gravity for growth management decision-making is at the federal, state, or local level, leapfrogging is inherently local in nature and its effects require that responses be tailored to fit each local situation.

The necessary approach may be to facilitate partnerships between local authorities that are directed towards designing growth management regimes that correspond to ecosystem geographies. For example, the endangered species conservation effort in Austin, Texas involved an interlocal effort between Austin and Travis County which was encouraged by the Fish and Wildlife Service and the Texas Parks and Wildlife Department.⁴⁹ Restricting the scope of endangered species conservation efforts to the city could have pushed development into the county, where development of open space was already fast apace. Coordinating the regulatory response across the local boundary was not easy, but clearly necessary if meaningful ecosystem conservation was desired.

On the other hand, the city-county partnership probably was not enough to serve the needs of sustainable development. The ecosystem in question truly is the entire Edwards Aquifer system, which extends roughly from Austin, seventy miles southward, to San Antonio. As those two cities direct their respective growth management regimes toward ecosystem conservation, the largely rural land between them could become a haven for low-density development that is realistically within commuting times of either city. However, the ecosystem is linked by groundwater in such a way that an impact at any point can spread to all points. It is senseless for any single jurisdiction to ignore what others are doing because the leapfrog problem will come back to "bite" whichever jurisdiction causes the problem.

Therefore, a partnership of all local jurisdictions, within or affecting an ecosystem, is necessary in order to bring about meaningful sustainable development initiatives. Ironically, this may mean that "progressive"

49. See BCP-EIS, *supra* note 43, at I-ii.

jurisdictions that otherwise would impose strict regulations on development within their boundaries will need to exercise restraint, so as to not simply transfer the problem elsewhere. In addition, traditional laissez-faire jurisdictions will need to enhance regulatory approaches in order to avoid becoming magnets for an uncoordinated sprawl. In either case, some measure of local decision making sovereignty must yield to the larger cause of sustainable development. Also, state law, which often restricts regulatory powers outside incorporated cities and limits the degree to which local jurisdictions can delegate powers to interlocal authorities, should be redirected towards facilitating such interlocal, transboundary partnerships.⁵⁰

B. Principle Two: Build Credible Scientific Foundations

Early in the Balcones Canyonlands Preserve (BCP) planning process, I was interviewed by one of the authors of a now famous book on the Endangered Species Act (ESA) about the Austin experience. One question had to do with the budget that had been allotted for developing baseline scientific information to support the BCP design. It was approximately \$100,000. The interviewer asked me whether that was not a large amount to invest in that effort. I detected that he wanted me to say yes. My reply was an unequivocal negative, that the BCP organizers should have thrown all the money they could find at the underlying scientific foundations. Although that response probably led to the quick termination of the interview, I am positive it was the correct response.

Whenever law is used to regulate human interaction with the environment, we face an intersection between law and science. The fitness of the legal decisions, therefore, is limited by the fitness of the scientific information available. In Austin, for example, the listing of the Golden-cheeked warbler as an endangered species in 1990 was based largely on assumptions about the species' habitat needs. Immediately prior to the listing, it was revealed that considerable debate continued in the scientific community over the assumptions that the Fish and Wildlife Service relied on in the listing decision and that the City and County adopted in the early stages of BCP planning. Indeed, the Fish and Wildlife Service recently conceded that more current scientific field research demonstrates that "the edge effects for large blocks of [warbler] habitat are not as severe as those projected [early in the BCP planning process]."⁵¹

50. An example of such an approach comes from Massachusetts, where recently enacted state legislation establishes building restrictions within 200 feet (25 feet in highly industrialized areas) of river shorelines and authorizes local conservation commissions to review development proposals in such areas. See *New Law Aims to Control River Pollution by Restricting Development Near Shorelines*, 27 *Env't Rep.* (BNA) 893, 893 (1996).

51. BCP-EIS, *supra* note 43, app. C at 34. On several other occasions, field

Of course, it is difficult to fault regulators for making legal decisions in the face of imperfect scientific information when a decision is required by strict statutory time lines or by economic necessity. It is also prudent for regulators to take precautionary measures in those legal decisions when it is known that imperfect scientific information adds a level of uncertainty and unpredictability to the outcome. However, every time new scientific information reveals flaws in the approach previously taken, the decision making process loses credibility. To limit that problem, greater attention must be devoted to amassing reliable scientific information about the effects of land use on the environment. Programs such as the National Biological Information Infrastructure⁵² and Gap Analysis⁵³ are critically needed at federal and state levels, with full access and participation by local governments if this goal is to be fulfilled.

C. Principle Three: Avoid Playing the Endangered Species Card

Austin provides yet another example of the “how to” versus “how not to” models of ecosystem planning. The BCP habitat preserve program was predicated on the coercive power of the Endangered Species Act (ESA);

investigations demonstrated that model assumptions used in the warbler listing were faulty. For example, whereas the warbler listing was based on an assumption that warblers could not tolerate an urbanized edge, many examples were later discovered in which warblers were found to occupy habitat within 300 meters of heavy urbanization development. *See id.* at 25. Similarly, in 1992, researchers found that models of warbler habitat in Travis County significantly overestimated the acreage when compared to field surveys. *See id.* at 4-59.

52. The National Biological Information Infrastructure began in 1993 as a distinct bureau of the Department of the Interior known as the National Biological Survey. The objective at that time was to consolidate the biological research, inventory and monitoring, and information transfer programs of seven different DOI bureaus. The program name later was changed to National Biological Service, and subsequent to that, the program was merged into the United States Geological Survey as the Biological Resources Division. Today, the BRD is a non-regulatory, non-managerial, non-advocacy science agency with over 1800 employees and a \$137 million annual budget; its principal function is to maintain the National Biological Information Infrastructure, an evolution of the original NBS concept. For information on the history of the program and its current mission, see (last visited Feb. 4, 1997) <<http://www.nbs.gov/nbii/overview2.html>>.

53. The Gap Analysis Program (GAP) refers to a state based cooperative program using Geographic Information Systems (GIS) technology to map major indicators of biodiversity over states, along with the existing network of conservation lands. GAP, which is coordinated by the USGS Biological Resources Division, currently is made up of 430 coordinating units in 43 states, G. Cotter et al., *Developing a Biological Information Infrastructure* (visited Feb. 4, 1997) <<http://www.nbs.gov/nbii/whatsnew/devbii.html>>, and has become an important component of conservation biology research. *See* A. Ross Kiester et al., *Conservation Prioritization Using GAP Data*, 10 CONSERVATION BIOLOGY 1332, 1333 (1996).

specifically, the Fish and Wildlife Service's (FWS) theory that urbanization near suitable warbler habitats constitutes a violation of the ESA's prohibition against causing death or injury to endangered wildlife species. Once a species is listed, the ESA's protective provisions operate rather rigidly and can quickly lead to acrimony within a community, alienating large segments of the community from the basic goal of ecosystem planning. For example, many landowners affected by the BCP view the ESA as a gun pointed towards their heads.

This is not to say that the BCP is a misguided ecosystem planning program. Rather, the process from which it was forged, because the ESA acted as the justification for all decisions, led to sharp divisions within the community that will have lasting effects on the BCP. Therefore, if there is an ecosystem coordination solution that can be forged without relying on listing species under the ESA, it is likely to enjoy greater local consensus and planning flexibility over the long run.

D. Principle Four: Take Advantage of Planning and Environmental Synergies

The BCP preserve will encompass over 30,000 acres. Although the primary objective is to preserve vegetative habitat for endangered song birds, it cannot be ignored that "[t]his preserve system area includes [eleven] watersheds, comprised of [thirty-three] drainage areas."⁵⁴ Water quality in and downstream of the preserve system, in other words, can only benefit as an ancillary effect of the BCP habitat preserve effort. Other positive side effects are expected as well.⁵⁵ Indeed, the focus of the BCP planning process on endangered species tended to obscure the BCP's merits in this regard and opened the door to demands that the BCP go no further than necessary under the ESA. Hinging the local ecosystem coordination process on the ESA may stand in the way of fully defining the benefits of ecosystem coordination processes at the local land use scale.

E. Principle Five: Avoid "Greenlining"

The ecosystem planning process at the local level will backfire on planners if it is carried out through brute force. Again, Austin offers an apt example. The BCP relies on the explicit designation of over 9000 acres of privately owned land as part of the preserve system. The purchase of those lands, however, may not be conducted for as long as twenty years, as the permit authorities must amass and expend development fees gathered from nonpreserve landowners who carry out development in or near species

54. BCP-EIS, *supra* note 43, at 4-87.

55. *Id.* table S-1 at 7-20.

habitat. Even under liberal development scenario estimates, the fees will not be sufficient to pay the preserve land owners for many years.⁵⁶

The net effect of that approach is to “greenline” the private lands into oblivion, as no reasonable prospect of development or sale exists once a parcel is designated for preservation. Further, no reasonable prospect of receiving fair market compensation exists for the foreseeable future either.⁵⁷ Is it fair to force landowners who have *not* developed their land to bear the weight of the urban dwellers’ impact on the environment? Clearly, for a coordinated ecosystem planning approach to elide with land use planning and market reality, creative preserve acquisition mechanisms are needed to avoid the greenlining effect.

F. Principle Six: Articulate Clear Rules of the Game

Although long term adaptability and flexibility are needed to live up to the “compass and gyroscope” model of ecosystem planning, the rules of development need to be stable and predictable in order to avoid a permanent state of chaos in the development sector. In Austin, for example, because the BCP planning process dragged out for many years with no template in sight for how development would be handled, many developers simply refused to wait for the process to conclude and sought ESA permits one-on-one with the FWS.

By the time the BCP was finally approved as a regional permit, most of the developers who might have taken advantage of it had already exited the

56. For a discussion of the dynamics of this predicament, see John Anderson, *This Land Is My Land*, SMART MONEY, Sept. 1996, 106, 112-113 (discussing how developers in the Hill County of Texas would pay a one time fee of \$1,500 to \$2,750 per acre to develop any land outside the preserve; however, the land is worth approximately \$20,000 an acre to landowners).

57. I provide a more detailed outline of the greenlining effect in J. B. Ruhl, “Greenlining” *As Ecosystem Management: Panacea or Pandora’s Box?*, NAT. RESOURCES & ENV’T, Summer 1996, at 53; see also Arthur C. Nelson, *Using Land Markets to Evaluate Urban Containment Programs*, 52 J. AM. PLAN. ASS’N 156, 164 (1986) (“urban containment programs that apply greenbelt zoning to privately held rural land will necessarily condemn greenbelt land to lower productivity, and correspondingly lower land values”). Another example of greenlining as an ecosystem protection tool is found in New York’s Central Pine Barrens, where recently enacted state legislation designates a 100,000 acre zone consisting of a growth area and a larger preservation area, with acquisition from private landowners of 10,000 preserve acres scheduled to take place in subsequent years and other private holders compensated through transferable development rights. See Raymond P. Corwin, *New York’s Central Pine Barrens: A Formal Partnership in Land Use Planning and Resource Management*, 2 ALBANY LAW ENVTL. OUTLOOK, Winter 1996, at 24, 26. Preserve landowners, to say the least, are not uniformly pleased with their deal. See Michael R. Jung, *The Pine Barrens: A New Model of Land Use Control for New York*, 3 BUFFALO ENVTL. L. J. 37, 39, 41 (1995).

ESA permitting process. The ad hoc nature of individual permitting frustrates ecosystem wide land use coordination decisions by replacing local authorities with the FWS, which is ill equipped to execute a landscape planning function. Had the BCP planning entities established interim development rules designed to meld into a final regional permit structure, it may have been possible to gain developer participation in the ecosystem wide process and keep the decision making at the local level.

G. Principle Seven: Avoid Fueling the "Race to Develop"

Land use regulation may have the counter-intuitive effect of accelerating development as developers seek to exit the process before proposed rules become final and more proposed rules follow on their heels.⁵⁸ When regulation appears to emanate in response to today's environmental crisis, it would not be unreasonable for developers to behave in this "race to develop" manner. But when regulation is carried out as a long term program coordinated around comprehensive ecosystem planning, we might reasonably expect developers to have integrated the likelihood of long term regulatory developments into their market analysis with greater confidence. Once the regulatory program has focused on the goal of sustainable development at the local level, no one can claim unfair surprise when new regulatory initiatives are introduced that fulfill that goal. The market presumably will already have reflected that regulatory reality. Neither developers nor regulators should have to race in that regulatory environment.

H. Principle Eight: Don't Let the "Crazies" Control the Process

Many of the foregoing problems with the BCP could have been avoided had an early financing option come into being. Once the basic preserve design had been forged out, the City successfully obtained voter approval for over twenty-five million dollars in public bond money to begin acquiring preserve land. The County had a larger share of preserves to purchase, and required over forty-nine million dollars. The County's bond election, however, failed by a narrow margin. The most vocal enemies of the bond were extreme environmental and property rights groups. Rather than openly identifying these groups as naysayers and extremists, the City and County directed voter lobbying efforts towards the groups that were already convinced that the bonds made sense. Moreover, the battle for voters was at the margins. The bonds lost because the extreme groups

58. David A. Dana, *Natural Preservation and the Race to Develop*, 143 U. PA. L. REV. 655, 656 (1995).

appealed to voters who were on the fence, whereas no counter appeals were heard from the City and County.⁵⁹

Current wisdom is to be inclusive in community wide environmental disputes. However, there comes a point at which those committed to accomplishing comprehensive land use and ecosystem planning simply have to cut ties with the extreme camps and openly ostracize them. Sustainable development at the local level means very few interest groups will get everything they want. Local authorities must accept that they will not be able to achieve everything, and that anyone who demands more is simply a barrier to solutions.

I. Principle Nine: Secure Positions ahead of the Development Curve

Most of the problems identified with respect to the Austin BCP process relate to the profoundly urban nature of the preserve effort in that city. But ecosystem planning must advance the regulatory focus ahead of the urban development fringe if it is to fulfill the ecosystem integrity goal. Thus, more creative approaches will be needed. For example, in Austin, the FWS had the vision to assemble a preserve segment well outside of the Austin development fringe because land prices are low and contiguous habitat patches are more available.⁶⁰ Unfortunately, the agency has restricted the funds available for acquisition of the property (yes, it is “greenlined” property) to federal funding sources. A more creative approach, and one which will lock the preserves in place sooner, would be to allow development interests to contribute to the federal preserve in return for development rights elsewhere in the warbler’s range. Indeed, any community ought to consider acquiring blocks of habitat well outside the development fringe to use as habitat mitigation banks for local, public, and private development.

J. Principle Ten: Share the Costs and Benefits Broadly throughout the Community

Perhaps the failure of the BCP bonds was not at the hand of the “crazies,” but rather at the hand of the dispossessed. At the time of the bond election, it was sadly apparent that the preserve efforts, for which the County desired over forty-nine million dollars in public debt, accrued largely to affluent white communities located in the Hill Country. The lower income and minority communities are found on the east side of Austin,⁶¹ geographically a few miles from Barton Springs and warbler country, but light years away

59. See Ruhl, *Biodiversity Conservation*, *supra* note 32, at 635-37.

60. See BCP-EIS, *supra* note 43, at 1-2 & fig. 2.

61. See BCP-EIS, *supra* note 43, at 3-81.

in terms of opportunity to use those resources. No buses run from East Austin into the Hill Country preserves, so why are those people asked to pay for the preserves? East Austin has all the polluting industry, so why protect the Hill Country from those foul land uses for perpetuity? Storm water in East Austin is polluted, so why pay millions of dollars to keep Barton Springs pristine? Until he or she has decent housing and clean air, these are not unreasonable questions for someone in East Austin to ask someone who cares most about a warbler. Thus, East Austin voter support for the BCP bonds was, to say the least, thin.

III. CONCLUSION

In the end, sustainable development at the local level presents many of the same issues as it does at the global level. In particular, we cannot get sustainable development firmly on the map until we address the two most difficult questions of all: how is the economic wealth to be distributed equitably, and how is the environmental wealth to be distributed equitably? Most of the criticisms of current local growth management programs focus on one or both of those issues, and the principles I have outlined above for a flexible local program of sustainable development also have them in mind. In our zeal to preserve ecosystem integrity, we should not forget about the humans.