Order Number 1332168

Planning criteria and processes for regional open space systems

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The University of Arizona, 1987

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PLANNING CRITERIA AND PROCESSES FOR REGIONAL OPEN SPACE SYSTEMS

by

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A Thesis Submitted to the Faculty of the

SCHOOL OF RENEWABLE NATURAL RESOURCES

In Partial Fulfillment of the Requirements
For the Degree of

MASTER OF LANDSCAPE ARCHITECTURE

In the Graduate College

THE UNIVERSITY OF ARIZONA

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ABSTRACT

With the rapid growth of American metropolitan areas, it is essential to plan for the preservation of open space before development occurs on lands which would better be left undeveloped. Although there is a long tradition of parks and open space planning in American cities, planning efforts over the past twenty-five years (since 1960) have not been systematically reviewed and there remains no set standard to guide the planning of regional-scale open space.

Two foundations of open space planning are examined: its roles in guiding urban form, and in preserving natural processes in the city. Six case studies of contemporary open space plans and systems elicit the fundamental criteria and decision processes for open space planning.

CHAPTER 1

THE IMPORTANCE OF OPEN SPACE PLANNING

In the spring of 1985, a newly elected Board of Supervisors in Pima County, Arizona appointed two new citizens' commissions--an Urban Design Commission and Open Space Committee--to make background studies of the County's physical design and open space needs, and to draft elements for a proposed comprehensive plan revision. The studies were timely, following a report issued the previous year by a visiting study team sponsored by the Urban Land Institute and the American Institute of Architects (ULI/AIA 1984) which recommended both fundamental changes in the County's land use practices and physical design, and the preservation of open space in advance of local development.

The rate of population growth and development in Pima County over the past two decades has made open space a critical issue. Tucson, the county seat and main population center, is one of the most rapidly developing metropolitan areas in the U.S. Its population, currently 625,000, has grown by 75% in the decade between 1970 and 1980, and is expected to surpass one million by 2005 (Tucson Trends 1986). The population growth has been accompanied by a voracious appetite for land for generally low-density residential development, and a rapid expansion of the metropolitan area. Between 1950 and 1980, the city of Tucson grew seven times in population and ten-and-one-half times in land area (from 9.5 to 98.8 square miles), so that the population density is actually lower than it was thirty years ago.

Local residents appear to prefer the low-density, dispersed settlement pattern. Health, climate and the beauty of Tucson's natural setting in the Sonoran Desert uplands are strong factors in attracting the 20,000 who settle here each year (Tucson Trends 1986), and the values of privacy and a rural desert setting rank strongly among many local residents (Wilkin and Iams 1984). At the same time, however, this decentralized, low-density land use, and the tendency of the city to spread outward into the pristine desert, cause concern among many citizens. There are strong local values for neighborhood and environment preservation and anti-development attitudes (Zube, Law and Carpenter 1984), and the pro-growth/anti-growth debate is an almost weekly issue in the opinion sections of local newspapers.

In short, Tucson is typical of many rapidly growing metropolitan areas, particularly in the west and south-western United States, where the very qualities of natural beauty and abundant open space that attract new residents are threatened by rapid growth and a dispersed settlement pattern. Given the conflict between values of environmental preservation and rapid development, planning for the preservation of open space in advance of development would seem essential.

Pima County's newly formed Open Space Committee faced a major task in beginning to inventory existing open space in the County and select parcels for future acquisition and inclusion into an open space system. There was little initial discussion on the meaning and rationale of an open space system, nor of a systematic methodology for planning one. Likewise, no specific criteria for the evaluation of potential acquisitions were discussed (Personal experience of author and discussions with Committee members).

In fact, the Committee did not have a great deal of precedent to draw on in its planning efforts. There has been relatively little professional research on open space planning. Although a substantial body of open space literature does exist, most of it dating from the 1960s and early 1970s when substantial federal funding for local park and recreation planning made open space a popular subject, it does not provide a great deal of guidance on the specifics of planning an open space system. Much of the literature, coming from the urban redevelopment period of the late 1960s, addresses open space as an urban design issue, in the context of specific inner-city parks, plazas and playgrounds, rather than in the context of the regional scale growth. Where the metropolitan region has been the scale of concern, the literature has spoken to the potential of building open space systems where none had existed previously. A survey of professional literature in the fields of planning, landscape architecture and parks and recreation shows that there has been relatively little review of open space planning principles or of the successes and failures of regional open space systems planned and implemented during the past twenty-five years..

The purpose of this study, then, is to review what has been learned about open space planning during the years since the popular open space revival of the early 1960s, first by examining the available literature on open space, and then by surveying some of the systems which have been planned and developed over the past twenty-five years. By synthesizing this information, some patterns and sound principles of open space planning should emerge.

The fundamental questions to begin with, of course, are, "What is open space?" and "What is an open space system?" Clawson (1962) defines open space in the broadest sense, as all land and water and sky in the metropolitan area which is not occupied by buildings. While a definition so inclusive is useful in expanding the ways we can look at open space--the concept of space becomes meaningful in itself--it does not give us any idea of the potential functions and relationships of open spaces. Tunnard and Pushkarev (1962) define our functions of open space: productive, protective, ornamental and recreational. Tankel (1963) refers to two types of open space. The first is space of which people are immediately aware. It provides places for active and passive recreation, places which are viewed and felt, which provide feelings of privacy, insulation, spaciousness and scale. The second type is open space of which people may not be aware, but which performs functions affecting their daily lives--for instance, control of runoff and stormwater, purification of the air.

Charles Eliot (1902), one of the first American planners to conceive of open space as a system while planning Boston's park system in the late nineteenth century, proposed two fundamental purposes of open space--providing structure to the city, and maintaining the functions of natural processes in the urban environment. This begins to suggest a definition of open space which may be useful to planners and citizen advocates justifying open space acquisition. It also suggests a spatial definition:

if open space has to do with defining the form of the urban pattern, and if it is itself defined relative to the natural pattern on which the city is built, then there is the basis of a rationale for the location of particular open spaces, and the relationship of those spaces to one another as a system of parts which relate as a whole.

These two basic open space functions--defining urban form, and maintaining natural processes--provide the framework for looking at open space in this study. In Chapter 2, the historical roots of the American parks movement are examined, along with the role of parks in traditional notions of urban design. Chapter 3 looks at the resurgence of open space planning during the past twenty-five years, starting with the post-war boom in urban development and the realization of the necessity of curbing urban sprawl. It also examines the contemporaneous interest in environmental planning and its effect on viewing regional open space in its geographic and bio-regional context. Chapter 4 presents six case studies of regional open space plans and systems and summarizes their similarities and differences. Finally, Chapter 5 presents conclusions on some of the principles and processes which appear fundamental to the planning of open space systems.

CHAPTER 2

THE DEVELOPMENT OF THE PARK SYSTEM IN AMERICA

Europe at the end of the eighteenth and beginning of the nineteenth century saw the birth of an entirely new concept: the public park. Until that time, the word park had generally referred to the grounds or gardens of a private estate owned by the nobility or landed gentry. Frequently these included large game parks and hunting preserves. The revolutions of the end of the eighteenth century brought about fundamental changes not only in the way men thought about government and human rights, but also about ownership and use of the land.

Although public plazas and open spaces had been used in Europe since Roman times, they were never conceived of explicitly as public property, existing for the purpose of public recreation; and while there are instances of public use of royal parks and gardens, such as at Versailles, where Louis XIV, the Sun King, had opened up the palace grounds to all his subjects to permit them a glimpse of the royal splendor, these are exceptions. With the revolution in France, however, many of the royal properties were wrested from the former nobility by the public (who frequently desecrated them as symbols of the royal dominion). In Paris, the Bois de Boulogne and Bois de Vincennes, former crown forests, and the old Bourbon palace grounds in the Jardin de Luxembourg were all opened to the public. By the mid-nineteenth century, the Baron Hausmann, working as an agent of the Emperor Napoleon III, was redesigning the Bois de Boulogne, then on the outskirts of Paris, as a public park, and was working on three other major parks--Monseau, Buttes-Chaumont and Montsouris--within the city.

In England, affected earlier by the industrial revolution, the change was taking place somewhat differently. The mid-century political revolution had left the nobility and their land intact, if reduced in political authority. The estates or "country places" remained and became the proving grounds for a new school of naturalistic "landscape gardening." But the enclosure and division of common pasturage, which had been progressing since the seventeenth century and was formalized by the Parliamentary Enclosure Acts of the eighteenth, forced many of the rural peasant farmers off their land and deprived them of their traditional means of support. Many in the rural population which had been growing by roughly half each century (Fairbrother 1970) were forced to migrate and make their livings in the rapidly industrializing cities of the south. Old cities like London, Birmingham and Liverpool were ill-prepared for the staggering migration. Between the crowding, lack of housing, air polluted with coal smoke from factories and fireplaces, and water polluted with human waste, public health conditions were appalling.

The affluent classes, living in "town houses," had already discovered the park; and real estate developers had discovered the increment to land values that nearby urban open space could bring to their properties. In London, Regent's Park, Battersea Park, Hyde, Green and St. James Parks were developed. All of these, though technically owned by the Crown, were open to the public; but all were located in upper-class West London and were not accessible to the residents of the crowded, working-class East End. In the 1830s and 40s social reformers began calling for the creation of parks to relieve the dismal living conditions in the tenement sections of the East End, and in 1842, Victoria Park was authorized. It should be pointed out that the main argument of the social reformers was that parks would provide not only for the physical health of the working-class, but also for its moral upliftment from a debased and depraved condition. Thus, with the development of Victoria Park, we have for the first time an example of the creation of parks for the recreation, health and welfare of the general public.

Olmsted and His Followers

American cities on the eastern seaboard were experiencing from the industrial revolution conditions similar to those in England. The Irish potato famine and the several European revolutions of the mid-nineteenth century brought a wave of immigrants to the industrial cities of the northeast, where they found ample opportunity to work, but often under deplorably exploitative conditions. This was the age of child labor and of the seventy hour workweek. Living conditions in the rapidly growing eastern cities were as crowded and unsanitary as those in England; and here too the social reform movement made its voice heard.

In New York, central Manhattan was becoming crowded and rapidly spreading north on the island. During the 1840s, reformers such as Andrew Jackson Downing and William Cullen Bryant editorialized on the subject of "the corrupt atmosphere generated in the hot and crowded streets" (Olmsted and Hubbard 1922, p. 21) and began to advocate reserving land for a park above the developing areas of what today is midtown Manhattan. In 1851, the First Park Act was passed by the New York State Legislature, authorizing the City of New York to acquire land for America's first public park.

Land acquisition was accomplished incrementally over a period of seven years. An interesting aside, that, as Newton (1971) points out, should be educational to park planners, city administrators and public decisionmakers, is the record of the increment in land value of more than 250% during that period. In 1838, when land for the Croton Reservoir, formerly in the northern section of the park, was acquired, the land cost was $2,314. per acre. In 1856, the acquisition of park land, including the New Reservoir site, cost $6,838. per acre; and when the final purchase of 65 acres from 106th to 110th street was made in 1863, cost had risen to $18,147. per acre. This shows clearly the effect of approaching development, both of private real estate and parks on land value. For private developers, the planned parkland may be a boon if it is in the vicinity of their property. For the public, the effect of private development is the opposite; it is clearly advantageous to acquire land for parks as far as possible ahead of the time when projected development has increased property values and land acquisition costs beyond the reach of public budgets.

In 1858, Frederick Law Olmsted and Calvert Vaux won a competition for the design of the new park. The history of the twenty years spent in developing the new park has been well documented both in Olmsted's own papers and by later historians (Newton 1979, Roper 1973, Fabos, Milde and Weinmayr 1968, and Fein 1971). The important point to be made here concerns Olmsted's underlying social philosophy and the extent to which it was a guiding force behind his park designs, for, besides being an extraordinarily gifted interpreter of natural landscapes, Olmsted was a liberal social reformer. He had toured the ante-bellum South and published A Journey to the Seaboard Slave States (1856), and would subsequently take a leave of absence from his duties as Architect in Chief of Central Park during the Civil War, to direct the Sanitary Commission, forerunner of the Red Cross. In the design of the public park, Olmsted had found a way to combine his own appreciation for natural landscape with a deep concern for the social welfare of the common people. In his comments on the park, Olmsted wrote:

> It is one great purpose of the Park to supply to the hundreds of thousands of tired workers, who have no opportunity to spend their summers in the country, a specimen of God's handiwork that shall be to them, inexpensively, what a month or two in the White Mountains or the Adirondacks is, at great cost, to those in easier circumstances. (Olmsted 1958)

But if Olmsted was concerned with the health and recreation of urban dwellers, it was not with "active" or "structured" recreation as the term is generally used today. He did not design sports fields for the park, but rather walking and riding trails; and, from the quotation above, it is clear that what he intended to provide for people was an experience for the healthfulness and uplifting natural beauty of the rural landscape. Olmsted had visited Birkenhead Park, one of the first public parks in England,

and had met its designer, Joseph Paxton. He was much impressed with the naturalistic design of the English landscape school which had inspired Paxton; and in New York he wanted to create a "country park" which would be a direct contrast to the rigidity of the street pattern and buildings and the oppressiveness of the city. In doing so, he set the dual standard of professional devotion to social service and natural preservation which would guide park design for the generations of landscape architects and park administrators who were his associates and direct successors. His former apprentice and subsequent partner, Charles Eliot, later reiterated that parks existed to provide the working masses with a place of recreation and refuge from the city "by means of their rural, sylvan and natural scenery and character" (Eliot 1902, p. 305).

Olmsted had hoped for the opportunity in Central Park of establishing a series of open spaces woven throughout the urban fabric, but the land constraints of the narrow and rapidly growing Manhattan, combined with the rigidity of a street grid, constrained the boundaries of the park to a strict rectangle. His next commission for the City of New York, Brooklyn's Prospect Park, gave Olmsted more land and a less constrained boundary shape, but he was still unable to realize his hope of connecting it with other parks throughout the city, and to the Atlantic shoreline, and the only vestige of that linkage is Brooklyn's Ocean Boulevard.

It was not until he began to practice in Boston that Olmsted had the opportunity to create an urban park system. Boston in the 1870s had only two public parks: the old Common, dating to 1634, and the adjacent Public Garden; and because of the density of the old city, there was no room to build additional parks downtown. But a rather rare coalition of citizens attempting to prevent filling and development of the marshlands of the Back Bay Fens and real estate investors aware of the increment value of parkland on adjacent property began to press the city council to set aside land for parks at the outskirts of the expanding city. The Fens, a former marsh where the Muddy River emptied into the Charles, were now in a degraded condition, a catchment for stormwater and sewage carried from the upstream towns of Roxbury and Dorchester. Their periodic flooding and deposition of sewage made them a health hazard and a public nuisance (Newton 1971).

In 1876, after the approval of funds to acquire parkland along the Back Bay, Olmsted was commissioned to do a study of possible sites. A design competition for a new park was held the following year. Olmsted chose not to enter, but when no design was submitted that dealt successfully with the problems of flooding Olmsted was again engaged. Working with the city engineer, who had proposed a floodgate and rectangular holding basin to contain the floodwaters, Olmsted modified his design to a more naturalistic form through extensive grading of the banks of the Muddy River to control the flood tides but raise them above the level of the odorous mudflats. He then revegetated the Fens with codgrass and other native plant materials, restoring the marsh and creating wooded banks upstream.

In the course of making these improvements and studying possible park sites, Olmsted realized the possibility of achieving a connected, linear park system running along the Muddy River, and in 1880 he presented to the Boston Park Commissioners his "Suggestion for the Improvement of the Muddy River and for completion of a Continuous Promenade from the Common to Jamaica Pond." This plan was to be the basis of a park system connecting the Common, in the heart of the city, to the rural outlying communities via a series of walking and riding trails along the Fens and Muddy River. Although it has suffered in this century from incursions of the automobile and urban development, Olmsted's "Emerald Necklace" still provides a park and trail system running continuously for more than five miles through now intensely urban areas, connecting Boston's downtown with five major Olmsted parks, and culminating in what is considered one of his greatest designs, Franklin Park (Newton 1971, Boston 2000).

In designing the Emerald Necklace, Olmsted had made two great achievements. First, he had undertaken a project of ecological restoration to return degraded land to a natural condition in a way and at a scale that had never before been conceived of. Secondly, he had succeeded in bringing the surrounding countryside into the city and interweaving the urban fabric with a continuous green corridor. The Boston Park Commissioners' Report of 1887 refers to Olmsted's Parkway, or "promenade" as he preferred to call it, as Boston's "Park System".

Perhaps the greatest bequest by Olmsted to the park builders and city planners who followed him was the example he set for comprehensive planning of parks and park systems. Throughout his career, Olmsted had insisted, often in the face of considerable opposition, that parks must not be developed piecemeal and opportunitistically, but rather should be planned comprehensively. In his notes on the design of Central Park, he comments, "The park throughout, is a single work of art, namely, that it shall be framed upon a single, noble motive, to which the design of all its parts, in some more or less subtle way, shall be confluent and helpful" (Olmsted 1928). This statement lays the foundation of the process-oriented planning that has become the fundamental principle and practice of the landscape architectural profession.

Moreover, Olmsted was able to extend park planning beyond the boundaries of the park itself, and to use the park, or park system, as a basic element of urban form. Although his parks were originally conceived as rural, pastoral settings in direct and deliberate contrast to the city which surrounded them, Olmsted realized their potential to attract and organize development and influence its quality. This was particularly true of his 1869 plan for the new town of Riverside, Illinois, in which he determined to break the gridiron street pattern, which dominated midwestern city planning, by providing curving, landscaped "parkways" throughout the city. In doing so, he changed the street from a strictly functional traffic conduit which fragmented the city pattern and frequently frustrated the opportunity for continuous open space, to an element which could be at once functional and aesthetic, a connector of parks and districts, and a basic organizer of the form of the city.

Olmsted's contributions to the development of urban park systems attracted wide notice, and other landscape architects, many of whom had been directly associated with him, were quick to build upon his ideas. Three other significant early park systems--those of Minneapolis, Kansas City, and Cincinnati--should be mentioned in this context.

In Minneapolis, H.W.S. Cleveland was called in 1880 to develop a park system. Cleveland had worked as a landscape architect in Chicago and in Boston, where he had contributed a design for the Back Bay Fens and subsequently endorsed Olmsted's plan. Like Olmsted, Cleveland was disturbed by the disruptive and monotonous repetition of the street grid, and the way it ignored the natural topography of the region. In Minneapolis, he designed a system of ornamental boulevards in the dense inner city, surrounded by a greenbelt of linear parks following the city's drainage system along the Mississippi and one of its tributaries, and connecting a series of lakes surrounding the city. Although the boulevards were never fully realized, the greenbelt remains intact today, and a 1971 study of the system (Eckbo, Dean, Austin and Williams) confirms its integrity and outlines four goals of the park system:

--providing visual relief from urban structures

--defining edges that provided urban form and neighborhood identity

--preserving the natural drainage system; and

--providing the setting for urban recreational experience.

Kansas City, like many new and growing cities in the closing decade of the nineteenth century, was strongly influenced by the City Beautiful movement, which had grown out of Chicago's World Columbian Exposition in 1893, and in which Olmsted had participated in the site design. In that same year, Kansas City hired George Kessler, who had worked under Olmsted as a gardener in Central Park, to design a system of parks, plazas and boulevards which would beautify and lend dignity to the city. Although there was substantial opposition to the "park foolishness" by local real estate developers and others opposed to a park acquisitions tax, parks supporters finally won out (Hecksher 1977). The final and outer link of the system was an 1134 acre parcel purchased and donated by a former opponent, Col. Thomas A. Swope, in 1893. Kessler had originally been hesitant to accept the dedication, which was at that time nine miles distant from the central city; however, a decade later, when the city limits had bypassed the new park, he "recalled his judgement with amusement" (Hecksher 1977, p. 202). "The outer park system of yesterday is the boundary park system of today," as the Minneapolis Park Commission report of 1917 points out; "it will be the interior park system of tomorrow.

In 1907, Kessler was called to Cincinnati to design a park system. There he expanded the concept of an urban park system to a truly metropolitan context by linking downtown Cincinnati with several of its suburban communities. He started in the city's downtown by filling in the obsolete Miami and Erie Canal to create a broad boulevard, which he then extended as a parkway running up into the hills surrounding the city and broadening into a series of neighborhood parks providing hilltop views of the city. In this way he created a network of parks which provided "access along fine and easy lines into the very heart of the city district [by means of] an unsurpassed main, central artery from the heart of the business portion of the city, connecting it with every residence district" (Kessler 1907).

Charles Eliot and Metropolitan Park Systems

By the 1890s, thanks largely to the work of Olmsted and his successors and to the influence of the City Beautiful movement, landscaped parks and park systems had become de rigeur for any city wishing to be regarded as up-to-date. But at the same time, many cities were experiencing a rapid population growth and outward expansion. Particularly in the east, where there was less available land and the older and denser settlements were tending to grow into one another, it was becoming apparent that the problem of providing parks and preserving open space in the face of expansion was no longer within the jurisdiction of one city alone.

In 1886, Charles Eliot, a former apprentice in the Olmsted office, who had worked with the elder Olmsted on the Back Bay improvements, left to open his own practice in Boston. Eliot was concerned at the rapid disappearance of natural lands and of many of the old estates in the area, and began working for the preservation of areas of scenic beauty and historical interest. He realized that this needed to be a comprehensive planning effort backed by political support on a larger-than-local level. In 1891 he wrote to Massachusetts governor Russell:

> What provision is being made within this metropolitan district for securing those public open spaces which the experience of all great cities has proved to be essential to the welfare of crowded populations? It is obvious that no adequate provision of this sort is either thought of or attempted. The City of Boston is creating a limited system of public pleasure drives and parks, but the other municipalities within the metropolitan district are allowing their few remaining open estates to be divided and built upon one by one and year by year...One city refuses to seize its opportunity to obtain for all time a charming natural park which the loving care of an old family has preserved, because it fears that the people of the adjoining city will enjoy what it has paid for. The towns are influenced by similar selfish fears, and the very wards within the cities are similarly jealous of each other.
>
> There seems to be no remedy for this state of things except the establishment of some central and impartial body capable of disregarding municipal boundaries and all local considerations, and empowered to create a system of public reservations for the benefit of the metropolitan district as a whole. (Eliot 1902, pp. 356-357)

In 1891, the state approved the formation of the Trustees of Public Reservations, which immediately recommended the creation of a comprehensive metropolitan park system in the Boston area. The first step by the Trustees was to initiate a survey of existing open spaces within the state, and the laws which pertained to their acquisition and preservation. Second, the Trustees organized the park authorities of the Boston metropolitan area, and began to press the state legislature for action on park preservation. This led to the formation of the Metropolitan Park Commission in 1891, and eventually to the establishment of America's first metropolitan system of parks (Newton 1971, p. 323).

The newly created Metropolitan Parks Commission immediately retained Eliot as its landscape architect and advisor, and Eliot began an extensive survey of potential parklands. He proposed the inclusion of five types of areas: ocean front, shores and islands of the inner Bay, larger estuaries, large areas of forest on the outer rim of Boston, and smaller, local parks, squares and playgrounds which comprised the park systems of individual localities (Eliot 1902, p. 381).

In January of 1893, Eliot presented to the Commissioners his report of the selection of parklands. He began with a discussion of the physical and historical geography of the area, and then established geographic criteria for the selection of open space. Finally, he reported his recommendations for open space areas selected according to the criteria he had established (Commonwealth of Massachusetts 1893).

Like Olmsted, Eliot always insisted on the necessity of comprehensive planning, at a time when this was little understood by many decisionmakers. In 1896, now a partner in the Olmsted office, he urged the Metropolitan Commissioners either to relieve the firm of its responsibilities, or to commission them definitely to "draw up for the consideration of the Commission those comprehensive schemes or programmes of work which are commonly called 'general plans.' You will readily understand," he continued, "that we cannot professionally afford to have our names associated with work done regardless of comprehensive studies" (Eliot 1902, p. 658).

By 1894, a year after its creation, the Metropolitan Parks Commission had acquired some 7,000 acres of open land, 30 miles of riverbanks, and 10 miles of ocean shoreline. Today, its successor, the Metropolitan District Commission, operates over an area of 600 square miles, serving a population of 2 1/2 million, and is involved with highway and regional planning as well as (and sometimes to the detriment of) parks (Hecksher 1971). Charles Eliot, who died in 1897, left this legacy of park lands, as well as a model for park planning and landscape preservation on a metropolitan scale, and for dedicated public service.

Benton Mackaye: Open Space and Regional Planning

As much as Charles Eliot's work built upon the foundation of Olmsted's urban park systems, especially boston's Emerald Necklace, Eliot's own work with the Boston Metropolitan Parks Commission would pave the way for the conceptual expansion of planning to the regional scale.

The opening years of the twentieth century, and especially the initial period of giddy prosperity which followed World War I, brought about two technological developments which would radically alter the form of cities and the pattern of customs of land use in general. The twin advents of electric power and motorized transport would introduce, and would continue to exert, a tremendous centripetal, decentralizing effect on urban growth. The first freed cities of their traditional dependence on water as a source of industrial power, enabling them to spread and locate away from rivers. The second broke the tight pattern of the centralized city until then determined by the limitations of pedestrian travel and horse-drawn cart and carriage traffic, and made it possible for cities to expand in linear strips in any direction in which a highway led out of town. Now, a city could be anywhere a highway and an electric power transmission line could reach.

One of the first thinkers in the United States to realize the implications of this technological change in terms of the devastating effect it would have both on the city and the surrounding landscape was Benton MacKaye. A forester by training and an ardent preservationist, MacKaye became interested in the relationship between the urban pattern and the natural open land which surrounded it. He observed how the eastern cities were overflowing their old boundaries, growing and coalescing into an amorphous metropolitan "conurbation," and devouring what had been, until recently pristine rural land surrounding and separating them. He was among the first to realize that planning for urban development and natural lands preservation were parts of the same process, and that this planning must happen at the regional scale.

In 1921, MacKaye published in the Journal of the American Institute of Architects (Oct. 1921) a proposal for an "Appalachian footpath" running continuously along the Appalachian Mountain chain from Maine to Georgia. He conceived of this trail as the backbone of a linked system of parks and nature preserves in each region along the eastern seaboard, which would not only preserve significant wilderness areas from development, but would also help to give form to the east coast conurbation.

In 1923, along with Clarence Stein and Lewis Mumford, MacKaye formed the Regional Planning Association of America to advance the concepts and cause of planning at that scale. He began the thinking which would lead to the publication of The New Exploration in 1928. Central to MacKaye's thinking was that cities should be planned so that they were distinct and individual entities, and there was a clear definition between city and countryside. A true city should be individual, and, "to be an individual, must first have unity: to be an interesting individual it must be to some extent cosmopolitan. These seem to me to be the two bedrock essentials of the true urban environment" (MacKaye 1928).

He deplored what he termed the "metropolitan suburb":

> Its substance consists of tenements, bungalows, stores, factories, billboards, filling stations, eating stands and other structures whose individual hideousness and collective haphazardness present the unmistakable environment we call the 'slum.' Not the slum of poverty but the slum of commerce...a single environment, not city, not country, but wilderness--the wilderness not of an integrated ordered nature, but of a standardized, unordered civilization. (ibid, pp. 160-161)

This slum, was, specifically, a "roadtown slum": MacKaye laid direct blame for it on the influence of the automobile and the highway. But if the highway could be a decentralizing and entopic force, MacKaye reasoned, it could also be controlled, planned, and used as a positive organizing force in regional planning. If highways were planned as fast and efficient connectors between towns, bypassing the towns rather than bisecting them, and if towns were planned, and located at the appropriate placed _off_ the highway, and development along the highway were strictly limited, then highways could be a positive tool for planning the region, used not only to diffuse central city population pressures and distribute regional satellite cities, but also to maintain greenbelts of open country between separate towns. In his proposal for "The Townless Highway," published in the March 10 issue of _The New Republic_, MacKaye wrote:

> Instead of a single roadtown slum, congealing between our big cities, the townless highway would encourage the building of real communities at definite and favorable locations off the main road... Regional planning with these ends in view will in turn save both the local community and the open wayside environment and give proper access to the wild places, instead of insidiously wiping out all those precious assets together.

Although it is not clear that MacKaye was aware of Olmsted's contributions in this area, it is interesting to note that he was extending Olmsted's original ideas on the scenic parkway into the motor age and a regional dimension. The logical correlate to the townless highway was the highwayless town, the community not dominated and dissected by roads and automobile traffic. This idea was being developed by MacKaye's associate, Clarence Stein, in the new town of Radburn, New Jersey.

MacKaye was given the opportunity to test his ideas in a working plan when he was called upon the by the Massachusetts Trustees of Reservations to undertake a study for the Bay

Circuit, a proposed major access highway for the City of Boston. His plan consisted of a divided-lane North-South bypass route around the city, located within a wide greenbelt which would contain hiking and bicycle trails (MacKaye 1928, introduction, by Lewis Mumford). The plan was ultimately rejected by the city, and the new highway became Route 128, now a major entry to Boston and a slow and inefficient urban highway bordered by roadside development and extending commercial suburbs out for many miles beyond the city of 1930.

The most detailed of MacKaye's plans was another study of the Metropolitan Boston area undertaken for the Governor's Committee on the Needs and Uses of Open Spaces, and described in The New Exploration (1928). MacKaye begins with a discussion of regional population geography, using the metaphor of an "urban-industrial watershed." Like stream flow in a natural watershed, each metropolitan area is the source of "metropolitan steams" of motor traffic representing the flow of goods and the distribution of population and industry. These streams flow along the major highways into and out of the metropolitan area, and, uncontrolled, they tend to flood, overflowing their banks in unchecked suburban sprawl. The stream flow may be controlled, however, by "levees" consisting of "open ways" along the routes between cities. These levees may consist either of natural topographic features, especially ridgelines, which should form natural boundaries to urban development, or of "intertown motorways" or greenbelt parkways.

Having established these general principles, MacKaye began an analysis of the greater Boston area, consisting of three overlays. He began by mapping the main "streams" comprising the "metropolitan flood", taken from traffic counts on major highways connecting Boston with all cities with a population greater than 10,000. Next, he inventoried the major topographic features suitable for natural levees. These included mountain ridges, escarpments or steep slopes, river valleys, river bottoms (i.e. floodplains), swamps, beaches, lakes and lake shores, and other land already reserved by public agencies. Finally, he analyzed the suitability of the potential open spaces for levees according to three criteria:

--They must cross or flank a motor way.

--They must be sufficiently remote from population centers to be considered wild or semi-wild.

--They must be sufficiently accessible to population centers to be useful for hiking or camping.

From this analysis, MacKaye was able to select and recommend five critical areas for initial acquisition because of their strategic location in forming an open space levee. His hope was for the eventual extension of this plan to a state-wide and regional level where it would become part of an extensive open space system along the entire eastern seaboard, linked by the Appalachian trail, and providing the main element in a comprehensive regional strategy for the control of metropolitan growth and preservation of natural lands. The plan was, in MacKaye's words, only "incidentally" a natural resource conservation strategy, in that it had the additional benefits of conserving forests and controlling runoff. Primarily, it is a strategy for the development of the "psychologic resource--environment. It's purpose is to develop the indigenous environment--especially the primeval and wayside rural environments" (ibid.).

MacKaye's plan was an exercise in regional landscape planning equalled, at that time, perhaps only by the work of Warren Manning. In terms of open space planning, it was completely original in its time, and, in its intent it has never been equalled. In certain aspects, it typifies the scope of vision and largesse of many of the depression-period regional planning and public works projects which would follow it by a few years. It is unfortunate that the fulfillment of that vision would require a public endorsement of comprehensive regional authority, which, except for a short period during those years, the United States has never had.

CHAPTER 3

CONTEMPORARY OPEN SPACE PLANNING

Since the development of the first park systems in the nineteenth century, parks and open space systems have represented a wide variety of social meanings (Cranz 1982, Gold 1980). Nineteenth century park systems, or what Cranz (1982) characterizes as "pleasure gardens" were influenced by two main ideas. The first, established by Olmsted and based on the English school of Landscape Gardening, was an idealization of the naturalistic, pastoral landscape, intended as a contrast to the city and a relief from the urban-industrial environment. The second, influenced by the City Beautiful Movement in the closing years of the century, recognized the park and landscaped urban square and boulevard as important design elements and amenities in enhancing the design of the city and its desirableness as a place to live. Although there was some provision for active public recreation in the form of sports and games in these parks, such facilities were minimal and the main emphasis was on the enjoyment of nature.

In the opening decades of the twentieth century, the emerging practice of city planning began to define standards of public health, safety and welfare and to view the incorporation of local parks into the city plan as one means of meeting those goals. Neighborhoods were defined as local planning units, based on the service area of an elementary school, the grounds of which would serve as a neighborhood park and playground. The ideal was to have an elementary school and playground within one-half mile safe walking distance of every child in the neighborhood. Park planning thus became a standard part of city planning under the aegis of providing the opportunity for local recreation.

The depression era of the 1930's saw the development of major, federally-funded work programs such as the Emergency Conservation Work (ECW), Works Progress Administration (WPA), Civilian Conservation Corps (CCC) and Tennessee Valley Authority (TVA) which accomplished conservation and public works improvements both in urban parks and rural wildlands on a scale unequalled since that time (Newton 1971, Wirth 1980, Cutler 1986). Although the work was carried out nationwide, it provided a major incentive to regional multipurpose planning and conservation programs, particularly in the case of the TVA. Much of the federal money was also directed through state governments for the development of state park systems. Newton (1971) states that in 1935, at the peak of its efforts, the ECW program had 452 park camps with a total workforce of 90,000 stationed throughout the country. Despite the depression economy, national and state park systems and independent metropolitan park systems such as New York's Metropolitan Park System, Chicago's Cook County Forest Preserves, Detroit's Huron-Clinton Metropolitan Authority, Cleveland's Metroparks and the San Francisco Bay Area's East Bay Regional Park District all experienced enormous growth and development. Not only did New Deal development programs contribute directly to park systems; they also provided employment for landscape architects on park projects throughout the country, significantly advancing the practice of park planning and design.

The decades of the 1930s through the post-war years of the '50s are what Cranz (1982) refers to as the Recreation Era. The major emphasis in park planning was on social service and the provision of recreational facilities. Recreation leadership and planning became recognized as a profession. The National Recreation Association was formed in 1930 from the former Playground and Recreation Association (Gold 1980). Public recreation programs were developed in most major cities as part of Parks and Recreation departments, and playfields, sports facilities and recreation centers were developed in urban parks. Particularly during the

'50s, when a healthy post-war economy stimulated the rapid development of suburban communities, there was an increase in emphasis on the development of community park standards such as the service radius, measures of park acres per thousand residents, and local recreational deficiencies.

By the close of World War II there had been a major shift in the American public park ideal, and a division between the traditional view of preservation and public enjoyment of natural open space, represented by many landscape architects and park planners, and the new emphasis on active recreation represented by recreation planners. Gold (1980) characterizes these two viewpoints as the Resource Approach and the Activity Approach to parks planning.

Fundamental changes were also taking place in American society which would focus public attention on land use and open space in an entirely new way. The post-war years of social optimism, economic growth and technological development brought the ideal of suburbia within the economic reach of the average American working family. The marriage of the suburban ideal to the mass-market housing economy meant that each family could now expect to own its own ranch house on its own landscaped quarter-acre lot. The family car in every garage made access to shopping and services easy, and made the daily automobile commute to work commonplace. Since the home was no longer bound to be near the workplace or to public transportation linking it with the city, new cookie-cutter subdivisions such as Levittown, Long Island spread away from the urban centers. Suburbs expanded and cities became metropolitan areas. New federal highway-building programs established by Congress in 1956 as part of the Interstate and Defense Highway System, increased access between cities and to the outlying countryside. Driving for pleasure became the favorite form of national recreation (ORRC 1962), leading to the further regionalization of park systems and the extension of service areas from measures of walking distance to hours of driving time.

The rapidity of suburban growth began to cause concern in many communities for the disappearance of rural farmlands and natural area. As one report put it:

> To a population exuberant in the intense activity of boundless development and expansion, the anguish of a few at the miracles of the chain saw and bulldozer went largely unheeded. Orchards and farms were stripped, hills and valleys leveled, marshes filled, creeks covered, forests removed, estates sold and their contents auctioned and gardens plowed under. The open spaces which just twenty years ago provided variety and contrast and relief to our cities, towns and villages became the raw land for urban expansion of a fast, expensive, largely unplanned and monotonous character (Williams 1969, introduction).

There was a new and growing awareness by planners and communities that both recreational needs and standards and the need to protect natural resources and preserve open space were changing radically. Recognizing these needs, Congress in 1958 appointed an Outdoor Recreation Resources Review Commission (ORRRC) to make an intensive study of outdoor recreational need and resources through the year 2000. It was assumed at the outset that the Commission would focus on traditional recreation goals and standards, and on the needs of large--national, state and regional--park systems; but when the ORRRC report, consisting of 27 separate publications and a summary, was published in 1962, it placed its heaviest emphasis on the common, close-to-home recreational activities and needs of people living in metropolitan areas. The team made an inventory of 2,400 public recreation areas, a more detailed analysis of 5,000 larger sites, and had interviewed 16,000 recreationists (ORRRC 1962). The summary of their findings stressed the need to provide local recreational opportunity by protecting open space in developing areas. The Commission found that:

-- Outdoor recreation is extremely popular and can be expected to increase three-fold by the year 2000.

-- Simple, passive recreational activities such as walking and driving for pleasure are the most popular.

-- Although there is a great deal of land potentially available for recreation, most of it is not easily accessible to the population.

-- Recreation is frequently compatible with other land uses (such as resource conservation)

-- Water is a focal point for recreation.

One of the Commission's first recommendations was a national classification system to clarify the types and uses of open space. It outlined six classes:

Class I	High density; developed for mass use.
Class II	General; serving a variety of recreational uses.
Class III	Natural environmental areas.
Class IV	Unique or outstanding natural areas.
Class V	Primitive and wilderness areas.
Class VI	Historic and cultural sites.

Two further recommendations were to have a profound impact on the development of parks and the preservation of open space throughout the decades of the '60s and '70s. The first was the recommendation that Congress initiates a national outdoor recreation policy by establishing a Bureau of Outdoor Recreation (BOR) to stimulate and coordinate state and local efforts in planning and developing parks and recreational programs. The second was to establish a federal funding source to encourage the state programs for parkland acquisition and development.

Initial funding was provided as part of the 1961 federal Housing budget. In his Housing speech to Congress in 1961, President Kennedy had asked for an appropriation for the acquisition of local open space in connection with suburban development. His speech to Congress provides a fundamental rationale for preserving open space:

> Land is the most precious resource of the metropolitan area. The present patterns of haphazard suburban development are contributing to a tragic waste in the use of a vital resource now being consumed at an alarming rate.
>
> Open space must be reserved to provide parks and recreation, conserve water and other national resources, prevent building in undesirable locations, prevent erosion and floods, and avoid the wasteful extension of public services. Open land is also needed to provide resources for future residential development, to protect against undue speculation, and to make it possible for state and regional bodies to control the rate and character of community development.

The second source of federal funding was the Land and Water Conservation fund, established by Congress in 1964. The Federal Housing Open Space Program provided $133 million in local grants for open space between 1961 and 1968; and the Land and Water Conservation Fund gave states $214 million in state matching grants between 1965 and 1968 (White 1968). The availability of these monies and of technical assistance from the BOR stimulated a great deal of interest and action on open space planning at the state and local level. Numerous books, articles and papers appeared, most written to a popular audience, addressing local political action to preserve open space (Tankel 1963, Tunnard and Pushkarev 1963, Little 1968, Whyte 1968, Shomon

1971, Schmertz 1975, Lemire 1978). Between 1962 and 1968, twenty-four states approved open space bond issues totaling $455 million, much of that in the form of local matching grants (Whyte 1968). The Regional Plan Association's 1960 report, The Race for Open Space, which had helped to inspire Kennedy's 1961 Housing speech, also stimulated five bond issues in three states which enabled a 30% increase in open space in one year's time (Keith 1975).

The wave of popular interest in open space, as well as the necessity of guidelines to administer federal monies, focused attention on the need to define open space and its functions more closely. Local groups needed to know which land to preserve and how to argue convincingly for its preservation. At the same time, the Bureau of Outdoor Recreation was developing new technical sophistication in planning, and stimulating studies on the state and regional levels (Regional Plan Association 1960, Williams 1969, Wallace 1970, Royston 1973). In order to establish and evaluate needs, states receiving federal parks and recreation allocations through the LWCF were required to produce State Comprehensive Outdoor Recreation Plans (SCORPs).

Three general trends emerged as paradigms for open space planning. The first was an increasing sophistication in the techniques of park and recreation planning, particularly emphasizing needs analysis and social survey techniques

(Hester 1975, Gold 1980). The second was the development of traditional planning concerns about how open space shapes the form of the city, and especially how it can be used as a tool to control growth. The third was the emergence in the mid-'60s and early '70s of a popular environmental movement, and the development of the paradigm and methodology of environmental planning. Recreational planning and programming is generally more focused on a user-needs approach, rather than on the preservation of land as an end in itself, which is the focus on this study. The other two schools of thought are by no means contradictory with this approach, but only conceptually distinct by virtue of their relative degree of focus on urban form and natural process. Together, they lay the foundation for a rational and comprehensive planning process for open space preservation. They will be further explored in the remaining sections of this chapter.

Urban Form

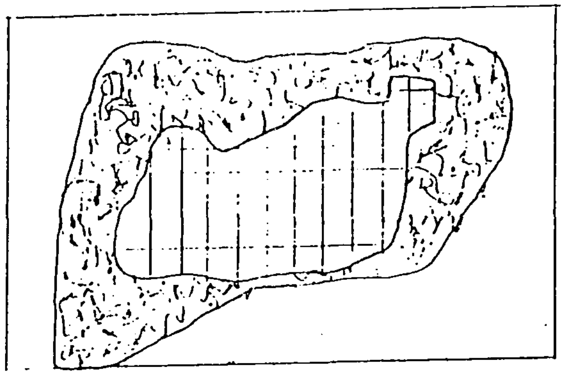
The idea of utilizing open space to shape urban form is by no means a new one. Both Olmsted and Eliot were well aware of the role of open space in the design of the total city; and the City Beautiful movement at the turn of the century based much of its planning on the use of public plazas and broad boulevards to open up broad sight lines to monumental buildings and sculpture. By the 1960s, two additional areas of concern about the relationship between the natural and the built environment were becoming apparent to the American public. The first was about suburban sprawl and the control of metropolitan growth: the new interest in open space preservation was not only a concern for saving natural and agricultural lands per se, but an interest also in how open space could be used to contain and direct urban growth. The second concern was for the quality of the visual environment, and the pervasiveness of "visual blight." With it came a renewed interest in urban and regional design and the management of large federal land holdings, coupled with research and increasing sophistication in methods for evaluating the visual quality of the landscape.

Tankel (1963) categorizes open space as space that can be used, viewed, or felt. It can perform functions of which people are aware, such as providing recreational space or view protection, and functions that people may not be aware of, but which affect them daily in important ways, such as protecting ecological processes and shaping the urban development pattern. "Not only is the physical configuration of open space less elusive than its function," Tankel comments, "it has...intrinsic qualities which make it the main basis for a policy and program for open space" (p. 59). By the early 1960s, planners had come to view open space as a fundamental element in shaping the form of the city and region. Washington D.C.'s Year 2000 Plan (as quoted in Whyte 1968, p. 152) states, "The single most important aspect of open space is as a means to structure the metropolitan area." And Whyte (ibid.) adds, "Planners now see open space as a key to the design of regions, and the process of selection has become a technically formidable task."

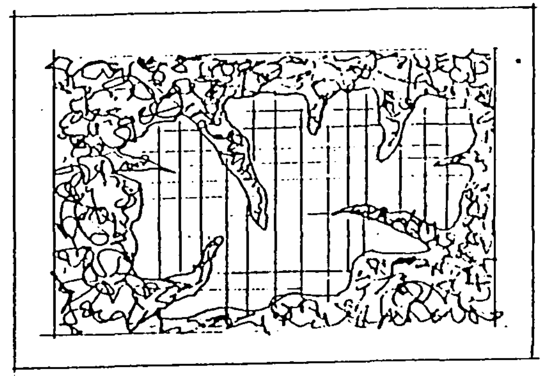
The first and major figure to fully integrate open space for its own sake into the process of town planning was the Englishman, Ebenezer Howard, who, in 1902 published the treatise, Garden Cities of Tomorrow, outlining his ideas for a planned new town which would regulate its size and density, sequester industrial uses, preserve farmland and separate itself from other towns by providing an agricultural greenbelt surrounding the city. Howard's greenbelt concept became a formidably influential idea in subsequent British town planning, and Letchworth, his first completed new town, was the predecessor of 17 greenbelt new towns as well as the post-war establishment of an extensive greenbelt surrounding London. In America, however, his ideas have had much less effect, primarily because the American temperament is less receptive to the dominion of public planning and regulatory powers over private property rights. Three American greenbelt towns--Greenbelt, Maryland, Greendale, Wisconsin and Green Hills, Ohio--were, in fact, built during the Depression-era public works programs of the Roosevelt administration, but the degree of direct, centralized public involvement in planning and development was unprecedented, much-criticized, and never to be repeated.

The idea of preserving a greenbelt of open space as a means to control the expansion of existing towns, however, took hold and became popular with '60s-era community conservationists, and remains popular in some areas today (People for Open Space 1985, Kunofsky and Orman 1985). Critics, however (Mandelcker 1962, Whyte 1968, Roberts 1970), have pointed to difficulties of the greenbelt form. While surrounding a town or city with a ring of protective natural or agricultural land is an appealing one, accomplishing it is a more difficult matter. To be an effective buffer against urban encroachment or suburban spillover, a greenbelt has to be fairly substantial in width, and its land area increases proportionately to the square of its radial distance from the city it surrounds, requiring, ultimately, enormous acreage (Whyte 1968). Costs of public acquisition are therefore frequently prohibitive, even in situations where more-or-less continuous areas of open land do remain between the city and its suburbs. Furthermore, as has already been suggested, the limitations imposed by American social and legal tradition on public powers of land-use regulation make the prohibition of development, or even regulation of density in such an area extremely difficult. Commentators sympathetic to open space preservation (Mandelker 1962, Whyte 1968, Roberts 1970) have pointed out that even in England, where the government exercises considerable authority both in land-use regulation and public acquisition, it has been difficult to defend the integrity of large greenbelt areas, such as the 12-mile wide greenbelt surrounding London, from urban encroachment. In the first place, a radial preserve surrounding an urban area will inevitably be bisected wherever major access routes, with attendant strip development, approach the city. Secondly, as real estate developers and speculators have long known, the amenity of parks or natural open space makes the edge of a greenbelt one of the most attractive areas to develop. Thus, greenbelts actually attract development; and when the development is stopped at their boundaries, it is apt to simply leapfrog to the far side of the open space. (This was actually part of the intention, in the case of London, where the postwar development policy called for a decentralization of towns and a dispersal of population from the overcrowded central city). Despite these drawbacks, Mandelker (1962) judges the English greenbelts to be to a large extent successful in limiting low-density sprawl and strip development and preserving some agricultural land close to the metropolitan area. The probability of achieving similar successes in establishing greenbelts in established and rapidly growing U.S. metropolitan areas without a strong tradition of national or even regional land-use planning, appears relatively slim. The exceptions to this are U.S. cities with either established greenbelts or extensive regional park systems during the turn-of-the-century parks movement or depression-era federal-assistance programs prior to the period of post-war suburban growth, or those fortunate enough to have on their borders extensive federal lands, such as national forests, which effectively serve as a greenbelt and growth barrier.

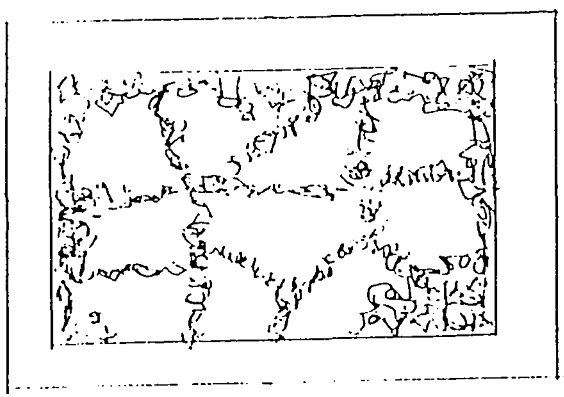
Besides greenbelts, a number of other conceptual designs for open space have been common through the open space literature. Tankel (1963) and Alexander (1977) discuss variations of radial wedges of green space. Roberts (1970) elaborates variations on the wedge theme: fingers, webs and lattice patterns; and Gold (1980) adds the motifs of containers and recreation cores (see fig. 1). The wedge concept postulates linear fingers of open space penetrating the central city and radiating outward from it. Ideally, these would follow natural features, especially streams and rivers, as in the case of many turn-of-the-century stream corridor park designs by the Olmsted firm and Charles Eliot. In theory, wedges of open space would still permit



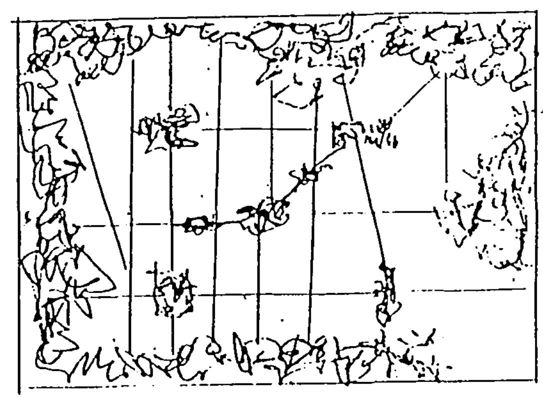
Greenbelt



Fingers or Wedges



Containers



Cores

Figure 1. Concepts of Open Space Form

outward growth of the city, but would concentrate it in high-density development corridors along the major radial access routes. It would also permit the integration of clearly defined rural areas within the urban fabric, while at the same time ensuring continuous access to the urban greenspace via the radial routes. Stockholm's open space system is a notable example of a radial finger plan. Like the greenbelt, however, wedges tend to demand more land area in acquired or regulated open space the further they get from the city. Furthermore, their susceptibility to urban encroachment, particularly by the incursions on several nineteenth century park systems, notably those of Boston, Buffalo and Kansas City (Hecksher, 1978).

The greatest problem with plans based on these conceptual design schemes, as Whyte (1968) points out, is that they generally have little or no relation to the physical reality of the city, the needs and perceptions of park users, and the political and economic realities or public land acquisition and regulation. Large green areas on the planners' maps have frequently been unrelated to the topography of the region (as was the case of Washington D.C.s Year 2000 Plan; see Whyte 1968, Ch. 8). Often the areas delineated are simply bigger than they need, or can afford, to be. Large areas such as wedges, particularly if they are not based on specific topographic features, cannot be expected to be uniformly desireable in terms of the quality of land and views from it. White (1968) remarks that the planner's perception of a green area on a 1:20,000 scale map can be remarkably different than the experience of the same area on the ground; and recent research by Talbot and Kaplan (1986) demonstrates that small parks may be perceived as more spacious than they actually are, and that design is a more important factor in the perception of spaciousness than actual size. Furthermore, research on recreational use (Gold 1980 and others) has shown that big parks in the city are often underused, and that park design and an accessible location are more important factors for visitor use than size. This suggests that traditional recreational planning standards like 10 acres of park space per thousand residents, are arbitrary and have little validity in the planning and design of open space systems (Little 1968, Whyte 1968, Gold 1980).

Since large areas of open space do not appear to be effective for growth control, and since gross acreage is not a prerequisite for recreational enjoyment, more specific and practical approaches to open space design must be found. Whyte (1968) suggests that the real need is not necessarily for large spaces but "effective" spaces--that is, places that have a reason for being reserved that relates to local topography and location, and which are accessible to park users and perceived by them as special. "The best regional networks are networks of locally useful spaces," he says (1968, p. 204), and continues, quoting regional planner Bruce Howlett:

> When you start thinking of how best to bring people and open space into contact you find yourself questioning some hallowed planning concepts. One is that we should design an urban open-spaced system and that the system should be large, integrated, and continuous. It may be heresy, but I think a fresh approach is overdue in planning. It is noteworthy that no workable concept has been forthcoming on how such a system should be organized and paid for. Perhaps the problem is that the scale is wrong. I would go even further: Perhaps we don't need a regional open-space system at all.
>
> The highly useful kind of spaces that provide a maximum contact with people--the kind we get in cluster development--are much more appropriate to real needs. If we couple these many kinds of spaces needed to serve specific places, we will come up with a non-system of scattered spaces. This may not satisfy those who want to design urban regions in the grand manner, but it has every likelihood of success and more profound and useful ways. (Quoted in White 1968, p. 204)

Hecksher (1978), in his study of American urban open spaces, reaches a similar conclusion:

> Open space tied to important recreational or conservation areas has a chance of surviving--far less open space per se, whose value to the public is not self-evident. However, much such space may serve the planners' objective of controlling regional growth, its preservation has little popular appeal. Too often, as a matter of fact, it is simply not very inviting as a recreational resource, and, to the passer-by, conforms ill to standards of natural beauty. If the designation of open space upon a regional map is actively reinforced by other policies--by the laying out of transportation routes and sewer lines, for example, or by the promotion of housing--the desired configuration may have a chance of emerging into reality. Without such reinforcement, the best-

> laid open space plans gather dust on the shelves. (Hecksher 1978, p. 238)

This "use it or lose it" approach to open space planning suggests that more specific criteria and designs must be found to identify effective, or meaningful, open space. What are they?

The first, and most basic, is the topography of the area. Natural features, such as river floodplains and steep hillsides have always been barriers to building, and have traditionally laid the basis of open space systems. Not only is their reservation from development defensible on the grounds of public safety, but they perform vital ecological functions which will be discussed later. Furthermore, they often provide the best views and greatest amenities in terms of vegetation and wildlife, and thus serve multiple functions (Roberts 1970). Finally, stream systems, being essentially linear, provide fingers or networks of natural areas running through the city, and are thus accessible to the largest surrounding area and greatest number of people.

Accessibility is another important factor in open space design. A problem that has been pointed out with the greenbelt concept is that it places most of the land on the periphery of the urban area, furthest from the greatest concentration of users. Linear corridors, on the other hand, provide what Whyte (1968) calls an "edge effect." "Per acre," he says (p. 196), "linear strips are probably the most efficient form of open space." The linear concept "provides a way of securing usable spaces in urban areas where land is hard to come by and, in time, a way of linking these spaces together." Linear open space design is also adaptable not only to the natural topography of the stream drainage system, but to man-made rights-of-way such as the street and rail system, canals, and the power grid.

Gold (1980) suggests two other design concepts which are particularly adaptable to local access: containers and recreation cords. Containers are essentially mini-greenbelts or corridors on a local development scale, used to separate and define different land uses and to buffer development. Thus, local container open space can be designed in association with any new development, and will provide amenity and recreational open space to the residents of that area. Recreation cores, on the other hand, are open spaces which serve as nexes and stimuli to development. They preserve special places or take advantage of particular opportunities to develop scenic or recreational space. They may be parks or plazas, or may be associated with surrounding commercial or recreational development. Neither of these concepts in itself constitutes regional-scale open space design, but as locally significant opportunities, both may be extended and integrated into a regional system.

Research done during the past two decades on urban design and the perception of urban areas also has important implications for the planning of open space. Whyte (1968) suggests that local residents' perceptions of the size and importance of local parks and open spaces are often entirely out of proportion to their actual sizes, and proposes that community residents be surveyed and asked to map their perceptions of their neighborhoods. Cognitive mapping of this sort was first employed by Lynch, in his seminal work The Image of the City (1960). Lynch asked local residents to describe, and then draw maps of their neighborhoods. By compiling and analyzing these individual images, he arrived at a collective impression of the neighborhood or city, which he describes as its "imageability." He then developed a system for analyzing the imageability of any city by describing it in terms of five elements: landmarks, nodes, paths, edges and districts (see fig. 2). While Lynch did not conceive his system with specific reference to open space, his elements have a great deal to say about the role of open space in urban and regional design, and about its perception by the people who use it. The preservation of significant natural features, for example, as the basis of recreation cores, might constitute landmarks of city-wide or even regional significance. Parks, as meeting places and activity centers may become urban nodes. Pedestrian

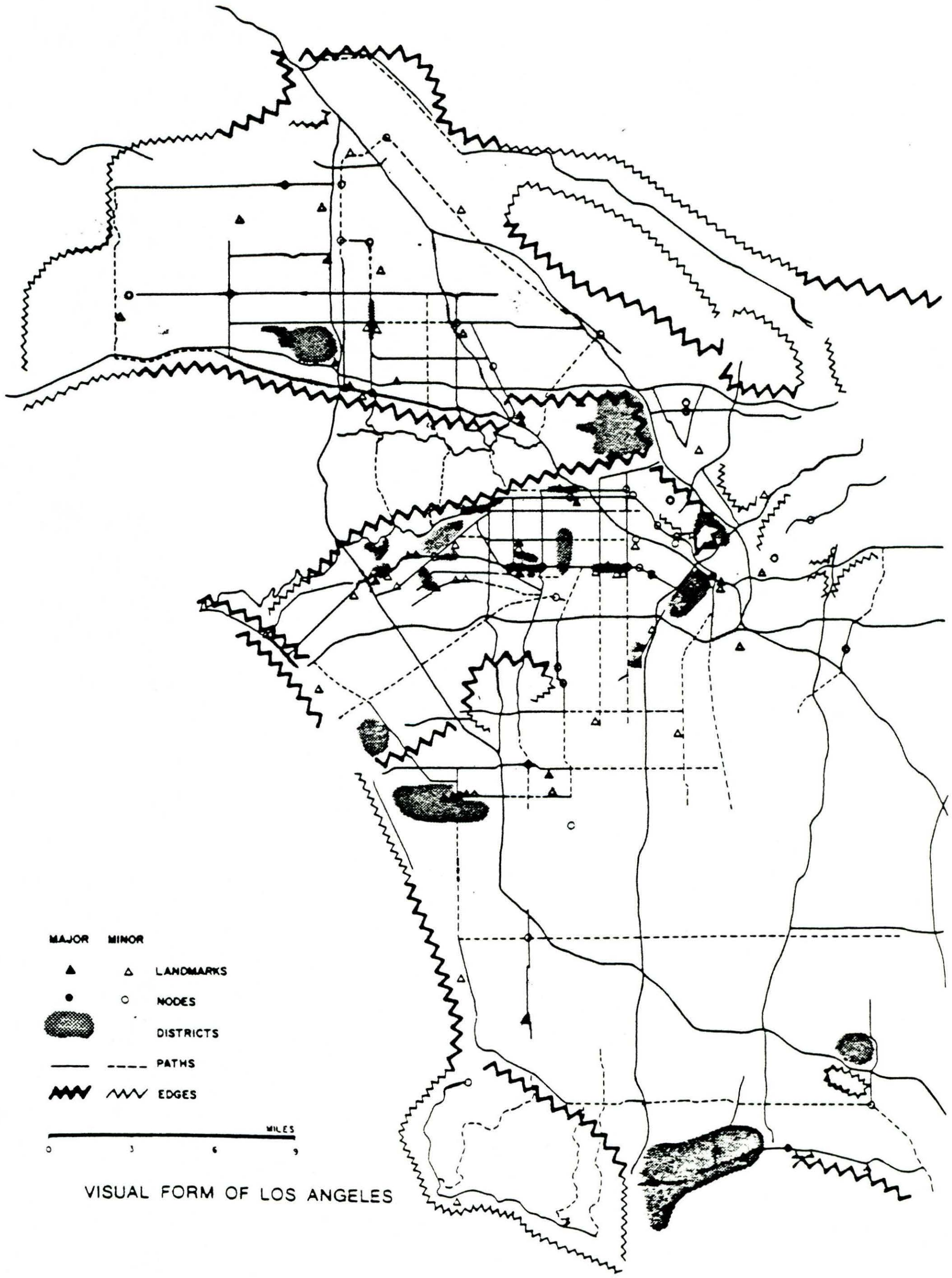


Figure 2. Lynch's System of Imageability

trails or bike paths are paths; and open space buffers or containers become edges which define the boundary between one neighborhood or district and another. Seen in these terms, open space can be designed with specific reference to the perceptions of local users, and also, to the overall design of the city or region.

In later work (1976) Lynch broadens his concerns to the regional scale. "Place, identity and image structure at the regional scale are looked upon as esoteric matters," he points out (p. 25). "Yet for many people, the region, or a large sector of it, is their true life space." Regional design, Lynch says, has two roots: aesthetic, deriving from architecture and landscape architecture, and scientific, based on the disciplines of land management. It is at the regional scale, he says, where these two concerns meet:

> The natural conditions of a region are an obvious ground and limit to its sensory form: Its geology and topography, its climate, its ecologies...In addition, there are non-physical systems of the environment: patterns of ownership and of the control of use and development, communications networks and interrelationships between localized activities, technological capabilities, widespread images about environment and common ways of using it. These patterns, directly linked to the environment, must be understood if its sensory quality if to be managed. They not only set limits but define purposes and priorities as well. For example, an arid climate calls for shade and water, while private ownership of land stimulates a search for public access to open spaces. (Lynch 1976, pp. 38-39)

During the 1970s and early '80s, and particularly as a result of the recognition of scenic quality as a bona fide resource by the National Environmental Policy Act (NEPA) of 1969 and the Federal Land Management Policy Act (FLPMA) of 1976, a substantial body of literature has evolved dealing with the definition, perception and evaluation of visual landscape quality on a regional scale (see, in particular, Smardon et al. 1986, especially chapters by Schauman, and Chenoweth and Gobster). Appleyard, Lynch, and Meyer (1964), and Tunnard and Pushkarev (1965), recognizing the predominance of automobile community and the importance of pleasure driving as an American recreational pastime, made notable early contributions dealing with movement through the landscape and reaffirming the importance of the relationship between regional design, open space, and scenic parkways. Public agencies have developed visual landscape assessment methodologies (Litton 1968, 1973, U.S.D.A., Forest Service 1974, U.S.D.I., Bureau of Land Management 1980), although these technical "expert" approaches appear to have been employed most extensively on federal projects. Another approach has been the development of user surveys. Chenoweth (1983), in one interesting study, adapted Lynch's user description technique to the camera by asking boaters along a river course to photograph what they considered to be outstanding scenic elements.

The increasing sophistication of landscape visual assessment over the past decade appears to show much opportunity for application to the evaluation of the location, design and quality of regional open space. Open space is at a political and economic premium, and, as noted earlier, must have a demonstrable use value to the people who will vote on tax assessment for it and who will ultimately enjoy, support and defend it. Its design, accessibility and imageability are all important factors in creating open space that works and establishing public support for it. The process of designing the regional sensory environment should be, as Lynch noted (1976, p. 79), "political and open, attentive to the user, helping him to understand his relationship to the landscape and making it increasingly possible for him to control it."

Natural Process

Along with the renewed interest in urban form, typified by growth control efforts and concern for visual quality, that arose during the 1960s, a concurrent interest in wild lands and the functioning of the natural environment developing, characterized by a new popularity of the study of ecology. By 1970, this new ecological consciousness would bloom in the form of Earth Day; and its political effects would be felt with the first national environmental protection legislation (The Wilderness Act 1964, NEPA 1969, FLPMA 1976), which provided models for similar measures in several states.

The idea of ecological process, applied to regional planning, began to assume a new importance among landscape architects and planners, influenced by several key studies in broad-scale landscape analysis. G. Angus Hills (1961), a Canadian ecologist and forester, developed a system for classifying Canadian wildlands into "landscape units" according to common physiographic and ecological characteristics, and evaluating the units according to their suitability for various human uses.

Philip Lewis (1964), a landscape architect commissioned by the State of Wisconsin to do a statewide study of recreational and open space resources, developed a system to locate and map patterns of natural and cultural resources. Lewis made extensive inventories of every important resource and natural and cultural feature throughout the state including topography, stream systems, wetlands, soil and vegetative associations, and archaeological and historical sites. He mapped each of these resources separately, and found that they formed well-defined patterns, which he termed "corridors of outstanding landscape qualities" (fig. 3). By overlaying the maps of cultural features onto the natural features, he found that they coincided closely and that most of the valuable cultural sites fell within the landscape corridors of long, glacially formed ridges and valleys, streams and wetlands running in a generally north-

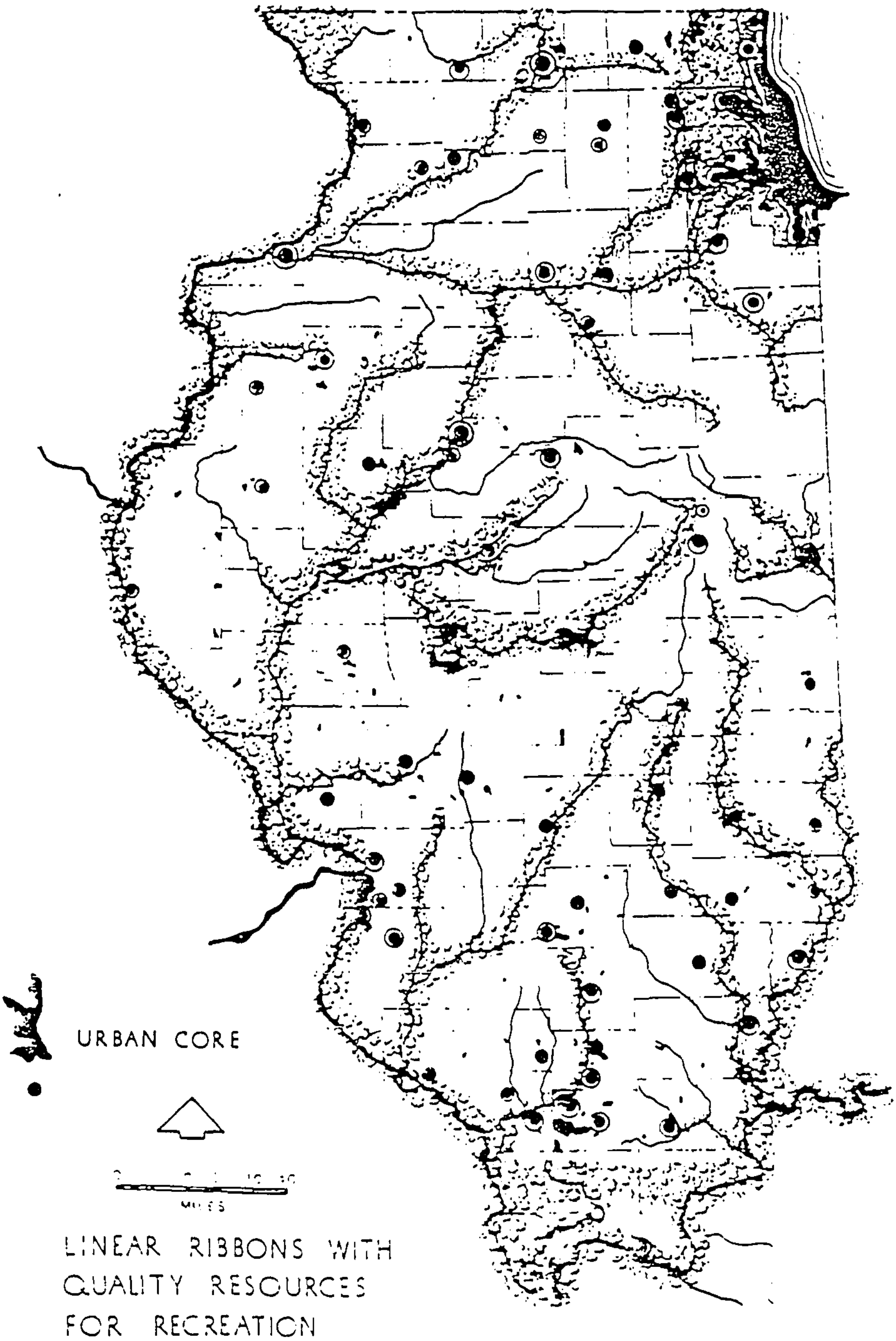


Figure 3. Quality Corridors

south direction through the state. Lewis was one of the first planners to use the technique of overlay mapping and numerical evaluation applied to landscape units. But his major contribution is his recognition of the association of natural, cultural, and landscape quality values in clearly recognizable patterns: an objective evaluation of the landscape, in other words, can demonstrate that certain areas are clearly superior to others for preservation or recreational opportunities because of the association of multiple values.

A similar approach was being developed at about the same time by Ian McHarg (1965, 1969). McHarg and his firm were asked by landowners in the Green Spring and Worthington Valleys on the outskirts of Baltimore, where economic pressures were making development inevitable, to prepare a plan which would ensure controlled, high-quality development, and at the same time preserve the maximum amount of open space and natural amenity. McHarg operated on the guiding principle of "physiographic determinism": the idea that the natural history of a region, developed over hundreds of millions of years, determines its physiography and natural character, and forms a pattern of ecological cause-and-effect which needs to be understood and used to determine the location and consequences of any development. Appropriate and inappropriate locations for any land use are not matters of chance or haphazard choice, but are strictly determined by the natural history and processes of the area. Planning is the process of uncovering those natural patterns and discovering their significance.

McHarg and his associates began by inventorying and mapping the physiographic qualities of the area: topography, subsurface geology, surface and groundwater, floodplains, slopes, forest cover, and soil stability and permeability. He noted the factors which constrained development, for example, the Cokeysville marble formation which overlay the region's aquifer and was therefore unsuitable for sewerage. By overlaying maps of the ecological constraints to development, he compiled a composite of areas permissive to development, as well as those to be avoided. His conclusion was that development should be confined to clusters on the tops of the open plateaus surrounding the valleys, and that the valleys themselves should be retained in natural open space and pasturage. Not only did this plan protect the Baltimore region's water table and other natural processes and preserve open space as an amenity to the developing communities; it also provided an estimated financial return to the developers of $7 million in excess of the projected returns had they developed without comprehensive planning (McHarg 1969).

Mcharg had the opportunity to use this ecological planning method on several other projects around the country.

In 1970, his firm was contracted to produce an ecological plan for Woodlands, Texas, a planned new community on 20,000 acres north of Houston. The most critical problem to the developers was the frequent flooding caused by the combination of impermeable soils and an essentially flat site. As an alternative to the costly storm sewerage system designed by the project engineers, McHarg proposes extensive regrading of the site to take full advantage of the natural drainage system consisting of two creeks crossing the area. By locating development near the tops of graded ridges, McHarg's plan kept it out of the floodplains and at the same time minimized erosion and protected water quality and recharge. Also, the best forest cover and wildlife habitat was located around the washes, floodplains and lowlands, and these were retained as amenities in community open space. Finally, the plan saved developers some $14 million as compared with the engineering solution of storm sewerage (McHarg 1975).

Ecological planning such as this introduced a new dimension to open space planning. Open space could now be recognized not merely as an enjoyable amenity, as had been the case in traditional park and recreation planning, but also as functional, indeed vital, to the ecological integrity of the region. Moreover, it provided a number of different functions at the same time. Each physiographic characteristic could be assigned a value, positive or negative, by the planner, according to the function it performed, and by spacially mapping these characteristics and overlaying the maps, their values could be aggregated to assess the relative value or suitability of various land units to different uses. As little explains it:

> ...the best recreation land is the best conservation land is the best amenity land. This hypothesis is arrived at by applying a theory of priority by overlapping functions. When more than one function is served, priority is automatically established. The lowest priority is where only one function is served; the highest where all three functions are served. (Little 1968, p. 17).

Analyzing the areas where these characteristics coincide, Little concludes:

> High priority open space should be preserved in systems that are essentially linear and augmented by big chunks of land wherever they can be found. These linear systems, as well as the big chunks, should be located on or contain surface water, or be part of a ground water system. Also the system should contain distinguished forms such as ridge tops (also linear) and steep slopes.
>
> If these kinds of lands are preserved, by one means or another, all three open space functions can be served, often simultaneously. (ibid.)

The overlapping and interdependence of ecological functions can be most clearly seen, according to McHarg, at the level of the physiographic region, where the underlying geomorphology, climate and hydrologic processes work as a unity. In explaining his "Ecological Method for Landscape Architecture," McHarg (1967) describes two states of natural process. The first, Evolution/Health, is characterized by complexity, diversity, interdependence of organisms and processes, stability, a high number of species and low entrophy. These characteristics describe the integrity of the natural ecosystem in a healthy and undisturbed state. The second state, Retrogression/Ill Health, describes the ecosystem disturbed by piecemeal human intervention which disregards and disrupts the interdependence of natural systems. This state is characterized by simplicity, uniformity, independence of parts, instability, a low number of species, and high entrophy. "When natural processes are interrupted," says McHarg (1970), "there are often resultant costs to society." Many of these can be measured in the social costs of flooding, drought, soil and crop loss, disease, and the diminution of scenic, historic, and wildlife values. Conversely, there must logically be measurable benefits to maintaining natural systems.

Assessing these values by constructing an ecological model for a city or an entire metropolitan region had never been attempted, according to McHarg, before the late 1960s, when he and his colleagues began a study of urbanization in the Philadelphia metropolitan area and the potential to preserve remaining open space before it was lost to development (Wallace 1970). The problem was not scarcity of open space--this existed and would continue to exist in abundance--but rather the infusion of open space into the metropolitan fabric in appropriate locations. This is because the mechanism of land market values tends to raise market prices in developing areas, making open space a marginal or transitional use. There exists no general recognition of the ecological and social value of open space capable of countermanding these market values; but if ecological values are not capable of being quantified in the same terms as economic values, at least they may be described. McHarg enumerates them as follows:

Natural Values
Continuous soil formation
Biomass production
Natural defenses against epidemic disease
Regulation of climatic extremes
Minimal oscillation between flood and drought
Minor erosion
Natural water purification

Social Values
Viable agriculture and forestry
Abundant fish and wildlife
Stability and purity of the water system
Diminished erosion, sedimentation and silting
Maintenance of comfortable climate
A self-cleaning environment
Natural beauty
High amenity and recreational value

In all of these values, water is the unifying link, for the hydrologic cycle permeates and regulates all natural processes. McHarg analyzes the three physiographic areas of the region--the Piedmont Uplands, Piedmont Lowlands, and Coastal Plain--in terms of the role of each in the regional hydrologic process. He then further defines eight land-unit marshes, aquifers, aquifer recharge areas, steep slopes, forests and woodlands, and prime agricultural land, and maps each of these parameters in the metropolitan area. He analyzes the role of each in the hydrologic cycle and outlines the permissiveness of each to suitable land uses. Altogether, he maps 5,671 linear miles of surface water and about one and a half million acres of water-related land woven through the metropolitan area and comprising about 60% of it, which should be reserved for low density or open space uses of one kind or another. Not all of this land needs to be acquired at public expense. Some may be left in agriculture or regulated through zoning to low-density and non-harmful uses.

The point made by this study is that the integrity of the ecological process has a clearly demonstrable, if not precisely quantifiable, social and economic benefit to the region, and that only by planning the region with ecological values in mind will human development realize these benefits and minimize costs. A key to regional ecological planning is the preservation of open space, not as a remnant of the development process, but as a primary planning element used to protect natural processes and infuse natural amenity into urban development.

During the late 1970s and early 80s the lessons of environmental planning have taken hold, particularly in the field of landscape architecture, with specific reference to ecological processes in the design of cities. Several writers (Steinitz 1979, Hough 1984, Spirn 1984, Lyle 1985) have criticized the distinction traditionally assumed between the disciplines of urban design and regional planning, the former deriving largely from the beaux-arts tradition of the design professions, and the latter from scientific and resource management orientations. These writers argue that the concept of design is equally appropriate at the regional level (Steinitz 1979, Lyle 1985) and that it is time that concerns for natural process should be added to the traditional urban skills of hardscape and decorative planting design (Hough 1984, Spirn 1984).

During the past decade many American cities have experienced energy shortages and severe budgetary constraints. One result of this has been a shortage of funds for the acquisition and maintenance of parks and open space lands, accompanied at the same time by a growing surplus of derelict urban waste land (Hough 1984, Francis et. al. 1985). Urban ecology is in one part a response to financial and energy constraints, as well as to concerns about the general degradation of the urban environment. Hough argues that while parks were traditionally viewed in terms of amenity, recreation and social betterment, they must now be treated as functional parts or an urban ecosystem. Traditional manicured parks with ornamental plantings and turfgrass lawns are the most expensive to maintain, both in terms of human labor, and economic and energy costs. At the same time they are more sterile, in terms of the richness and diversity of plant and animal species and the integrity of ecological function, than many derelict lands returning to natural succession. Hough maintains that by simplifying, or simply denying, the role of the natural process in park design, we have missed their most essential qualities:

> Open space planning should be concerned with the productivity and efficient use of land...The tendency of parks planning to downplay the essential vitality of place and human need and interests denies vitality to the city's open space system...the application of this philosophy means the traditional single use of open space must be revised. (Hough 1984, p. 251)

Spirn (1984) argues that each individual landscape element in the city should be designed, insofar as possible, as an integral ecosystem. She characterizes traditional parks as "open ecosystems", demanding inputs of seed, sod, exotic plant materials, fertilizers, pesticides, fossil fuels and irrigation water, and producing outputs of frequently unused biomass (dead trees, plant and grass clippings), pollutants and stormwater runoff. Many urban parks and open spaces can be managed as relatively closed ecosystems, resembling forests, where the only energy inputs come from the sun, nutrient and hydrologic cycles, and outputs are entirely recycled through the system. "When individual parts of the ecosystem are designed to fill more than one function," she says, "energy may be conserved," and that part becomes a part of the overall urban ecosystem.

> Designing a park to funnel cool air into the city, detain stormwater from the surrounding streets, and buffer a residential neighborhood from the noise and air pollution of nearby highways may be more energy efficient than designing separate solutions to each problem. (Spirn 1984, p. 245)

Preserving open space ahead of development will thus afford metropolitan regions the opportunity to plan for the protection of the ecosystem and its integration into the urban pattern, providing benefits of climate control, maintenance of air and water quality, flood prevention and control of runoff, local food production, urban wildlife habitat, environmental education and enjoyment.

Hough (1984, p. 243) points out that attention to urban ecology has a threefold implication for the future of urban open space. First, it expands the usual definition of open space to include all open (e.g. unused) land and to regard that land as a precious resource. Second, open space lands must be seen as serving multiple uses (e.g. productive and protective) as well as providing multiple benefits. Rooftops, rights-of-way, golf courses, cemeteries, industrial parks, vacant lots and sewage treatment ponds, to cite a few examples, may all serve multiple (though not necessarily public) open space uses, each of which will increase the public value of those spaces. Third, the social value of open spaces is directly related to the level of public involvement and support they engender. Local open space has the advantage of bringing the natural environment into the urban setting, rather than the city-dweller being forced to go to the country to find an experience of nature. As such, it provides, on a daily basis, the best possible opportunity for environmental education. Furthermore, Hough predicts that in the future, fewer parks and open spaces will be publicly owner and managed, but rather will be planned and maintained as a result of the participation of local users. It is essential, therefore, that members of the public understand the public benefits derived from open space, and be encouraged to participate in its planning.

CHAPTER 4

THE OPEN SPACE PLANNING PROCESS: SIX CASE STUDIES

This chapter reviews several open space studies and open space systems planned in large part since 1960, in order to examine the principles used in planning open space systems, and in particular, the criteria and planning methodologies used in selecting lands for acquisition. The case studies were chosen as particularly significant open space systems or plans on the basis of background reading cited in the previous chapter. Requests for information were mailed to the directors or head planners of 13 park districts or municipal open space systems. Of these, nine responded, and six were selected as containing information most explicit and relevant to the concerns of open space planning (see fig. 4).

The cases reviewed vary considerably in their scope, intent, and the amount of information they provide. Two, the Royston _Landscape Preservation Study_ for the State of California (Kunit and Calhoon 1973) and the Eckbo, Dean, Austin and Williams California _Urban Metropolitan Open_

	Response	Evaluation	Case Study
Boulder, CO	●	●	
Denver, CO	●		
Boise, ID			
American River Parkway, CA			
Association of Bay Area Governments, CA	●	●	●
Mid-Penninsula Open Space District, CA			
East Bay Regional Park District, CA	●	●	●
San Diego, CA	●	●	●
Marin County, CA	●	●	
Boston, MA	●		
Cincinnati, OH			
Seattle, WA	●	●	●
Detroit, MI	●	●	
Cleveland Metro Parks	●	●	

Figure 4. Open Space Survey Respondents

Space Study (Williams (1969), are state-wide studies. The Royston study is oriented primarily toward the preservation of significant natural landscape types, and the Williams study mainly toward recreational opportunity. These were chosen because they provide excellent illustrations of landscape assessment methodologies useful in open space planning. The remaining cases are plans for actual, or at least partly realized open space systems. Two are open space elements of municipal general plans. One is the regional plan for a large, metropolitan area, where open space is viewed in the context of a preferred regional development pattern. The last is the master plan for a regional park system within that area.

There is a strong emphasis on California case studies in this chapter. California open space studies are both more numerous and frequently more technically exemplary than those from many other regions of the country. Unrelenting population pressures since the late 1950s, combined with a strong incentive for natural, and particularly coastal, protection, have made California a leading state in open space planning and preservation. In 1970, the California State Legislature mandated that every city include an Open Space Element in its general plan. Many of the landmark planning studies have occurred there, and at least one system--the East Bay Regional Park District--is an outstanding example of a regional open space system.

The California studies also cover a broad range in terms of size and geographic scope of the open space system, administrative purview, and their perceptions of the functions of open space and intent in preserving it. The two statewide studies mentioned above divide the state into northern and southern sections, and, in the case of the Royston study, into "landscape provinces." The open space element of the Association of Bay Area Governments (ABAG) Regional Plan is presented in order to establish a framework for open space planning in a multi-county metropolitan area, where detailed policy planning and implementation is carried out for the most part on a county, special district, and municipal level. It also provides the setting for the case study of the East Bay Regional Park District.

The varied geographic and administrative setting of the cases establishes a broad framework of principles of open space planning at different scales; however, the fundamental planning concerns examined in each cases--urban form and natural process--suggest a common format for the studies. Materials provided by the planning department of each agency contacted are reviewed for open space values, planning criteria and methodologies under the following format:

1. Legal/administrative basis of open space planning.

2. Geographic and demographic background (urban form, natural process).

3. Perceived functions of open space.

4. Open space goals and policies.

5. Selection criteria and planning methodology.

6. Implementation: related plans and ordinances.

7. Summary of significant attributes.

The goal of open space planning is not the formulation of an open space plan, but the creation of an open space system. Many plans fail to be implemented. Although an evaluation of the success of plans is largely beyond the reach of this study, particularly on account of the relatively recent nature of many of the plans discussed, it should be clear from a review of the cases that there is a direct connection between goal formulation, planning methods, and policy implementation. Particularly in the case of municipal open space plans or elements, where this relationship is most explicit, an attempt will be made to trace the genesis of open space policy from the setting and perceived needs of the city through the formulation of goals and particulars of the selection process, to specific methods of acquisition, regulation and other forms of implementation.

California Landscape Preservation Study

Administrative Background

In 1973, the landscape architecture and planning firm of Royston, Hanamoto, Beck, and Abey was commissioned by the California State Department of Parks and Recreation to perform an inventory of natural lands in the state worthy of preservation and to formulate a strategy to evaluate the relative merits of candidate parcels and priortize them for future public acquisition (Kunit and Calhoon 1973). The focus of the study was the preservation of areas of land which were either unique in themselves, and significant on a statewide level, or which represented typical natural landscape types or ecosystems. The parcels selected did not necessarily bear any relationship to urban areas. Recreational use was not a consideration of the study. The purpose of the study was to formulate a prioritized "wish list" for selection, and possible later acquisition, of significant areas. There were no implementation guidelines.

Geographic Background

The study team divided the state into several physiographic "landscape provinces" including Coastal Range and Foothills of the Sierras and the Great Central Valley. Each province is typified by a variety of landscape types: oak woodland, riparian, freshwater marsh, salt marsh, grassland, vernal pools, and alkali sinks.

Perceived Functions of Open Space

The intent of the study was to select for preservation lands representing whole, undisturbed, functioning ecosystems. The introduction of the report states:

> The original work of this report lies in the presentation of a preservation overview of the province, the formulation of criteria, and a methodology by which to evaluate identified natural sites. The criteria and methodology were designed to select sites which together represent a total cross-section of a diverse, functioning ecosystem within the province for the benefit of the entire state...A system of preserved areas must be managed with a knowledge of the interplay of chemical and energy flows between the site and surrounding lands or intervening waterways...One of the most effective ways to insure the integrity of natural areas is to include in a system coordinated for management and maintenance. The acquisition of certain areas for preserves can act to force the acquisition or influence the management of other areas (such as forage or water supply and nesting or spawning sites).

Selection Criteria and Planning Methodology

The Royston firm designed a selection process to evaluate parcels nominated for preservation by passing them through four "criteria filters," which are briefly summarized here.

Filter One determines whether nominated parcels meet the "Environmental Goals and Policies" of the state as well as the management criteria of the State Parks and Recreation Department, and whether sufficient information is available to permit an evaluation of the parcel. Each parcel is evaluated under two main criteria, Preservation Potential and Statewide Significance, defined as follows:

Preservation Potential

1. Physical capability: Is it legally and economically feasible to acquire the site and physically possible to preserve it?

2. Public agency responsibility: Is the site already under the protection and management of another agency?

3. Conflicting uses: Is the area already committed to another purpose, such as resource development?

Statewide Significance

1. Natural landscape type: Is the character of the landscape representative of an indigenous landscape type in the province.

2. Interest: Is the preservation of the parcel of general interest to the people of the entire region?

3. Critical resource: Does the resource help "to create and maintain a productive harmony between man and his environment?" (State of California, "Environmental Goals and Policies" 1972)

Each site is rated positive or negative according to these criteria, and the negative ratings are eliminated. Remaining sites are passed to Filter Two.

Filter Two classifies the parcel into one of several representative landscape types, for example, Oak Woodland, Grassland, Riparian, and rates it according to its representativeness, uniqueness, and geologic and biotic value. Scientific ratings of uniqueness, from the lowest to highest are:

1. California endemic.

2. Rare, with limited distribution.

3. Rare or unique association.

Each parcel is then rated for educational value, with each receiving points as follows:

1. Example of California landscape.
2. Demonstration of unusual process or event.
3. Rare or unique situation.

The scientific and educational scores are totaled, and the high scorers rated, again on a three-point scoring system, according to several scenic quality criteria, giving a final composite score for Filter Two, which indicates the significance of each parcel.

Filter Three, the "Endangerment Analysis," rates the immediacy and degree of threat to the environmental quality and integrity of each parcel in terms of immanent land conversion, environmental quality and other population and land use pressures. It is rated on a three-step scale, according to the immediacy of threat.

Filter Four evaluates each land unit geographically, in terms of its proximity to existing State Park units, to assess its management potential and the possibility of recreational linkages, should the State Parks Department decide that this would be appropriate at some future time. Each parcel is rated on a scale of 1 to 4 according to the following criteria:

Recreation linkage potential

Buffer zone

Resource cycle or migration pattern cover

Proximity to population centers

Proximity to existing State park units

Proximity to transportation

The Filter Four score is added to the sum of scores carried over from Filters Two and Three to give a combination suitability/criticality score which ranks the three best examples of each particular geologic or biotic type in the providence. The entire evaluation process is summarized in figure 5.

Summary

The Royston California Landscape Preservation study is significant to the concerns of open space preservation in that it develops an explicit and rigorous methodology for evaluating significant natural features. Its fundamental assumption is the preservation of ecological integrity in whole and undisturbed ecosystems. It evaluates candidate parcels on the basis of their geologic, biotic, visual and educational significance as well as the degree to which they are endangered by human development or environmental degradation. Although it considers ownership and management circumstances, it does not deal with acquisition or implementation methods. As its concerns are strictly for the preservation of outstanding examples of natural landscape or ecosystems

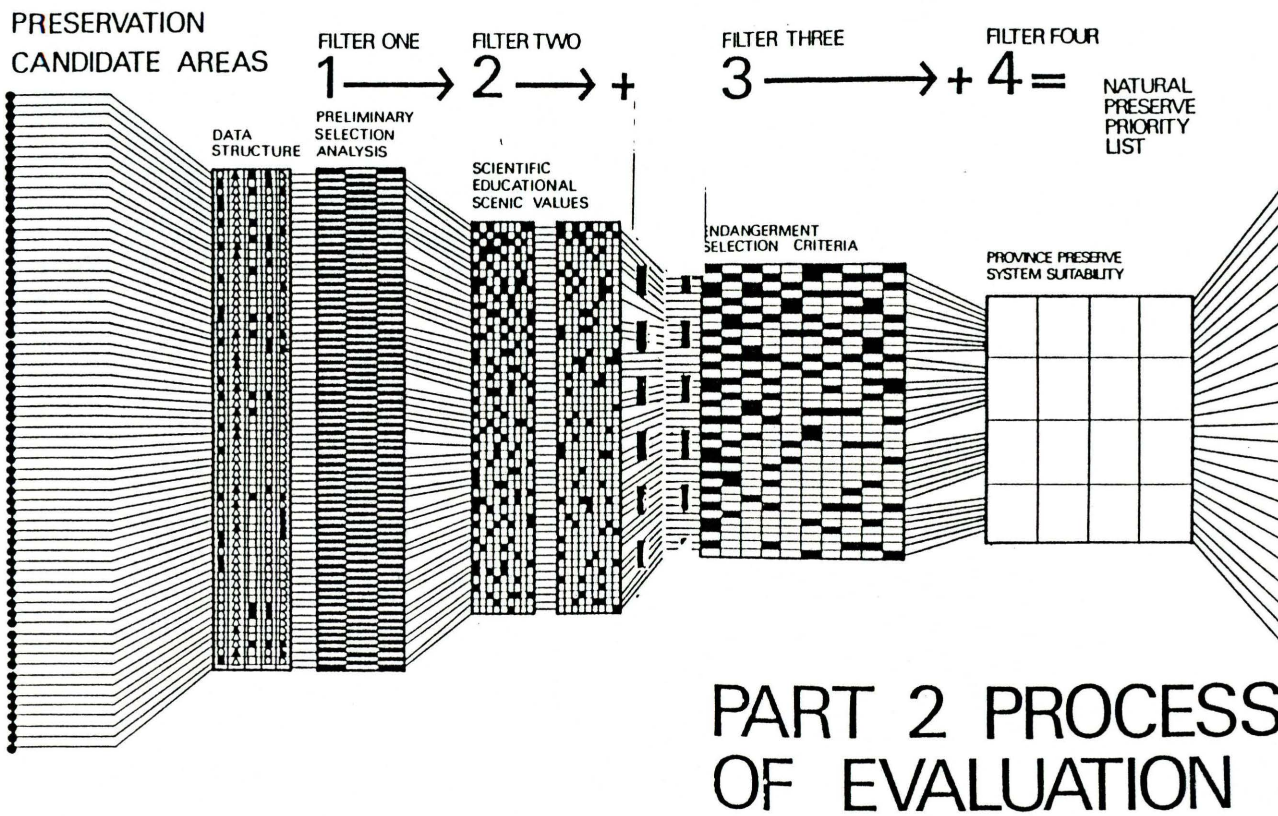


Figure 5. Open Space Evaluation Process in the Royston Landscape Preservation Study

of statewide significance, it does not address issues of urban form or growth management.

California Urban Metropolitan Open Space Study

Geographic and Administrative Background

The California Metropolitan Open Space Study was commissioned by the California State Office of Planning to the landscape architecture firm of Eckbo, Dean, Austin and Williams. The summary report was published as Open Space: The Choices Before California (Williams 1969). The purpose of the study was to assess future open space needs throughout the entire state in the face of rapid urbanization and conversion of open land. The study focused mainly on the major metropolitan areas of Northern and Southern California. Since the acquisition and management of open space was expected to be carried out by a variety of public agencies, ranging from federal and state resource agencies to local municipalities, the thrust of the study was to provide information and generate a range of flexible alternatives for implementation which could be adapted to each particular administrative jurisdiction.

Perceived Functions of Open Space.

The study takes its definition of open space from the California State Code, which states:

For the purposes of this chapter an "open space" or "open area" is any space or area characterized by (1) great natural or scenic beauty of (2) whose existing openness, natural condition, or present state of use, if retained, would enhance the present or potential value of abutting or surrounding urban development, or would maintain or enhance the conservation of natural or scenic resources. (Title I, Division 7, Chapter 12, Sec. 1)

Six categories of open space uses are outlined, each with several subdivisions and specific uses:

1. Open space for managed resource production
   A. Forestry
   B. Agriculture
   C. Mineral production
   D. Animal production
   E. Water supply
   F. Water areas for (commercial and recreational) fish and marine life production

2. Open space for preservation of natural and human resources
   A. Water, tidal and marshland wildlife habitats
   B. Forest and woodland wildlife refuges
   C. Geological features of note
   D. Historic and cultural sites and places

3. Open space for health, welfare and well-being
   A. Land to protect the quality of ground water
   B. Open space for sewage and garbage disposal
   C. Open areas to protect air quality
   D. Recreation areas
   E. Recreational travel areas
   F. Areas to provide visual amenity
   G. Areas to shape and guide development

4. Open space for public safety
   A. Flood control: floodplains and reservoirs
   B. Unstable soils
   C. Fire zones
   D. Airport flight path zones

5. Open space for corridors
   A. Power transmission line rights of way
   B. Canals and aqueducts
   C. Transportation and transit rights of way

6. Open space for urban expansion (i.e., areas reserved for future use by commercial, industrial, residential and public service facilities).

Open Space Goals

The main focus of the California Metropolitan Open Space Study is to ensure the future provision of open space around the most populated metropolitan areas of the state. In this sense, it aims both to provide recreational lands and to shape urban development. Within this context, it establishes three general priorities for open space lands:

--Multi-purpose open space

--Water and water-related lands

--Lands with unique or special qualities

Finally, the study aims to produce a set of alternatives which are translatable into a practical policy of open space acquisition and management, and to establish an evaluation system useful to a variety of public agencies.

Selection criteria and planning methodology

Potential open space throughout the state is inventoried and evaluated in a two-stage process. First, areas of potential interest are inventoried using the following sources:

Public agency nominations
County and local masterplans
SCS soil surveys
Engineering surveys indicating potential reservoir projects

Important recharge areas identified by the Department of Water Resources
Mineral areas identified by the Division of Mines
Wildlife areas identified by the U.S. Fish and Wildlife Service and State Department of Fish and Game
Beach and dune areas
Existing and proposed state scenic highways
Historic and recreational open space areas and trail and waterway systems identified in the State Outdoor Recreation Plan
Major canals, aqueducts and power transmission right-of-ways corridors
Rivers, streams, valleys and other features of topographic interest
Steep slopes identified on topographic surveys
Population projections and areas of urban expansion as indicated by city and county general plans

All relevant information on these areas is recorded on transparent overlays on 7-1/2 minute U.S.G.S. topographic quadrangle sheets.

The second stage involves setting up an assessment methodology to evaluate and compare the areas for future selection. To be considered in the evaluation, areas have to be greater than 100 acres in size, or, if smaller than 100 acres, have to be of regional or greater significance. The areas meeting these qualifications are then screened according to three further criteria:

1. Land not suitable for urban development on account of steepness of slope, flood or slide potential or poor drainage.

2. Areas having unique or special qualities deserving of protection, such as Class I and II soils, areas used for the production of specialty crops or minerals, and areas of significant wildlife habitat, natural history, cultural history, scenic quality and recreational opportunity.

3. Open lands in metropolitan areas which have particular potential to define and guide the urban growth pattern or serve as connectors between other major open spaces.

Land units selected by this screening process are then assembled on a matrix which describe the type of landscape (beach, hilly, grassland, etc.) and the open space functions it fulfills (fig. 6). Twenty-two functions are listed. The relative value of the functions is not weighted, so it is assumed that the value of the particular parcel is determined by the number of overlapping functions it fulfills (v=f1+f2+f3...etc.).

To link the evaluation of land units to acquisition strategies, each parcel is evaluated as to the most appropriate method of acquisition and the resulting degree of public control. Three general open space strategies are considered. Full fee acquisition, representing full public control and use, is appropriate for areas immediately threatened by development or those which have specific value for public recreational use, and where any private use should be excluded. Less-than-fee acquisition (acquisition of development rights, scenic, conservation, and access easements, and other deed restrictions) represents a medium degree of public control while still permitting limited or low-density private uses such as farming, grazing or very low-density housing. Finally, zoning and other public police powers represent, in that the classifications and controls may

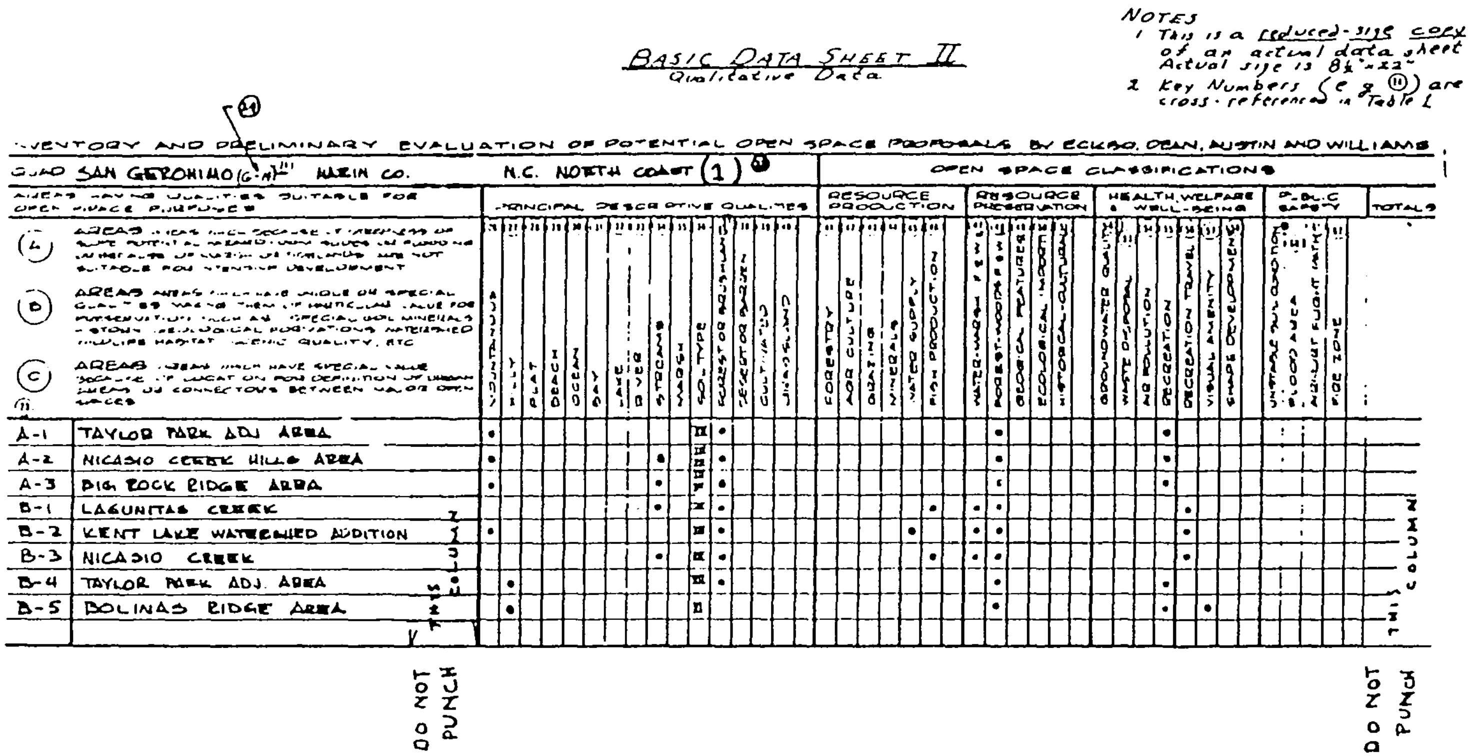


Figure 6. Open Space Evaluation Forms, Metropolitan Open Space Study

change, no public ownership and a minimal degree of control. Regulatory powers are appropriate where they safeguard public health and safety (hazard areas) or, in some cases, where they are used to preserve amenity (design controls, scenic conservation zones, etc.).

Recommended acquisition strategies are complemented by three sets of data: land cost estimates, population projections, and estimates of the imminence of urban encroachment on open lands. These data sets, recorded on U.S.G.S. topographic survey maps surrounding metropolitan areas, are intended to provide alternative criteria for evaluating priorities of lands to be acquired. Land costs, for example, will generally tend to be highest in the most highly populated areas; but this fact may be mitigated by the fact of the land unit have a particularly high rating because of its unique characteristics, or a high degree of threat from encroachment. Population, on the other hand, may be projected into the future, enabling agencies to find a bargain on existing open space in an area not yet highly developed. These strategies, then, are intended to provide flexible alternatives, enabling different public agencies throughout the state to plan according to their needs and the local circumstances.

Land costs were gathered from the State Department of General Services Property Acquisition Service, county assessors' offices, and the appraisal departments of local banks. Three estimates were made: cost of full-fee acquisition, cost of less-than-fee acquisition, and the projected percentage price increase over the next five-year period.

Population figures taken from census tract data were averaged over the area of each 7-1/2 minute quadrangle. Transparent overlays with a 40-mile radius circle could be overlaid, centered on any given quadrangle, to determine the population served within a 40 mile (one hour) service radius of a particular open space area.

Imminence of urban encroachment was estimated from state projections of urban expansion, rated high, medium and low by combining those projections with an analysis of local topographic constraints to development, and the value assigned to each quadrant.

All data pertaining to rated open space parcels, land costs, population projections and imminence of threat were summarized on data sheets and entered in digital form into a computer system. This allowed the selection and rearrangement of data in a number of alternative ways: open spaces could be assigned a priority, for example, according to features of the unit, cost of acquisition, proximity to population centers, or degree of threat. This would allow agencies the greatest flexibility in examining a number of alternative factors in the selection process.

Summary

The Eckbo, Dean, Austin and Williams Metropolitan Open Space Study (Williams 1969) is a state-wide, comprehensive inventory and assessment of potential open spaces, and examination of possible strategies to be used in open space preservation. It is significant for incorporating a wide variety of available data into an explicit methodology for complex, multi-parameter evaluation of open space parcels, and also for adapting this process to a digital database format. The adaptation of the assessment process to computers, and the provision of a number of flexible alternative priorities or assessment strategies makes the process adaptable to the needs of a variety of planning and management agencies. Although the study does not contain any direct implementation guidelines as such, it pays careful attention to decision factors affecting open space acquisition and incorporates data relevant to those factors into the evaluation process.

In an introduction written three years after the study, editor Williams cites a large number of pieces of legislation (California Land Conservation Act--Williamson Act of 1965), local organizations (People for Open Space, Planning and Conservation League), and regional plans (Southern California Council of Governments, Association of Bay area Governments, Napa County, Bay Conservation and

Development Commission) inspired and aided, at least in part, by this study.

San Diego

Legal and Administrative Basis for Open Space Planning

This is a municipal/metropolitan open space system planned and administered by the City of San Diego. Its main authority derives from the Open Space Element of the Progress Guide and General Plan for the city. Administrative authority resides with the San Diego Open Space Park Facilities District #1, established in 1978, and coterminous with the city limits. The district is empowered to acquire, construct, improve, maintain and operate park facilities.

Geographic and Demographic Background

San Diego is a well-established but rapidly growing coastal city in Southern California with a population of 1,862,000 (U.S. Census, 1980).

The flat landscape bordering the ocean is backed by steep, arid coastal hills punctuated by deep valleys. It is the hillsides and valleys which form the basis of San Diego's open space system ("Information Summary for the Proposed Establishment of the Open Space Park Facilities District #1").

San Diego has a long and established tradition of planning for open space, beginning in 1908, when John

Nolen, a planning consultant from Boston, recommended the establishment of an open space system to enhance the city's character and incorporate into the urban design the benefits of the region's "great natural resources." In 1926, Nolen wrote a series of planning proposals for the city, including a system of parkway thoroughfares through the canyons, preservation of agricultural and truck garden areas threatened by subdivision development, large playgrounds and a system of canyon and park-land reservations throughout the residential districts of the city. During the 1960s, as development began to encroach on steeper lands, residents became concerned with preservation of open space and environmentally sensitive areas. "A Plan for the Preservation of Natural Parks for San Diego" was adopted in 1973 as the official Open Space element, mandated by the California Environmental Quality Act (CEQUA). In 1974, planners Kevin Lynch and Donald Appleyard were retained to evaluate the city's growth trends. Their report, entitled, "Temporary Paradise?--A Look at the Special Landscape of the San Diego Region" (1974) recommended that San Diego "keep the valleys and canyons, and their rims out of development, using public purchase and floodplain and hillside zoning with real teeth in them." A hillside review overlay district was adopted in the same year. The current Open Space Element of the General Plan was adopted in 1979 and revised in 1984.

Perceived Functions of Open Space

The city takes its definition of open space from the California Government Code:

> Open space may be defined as land or water areas free from development or developed with low intensity uses that respect natural environmental characteristics. Open space is generally non-urban in character and may have utility for park and recreation purposes; conservation of land, water, or other natural resources; and for historic or scenic purposes.

The code specifically enumerates six functions of open space:

Preservation of natural resources
Managed production of resources
Outdoor recreation
Maintaining public health and safety
Controlling urban form
Providing places for scenic and visual enjoyment

Open Space Goals and Policies

The <u>Progress Guide and General Plan</u> amplifies on these functions, listing the following open space goals for the city:

Preservation of plant and animal life and
Wildlife habitat
Preservation of areas for scientific and ecological study
Protection of rivers, steams, bays and estuaries, coastal beaches, lakeshores and watershed lands
Preservation of sites of scenic, historic, cultural and recreational value
Protecting the public from risks of earthquake, landslides, flood, fire, air and water pollution
Utilizing the city's natural topography and drainage system to guide and control the form of urban development

Selection Criteria and Planning Methodology

The Open Space Element uses the functions and goals listed above as priorities for acquisition. Under a section entitled "Guidelines and Standards" it notes:

> Although there is virtually total agreement as to the need for open space, there is by no means agreement as to specific need standards. However, it is apparent that standards for the designation of open space should primarily consider the extent to which the uses of open space alluded to earlier in this element can be identified and accommodated. In addition, such standards should also consider the following variables: the extent, character, intensity, and pace of urbanization; its rate of growth, mobility, and social and economic characteristics; the degree of stress and tension of urban living; and the availability of financial resources for open space acquisition. (San Diego City Planning Department Report, Sept. 18, 1984).

Priorities for the evaluation and ranking of desirable open space parcels are established according to the theory of overlapping functions, using the six main functions established by the State Government Code. The more functions served, the higher the rank of the candidate parcel. Given more than one candidate which meet multi-use criteria, three additional factors are considered:

Threat of urbanization
Proximity to existing open space
Size of site and cost of acquisition

To keep information on open space areas it plans to acquire, San Diego maintains an "Open Space Retention List," which presently contains 111 open space areas throughout the city. This list enumerates thirteen criteria:

Length
Area
Access
Level Areas
Vegetation
Geological Features
Recreational Potential
Urban Form
Scenic Quality
Urbanization of Adjacent Communities
Threat of Urbanization
Public Interest

Implementation

The Open Space Element, as noted above, is administered principally by the Open Space Park Facilities District #1, which controls the Environmental Growth Fund, a revolving fund for land acquisition.

Since the Open Space Element has legal standing, designated open space areas are also under the jurisdiction of the City Planning Department, which may use the police power to regulate development in sensitive areas where there is concern for public health and safety. The city has adopted a Land Conservation (LC) Overlay Zone intended to prevent development to hillsides with slopes greater than 25%. This has been applied to 8,300 acres throughout San Diego (San Diego Planning Department 1984).

Several other General Plan elements, while they do not directly address open space, do regulate development in the interest of open space preservation. These include the Urban Design, Conservation, Seismic Safety, and Cultural

Resources Management Elements. In addition to these and local subdivision and zoning and development ordinances, including a Grading Ordinance and Vegetation Ordinance, each Community Plan is required to address local open space planning.

In 1984, San Diego adopted proposals to amend the Open Space Element to include sensitive areas not previously covered by that Element or by the LC Overlay Ordinance, and to strengthen the language pertaining to open space acquisition. A major change was the inclusion of an Open Space Zone designation in the Zoning Ordinance, permitting the City to make a clear legal designation of open space which would be useful in transfer of development rights cases.

Summary

Open space planning in San Diego is based principally on local topography, specifically the natural drainage system of canyons which interweave the residential areas of the city.

As a municipal government, San Diego is empowered (indeed, mandated) by California state law to plan for open space. This is accomplished through the Open Space Element of the General Plan, and a variety of planning, zoning and development ordinances, as well as local Community Plans. Thus, the city has available to it a wide variety of mechanisms to preserve open space, from the acquisition of public land to regulation of semi-public and private open space. Although the planning staff has commented on certain shortcomings of these regulatory tools, recent efforts have been made to strengthen and integrate them in order to improve their effectiveness. Consequently, San Diego is able to connect open space planning with designs for plan implementation.

Seattle

Legal and Administrative Basis for Open Space Planning

Seattle's open space planning is guided by the Open Space Element (1978-85) mandated by the Seattle 2000 Goals (1973) and Seattle Growth Policies. Information for this review is based on the latest reports on ongoing open space planning efforts, contained in the Open Space Background Report (April 1985) and Draft Open Space Land Use Policies (November 1985).

Geographic and Demographic Background

Seattle is an established city with a relatively dense central core surrounded by an expanding metropolitan area. It is a city of great natural beauty with close access to large areas of wilderness. The central city is built between Puget Sound on the West, and a large, natural lake, Lake Washington on the East. The Olympic Range lies across Puget Sound, and the Cascades and Mt. Baker some 50 miles to the East. Both ranges contain large wilderness areas within national forest.

Seattle, itself is built on a series of hills which run to the waterfront on Puget Sound. There is consequently a great deal of concern for protecting the city's hillside views to the water and the mountains beyond. The rainy climate of the Pacific Northwest also causes concerns for erosion, and stability of hillslopes under development.

While Seattle is actually losing population, recording a decrease from 530,000 to 500,000 between the 1970 and 1980 census, the number of housing units has continued to increase, and planners project positive trends in employment and residential development (Seattle 1985). Recent development pressures, and technological advances in development practices have caused concerns about increased hillside development and the loss of scenic and natural amenity. The central city, as mentioned, is densely built and has little open space. Recent attention has focused on preserving open space and amenity that presently exists, and planning ahead of future development. Seattle views itself as a city with "limited natural and fiscal resources for adding to the existing open space system" (<u>Open Space Background Report</u> 1984, p. 2). Open space planning efforts are strongly oriented toward making use of opportunities within the developed city.

Planning for open space is not a new phenomenon in Seattle. The Olmsted Brothers' firm was contracted to conduct a parks study in 1903. Their report on a "Comprehensive System of Parks and Parkways" (1903) led to a $4 million investment in the development of a 20-mile linked system of linear parks and boulevards between 1905 and 1912 (Seattle "Open Space Background Report" 1985). During the Depression era, $2 million were spent on WPA parks development projects. A 1954 city planning report entitled "Planning for Recreation" led to the acquisition of seven designated greenbelt areas totalling some 1,000 acres. The first "Outdoor Recreation and Open Space Plan" was published in 1965, following by a "Preliminary Linear Open Space Report" in 1973, "Urban Greenbelt Plan" (1977) and the establishment of a Greenbelt Overlay District (1984).

Perceived Functions of Open Space

The Introduction to Seattle's Open Space Background Report suggests that, in addition to recreation, open space is valuable to Seattle to "...provide buffers and establish boundaries between incompatible land uses. Open space protects our remaining natural environment and helps manage sensitive lands. It provides light, air and a sense of openness in a built urban area; and establishes a neighborhood focus and a city identity" (p. 1). The following functions are also listed:

Educational and cultural enrichment
Wildlife habitat
Visual relief from continuous urban development
Access to local parks and linkages between them
Preservation of unique places and environments
Balancing development with open space preservation

The report also lists several specific examples of areas to be appropriate to fulfill these functions:

Marsh, shoreline, bluffs and ravines
Landscaped boulevards
Freeway and rail rights-of-way
Utility corridors
Power transmission centers compatible with park uses
Reservoirs and wastewater treatment facilities
Transit facilities; park-and-ride centers
School sites
Property owned by other jurisdictions

Open Space Goals and Policies

Seattle's policy approach to open space planning is outlined in a series of "Framework Policies" contained in the Draft Open Space Land Use Policies report (1985, p. 14 ff.). Goals and policies related to open space are summarized here:

A: Growth. Provide sufficient amounts, types and locations of open space to
--Promote a visually pleasing, high quality environment
--Reinforce desired land use patterns
--Strengthen Seattle neighborhoods
--Provide links among Seattle's diverse parts

B: Environment. The heritage of natural assets...shall be protected, preserved and enhanced by
--Retaining belts of natural landscape and wildlife habitat throughout the city
--Giving open space priority to sensitive environmental areas such as flood and earthslide hazard area.

C: Urban form. Reinforce the special identify established for Seattle for its landforms and bodies of water by

--Maintaining a desirable relationship between natural features and the built environment
--Promoting the desired relationship between different [land use] activities
--Reinforcing physical qualities that distinguish between different areas of the city
--Providing greater cohesiveness among the various areas of the city through both physical connections and visual associations
--Highlighting points of activity.

D: Land Use. Use open space to moderate the intensity of continuous urban development by
--Buffering conflicting land uses
--Moderating intensive development
--Balancing open space preservation with the need to provide development rights

E: Rights-of-Way
--Preserve street vacations as public property where appropriate for open space for view protection
--Use to delineate neighborhoods

These Framework Policies are further refined and implemented through a series of specific land use policies (see <u>Implementation</u>, below).

Selection Criteria and Planning Methodology

The Open Space Policies plan prescribes guidelines for the selection, location and design of open space areas under 14 different categories. The categories, along with relative selection criteria, are outlined here:

1. Greenbelts
--Wooded
--Minimum of five acres
--Undeveloped
--Steep or erosion-prone slopes and slide areas
--Buffer zones
--Viewsheds
--Important wildlife habitat

2. Natural areas
   --Continuous vegetation or habitat
   --Minimum of three acres
   --Floodplains or wetlands
   --Little or no development
   --Aquifer recharge areas

3. Public parks and recreation zones.

4. Open space for planned development. Encourages Open Space Planned Development performance zoning criteria.

5. Seattle Center

6. Street parks

7. Street vacations

8. Boulevards
   --Landscaped character
   --Views
   --Linkages to other open spaces
   --Ridgetop and shoreline locations
   --Interest for pedestrians or cyclists through historical landscapes or other features of particular interest

9. Public view protection. Designates view corridors and scenic routes

Policies 10 and 11 relate to public actions and priorities and large areas for open space acquisition.

10. Acquisition. The City shall establish an ongoing program with a predictable fund source for acquisition of critical open spaces to ensure a timely response to attractive or unexpected opportunities to purchase open space, and provide an orderly way to protect open spaces that may be threatened. The following are priorities for acquisition:

    A. Lands needed for parks and recreation purposes.
    B. Lands providing public access to shorelines.
    C. Areas within designated greenbelts and natural area.
    D. Open space resources within areas with limited usable public open space.

E. Open space resources within other designated target areas.
F. Linear parcels needed for the continuation or expansion of urban trails or bikeways.

11. Open space target areas.

A. Areas that provide a wide range or open space opportunities that are potentially accessible to a large segment of the population and that have the possibility of providing linkages with a number of city neighborhoods.
B. Areas that are densely populated and have limited public open space Amenities.

These two sets of criteria imply no order of priority. Rather, they provide guidelines for the evaluation of open space opportunities to ensure timely action.

Policies 12 and 13 discuss specific open space target areas in the city. Policy 14 is the Urban Trails Plan, which identifies criteria for natural and scenic pedestrian linkages along existing linear rights-of-way and between urban open spaces and neighborhoods.

Implementation

Detailed locational and design guidelines, defined for each of the policies listed above, outline the means of securing and designing open space under each category. In addition to standard zoning and subdivision control procedures, Seattle has designated a Greenbelt Overlay District ("Urban Greenbelt Plan" 1977) and a Natural Areas Overlay Zone.

Summary

Seattle's is an open space plan with a distinctly urban orientation. Working within the framework of an already intensely developed city, and limited land and financial resources, it does not attempt to exclude development entirely from open space areas, but to accommodate it while taking the best advantage of existing opportunities in specific and limited areas within the city. Its main concerns are public health and safety (protection from hazard), urban form definition, and preservation of views.

Although there is no explicit system for ranking open space choices, there are sufficient criteria to establish a basis for targeting desireable open space areas and taking advantage of opportunities for acquisition.

Open space planning is carried out through the definition of policies under a number of different open space categories, and implemented largely through zoning and design guidelines.

Regional Plan for the San Francisco Bay Area

Legal and Administrative Basis for Planning

The Association of Bay Area Governments (ABAG) is a metropolitan council of governments with planning, advisory and coordinative functions for the nine-county San Francisco Bay region. In 1970, ABAG released the Bay Area's first official regional plan. Regional Plan 1970:1990, San Francisco

Bay Region. While not exclusively an open space plan, the document stresses the importance of open space preservation as one of six regional goals in its concept for a "City-Centered Region." The plan is thus useful in the present context both as an example of regional open space planning in a multi-nodal metropolitan area, and as an introduction to comments about specific implementation plans of various agencies throughout the area.

Geographic and Demographic Background

The nine Bay Area counties which comprise ABAG's planning jurisdiction are characterized by a variety of natural conditions. The Bay itself is drowned coastal plain, separated from the Pacific Ocean by two narrow peninsulas, San Francisco County on the South, and Marin County across the Golden Gate to the North. Most of the land directly adjacent to the Bay is a flat plain, much of it reclaimed from tidal marshes and mudflats by land filling activities between the mid-18th and mid-19th centuries. The flatlands surrounding the Bay are backed to the east by a coastal range of parallel ridges which separate the Bay Area from the great Central Valley agricultural lands. The western, seaward counties of Marin, San Francisco, and San Mateo are also built on coastal mountains nearly to the Pacific shoreline. Over its 70,000 square miles, the Bay region contains steep, wooded slopes and stream canyons, open grasslands, tidal marshes, ocean shoreline, flat, productive agricultural lands and heavily urbanized areas. The variety of open lands, hillside views of water, vegetation and wildlife are strong values. Two factors present constraints to human development: heavy, clay soils, which, when saturated with winter rains are prone to sliding on hillsides, and the occurrence of two major earthquake fault zones through urbanized areas.

ABAG estimates that of the roughly 4.5 million acres in the region, 4 million remained undeveloped (1965), and that three million of these were unsuitable for development because of natural constraints. Thus, about 25% of the land with urban potential had been developed by 1965. However, other estimates place the conversion rate of open land at 21 square miles annually or 370 acres per day (Williams 1970, Wall Street Journal July 20, 1971, p. 1). Regional population, according to ABAG projections, will increase from 4.8 million at the time of the study to an estimated 7.5 million in 1990, mostly concentrated around existing urban areas and areas served by existing and proposed transportation links. The ABAG plan proposes planned growth in designated areas of the "City-Centered Region" and planning for the preservation of open space around metropolitan growth centers at the earliest possible time: "The Plan anticipates that, as the population continues to grow, contact with the natural environment will become more and more crucial to maintaining a healthy life style."

Perceived Functions of Open Space

THe ABAG Plan lists the following functions of open space:

Conservation of land and its resource features
Ecological protection
Park and recreation purposes
Historic and/or scenic purposes
Shaping and guiding urban form
Enhancement of community values and safety
Maintenance of options for the future

Selection Criteria and Planning Methodology

The Plan proposes two types of open space: permanent open space, and controlled development areas, to be reserved at the discretion of individual local jurisdiction for development after 1990. Major areas to be reserved under each category are outlined in the Plan. Areas less than 100 acres are left to local governments to plan.

Permanent open space includes seven categories of lands:

Major ridges
The Bay
Waterways and floodplains
Major recreation areas
The ocean coastline
Selected Bay and river shoreline
Areas of outstanding natural attraction
Strategic areas to guide urban expansion

In addition, several specific land categories and areas are discussed: prime agricultural soils and specialty crop areas (such as vineyards, orchards and truck crop lands), salt ponds along the Bay shore, reservoirs and watersheds, marshes and other areas of significant wildlife value. Major drainage channels should be included in avoid future costs of flood control and damage and as linkages between other open space areas.

In selecting open space lands, multiple-functions were a major factor. The prime consideration, however, was timely acquisition of desirable lands immediately adjacent to urbanizing areas.

Implementation

The ABAG regional plan is advisory only. It is intended as a long-range, regional, scale, comprehensive guideline to coordinate the land-use planning efforts of local planning entities in a multi-city metropolitan area. The Plan does specify the preservation of several areas of natural and cultivated lands of regional significance, and further outlines the types, and maps locations of other areas to be retained in open space by virtue of local topography and their proximity to expanding urban areas.

A number of county and municipal planning jurisdictions in the Bay Area have implemented open space plans which follow the ABAG guidelines closely (Smith and Riggs 1974). Alameda County has articulated four categories of open space: agricultural, irreplaceable natural preserves, residential canyon open space (implemented by zoning and slope controls), and open space corridors--scenic routes, trails and linkages.

Rapidly expanding Contra Costa County has adopted a 10-year plan which follows the ABAG guidelines closely.

Marin county has an open space plan which designates three corridors--Eastern Urban, Inland Rural, and Coastal Recreation--running through the County. The plan aims to concentrate 90% of the County's population in the urban corridor and to preserve 22,000 acres of open space on 13 coastal ridgelines and 5,500 acres of watershed lands. The Marin County Open Space District performs planning and acquisition. A private Marin Agricultural Land Trust accepts dedications of land and easements to help buffer Marin's rich dairy grazing lands from development pressures.

Napa County has adopted suburban and rural large-lot zoning to preserve the rural agricultural character of the area, and, particularly, the local wine industry.

San Francisco County, along with Alameda the most highly urbanized county, has an open space plan tied to local parks and recreation opportunities and protecting the ocean coastline.

To the south, San Mateo county has an open space plan which concentrates urban development along the Bay front on the County's Eastern edge, preserving the mountainous central section for low-density residential uses and the western coastal plateaus for the coastal specialty agriculture which remains a profitable industry. The county is also home to one of the most innovative and effective open space agencies in the county--the Mid-Peninsula Open Space District which has preserved over 33,000 acres of ridgetop and ravine land in the Santa Cruz mountains in a park, parkway and trail system which interconnects with State, County and local parks throughout San Mateo and Santa Cruz Counties.

East Bay Regional Park District

Legal and Administrative Basis

Located across the Bay from the Mid-Peninsula Open Space District, the East Bay Regional Park District is one of the oldest and largest special-purpose park and open space districts in the country. Founded in 1934, the District is empowered by the California State Public Resources Code to acquire, develop and manage park, recreation, ecological, natural and open space preserves in the metropolitan East Bay. The District is a publicly supported special assessment district. Its actions are guided by a publicly elected Board of Directors, and a Parks Advisory Committee. There is, in addition, a full administrative, planning and management staff. The District currently owns and manages 41 parks totalling 57,000 acres (Stein 1984) in a two-county service area covering more than 955 square miles (Smith and Riggs 1974), and serves some 15 million visitors annually (Stein 1984).

Geographic and Demographic Background

The 41 parks in the district encompass a wide variety of environments from hilly woodlands to Bay front shorelines, and serve a number of purposes from developed active recreation to urban wilderness preserves. Ninety percent of the District parklands, according to the 1973 Master Plan, are to be left in a wild and undeveloped state. The bulk of this land forms an almost unbroken greenbelt running north-south along the ridgetops of the coastal hills that separate Alameda and Contra Costa Counties. However, unlike the typical greenbelt which rings and contains the urban area, these ridgetop parks separate the older cities on the Bay from the rapidly developing cities of the Contra Costa County, and provide an urban wilderness and recreation area centrally located between them.

Although it was not always foreseen that the East Bay would be the highly urban area it is today, there is a long tradition of concern for the protection of the special scenic and ecological qualities of the East Bay Hills. Frederic Law Olmsted, Sr. visited the Bay Area in 1866 and recommended the design of a system of "scenic lanes" along the tops of the hills. In the 1930s, the Olmsted Brothers firm, headed by Olmsted's son, was hired to do a survey of recreational needs for the East Bay communities. The Olmsted Plan, which recommended a chain of parks in the hills, was significant for being one of the first regionally-oriented recreation plans (Stein 1984).

Until the 1920s, much of the undeveloped land in the East Bay Hills was controlled by an assortment of private water companies which dammed the canyons to provide water for the cities on the Bay. In the late '20s, these companies were taken over and their lands consolidated by the publicly-controlled East Bay Municipal Utilities District (EBMUD). When EBMUD realized the necessity of obtaining a more reliable water supply for the growing cities, and developed a water source in the Sierra foothills which supplied the East Bay via a pipeline traversing the Central Valley, the water district announced the sale of surplus watershed lands in the hills. Alarmed by the prospect of mass speculation by local developers, East Bay citizens began organizing to acquire and maintain the hill areas as public parklands. In 1933, their proposals were adopted by the state legislature, and in 1934, the East Bay Regional Park District was endorsed by the voters.

Depression-era Federal programs contributed $3 million in funding, materials and CCC labor for parks development during the District's first seven years. Another period of parkland expansion and development began in the early 1960s, when William Penn Mott (now Director of the National Park Service) was made Director. This growth, along with expended concerns for ecological preservation, wildland and shoreline parks, and environmental educational, extended through the 1970s.

Cognizant of its expanded administrative role during this period, the Park District adopted its first comprehensive Master Plan in 1973. The planning effort was a collaboration between a 60 member Public Agency Advisory Committee, an 830 member Citizens Task Force, and a hired consultant, Overview, Inc. Seventeen public meetings were held during the course of plan preparation. Planning efforts wee funded 75% by the ABAG. The 1973 plan was revised and updated in 1980 to account for projects accomplished, new planning perspectives, and changes in acquisition strategies caused by budget reductions in the wake of California's tax-cutting Proposition 13. It was decided that there should be an ongoing process to review the plan and its implementation, with major iterations to be published at five year intervals.

Park Board president Mary Jefferds comments on the 1980 Plan: "Master Plan 1980 identifies goals, defines procedures, and provides comprehensive guidelines for implementation. This document serves as a blueprint guiding our practical decisions in prudent financing, acquisitions, capital development, and land use planning" (Stein 1984, p. 105).

Perceived Functions of Open Space

Much of the substance of the 1973 Master Plan remains unchanged in the 1980 version. The Plan mentions the following functions of open space:

Provides a sense of remoteness from urban areas
Roaming space for unstructured recreation
Viewshed protection
Ecological units for scientific study
Shape and control urban development and containment of urban sprawl
Wildlife habitat
Providing favorable scenery, climate and liveability.

Open Space Goals and Policies

Master Plan 1980 (EBRPD 1980, p. 7) lists five fundamental objectives which define the purpose of the Regional Park District:

1. To provide a diversified land and water system of regional parks, recreation areas, wilderness, preserves, trails and shorelines and parkland-related services which will provide the District residents with opportunities for creative use of outdoor leisure time.

2. To acquire, preserve and interpret significant examples of the natural environment, including biologic, geologic, scenic, and outdoor historic resources which exist within the boundaries of the District.

3. To cooperate with other public agencies in the acquisition, preservation and management of non-park open space lands.

4. To emphasize balance of both environmental concerns and regional recreational opportunities within the system of parklands operated by the District.

5. To effectively conserve energy by dispersed location of parklands close to the people throughout the District by reasoned management of energy resources available to the District; and by cooperating with other public and private entities in joint efforts to conserve diminishing energy resources.

A major goal which determines District planning is that of achieving equitable distribution of regional parkland throughout its service area. This balance is based on population percentages in three sub-regions within the District, as well as criteria of transportation and access, resource opportunities, and park land deficiencies. The primary method for determining land acquisition priorities in the Balanced Parklands System is a classification of seven types of parks and open space: Regional Parks, Regional Shorelines, Regional Preserves, Regional Wilderness, Regional Recreational Areas, Regional Trails, and Land Banks. Each of these classifications has a defined purpose, minimum standards, and planning and management guidelines which serve as acquisition and planning criteria. The following are examples:

1. Regional Park

   Purpose: to provide a spacious area with outstanding natural features where a variety of outdoor recreation opportunities can be provided for the enjoyment and education of the public.

   Standards:

   --Minimum 500 acres

--70-90% natural or scenic character
--30% suitable for a variety of recreation activities

2. Regional Shoreline
Purpose: to preserve for public use significant recreational, educational and scenic values on land and related areas along a river, estuary or bay.

3. Regional Preserve
Purpose: to protect features or outstanding elements of natural or historic significance, making them available for the enjoyment and education of the public. The essential element of such a preserve may have either open space, scenic, floral or faunal values, or archaelogical, historical or geological features.
Standards:
--Natural wonder or scientific importance
--Regional historical or cultural significance
--Regional open space values as indicated in a city or county plan
--Minimum of 100 acres, and sufficient size to ensure protection of significant features.

4. Regional Wilderness
Purpose: to preserve an area with dominant natural qualities where man can be isolated from the urban scene while enjoying hiking, hike-in camping, horseback riding, nature study, and other wilderness activities in a setting undisturbed by the adverse effects of man's activities.
Standards:
--Minimum of 3,000 acres and potential for both open and restricted access areas which may exceed 10,000 acres
--Sufficiently wide to be protected from outside intrusions and preserve wilderness character
--No public roads
--Generally natural and undisturbed
--Undeveloped viewshed within the wilderness area

5. Regional Recreational Area
Purpose: to provide a variety of outdoor recreation experiences on a site particularly suited to recreational activities of a regional significance.
Standards:
--Approximately 100 acres or greater in size
--Capable of withstanding intensive recreational use
--Proven recreational resources, which may include man-made bodies of water

6. Regional Trail

Purpose: to provide a linear parkland established primarily for walking, hiking, jogging, bicycling, and horseback riding, and the recreational, educational, therapeutic and aesthetic values associated with these activities.

Standards:

--Connection or link between regional parklands and open space administered by another agency, as well as Bay shore and east bay cities.

--Preference given to trails with opportunity for use as day-use loop trails, or which connect overnight camping areas.

7. Regional Land Bank

Purpose: to hold land which may be either a portion of a future East Bay Regional Parkland, an opportunity acquisition, easement or gift of land which has not been specifically identified as a potential parkland in the Master Plan; or other property which may have potential financial benefit to the District.

Standards:

--Step in acquisition of a regional parkland.

--Possess park, recreational and open space values which make public control desireable.

--Gift of real property to the District.

In addition to these classification criteria, the district maintains three general criteria for all acquisitions. They must:

1. Provide reasonable public access

2. Provide sufficient lands to meet the classification standards

3. Provide logical boundaries which ensure preservation of parkland values, protect the visual integrity of the unit, and allow for reasonable operation of the parkland.

Since the Park District covers a wide geographic area and may consider a number of parcels for acquisition at any point in time, it has developed guidelines to determine priorities for acquisition, as follows:

1. Properties which assist in meeting the percentage goals of the Balanced Parklands Plan.

2. Properties which present unusually favorable acquisition opportunities.

3. Properties which help round out existing parklands, remove inholdings, and protect visual integrity.

4. Acquisitions which will help to avoid future acquisition costs or difficulties.

5. Properties which will facilitate coordination with the joint plans of other public agencies.

6. Properties which can qualify for state and federal grants.

7. Properties which require a minimum of development and maintenance.

. . .

To provide a planning process suitable to analyze these multiple criteria during the formulation of the 1973 Master Plan, Overview, Inc., the Plan consultants, proposed a railroad sorting system involving four steps (see fig. 7):

1. Each potential park site is evaluated according to the District's design criteria.

2. Five criteria are applied to each candidate parcel: Relative suitability, need/demand, threat of loss, accessibility, and ease of acquisition.

3. Each criterion is weighted according to its importance as relative to each parkland category. Values of A+, A, and A- are translated into graphic alternatives in a three-way switching system flowchart.

4. Park boundaries are determined.

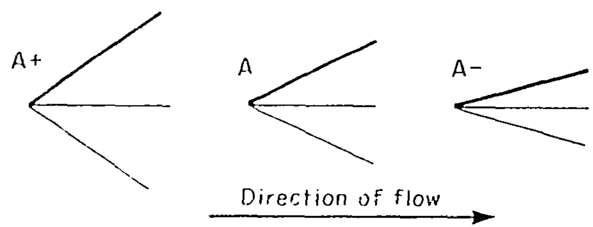
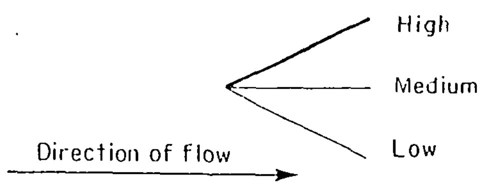


FIGURE 14.9 Visual weighting of acquisition criteria/East Bay Regional Park District, California.



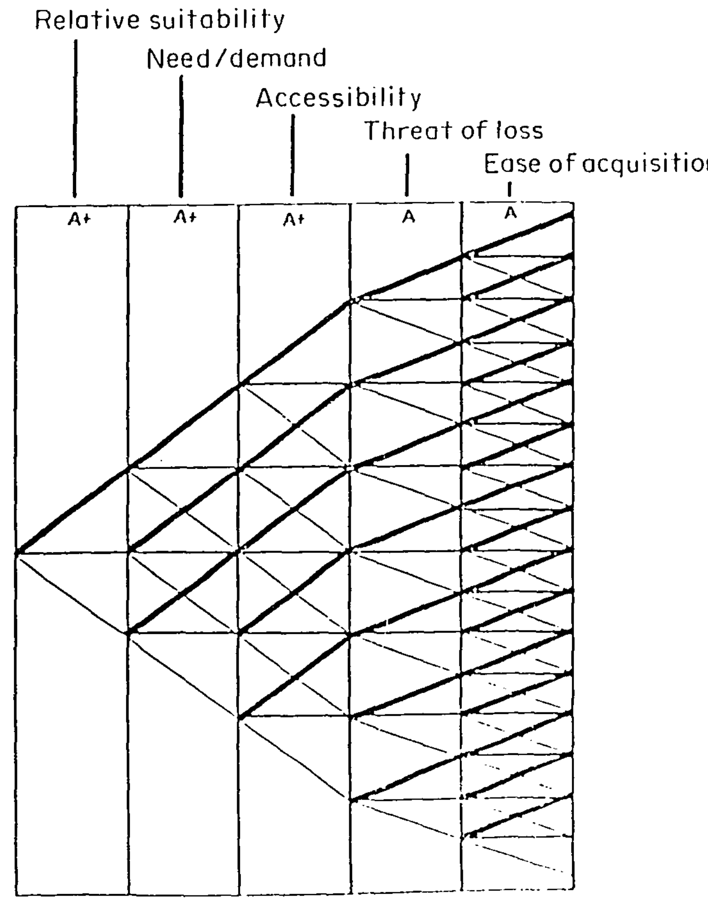


Figure 7. Open Space Weighting and Choice Process, East Bay Regional Park District

Summary

The East Bay Regional Park District, because of the extent of its service area and the nature of its public committment as a tax-supported special district, must provide a balance and diversity of parklands and services to its constituents; and, because it must plan and take advantage of parkland acquisition opportunities in a long-range framework and in an extremely competitive real estate market, it has developed will-defined set of acquisition criteria and a methodology for employing them in selecting new parklands. The strength of the District's acquisition, planning and management scheme is based on the following factors:

--Its autonomous decision-making authority

--Its tax-supported status--reliable revenue source

--An elected board of directors and a Parks Advisory Committee

--A strong commitment to public involvement in the park planning process

--A full professional planning and management staff.

--A clearly defined master plan containing explicit planning criteria and design and management guidelines, and implemented by a clear planning methodology.

--Ongoing evaluation and revision of the master plan.

CHAPTER 5

SUMMARY AND CONCLUSIONS

In reviewing the survey of open space plans and systems presented in the preceding chapter, it is apparent that, although the case studies differ considerably in their intent and geographic and administrative scope, there is substantial agreement among them on the fundamental functions of metropolitan-scale open space, and on the main priorities for its preservation (figs. 8 and 9).

The essential principles of open space preservation remain close to the themes established by Olmsted and Eliot in the nineteenth century, although their context and their connotations have changed somewhat in the second half of the twentieth, as is most strikingly illustrated by the ravages of the automobile on parks such as Boston's Emerald Necklace. The word "parkway" means something entirely different in the now than it did in Olmsted's time; and the difference highlights the extent to which cars have altered the shape of our cities and our patterns of recreation during the last century. Growth control, the taming of suburban sprawl, is a major theme of contemporary open

	TYPE				OPEN SPACE FUNCTIONS																
	Open Space Study	City	Regional Planning Authority	Park/Open Space District	Recreation	Natural preservation	Public health and safety	Guide urban form	Establish local identity	Buffer neighborhoods	Preserve surface drainage	Groundwater recharge	Flood control	Steep slopes	Prevent Erosion	Prevent other hazards	Protect airshed	Rare or endangered species	Wildlife habitat	Cultural features	Views and scenery
California Landscape Preservation	●					●												●	●	●	●
Metro Open Space	●				●	●	●	●			●	●	●	●	●		●		●	●	●
San Diego		●			●	●	●	●	●		●		●	●	●	●			●	●	●
Seattle		●			●	●	●	●	●	●	●	●	●	●	●		●		●	●	●
Boulder		●			●	●		●	●	●	●	●					●	●	●	●	●
ABAG			●		●	●	●	●					●	●	●	●				●	●
Marin Open Space			●		●	●		●	●	●				●							●
East Bay Parks				●	●	●		●									●	●	●	●	●
Huron-Clinton (Detroit)				●	●						●								●		●
Cleveland Metro Parks				●	●							●						●			●

Figure 8. Case Study Summary. Perceived Functions of Open Space

	ACQUISITION CRITERIA												
	Significance/ Quality	Hazard	Size	Topography	Recreational potential	Accessibility	Proximity to population	Linkage	Threat of development	Managent potential	Cost	Attractive opportunity	Conforms to other plans
California Landscape Preservation	●					●	●	●	●	●			●
Metro Open Space	●	●	●	●	●	●	●	●	●	●	●		●
San Diego	●		●	●	●	●	●	●	●	●	●	●	●
Seattle		●	●	●	●		●	●				●	
Boulder	●	●	●					●				●	●
ABAG	●	●	●				●	●				●	
Marin Open Space	●	●		●	●	●			●	●		●	●
East Bay Parks	●		●	●	●	●	●	●	●	●	●	●	●
Huron-Clinton (Detroit)			●		●	●	●						
Cleveland Metro Parks	●	●	●		●	●	●			●	●		●

Figure 9. Case Study Summary. Open Space Preservation Criteria

space planning. Its usual sobriquets of "guiding urban form" and "providing relief from continuous urban development" connote an entirely different scale than the one with which Olmsted was concerned.

Advances in science, particularly the science of ecology, and in environmental planning practice, have made some differences in the way open space is planned today. Factors such as subsurface geology, groundwater and the integrity of the hydrologic cycle, rare and endangered species and urban wildlife are certainly incorporated more explicitly into the planning process, although they by no means diminish the mastery with which Olmsted manipulated topography and managed natural processes before the term "ecology" came into popular usage.

Despite differences of scale and perspective, most twentieth century open space studies, regional or municipal plans, and park systems share a consensus on the basic principles of open space planning rooted firmly in the foundations of urban form and natural process established in the last century. Most agree that open space serves the functions of providing recreational opportunity, preserving natural resources and environments, as well as cultural and historic features, guiding urban development, and providing urban amenity, particularly views and scenery (fig. 9). There is also general agreement on priorities for open space protection. They include unique or special natural and cultural features, local topography, particularly steep slopes and stream systems, recreational value of the land, including such considerations as its proximity to population centers, its accessibility, and its size relative to intended uses. Contiguity and linkage of land units in the system is also a strong value, relating both to natural factors (ecosystem integrity, surface drainage and animal migration routes) and recreational use (access, scenic routes, trail connections).

The relative importance of several factors, not surprisingly, varies according to the type of open space system and its intent. Urban open space elements, because of the municipal mandate to protect public health and safety, show more concern for such issues as slope stability and erosion, reservation of flood plains and other hazard areas, and groundwater recharge. Also, more attention is given in municipal plans to the protection of cultural sites, as well as to urban design applications such as buffer zones and neighborhood definition. Natural resource considerations, on the other hand, especially wildlife, show up strongly in urban plans, regional park systems and preservation studies, although they tend not to be defined as specifically in urban plans. Environmental education registers as a strong value in both urban general plans and regional park plans.

There is also some variability which may reflect the period of time at which the plans were formulated. Certain factors given attention only relatively recently in landscape and urban ecological planning literature were not represented in any of the plans. Although both Hough (1984) and Spirn (1984) document instances of open space planning in the ecological context of the city, there is little evidence, aside from the well-established principle of open space following topography and stream channels, and collecting runoff and floodwater, that this has been given much consideration in the cases reviewed here. There is surprisingly little mention of protecting groundwater recharge areas. Although the role of open space in protecting the airshed is mentioned in several plans, this function is not defined or examined. There is no specific mention of open space or vegetation as agents to modify air pollution or the urban climate. Simarily, only one mention is made (by the East Bay Regional Park District) of the relationship of open space to energy use, and this is implicitly a question of automobile fuel consumption as a function of the proximity of parks to park users. The potential of green space to provide pleasant pedestrian route alternatives to automobile use in cities, and to modify the urban climate, clean the air and reduce energy use by natural climate modification are subjects worthy of more serious research and consideration by city planners.

This is true also of urban agriculture. While several open space plans and districts do stress the importance of protecting agricultural lands on the metropolitan fringe from speculation and conversion to urban residential uses, there is no mention in any of the studies reviewed here of the potential of public open space, particularly in densely built urban areas, to provide space for community gardening, a practice for which there is a strong tradition in European countries. Urban gardens have flourished periodically in the U.S., generally as parts of inner city redevelopment programs and neighborhood projects, and their adherents claim that they are experiencing a renaissance (Corbett 1981, Britz 1981, Summers 1984). If this is so, then densely populated cities need to recognize that the provision of local community garden space not only saves energy and costs of food processing and transportation, but provides, cheap, organically grown produce, as well as satisfaction, for local residents.

Another aspect of open space planning not addressed explicitly in any of the plans reviewed except one (again East Bay Regional Parks), is the role of public participation. In the Royston Landscape Preservation Study and the Eckbo, Dean, Austin and Williams Metropolitan Open Space Study, this is understandable. Both were technically sophisticated, broad-scale landscape studies carried out by professional planning teams at a time (1973 and 1969 respectively) when public participation had not yet become established as an essential part of planning studies. The apparent absence of public input into the urban open space plans is more surprising. Both the San Diego and Seattle plans tend to deal more explicitly with policies than with the process of plan formulation, so it is possible that the factor of community participation was simply not discussed. Nevertheless, if open space plays an important role in urban environmental education, as the case studies suggest, then the support of local users, and their enfranchisement in the process of nominating parcels and planning the open space system, seems essential.

In conclusion, several general observations about the open space planning process may be drawn from the review of background literature and case studies. First, it is important to plan for open space at the earliest possible time. Planning is made possible by the generally accepted fact that there are certain functions performed by open space in the metropolitan context, related specifically to the topography, natural process and urban form of the developing region. These functions may therefore be analyzed, and open space planned for and reserved, prior to the time when development pressures make regulation and costs of acquisition difficult.

Second, open space is not an abstract principle or plan. Although there are generally agreed-upon principles for planning open space, planning must be specific to the topography, hydrology, climate, urban development pattern and resident values of each region. Open space planning does not consist simply of a list of principles. Open space must be mapped and studied in its geographic relationship to the natural topography, to its users and their routes or travel, and to their existing open spaces.

Third, open space is not simply a map. As Whyte (1968) points out, green spaces on a planner's map do not necessarily produce an open space system. The system needs to make specific sense in terms of its geography and its users; and it also needs to be politically achievable. This is in some measure a function of local support and use. It also depends on a planning process which starts from a firm basis of well thought-out Open Space Goals and Objectives, connects these objectives to specific criteria for the selection of open space in several categories, and sees that these criteria are implemented by specific policies. Thus, each open space objective (corresponding to a particular function performed by open space) determines the kind of open space to look for, and is directly connected to a policy for selecting and acquiring that type of land. This planning process may be conceptually illustrated in the open space planning model shown in fig. 10.

In reviewing the criteria, priorities and planning processes described in the case studies, it is evident that they conform to his model to different degrees. The municipal open space plans, in general, follow the sequence of goal setting, criteria selection, and policy implementation most closely. This is because they are legally empowered with the widest range of policy options, including full-fee and less-than-fee acquisition,, zoning control, and negotiation with developers. The open space and regional studies, on the other hand, do not have the power to implement their recommendations, and the authority of the park systems is generally limited to acquisition and does not include regulatory power.

Implementation methods should not be considered as limited to the three basic options of public acquisition, partial acquisition of easements and rights, and regulation discussed in most of the case studies. A range of other options, including transfers of development rights (TDRs), land banking and land trades, specific plans, development exactions, and quasi-public or private non-profit organizations

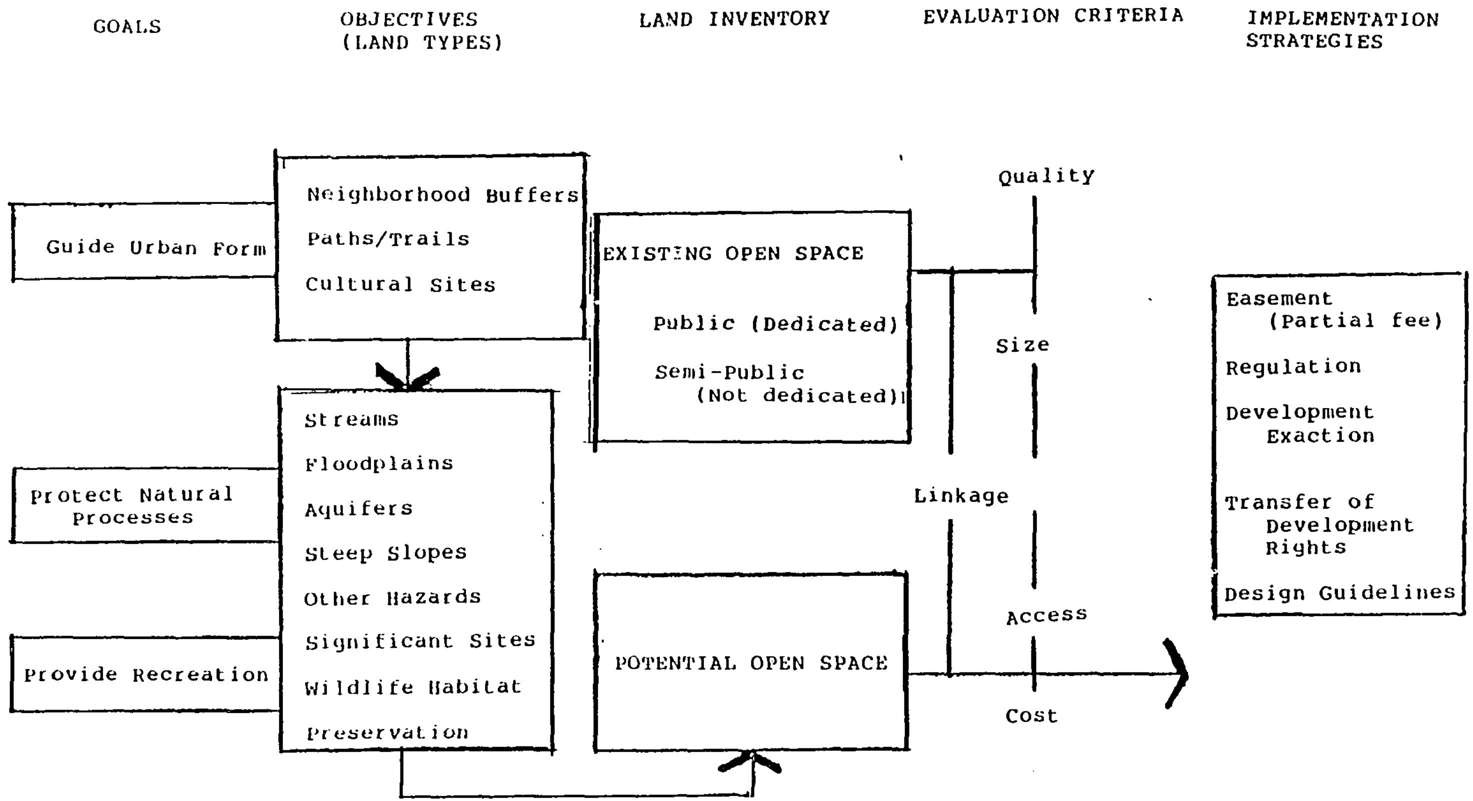


Figure 10. The Open space Planning Process

such as land trusts, deserve further exploration by local and regional planning authorities.

A final word about the planning process: As fig. 10 demonstrates, even a generic example represents a complex process involving the evaluation of numerous factors and values in a spacial context. The recent development of microcomputer-based geographic information systems (GIS) offers an opportunity to deal efficiently with the quantity and variability of information required for open space assessment. Computer GIS systems offer several advantages in this context. First, they provide a spatially arranged digital database which allows environmental attributes and values to be mapped and stored compactly. Second, they are flexible, in the sense that parcels may be added to or deleted from the database, or their status changed. By the same token, the data may be viewed alternately according to several criteria or values, environmental attributes, proximity, or cost, for example, or any combination of these values, thus permitting a rapid generation of the alternatives. Each alternative scenario will change the open space map output from the system, thus making the consequences of these choices geographically explicit. Relatively cost-effective GIS systems show a great deal of promise in manipulating complex data and graphically representing alternatives in open space planning.

This is not necessarily to imply that the process must involve complex and technical manipulation. With the exception of the two professional and technically-oriented open space studies discussed here, none of the plans used computer evaluations, and few were explicit about a method of ranking open space choices. In fact, for most metropolitan areas that have a firm grasp of the open space functions and planning principles, difficult specific choices between open space priorities may rarely be necessary. What is needed is a plan which will coordinate the preservation of open space as a system--that is, in a way that makes sense in the context of the natural and built form of the city, which defines a geographically cohesive open space pattern, and which will establish a map of lands desired for acquisition and a set of policies to take advantage of acquisition opportunities when they arise.

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