

# The Human Ecology of Parks

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## Introduction

Parks are important natural resources in American society. In Desert Solitaire by Edward Abbey (1968), National Parks: The American Experience by Alfred Runte (1979), and Mountains Without Handrails by Joseph Sax (1980), the authors describe the functions parks serve in our culture, and the role of people in the entire process of park establishment and use. Though they differ in many ways, all three works share a common theme: parks are important, complex and dynamic settings for human behavior.

Social scientists have likewise been interested in the analysis of such places. The relationship of people, human behavior and the park environment has been examined in works like The Social Organization of Leisure in Human Society (Cheek and Burch 1976) and Leisure and Recreation Places (Cheek et al., 1976). This paper describes a human ecological approach to the scientific study of people and parks.

The sociological study of parks has an intellectual genealogy of about twenty-five years. Prior to the ORRRC (Outdoor Recreation Resources Review Commission) studies in 1962, there was fragmented collection of visitor data at selected parks (Hornback 1980). The ORRRC effort, motivated by the need to support federal recreation policy, resulted in a baseline census of who among the general population was involved in outdoor recreation. A variety of participation studies followed, describing either the demographic characteristics of park-goers (Burch and Wenger 1967; Hendee et al., 1968; LaPage 1969) or the factors influencing demand (Clawson and Knetsch 1966). In the 1970s, focus was placed on describing the units of participation (Cheek 1971; Field and O'Leary 1973) and the dimensions of leisure settings (Field 1971; Lee 1972).

This geneology is characterized by a steady increase in the number of variables, interrelationships, and processes under scrutiny: the intellectual progress is largely due to the accumulation of baseline data, case studies and theory-testing (for detailed reviews, see Meyersohn 1969 and Burdge et al., 1981). We propose to extend the effort by defining a human ecological perspective, and applying it to parks.

We proceed in this way. First, we outline what is meant by a human ecological perspective, and describe the key units of analysis in human ecology. Second, a theoretical framework for treating parks as human ecosystems is developed, along with the major variables of concern. Third, we discuss several ecological processes relevant to understanding human activity within parks. We conclude by outlining some important research questions.

### The Human Ecological Perspective

The roots of human ecology lie primarily in general ecology, sociology, and anthropology, and several comprehensive literature reviews exist (e.g. Bruhn 1974; Micklin 1977). Frederick Clements' influential work Plant Succession (1916) began the formal development of ecological principles, described in a series of general treatises on ecology (Dice 1952; Shelford 1963; Odum 1971; Krebs 1972). The ecologists' work was soon applied to human activity; sociologists spearheaded the effort. Roderick McKenzie's "The Scope of Human Ecology" (1926), Robert Park's "Human Ecology" (1936) and Amos Hawley's Human Ecology: A Theory of Community Structure (1950) helped develop the central issues; other sociologists such as Otis Dudley Duncan (1964) began to clarify central concepts.

Simultaneously, anthropology found ecology a useful theoretical and descriptive tool. While Julian Steward coined the term "cultural ecology" in 1937, his later work (1955) led to an integration of the empirical field studies done by anthropologists. Recently, the anthropological version of human ecology has been refined in Bennett's The Ecological Transition (1976).

The essence of this general approach is a recognition of Homo sapiens as a part of Nature; the human ecosystem is its basic unit of analysis. The human ecosystem is defined by the interaction of population, social organization, and technology in response to a set of environmental conditions (Duncan 1964). These are in effect human ecology's "master variables"; their interaction is human ecology's major concern. Amos Hawley notes:

Human ecology, which is also interested in the relations of man to his geographic environment, fastens its attention upon the human interdependencies that develop in the action and reaction of a population to its habitat (1950:72).

For the human ecologist, it is the behavior of aggregates that is of special interest — whether it be the study of Tsembaga tribesmen (Rappaport 1967), the analysis of Chicago neighborhoods (Suttles 1972), or efforts to measure energy flow in industrial societies (Cook 1976). Vayda and Rappaport state:

...the units important to ecologists are populations (groups of organisms living within a given area and belonging to the same species or variety), communities (all of the populations within a given area), and ecosystems (either individual organisms, populations, or communities, together with their non-living environments) (1976:22).

Human ecosystems are dynamic and adaptive, i.e. the relations linking human populations to the environment can change over time. As examples,

new technology may lead to an alteration in settlement patterns (Cottrell 1951), and changed environmental conditions may cause a shift in the rhetorical uses of Nature (Burch 1971). As Micklin (1977) suggests, the analytic problem for ecological analysis is to explain these variations in adaptation. Human ecology asks, what conditions give rise to adaptive change? Why do some ecological units adapt more readily than others? What strategies of adaptation are available, and what are their consequences?

Adaptation is a crucial term here. The biologist's concept of adaptation has at least two meanings: evolutionary genetic change, and mechanisms used by organisms during their life-span to cope with the environment (Ricklefs 1973). While evolutionary genetic change has undoubtedly been influential (Wilson 1978), short-term adaptation within the human ecosystem is largely based on the importance of coping. Bennett writes:

The rational or purposive manipulation of the social and natural environments constitutes the human approach to Nature: the characteristics of this style of adaptation must, it seems to me, become the heart of any approach to human ecology that concerns itself with the question of what people want and how they go about getting it, and what effects this has had on themselves and Nature (1976:3).

A variety of examples — the Sioux Indian's adoption of the horse (Roe 1955), the cargo cults of the Pacific Islands (Jarvie 1963), and the current energy "crisis" — reflect the response of human behavior to environmental and social change.

In summary, a human ecological approach treats Homo sapiens as an integral part of Nature, deals primarily with aggregate units of analysis, and attempts to describe and understand the process of adaptation.

## Parks and Human Ecology

U.S. national parklands can be considered as human ecosystems. Created by society, these natural and cultural entities reflect a social organization and technology for the preservation and use of resources commemorated as parks. The National Park Service, for example, is a social organization with a cadre of professionals and infrastructure responsible for the planning, management and interpretation of such protected resources.

In this perspective, park visitors are a key population. Campbell notes:

...humans are the dominant species in every National Park. As a result of our social evolution we have expanded into one niche after another. We have created new niches where none existed. Further, we are a highly generalized animal, capable of an immense range of behaviors. Our impact upon the complex biochemical systems that exist within the parks can be drastically altered as people take on new behaviors. In short, to understand the natural systems of the park you must understand the park's most dominant species (1979:53).

Thus, we might describe the park ecosystem in terms of Figure 1. The biophysical environment represents those resources set aside as vignettes of natural or social history, and which support the human activity within a park. Included are the major energy flows (solar, fossil fuel, wind, etc.), the major ecosystem processes occurring in the park (erosion, succession, nutrient cycling, and so forth), and the plant and animal populations indigenous to the area. Man-made historical structures can be considered as part of the physical and biological environment. For example, a forested watershed may function as a habitat for wildlife, a natural area for hiking, a setting for interpretation, and as a source of potable water for park staff and visitors.

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INSERT Figure 1

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The social organization of a park has three basic components. Biosocial demands are the result of regularities in behavior, imposed upon the species by evolutionary trends (Burch et al., 1978). The need for sustenance and for shelter, the drive to protect and educate the young, are all universals that influence behavior in parks.

Norms reflect both broad societal definitions of appropriate and inappropriate behavior among conspecifics, and rules of conduct within a particular setting. Such settings can be deliberately planned. European churches, for example, attempt to manage visitor behavior by restricting access, defining appropriate dress, and requiring sober and reflective conduct within their sanctuaries. With equal vigor, special tourist resorts manage behavior by providing a communal environment, adopting a pseudo-barter economy, and encouraging "liberated" sexual standards (Turner and Ash 1976). Park-going may also have definitions of appropriate behavior.

Human institutions are defined as patterns of social organization that allow satisfaction of human needs and wants; they are standard solutions to collective problems (Martindale 1960). The National Park Service, Congress, Sierra Club and other groups are institutions impacting park ecosystems — as are the industrial economy that allows for blocks of non-work time, the concessionaire system that provides room and board, and the newspaper that disseminates information about park areas.

These interacting components — social as well as environmental — are what define parks as special places, and hence are visualized in Figure 1 as the park.

Our view of the park ecosystem includes visitors. Publics vary in the content and expression of culture; i.e. they represent diverse sub-populations within the park ecosystem (Field and Wagar 1973). When visitors enter a park, they reflect certain socio-demographic characteristics such as age and family life cycle, and these factors may influence participation. Visitors depend upon a set of human institutions to help organize their recreation experiences — transportation systems, tour operators, travel agents, clubs, associations, and so forth. Finally, they rely upon key cultural elements to guide their individual action. Examples would include ethical systems, attitudes toward Nature, and norms for proper conduct.

#### Human Ecological Processes in Parks

As dynamic human ecosystems, change is ever-present in parks. Wildlife fluctuates in abundance, visitors alter activities, and managerial philosophies flow in and out of fashion. To the human ecologist, several distinguishable patterns of change, i.e. ecological processes, seem important to the study of parks.

##### 1. Adaptation

In our previous discussion, we described adaptation as a coping process by which an organism, group or institution deals with changed conditions. Park ecosystems show the adaptive character of man-Nature interactions. The strong responses of certain animal species to contact with visitors have been increasingly documented (McArthur 1978), along with the impact of use upon fragile sites (Shreiner and Moorhead 1976; Ittner et al., 1978; Parsons et al., 1981).



The various social groups and human institutions involved in park affairs must accommodate to the existence of each other. There are numerous examples. In the 1970s, manager's perception of increased crime in the parks led to altering the training and role definition of a park ranger; in response to perceived crowding in the backcountry, permit systems were institutionalized (Fazio 1974). Clearly, changing the social definitions of parks can lead to organizational and behavioral adaptations.

## 2. Growth and Decline

The cyclical process of growth and decline has long been of interest to ecologists, for the analysis of distribution and abundance is one of the cornerstones of experimental ecology (Krebs 1972). Figure 2 illustrates the two basic forms of growth — the exponential and sigmoid growth curves (Nicholson 1954). In the exponential form, growth is rapid, and culminates abruptly in a "crash". In the sigmoid form, growth begins slowly, then accelerates, only to slow down and oscillate until a dynamic equilibrium is reached. At the species level, studies of animals like the lemming (Pitelka 1958) and the lynx (Elton and Nicholson 1942), have illustrated these characteristic patterns. At the ecosystem level, growth is often correlated with changes in community energetics, community structure, species diversity, life history of individuals, nutrient cycling, selection pressure and overall homeostasis (Odum 1969).

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INSERT Figure 2

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Both growth forms are evident in human populations. A classic example of the exponential form is the Irish Potato Famine, described by Woodham-Smith (1962). The relatively milder form of growth (the sigmoid curve) has been documented in studies of urban settlement patterns (Hawley 1950), resource systems in Japan (Bennett 1967) and real estate speculation (Holling 1969), among others. A central theme is the influence of cultural values, and the spiraling increase in Homo sapiens' wants and needs.

The process of growth and decline has consequences for the human institutions established to serve people. Schools built to accommodate a growing school-age population from the "baby boom" of 1946-1953, are today closing for lack of children (Population Reference Bureau 1980). Recreation activities are influenced by the population cycle as well. Institutional adjustment can be expected as participation in a given recreation activity increases or decreases. For example, the decrease in the number of younger children may reduce the number of little league baseball teams and the number of active leagues in some cities. Cultural factors could clearly alter this process.

We might experience a similar ebb and flow in recreational participation in National Parks. Backcountry hiking is dominated by a younger population, and there is a higher proportion of participating individuals in young cohorts (such as those individuals 20-29 years of age) than in older cohorts (Womble et al., 1979; Kelly 1980). The baby boom population contributed to the tremendous increase in hiking during the 1970s, but the number of children born after 1955 has declined significantly. As the baby boom population ages, the volume of backcountry travel may decrease, and the institutions serving these clientele — the National Park Service,

backpacking retailers, clubs, and so forth — can be expected to adapt.

### 3. Succession

In general ecology, development of an ecosystem is usually described as a series of stages (Ricklefs 1973), whereby the community of plants and animals creates conditions that lead to its own alteration. Catton writes:

By unavoidably modifying its habitat in the process of living in it, an association of organisms compels itself to change its own mode of adaptation (1980:106).

At some point, the process culminates in a stabilized, homeostatic ecosystem (Margalef 1968).

Human ecologists have utilized the concept to describe the displacement of one ethnic group by another (Hawley 1950), the history of regional settlement (McKenzie 1929), and the development of human society itself (Odum 1969).

National Parks may go through a similar process. As parks become more developed, they not only attract more users, but different types of users. In many cases the behaviors of these new visitors are incompatible with the original pioneers — and so the earlier visitors die out as recreationists, or migrate to new, and as yet undeveloped areas.

Shelby (1976) describes this pattern for Grand Canyon National Park. In the 1950s and early 60s, only a few enthusiasts ran the Colorado. With the popularity of the sport came outfitters and river-running concerns. The technology changed the experience; large boats brought a degree of safety that permitted a much larger novice population to experience river-running. The pioneers in their small boats no longer found that the

developed Colorado offered the same experience, and so they moved on to other rivers.

Similar examples are provided by Clark and Stankey's (1979) historical account of a Forest Service campground, and in the gradual shift of national parks from pleasuring grounds for the elite to middle-class recreation areas (Pomeroy 1957; Runte 1979).

#### 4. Competition

Related to succession is the process of competition. Ecologists broadly define competition as the interaction of two organisms striving for the same limited resource (Odum 1969). Competition can be expressed through simultaneous exploitation of a resource by different individuals, or directly by interference (Miller 1967). The emerging field of sociobiology has offered a variety of theoretical propositions concerning the role of competition in individual and group behavior, principally its influence upon territoriality, mate selection and social interaction (Wilson 1975; Barash 1977; Emlen 1980). In animals, such behavior can range from non-aggressive forms of territorial defense to ritualistic fighting to sporadic lethal violence.

For the human ecologist, competition is also an important social process. As they are limited resources, parks are likely settings for displays of intraspecific conflict. Several studies have documented a variety of competitive behaviors, including territoriality among visitor groups (Lee 1972; Kornbloom and Williams 1975), bureaucratic infighting between recreational agencies (Wirth 1980), and like other species, occasional violence (the 1970 Yosemite Riot is an example).

In addition, parks operate in competition with other uses of the same resource base. The act of setting aside an area for recreation rather than mining, forestry or agriculture is usually the outcome of competitive

processes at the political level; continual conflict over the exclusion of other uses is likewise a traditional pattern (Runte 1979).

### Avenues for Future Research

A human ecological approach to the study of parks suggests several avenues for future research. The following discussion is speculative, and rather than formal hypotheses, only a few general topics are presented.

#### 1. Adaptive Strategies as Explanations of Behavior

The human ecological framework places management activities in the center of certain adaptive strategies for coping with park environments. For example, Machlis (1975) found families often attended interpretive programs in order to gain needed information on other park activities. Shelby and Wolf (1979) found altering the physical design of a park led to significant changes in the distribution of visitors. Adaptive strategy could be conceptualized as a variable intervening between a set of ecological conditions and the behavior of social groups, populations and institutions. Examining the choice of strategic options, and their consequences to the park ecosystem, might be especially revealing.

#### 2. The Impact of Institutional Relations

The complex interdependence of park-related human institutions suggests that knowledge of their relationships could have significant value. An example is interpretive services.

Our framework implies that interpretation is not isolated from other activities within a park, nor is it limited to the organizations responsible for park management. At Grand Canyon National Park, interpretation is carried out by transportation companies (Scenic Airlines provides a guided

tour, leaflets, and other materials), by concessionaires (a small museum at the El Tovar Hotel), by private tour companies (including European firms) and by the National Park Service. Certainly, the institutional relations between these organizations may help predict the kinds of interpretation that visitors experience.

Further, external organizations may impact interpretation by influencing the distribution of visitors over space and time. Airline schedules and highway access routes may determine length of stay; the economics of mass tourism may determine size of group, and the travel industry may concentrate its advance bookings into predictable peak seasons. Ecological studies of this sort may greatly improve interpretive planning and effectiveness.

### 3. The Interdependence of Parks and Surrounding Regions

The perspective of human ecology is not only useful for understanding human behavior within a park, but can enhance understanding of the interrelationship of parks to neighboring regions. Land use practices adjacent to park boundaries (mining, agriculture, forestry, industrial development, tourism and so forth) necessarily impact the resource. As these activities expand, parks can increasingly become biological "islands", with ecological characteristics distinct from the adjacent landscape. An ecological perspective would help document the dynamics of such "threats to the parks" as air pollution, lowered water quality and acid rain, and would link these environmental changes to the social change occurring within surrounding regions.

This social change may impact visitor populations directly. Population growth resulting from energy development in the western states can

easily change the character of small rural communities (Freudenburg 1980). Since parks by and large derive a majority of their visitors from nearby regions (Field 1972), we can expect to see a shift in visitor populations, their expectations, and perhaps the activities pursued, as energy development proceeds. Such a successional process is of interest to those who manage and plan park areas.

#### 4. The Management of Interspecies Interaction

Park ecosystems are prime habitat for many species, and the inclusion of Homo sapiens raises a variety of scientific and policy questions. What happens to wildlife populations that are engaged in man-animal interactions? How do such contacts alter visitor behavior and attitudes? How should such interactions be managed?

Ecological analysis of such questions is not particularly new — George Wright and his colleagues argued in 1933 for joint occupancy of parks by man and wildlife (Wright et al., 1933). Studies have been made of visitors' attitudes toward wildlife (Kellert 1976) and their behavioral responses to wildlife management techniques (Trahan 1977). Biologists have documented the impact of harassment and habitat destruction upon wildlife populations (for a review, see Ream 1979).

The human ecological approach emphasizes the social variables that influence interspecies interaction, and could be useful in the synthesis of social and biological research programs. Such a synthesis has repeatedly been called for (Clark 1974; Cheek and Field 1979).

#### 5. New Methodological Approaches

Perhaps most importantly, the human ecological approach may offer opportunities for utilizing a wide range of research methods. We suggest

a "natural history" of the various visitor populations is the first step to understanding their role in parks and similar settings. Not surprisingly, the anthropologists provide useful research strategies. Participant observation, time-budget studies, ethnographic surveys and content analysis of written materials are all appropriate research techniques, and should provide the descriptive evidence needed to understand the ecological relationships that bind park ecosystems together.

At the institutional and ecosystem levels, tools such as descriptive inventories, economic input-output analyses, energy budgets and social indicators may allow examination of ecological problems. Dynamic models of park ecosystems, including social factors, could be constructed, and empirically tested with time-series data. In this scheme of park studies, the historian, ecologist, and anthropologist may play greater roles than they have in the past.

### Conclusion

In summary, we have suggested that parks are important, complex and dynamic settings for human behavior. We have described a human ecological approach to the study of parks, and have proposed a theoretical framework that outlines key variables of concern. We have suggested several research questions that emerge from the application of human ecology to park-related issues.

In general terms, the ecological perspective offers the opportunity to consider people, culture and resources simultaneously, so as to better understand man-Nature relations. Such understanding has the potential to be useful in the creation of social policy for allocating natural resources.



This applies to parks. In his book Overshoot: The Ecological Basis for Revolutionary Change, William Catton (1980) reminds us that the laws of Nature can be distorted but not broken by society: we remain a biological species. In his book on American national parks, Alfred Runte (1979) reminds us that parks reflect the social values and cultural traditions of the society creating them. Policy for parks, then, is both a biological and social issue. Bennett writes:

It is my conviction that a policy-oriented ecology will be achieved by focusing on strategic action, on the behavior of humans in dealing with Nature and society in order to achieve their objectives, on ways of controlling such behavior, and on the adaptive or maladaptive effects of the behavior on the natural and social environments. What do people want? How do they get it? What are the consequences? (1976:31).

These may be significant questions for those interested in the study of parks.

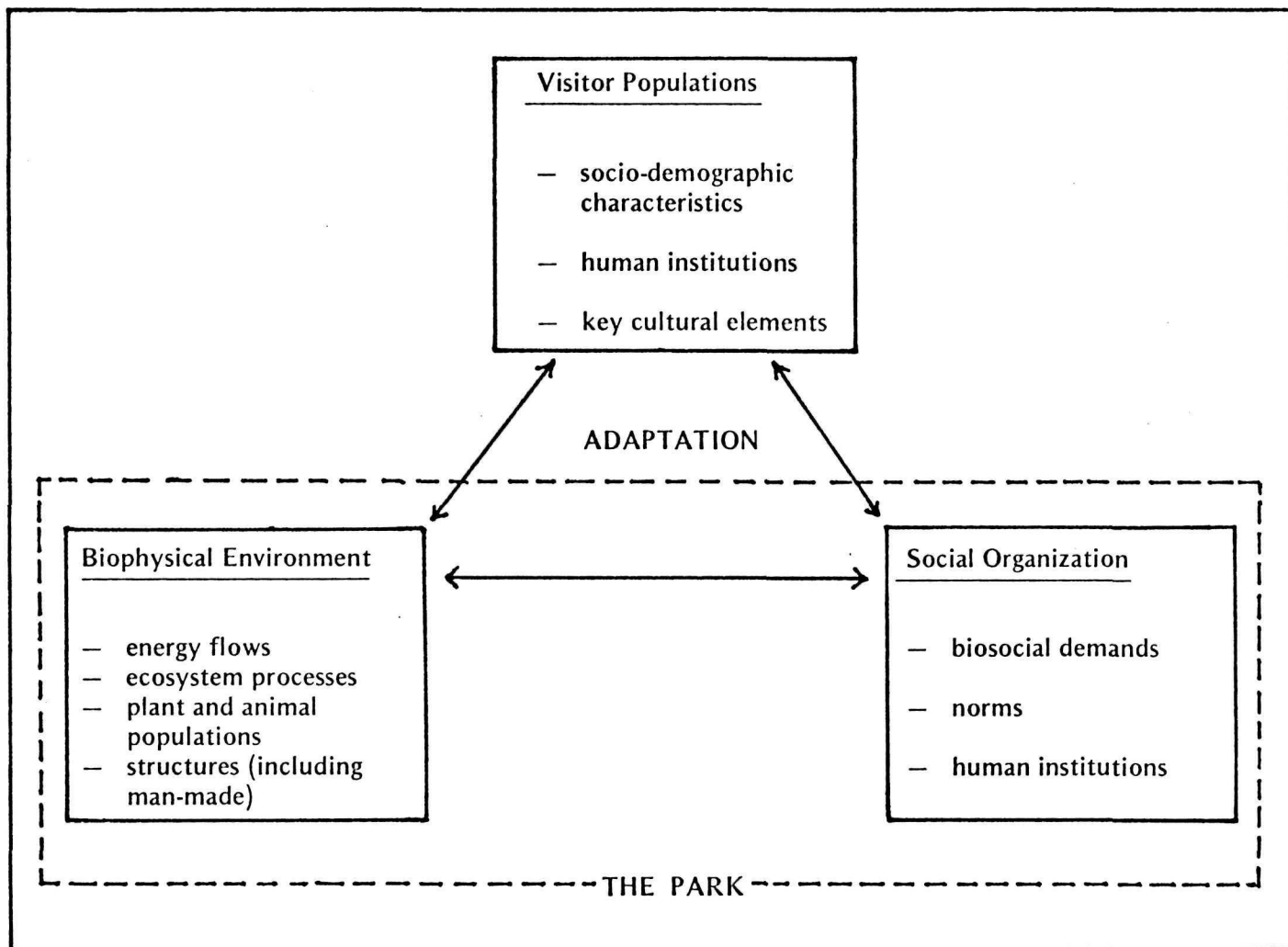
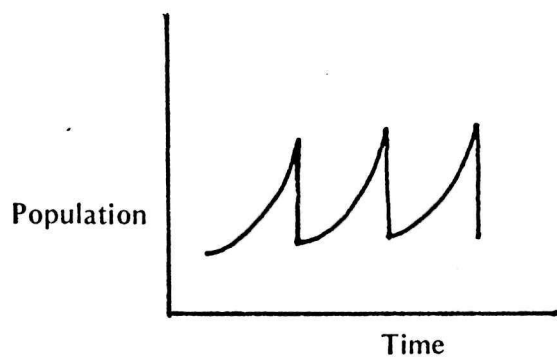
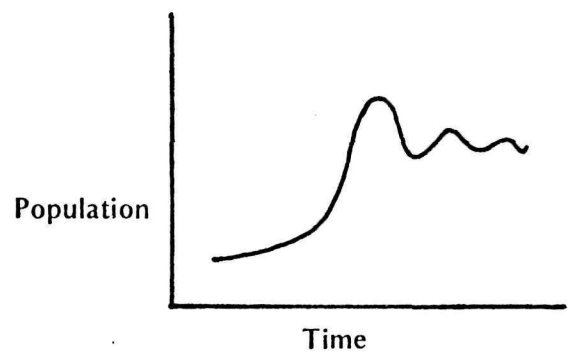


Figure 1. A View of the Park Ecosystem



Exponential



Sigmoid

Figure 2. Basic population growth forms.

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