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RECREATION PLANNING IN THE COASTAL ZONE: ANALYTICAL TECHNIQUES, INFORMATION, AND POLICIES

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RECREATION PLANNING IN THE COASTAL ZONE:
ANALYTICAL TECHNIQUES, INFORMATION, AND POLICIES

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TABLE OF CONTENTS

	Page
LIST OF FIGURES	vi
LIST OF TABLES	vii
FORWARD	ix
I. INTRODUCTION	1
II. THE FOUNDATION OF RECREATION ANALYSIS	3
Demand and Consumption--Preference Versus Participation	4
Interaction Between Demand and Supply	5
Socio-Economic Characteristics	
Carrying Capacity	
Site Suitability	
Standards	
Weather and Timing	
III. DATA COLLECTION FOR RECREATION PLANNING	19
Data Collection--An Overview	19
A Strategy for Data Collection for Beach-Oriented Recreation	23
IV. METHODS FOR THE ANALYSIS OF SUPPLY AND DEMAND IN RECREATION	33
The Participation Approach	33
Models of Recreation Travel and Site Use	35
Gravity	
The Attraction Model	

	Page
Probabilistic Models	
Gravity type	
Intervening opportunity	
Entropy maximizing models	
Network or Flow Models	
Linear Programming	
Psychological Models	
Simulation Models	
Utility Maximizing Models	
Methodological Considerations	50
A Special Case--Benefit Estimation	53
Criticisms of Benefit Estimation	56
V. RECREATION POLICIES AND INFORMATION	59
Review of Policy Examples	59
Policy Specificity	
Agency Hierarchy	
Agency Mission	
Direct Versus Indirect Policies	
Spatial Specificity	
Site-Related Policies	
Access, Equity, and Pricing Policies	
Acquisition Policies	
Policies and Methods: Implementation Considerations . .	70
VI. RECOMMENDATIONS FOR "BOTTOM UP" RECREATION PLANNING IN THE COASTAL ZONE	75
Local government should be willing to participate in a comprehensive planning effort for coastal recreation.	
Local government should undertake a policy analysis of all agencies affecting recreation within its jurisdiction.	
Local governments should assist and encourage the collection of recreation data.	
Local governments should evaluate data collected by other agencies.	

Page

Local government should analyze recreation data and set local standards where possible.

Local government should play a major role in the evaluation of the parameters, benefits and costs of analytic techniques used by a higher level agency.

VII. THE FUTURE OF COASTAL RECREATION PLANNING: ACTIVITIES, POLLS, AND CENSUSES	87
NOTES	91
BIBLIOGRAPHY	95

LIST OF FIGURES

	Page
Figure 1: Demand Curve for the Recreation Experience	55
Figure 2: Site Demand Curve	55

LIST OF TABLES

	Page
Table 1: Beach Use Standards	15
Table 2: Attributes of the Attractiveness and the Accessibility of a Beach	25

FOREWORD

This paper reviews methods and policies for the analysis of recreation supply and demand. The paper critiques the literature of recreation supply and demand with a view to its use in coastal zone planning. In particular, the paper examines the significance of the relationship between the broader question of coastal access and specific analytical methods for forecasting recreation demand and site use. A typology of the often conflicting recreation policies, for an example geographic area, are presented to highlight the lack of a coherent analytical basis for recreation planning in the coastal zone. The paper makes a number of recommendations for recreation planning in the coastal zone which should be of interest to local governments and state agencies charged with implementing the California Coastal Act.

The paper was written by Mr. Burke, a doctorate candidate in environmental planning in the Department of Landscape Architecture at the University of California, Berkeley, as part of a larger research project developing methods for cumulative impact assessment of coastal development. The research was funded by a grant from the Sea Grant Program, National Oceanic and Atmospheric Administration, U.S. Department of Commerce.

Thomas G. Dickert

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Project Director

I. INTRODUCTION

The central problem of recreation planning in the coastal zone is the public's inability to use beach facilities due to deficiencies in access, design, and management. Public officials are unsure of a long-term solution for symptoms such as highway congestion and inadequate parking, and therefore rely on piece-meal and politically oriented solutions. What is needed is information for the recreation planning and decision-making process. This deficiency is caused by theoretical issues, inconsistent and inappropriate data collection, the misuse of analytical techniques, and misleading policies.

Recreation planning cannot be considered separate from transportation planning. Adequate access must be provided in order to ensure full and equitable use of the facilities. Site design must account for sufficient parking and other transport facilities within the constraints of social equity and environmental degradation. Local, regional, and state planners must become more keenly aware of the traffic problems created by recreation development, as well as other forms of development which compete for highway capacity. For recreationists the trip to and from the site is an important part of their leisure experience; a critical factor in the selection of a destination.

This paper investigates how information can be developed and used in coastal zone recreation and transportation planning. Its emphasis is on the role of local government, especially in its interaction with state and regional agencies on issues of larger-than-local

significance. It is written for planners who are knowledgeable in one or more facets (policy analysis, modeling, etc.) of recreation or transportation planning. It attempts to bring together issues of information generation and use which are usually treated as separate problems in a multi-tiered bureaucratic decision-making environment. It views the relationship between information and policies as circular, whereby a melange of both public agencies and private developers promulgates policies based on a lack of information which, in turn, further misguides the information gathering process.

Following a discussion of assumptions and issues of recreation planning (Chapter II), there is a review of data collection (Chapter III) and information generating methods (Chapter IV). Chapter V provides an analysis of recreation policies, conflicts, and information needs in the Orange County, California coastal subregion. While it is necessary to consider a specific geographic area in order to understand the interrelationship of issues, organizations, policies, and information, the results of this analysis will be applicable to coastal zone planning in other states. Finally, the future of recreation research and its potential effect on coastal planning programs is discussed in Chapter VII.

II. THE FOUNDATION OF RECREATION ANALYSIS

Many assumptions and issues underlie a discussion of recreation planning. Gold (1973) defines recreation as "any leisure-time activity which is pursued for its own sake" (p. 321). Clawson and Knetsch (1966) define recreation as

...activity (or planned activity) undertaken because one wants to do it. In a deeper sense, recreation refers to the human emotional and inspirational experience arising out of the recreation act (p. 6).

On the other hand, Driver and Brown (1975) define recreation

...not as activity but as a particular type of human experience that finds its source in *intrinsically* rewarding *voluntary* engagements (mental and physical) during *nonobligated* time (p. 66).¹

More specifically, Ditton and Stephens (1976) define recreation in the coastal zone as

...any experience voluntarily engaged in largely during leisure (discretionary) time, from which the individual derives satisfaction. *Coastal recreation*, a term often used interchangeably with *marine recreation*, refers to such experiences derived from the coastal zone (p.1-1).

Rather than being caught up in an esoteric debate on the psychological consequences of recreation, the planner proceeds to develop and enhance recreation opportunities in response to demands of society that he determines or the political process impresses upon him. The planner works from the premise that a need² for recreation exists--and rightly so. Academics have studied this point from a theoretical perspective, and according to Mercer (1973) there is little consensus as to whether man indeed has a need³ for recreation. Mercer concludes

that a need exists and develops into four forms: expressed, comparative, felt, and normative.

Expressed and *comparative* needs correspond to direct and indirect measures of consumption or participation in recreation activities. *Felt* needs correspond to the desire for recreational facilities that may or may not be converted into consumption. Thus, felt needs are conscious desires that may be interpreted as recreational demand. Theoretically, total recreational needs, including felt needs, may be measurable using multi-dimensional scaling techniques at population origins. In reality, however, this is not possible due to the high cost of implementation and the existence of *normative* needs. These are needs which the public views as desirable because they represent the opinions of leading public and private citizens.

DEMAND AND CONSUMPTION--PREFERENCE VERSUS PARTICIPATION

Because outdoor recreation is not as easily priced nor as readily available as those commodities typically treated in the marketplace paradigm, the concept of recreation "demand" must be critically analyzed. Much of its popularity is due to the familiarity on the part of decision-makers with the concepts of demand, supply, and consumption,⁴ the emphasis given to economic techniques in recreation modeling by resource economists (e.g., Resources for the Future), and the type of data collected by the Outdoor Recreation Resources Review Commission (ORRRC) and related Bureau of Receptions (BOR) surveys. Recreation demand evaluation is not predictive, but is a method that estimates the benefits of a recreation project. The estimated benefits, based on data from a similar project, may then be used in a cost-benefit analysis to determine an investment strategy for recreation. They may also be used to justify pricing schemes.

Recreation demand is a difficult concept to interpret because it includes an individual's expressed and latent desires for recreation. *Expressed* demand, corresponding to Mercer's expressed needs, is the consumption of, or the participation in, desired recreation activities. *Latent* demand is the difference between total demand and consumption. It does not result directly in recreation activities, but may induce a substitution of recreation activities or even remain unexpressed. Lavery (1975) calls participation *effective* demand. He separates latent demand into the *deferred* demand of those who could participate but do not, either through a lack of knowledge, or lack of facilities, or both; and the *potential* demand of those who cannot at present participate and require an improvement in their social and economic circumstances to do so (p. 186). Other authors have hypothesized that factors that inhibit participation and cause latent demand include entrance fees, inaccessibility, and the lack of knowledge and experience (McClelland and Medrich, 1968), as well as satisfaction levels, life cycle stage (e.g., families with small children), time, money, proximity to resources, and perception of resource characteristics (Hecock and Rooney, 1975).

In the analysis of ORRRC studies (1962) the forecast of recreation participation was mistakenly termed a recreation demand forecast. Knetsch (1969) commented on this as follows:

The myth persists that somehow we are able to multiply population figures by recreation activity rates obtained from population surveys and call it demand (p. 85).

INTERACTION BETWEEN DEMAND AND SUPPLY

One of the major difficulties in the study of recreation is the difficulty in separating demand from supply components. Cicchetti

et al. (1972) call this the *identification problem*. In identification of the components of a model that represents a specific case study, many of the site-related variables contain endogenous components. That is, the supply attributes are jointly determined, interrelated, and dependent, resulting in a major methodological difficulty.

Diverted consumption (Burton, 1971), or the *intervening opportunities effect*, occurs where the same or other activities are pursued elsewhere, perhaps due to an increase in supply at a new location. These shifts in consumption indicate a demand that is not fulfilled by the existing supply. However, demand is not readily identified under these circumstances for the following reason. Individuals seek out their preferred recreation activity, but they may also be attempting to minimize travel impedance, a complex trade-off between preference and impedance occurs. This results in a less preferred, but a more opportune, participation in recreation activities. Hendee and Burdge (1974) have referred to this phenomenon as *substitutability*--the interchangeability of recreation activities in satisfying participants' motives, needs, and preferences (p. 157).⁵ This trade-off approach explains the socioeconomic differences in participation, when they occur, as differences in, and reaction to, opportunity rather than differences in demand.

Socio-Economic Characteristics

It is an appealing idea that specific socioeconomic groups might participate in certain activities or activity packages. This is, in fact, the underlying assumption of the recreation forecasting method used in many outdoor recreation planning efforts. The approach, in which the participation rates of various socioeconomic groups and their

population projections are combined to project future recreation participation, has its origins in the ORRRC (1962) studies.⁶

The factors considered in the ORRRC study were income, age of head of household, race, region, place of residence, education of household head, paid vacation, life-cycle stage, and occupation of household head (ORRRC, 1962, #20, p. 27). Controversy over the validity of these factors as indicators of recreational preference has occurred. Cunningham (1970) saw no evidence linking occupation with type of recreation. Orthner (1976) found little similarity between the recreation pattern of husbands and wives. Hendee (1969) investigated the significance of place of residence in recreation activity, but factors other than residence could also have caused differences attributed to urban and rural residences.

The problem of non-independent factors is not unique. Statistical analysis using regression techniques defines this as the problem of multicollinearity. For example, when age is a relevant variable, education, race, and income, usually are as well. Therefore, the combined analyses of these factors merit additional care.

Age varies significantly with participation in certain activities (ORRRC, 1962, #20). Although other factors may be more important (e.g., diet), age certainly plays a role in recreation participation. Perhaps it is a constraint that limits the very young and the very old for some activities.

The most controversial factor is income. Although some investigators have suggested that poor people do not participate in costly activities (ORRRC, 1962, #19; Cicchetti, 1973; Rosma, 1973; Tatham and Dornoff, 1971), that they do so out of preference is not a warranted assumption.

Hecock states that "no relationship was found that would link past experiences, socioeconomic status, or demographic group type to any measure of accessibility on Cape Cod. Apparently beach visitors with small children or low incomes are as likely to travel long distances as any other group" (Hecock, 1970, p. 243). Also, Lindsay and Ogle (1972) found that when a recreation area is very close to an urban area, no difference between the income level of users exists when compared to that of non-users. In contrast, Ellis (1967) found that high income groups had a higher tendency to perform more energetic activities, travel farther distances, haul trailers or boats, enter wilderness areas, and go sight-seeing.

Recreational planning could make the desired facilities and opportunities available to lower income groups. However, the HUD report *Urban Recreation* (1974) found that

Poorer communities have not been able to afford participation in the federal matching grant programs for acquiring land and facilities, much less the maintenance and programming expenses required to operate urban recreation facilities (p. 6).⁷

In contrast, a belief that facilities should be expanded for popular activities could lead to an oversupply, secondary problems associated with concentrated activity, or even social and environmental disasters.⁸

An example of enlightened recreation planning in the coastal zone that accounts for differences in opportunity for recreation between the rich and poor is difficult to find. Unfortunately, many counter examples are available. Playland-at-the-Beach in San Francisco was an amusement park popular with the city's lower and middle income citizens, many of whom rode non-polluting street cars to its gates from the inner

city. However, it was apparently of little value to political and financial decision-makers, and was demolished as an entrepreneurial exercise. Today the site does not hold the oceanfront condominiums that were portrayed in the architect's drawings--it is a flat and quiet scene. The project itself is a victim of the "freedom" and non-planning to be found in the marketplace.

The message here is that disaggregation of recreationists by socioeconomic factors is not a simple matter, nor is it necessarily effective in planning decisions. Many researchers have become less enthusiastic about the straightforward application of socioeconomic attributes, available in many secondary data sources, to an analysis of recreation demand. Specifically, two related areas of research have evolved--a new look at users and an analysis of activity patterns.

Users of recreation facilities are not just individuals distinguished by age, income, sex, education, and so forth. They are typically small groups: families with small children, teenagers, young couples, old couples, and persons with pets. Sometimes they are members of larger groups: surfers, naturalists, sunbathers, and swimmers. Of course, these categories could be extended and are not meant to be mutually exclusive. Anthropology and the phenomenon of group dynamics in relation to recreation appear to be fertile perspectives for further study in this regard (Field and O'Leary, 1973). Lee (1973) identifies local, non-local, and lifestyle recreation user groups, and further disaggregates these groups into single persons, friendship, and kinship groups.⁹

Other factors, such as childhood experience (Christensen and Yoestring, 1973), taste, "the thing to do," and cultural background (Leonhardt, 1971), or recreation as a form of play action (Burch, 1965),

recreation versus work experience (Spaulding, 1976), that distinguish recreationists and yet are seemingly intangible in the view of the recreation planner, lead to further complications in the analysis of user groups.

Another relevant difficulty is that the activity preferences for groups may not reflect individual recreation utility accurately. Brewer and Gillespie (1974) have pointed out that on the basis of an empirical index, group activities may not maximize total satisfaction because some members of the group are not fully satisfied. This situation involves a trade-off between maximizing individual versus total group satisfaction. Recreation planners usually emphasize group activities because more people can be satisfied with them than in individual activities. However, some provision for individuals could be made, provided that it is not too costly.

Another aspect of socioeconomic characteristics is their relationship to combinations of activities, or *activity packages*, which may be preferred over a random assortment of possible activities. Obviously, this sort of information would be invaluable to the site designer and the recreation planner.

Factor analysis and non-metric methodologies, such as cluster analysis and multi-dimensional scaling, have been used to investigate the existence of activity packages. This research has not established any clear-cut results to date because the findings of one analysis are seldom applicable to any other (Bishop, 1970; Neulinger and Brent, 1969; Burton, 1971b; Ditton et al., 1975; Rosma, 1973; Romesburg, 1973; Becker, 1976). Generally, three to eight activity groupings are found, representing various degrees of active to passive recreation. However, the findings appear to be directly related to local cultural and natural features, making comparisons difficult.

Carrying Capacity

In its original meaning, *carrying capacity* is the ability of the physical landscape to support a biomass of vegetation or range animals (Wagar, 1964, pp. 3-4). In population ecology, the term carrying capacity has been used to describe the upper limit of a steady state population. The carrying capacity of recreational facilities was first popularized by Wagar (1964; 1974), and has several meanings, including "the use at which total satisfaction or benefits, produced by a recreation area, are maximized" (Griest, 1976). "Recreational carrying capacity" in the context of Wager and others (Lime and Stankey, 1971; Alldredge, 1972) will be used in this paper. It is defined as the number of recreationists that a facility or a recreation area can support.¹⁰

Recreational carrying capacity has three components, each of which can limit the capacity of a recreation facility. First, the *design capacity* is expressed in terms of installed visitor facilities such as the size of a parking lot, level of maintenance, and other similar considerations, and may be viewed as a reflection of management policies and budgetary constraints.¹¹

Second, the *resource-bearing capacity* is the maximum number of persons a facility can accommodate without irreversible permanent degradation occurring in the natural environment (see Clark, 1977). This is currently thought of as including short-term effects, such as the number of persons allowed to enter a dune grass area; but the long-term effects, such as the effect of fifty years of camping in a redwood grove, should also be taken into account.

Finally, the *psychological-social capacity* of an area consists of psychological and social barriers as distinguished by race, language, and other attributes. This component of carrying capacity is often cited in relation to crowding and standard setting. However, crowding is a problem only when an individual or a group wants privacy. Hecock (1970) found that teenagers tended to congregate at beaches that had food facilities and other teenagers (a positive crowding effect). As one recreationist exclaimed, "This is where the action is!" (p. 246).

The concept of carrying capacity implies a limit that should not be exceeded. This level may be established by any of the components of carrying capacity that are limiting under the prevailing conditions. However, the limits may be removed. The carrying capacity of an area may be increased by a technological innovation or a change in management policy; it may also change over time as a function of societal needs (Clay, 1971).

Implicit in the concept of carrying capacity are the perceptions and preferences of various groups, activity type, and access (parking lot size, etc.), and standards used by planners and management. To define the carrying capacity of an area only in terms of its resource-bearing capacity and crowding, as Menchick (1973) does, is an approach that cannot entirely explain the phenomenon. Some of the problems, such as the compatibility of various user groups and the resulting impact on recreation, are simply not understood (Gold, 1976).

Although some researchers have discussed concepts such as zoning to assign recreation areas an appropriate carrying capacity (Armstrong, 1973), in general no management guidelines are available that a planner or analyst might use to apply the concept in a completely acceptable fashion.¹²

Site Suitability

Recreation planners and site designers will study a site to determine which activities can occur there. Some activities are incompatible with the site; some activities are incompatible with other activities; and, finally, some activities may be incompatible with management policy. Reasoning of this sort is mainly common sense. Sunbathing requires a flat, sunny place, and hill climbing requires a hill. Activities must be compatible with the physical landscape. But some activities may be physically detrimental to the site. For example, extended use of a dune area of a beach may kill the dune grass and cause the dunes to erode.

The physical attributes of a site may cause certain activities to be incompatible in another sense; i.e., damage to the user rather than to the site may occur. For example, dangerous tides would preclude swimming at some beaches.

A mix of compatible activities should increase the use of a site. Sunbathing, picnicking, and beachcombing are compatible activities, and can occur in the same area. Playing football on a sunbathing area, or hiking in a motorbike hill climbing area, are generally undesirable. On the water, the incompatibility of power boats and sail boats is a long-standing issue subject to jokes and editorials. De Sylva (1971) reports a more serious conflict:

More than once has a motorboat operator deliberately tried to run over a skin diver floating at the surface; I know of one battle between an angler who threw lead sinkers at a scuba diver who defended himself by firing a spear using a compressed-air gun at the angler, who fortunately ducked (p. 12).

One activity may be incompatible with other activities for several reasons. As previously suggested, some activity mixes are

unsafe. Whereas each activity might be safe, the mixture is unsafe. Some activities directly interfere with one another. Other activities are incompatible for aesthetic reasons. Most campers and hikers desire privacy. Birdwatchers require privacy and little or no noise. Recreationists may be offended by the visual degradation caused by activities such as hill climbing, by view blockage, or the symbolism of structures such as that of a massive information center as a symbol of government bureaucracy. Finally, some activities are not permitted because of management policy against high capital expenditures, high maintenance costs, security problems, privacy problems (with respect to neighbors), and liability (insurance, lawsuits, etc.).

Standards

Standards are constantly being used by landscape planners in the design of recreation facilities (Buechner, 1971; California Committee on Planning, 1956; Moellar, 1965; USBOR, 1964, 1967). They are used in reference to visitation levels, recreation development, carrying capacity, recreation programming, and management (Gold, 1976, p. 66). Standards may be spatial, linear, based on a per capita measure of population or on a fraction of the recreation area. They may be simple normative statements without rationale. A cursory glance at *Space Standards* (US BOR, 1967) will show a wide variety of standards used in the design of recreation sites. As the director of BOR implies in the forward of the publication, national recreation standards may never be possible:

The reader should note that the standards cited were designed and used by widely varied agencies under as many different sets of resource, land-use, and cultural conditions, and also that in most instances they include a spread rather than absolute space requirements.

The implication is that these standards have been established after an analysis of the relevant aspects of a particular planning or design situation. However, it is difficult to conceive of conditions that would lead to the variation in beach use standards as indicated in Table 1. Presumably some of these standards were derived empirically. Even so, they seem to have a component that reflects the bias of their originators--as well as their users--because in the evolution of the empirical result, a determination must be made that the beach is being used at a level above, equal to, or below its capacity.

Table 1
Beach Use Standards*

Beach standard (ft. ² /person)	Source
50	Army Corps of Engineers
50-100**	Soil Conservation Service
75	Bureau of Outdoor Recreation
100	California
100	Louisiana
200	Wisconsin
300	Texas
548	Nevada

*From US BOR (1967).

**Includes swimmers.

A review of a local government's recreation-related plans leads one to believe that no theoretical basis may exist for the setting of standards. Standards are never disaggregated by any socioeconomic or other attribute, and they never address the possibility of simultaneous activities occurring in the same area (Twiss, 1970).

At present the consensus among recreation experts is to use standards as guidelines rather than absolutes (Gold, 1973, p. 154). However, when they are used as rules, it is because they are simple; they are set by an established national organization, and can be defended on the principle of authority; they are a symbol of pride (they become ends rather than means); and finally, that they are useful as bargaining points in the allocation of financial resources (Gold, 1973, p. 149).

Recreation standards are often used in a misleading fashion. An interesting criticism on the use of standards is in *The Uncertain Search for Environmental Quality* (Ackerman et al., 1974, pp. 127-130). A fishing standard of one person per ten feet of shoreline was used to estimate future benefits of open space along the Delaware River, when actually it would have led to a gross overestimation of the fishing that currently takes place from the existing open shoreline!

Standards can be used to provide "eye openers" before decision-making bodies and in planning reports. For example, a well-designed parking lot requires 400 square feet per automobile. Therefore, for a crowd beach (100 square feet/person), where the users arrive four per car, the parking area will have to be as large as the beach! Obviously, standards can be manipulated to achieve the desired effect, but this approach should have supportive examples. For example, the solution

to the parking problem at Huntington State Beach, California, has been to pave the dunes in an attempt to equalize the parking and beach areas.

Weather and Timing

In certain areas, such as the Northern California and Oregon coastlines, weather is a major factor in the participation of beach-related activities (Rense, 1973). During a weekend when peak recreation crowds are expected, fog may blanket the beach areas and cause low attendance. During the week or in the off season (spring or fall), however, several hot, sunny days may lead to overflow crowds. For example, in 1973 the single day peak attendance at Half Moon Bay State Beach, San Mateo County, California, occurred in early April, while nearby Montara State Beach recorded its daily peak in mid-October.¹³

A timing factor is also involved in peak usage of facilities. First, special events occur. Further analysis of 1973 peak usage at Half Moon Bay and Montara State Beaches shows that in early April the spring vacation for local colleges took place, while in the latter part of October, the Half Moon Bay Pumpkin Festival, an event that draws crowds up to five times the level of the local population, was celebrated. From this preliminary evidence, both occurrence of special events and weather affect beach usage. Timing is also a factor with respect to the scheduling, as well as the duration, of leisure time (Leonhardt, 1971). Weekends and holidays find more people available for recreation. Thus, McEvoy (1974) and others infer an increase in recreation demand with the advent of the four day work week.

Most family vacations are taken in the summer during school vacation, and many facilities are open only for that period. This

leads to the question of how to treat recreation participation with respect to time. Should it be yearly, seasonally, weekend versus week, or daily (Smith, 1975)?

Timing can affect recreation analysis in another respect. Becker (1975) has proposed that in the maximization of utility, which the rational man does in the economic sense, consideration be given to the utility of time; that is, one might wish to consider the maxim "Time is money" with respect to time spent in recreation.

Interest in particular recreation activities appears to change over time. Although recent trends indicate only an increased interest in recreation, there is no reason to expect that this should continue. These changes are based on individual decisions. Some activities are "in" and some are "out," just as many other activities in everyday life. This popularity effect should not be confused with the intervening opportunity effect, although the two are not independent. Popularity can be considered a change in demand over time. Moreover, it can be manipulated--as is well known in the advertising industry.

III. DATA COLLECTION FOR RECREATION PLANNING

Two problems are associated with data collection. First, how does one collect data (the pragmatic issue); second, what does one do with it, or, which data should be collected? These problems have left concerned planners with little data for analysis. States that routinely collect data, such as California, simply present attendance figures and extrapolate these into the future as estimates of participation. In addition to looking at the mechanics of data collection, a rationale for types of data to be collected is presented in this chapter.

DATA COLLECTION--AN OVERVIEW

Data may be collected at the site of recreation or in population centers (hereafter referred to as origins) where recreationists and would-be recreationists live. These types of data are site data and origin data.¹⁴

Site data may be collected about site users or the site's physical characteristics. The user data are usually collected at the site with interviews. As is well documented in the social science and psychological literature, many problems are associated with the survey research methods. For example, the manner of the interviewer may cause a person's stated behavior to differ from his actual behavior. Wicker (1969) doubted that behavior can be predicted from verbal attitude statements. However, Murphy (1975) believes that attitude is a good measure of site attraction because it is an important dimension of an individual's leisure and recreation behavior, summarizes experiences, and can be measured.

An example of the site interview is the work of Spaulding (1973). He conducted 400 interviews at Sand Beach, Rhode Island, to obtain information about users, factors that encourage or discourage beach use in comparison to other activities, access factors, and activities occurring at the beach. Similarly, Usher et al., (1974) interviewed 1,225 groups of visitors to Spurn Peninsula Reserve on the southeast tip of Yorkshire in England during the summer of 1970. Also, in the summer of 1969, California Parks and Recreation interviewed briefly 9,474 visitor parties at 34 state parks along the California coastline (California Parks and Recreation, 1972).

In an effort to circumvent some of the controversy associated with interview methods, researchers have used indirect or unobtrusive measures to collect data (Webb et al., 1966). Examples of indirect data collection methods are *simple observation*,¹⁵ such as counting the number of swimmers or conducting a license plate survey (Burch, 1964); the *use of existing records*, such as the data collected from campers at state parks or the daily usage counts made at state parks; and *contrived observations*, such as road counters.

Indirect measures have been used in several recreation studies to date. A large scale license plate survey was conducted in recreation areas in Kentucky (Deacon et al., 1972). It has proven to be a satisfactory approach in that the most data could be collected in the shortest time with the available personnel. Research by Ellis and Van Doren (1966) and Leonhardt (1973) have used the origin-destination records of campers.

Data on the physical characteristics of the site are necessary to determine the potential environmental impact of activities and

development. It is also used to determine the type and level of activities (e.g., carrying capacity, supply) for which the site is thought to be best suited, or for which special constraints exist. For example, a physical construct (dunes) might limit parking while a safety constraint (rip tides) might limit swimming.

Various methods for the collection and use of data relating to the physical environment are outlined by Dickert (1974). A study that compared beach interview data to data of the physical characteristics of the beach sites was conducted by Hecock (1970). He studied ten sites on Cape Cod and related interview information to physical characteristics of each site.

It is important to recognize that the physical data about a site contained in reports or on maps are based on the observations and measurements that have been made in earlier studies. As more reports are compiled for an area, the probability that an informational conflict will occur increases. Some differences in physical characteristics over time should be expected. Examples are the changes in beach size and appearance due to seasonal variation of wave action and changes in vegetation due to succession. It is important, therefore, that observation and the use of current photographs (secondary observation) be used in every new study. Conflicting information which is introduced may, in fact, be an indication of processes that are affecting the site in an unexpected manner.

Data may be collected at origins through interviews and indirectly through the use of secondary data sources such as the U.S. Census. *Origin data* differs from site data in that it includes non-users as well as users of recreational facilities. As pointed out by Burdge

and Hendee (1972), a sample of the entire population rather than just site users is preferred, provided that the sample is stratified across socioeconomic groups. Of course, origin interviews will be subject to the same errors as those previously discussed for site interviews.

The use of existing data, as tempting as the prospect seems, may provide some hidden pitfalls for the coastal zone analyst. Incongruities may exist between the format of the data and the available methods of processing it. The data may be for the wrong time period (weekdays versus weekends), for a different locale, or in dissimilar units or classes. Further, data are usually collected for specific purposes and may not be applicable in the current planning effort. According to Ditton and Stephens (1976), a full complement of coastal recreation activities is usually not included in the State Comprehensive Recreation Plan (SCORP). For some activities such as fishing and swimming, no distinction is made between salt and fresh water locations. Further, data collected on a county basis is not disaggregated for the coastal zone, but is often aggregated into regions (Ditton and Stephens, 1976, pp. 4-8). The SCORP data collection efforts have also been criticized by Burdge and Hendee (1972). They point out that while spot interviews and questionnaires of users are the usual form of data collection, the plan presents projections for recreation use for the entire state. Obviously, certain biases related to vocal recreational groups, such as middle and working class persons, will be present. In addition, the tourist is often disregarded in these surveys.

Recreation data has a short life in comparison with other types of planning data. Recreation demand may shift quickly and unexpectedly due to the *education effect*, which has direct and indirect components,

Individuals who try a recreation activity for the first time and find that they enjoy it form a new attitude toward the activity and are anxious to try it again. Conversely, they may not like it and will not wish to participate again. This phenomenon is *direct education effect* through action.¹⁶

Education does not always come from direct experience. One might read or hear about a particular activity and form a favorable *expectation*. For example, an interview conducted at an origin might stimulate a person's interest in an activity so that he might try it. In any case, it is likely that his response to that activity will be markedly different at a later date. This is how demand may shift through the *indirect education effect*. The indirect effect, stimulated by reading, word-of-mouth, or an interview, precedes the direct effect except when the activity is introduced under surprising or unusual circumstances. A large scale survey on the use of coastal resources might therefore result in a large increase in their use, or at least an increase in the demand for recreation resources in the coastal zone.

A STRATEGY FOR DATA COLLECTION FOR BEACH-ORIENTED RECREATION

This section suggests a framework for the collection of data useful to coastal zone recreation planners. The framework assumes that once a group (or individual) has decided to participate in outdoor recreation, a trade-off between the attraction and the accessibility of recreation sites and activities occurs as perceived by the group or individual. It is not intended as an investigation of how perception or evaluation occurs during the trade-off process, but rather as a listing and description of the attributes that may indicate the outcome of such a decision.

The concepts of site attractiveness and site accessibility are not new. Some attraction attributes that have been used are spatial area, the amount and quality of available facilities such as hiking trails and campgrounds, and natural environmental factors (Lavery, 1975; Klett, 1976). Access characteristics that are typically seen in recreation studies are distance, time, and cost.

The basis of the framework lies in the assumption that many of the factors that may cause an attraction or impede access are the same. These characteristics for a beach are summarized in Table 2: size, aesthetic characteristics, natural characteristics, weather, physical access, costs (\$), intangible costs, facilities, current use, user characteristics, safety, management policies, and timing.

The *size* of a beach is an access constraint in that it theoretically limits the number of users. The number of persons it can hold may be roughly estimated using a standard. Size may be an attraction in that individuals know that plenty of room will be available in which to spread out. Size may also determine the suitability of the beach for certain activities or activity mixes. However, it does not necessarily follow that "bigger is better." The small *cul-de-sacs* of the south Orange County coast are apparently more popular than the wide open expanses of Huntington Beach to the north.

The *aesthetic characteristics* of a site such as its view, sounds, ambience, and landscaping provide an intangible, perhaps subconscious, attraction. These are the factors that a good design will use to advantage and enhance.

Typical *natural characteristics* of a beach are its shoreline (bluffs, etc.), vegetation, sand, surf, offshore bottom type, and

Table 2

Attributes of the Attractiveness and the Accessibility of a Beach*

I. <u>Size</u> (sandy beach area)	VI. <u>Costs</u> (\$)
a. Large	a. Costs of transportation to site
b. Small: cul-de-sacs	b. Parking fee
	c. Entrance fee
II. <u>Aesthetic Factors</u>	d. Bathhouse and shower fee
a. View	e. Food and beverage costs
b. Sounds/noise	f. Equipment costs
c. Ambience	VII. <u>Intangible Costs</u>
d. Landscaping	a. Cost of time
III. <u>Natural Characteristics</u>	b. Cost of stress and related health effects
a. Shoreline	VIII. <u>Facilities</u>
b. Vegetation	a. Food and beverage service
c. Sand	(1) Restaurant (seating)
d. Surf	(2) Snack bar
e. Offshore bottom	(3) Portable (truck or hand cart)
f. Micro-climate	b. Restrooms
(1) Winds	c. Showers
(2) Water temperature	d. Picnic tables
IV. <u>Weather</u>	e. Barbecue pits
a. "Heat waves"	f. Boat ramps or hoists
b. "Cold waves"	g. Boatslips (temporary for visitors)
(fog--a major factor on western beaches)	h. Permanent boat slips/other marina facilities
c. Rain	
d. Weather forecasts	
V. <u>Physical Access Criteria</u>	IX. <u>Current Usage</u>
a. Network capacity and impedance	a. Active beach use
b. Feeder road capacity	b. Passive beach use
c. Available parking	c. Swimming
d. Available transit service	d. Surfing
e. Available rights of way	e. Windsurfing
f. Distance; ease (steps, hills) of walk to beach	f. Sailing
	g. Rowing, canoeing
	h. Power boating
	i. Surf fishing
	j. Boat fishing
	k. Snorkeling
	l. Scuba usage

*The relationship between attractiveness and access is not simple. It may be investigated by testing hypotheses formulated from the above attributes.

Table 2 (continued)

X. User Characteristics

- a. Origin (location)
- b. Preferred activities
- c. Age distribution
- d. Cultural distinction
- e. Single, family group

XI. Safety

- a. Natural factors
 - (1) Rip tides, etc., frequent drownings
 - (2) Shark, etc., attacks
- b. Social factors
 - (1) Loud, boisterous, threatening groups

XII. Management Policies

- a. Eliminate activity conflicts
- b. Allow "deviant" behavior
 - (1) Nude bathing
 - (2) Drinking, drugs
- c. Site cleanup
- d. Eliminate safety hazards

XIII. Timing

- a. Periodic change in social and individual values
- b. Vacation season
- c. Seasonal weather cycles
- d. Weekend versus weekday
- e. Special holidays and events
- f. Hourly use patterns
- g. Duration of planned beach use or vacation and length of required lead time for plan changes

micro-climate (wind, water temperature, etc.). These might establish access constraints for some types of activities. On the other hand, they may provide a strong attraction for other groups of recreationists. The resource-bearing capacity of a site is based on these natural characteristics. Finally, they determine the suitability of location of activities and facilities (site analysis).

Weather in terms of heat waves, cold waves, rain and fog, plays an obvious role in the selection of a beach; first, over other recreation opportunities, and second, over other beaches. The weather at the recreationist origin is a factor in recreation decisions both as an access or an attraction factor. Weather prediction for the recreation area also influences its use later in the day or on succeeding days.

The *physical access criteria* include the regional network capacity and impedance for recreation trips to the site, the feeder road capacity, the available parking, available transit service, and distance and ease (e.g., available rights of way, steps, hills, etc.) of the walk to the beach from autos or buses. Many analytical methods use only a measure of impedance such as distance, time, or cost (below) as an indicator of site access. They may also be measures of site attractiveness, because if recreationists know in advance the access characteristics of a site, this will tend to make that site more or less attractive.

Costs (\$), including costs of transportation to the site, parking fees, entrance fees, bathhouse and shower fees, food and beverage costs, and equipment costs are all factors that may make one site more attractive than another. Costs are frequently used in models, both as a measure of impedance and as an indicator of "willingness to pay" for benefit estimation methods. Low costs are always an attraction for all

income groups, but high costs may cause recreation facilities to be inaccessible to low income groups.

Intangible costs include the cost of time and stress, with its related mental and physical health effects. These and other intangible costs are obviously very important in modern life. Recreation should relieve stress rather than cause it. Intangible costs may detract from the accessibility or, if low, add to the attractiveness of a beach.

Facilities, such as food and beverage service, restrooms, showers, picnic tables, barbecue pits, visitor boat slips, boat ramps or hoists, permanent boat slips, and other marina facilities provide a strong attraction for a beach. Standards may be used to estimate the numbers of each type of user the area can support.

The *current use* of beaches includes active beach use (throwing frisbees, etc.), passive beach use (sunbathing, reading, etc.), swimming, surfing, wind-surfing, sailing, rowing, power boating, surf fishing, boat fishing, snorkeling, and scuba diving. Access to some of these activities is precluded by the presence of the others unless the beach is so large that it can be zoned or divided into special use areas. Certain activities attract persons with the same interests, and it is not unusual for areas to have identities in this regard, which may affect its sociological carrying capacity. The number of users who can be accommodated can be estimated using standards.

The *user characteristics* of the beach users, such as age, cultural differences, race, and group type (e.g., families with young children, young couples, persons with pets) appear to help establish the identity of a beach, and may act as a relative access constraint or as an attraction for other users. Individuals who live nearby may not

use certain sites because of fear or non-acceptance, while others will travel long distances to be with other members of their "group." A related phenomenon occurs with respect to certain activities. Surfers, hang-gliders, and skin-diving abalone fishermen will travel long distances, past nearby beaches, to be with their group. Still others, who do not identify with a particular group, may find large numbers of certain groups (surfers) bothersome and go to alternative facilities.

Safety is not typically a factor in beach use, although the presence of rip tides (frequent drownings, etc.), shark attacks, or the presence of loud, boisterous, and threatening groups will have a definite effect on the perceived attractiveness of a site. Some physical hazards may be mitigated through the use of standards in judicious site design.

Management policies pertaining to activity conflicts, deviant behavior, site maintenance, and the elimination of safety hazards have an effect on beach usage. Some activities can be barred from the site, including nude sunbathing, drinking, and other deviant behavior. Many users would find these access controls an attraction. However, if these activities were allowed at some beaches, then different types of people would be attracted. Presumably, "normal people" would consider deviant behavior a dis-amenity, and would tend to avoid these beaches. Or, as recent experience in San Diego suggests, the electorate may desire to overrule management policy and eliminate deviant behavior, such as nudity on public beaches.

Timing ranges from the periodic change in social and individual values to hourly use patterns. It includes the occurrence and duration of the vacation season, seasonal weather cycles, weekend versus weekday,

and special holidays and events. Timing is reflected in the hours of operation of site facilities and the corresponding schedule of leisure time of the recreationist. Thus, timing affects attraction and access to various sites.

THE POTENTIAL USES OF RECREATION DATA

Implicit in a data collection effort concerning attractions and access is the requirement that data be collected from users in origins and on-site, as well as about the site itself. User information about attractions and access can be collected in a manner that would allow a wide variety of research, such as the investigation of the values and perceptions of groups and individuals who engage in outdoor recreation. The existence of non-linearities (e.g., Weber's Law) in the perception mechanism and the trade-offs in the individual decision-making process can be investigated. Physical and intangible barriers to desirable recreation facilities can be identified and appropriate policies established. For example, if a given population group strongly desired a particular type of facility and none were accessible to that group, then a priority for this need in site acquisition could be established. At present, the participation method (described in the following section) links persons of various socioeconomic characteristics to activities through consumption patterns; facility needs are established through the application of standards on population projections, often without regard to who the population is and what its desires are.

The attraction-access approach could wrench the recreation establishment away from the view that recreation is a physical phenomenon in which a given number of square feet are required to perform some activity into the recognition that recreation has sociological and

psychological components as well. For example, the traditional approach to recreation planning would tend to limit the degree of crowding in a beach. However, Hecock (1970) found that adolescents actively sought out each other and food facilities on Cape Cod beaches. Positive crowding of beaches may result from social-cultural and facility attractions. Dockweiler Beach, a "black beach" in Los Angeles is another example of a socially attractive recreation facility for a large segment of the population in the Los Angeles area. Many of the groups up and down the Santa Monica beach, also in Los Angeles, appear to belong to different age groups from young adolescents to college age. At Marina Green in San Francisco, sunbathers jam the small western area with its restrooms and foodstand, while avoiding the larger, barren section to the east of the boat harbor. Positive attractions to people and facilities are readily found in most beach areas. One possible result from an investigation of positive crowding would be the establishment of facilities where crowding would be encouraged in order to relieve this pressure from fragile or rare recreation sites.

IV. METHODS FOR THE ANALYSIS OF SUPPLY AND DEMAND IN RECREATION

THE PARTICIPATION APPROACH

The participation approach attempts to forecast recreation "consumption" based on socioeconomic characteristics and recreation site attributes which have been linked to recreation through the empirical analysis of data collected in the National Recreation Surveys (ORRRC, 1962; US BOR, 1965, 1967, 1971, 1972).

Recreation "demand" is assumed to vary with population size, real per capita income, education, leisure time, age, race, marital status, and other socioeconomic characteristics. Recreation "supply" is assumed to be a function of recreation land and water acreage, natural environment acreage, historical and cultural acreage, levels of environmental degradation, and other factors.

The probability that an individual from the "jth" population group will participate in activity a is:

$$p_a^j = k_1 + k_2 D + k_3 (S/N) + \sum_{j=1}^n \sum_{\substack{i=1 \\ i=a}}^m w_{ai}^j p_i^j \quad (1)$$

where

D = demand, represented by one or more socioeconomic characteristics;

S = supply, as above;

N = total population;

k_1 , k_2 , k_3 , and w_{ai}^j = participation coefficients (constant) with n population groups ($1 \leq j \leq n$) and m activities ($1 \leq i \leq m$). The meaning of k_2 and k_3 varies with the selection of units for D and S.

The first two terms in Equation 1 indicate that the probability of participation will have a constant component and will vary with demand. The third term states that this probability will increase with the per capita supply. The last term describes the interaction effect with other activities other than activity "a" undertaken by other population groups. When w_{ai}^j is greater than zero, activities "a" and "i" are said to be complementary (e.g., boating and fishing); when equal to zero or less than zero, they are defined to be independent and substitute activities, respectively.

The number of recreationists undertaking each activity for a given period can be obtained by multiplying the probability of participation by the population of the group and summing over all groups:

$$P_a = \sum_{j=1}^n d_a^j p_a^j N^j .$$

The total number of participants and participation days may be obtained by summing over all activities.

The calibration of the participation model through the use of regression techniques to estimate the participation coefficients, or parameters, has been a major area of recreation research over the last decade. The identification problem, previously described, leads to a lack of independence between regressors (the components of Equation 1) and various techniques, such as two-stage least squares and the reduced form approach, have been proposed to circumvent this problem (Cicchetti, 1972a, 1972b, 1973a, 1973b; Cicchetti et al., 1972).

Once the model is calibrated, forecasts of participation may be obtained through projections of population disaggregated by socioeconomic characteristics and estimates of increases in recreation supply. Many

of the State Comprehensive Outdoor Recreation Plans (SCORP) are based on such an approach (Brown and Wilson, 1975).

California has developed a Park and Recreation Information System (PARIS) which inputs the "recreation demand" from a participation model and compares it with the supply of private and public facilities. The comparison is disaggregated over intra-county areas called geopieces. The difference between demand and supply in each area is expressed as a "need." Needs can be projected into the future based on population projections, and are meant to provide recreation planners with a basis for determining a priority for recreation development throughout the state.

In addition to projecting use, PARIS also presents tabular and graphic summaries of visitor attendance for each of the state parks (California Department of Parks and Recreation, 1966; Yotter, 1974).

MODELS OF RECREATION TRAVEL AND SITE USE

Every model of recreation travel and site use has an explicit or implicit theoretical base. The reader may be familiar with some recreation theories based on attractiveness or travel distance. Even if there is no explicit theory, attempts to fit the available data to an equation or model imply the existence of a theory. In the use of regression techniques such implicit theories are quite readily assumed and discarded, depending on values of their calibration measures.

This paper, as in past reviews (Cesario, 1969; Deacon et al., 1972; Lavery, 1975a; Moeller and Echelberger, 1974; Thompson, 1967; Wilkinson, 1973; Yotter, 1974), classifies models by theoretical approach. The types discussed are:

- (1) Gravity
- (2) Attraction
- (3) Probabilistic
 - (a) Gravity type
 - (b) Intervening opportunity
 - (c) Entropy maximizing
- (4) Network or flow
- (5) Linear programming
- (6) Psychological
- (7) Simulation
- (8) Utility maximizing.

The Gravity Model

The primary use of modeling in recreation has been to link the origins of recreationists to their destinations. The gravity model is the most widely used of these recreation origin-destination, or trip-destination, models.

The gravity model of spatial interaction was adopted from the law of gravity in physics. It was originally intended to explain the interaction between two population centers. Carrothers (1956) discussed many of the early formulations of gravity type models. He presented the gravity model as:

$$I_{ij} = \frac{f(p_i p_j)}{f(D_{ij})} \quad (2)$$

where

I_{ij} = interaction between center i and center j ;

D_{ij} = the distance between center i and center j ;

and f = some mathematical function.

In recreational transportation modeling, the I_{ij} is generally the number of trips, v_{ij} (or some similar variable), from origin i to destination j . According to Carrothers, the first application of the gravity model in this respect took place in the late 1920s when E. C. Young postulated the migrations between origin "i" and destination j as:

$${}_jM_i = k \frac{Z_j}{D_{ij}^2} \quad (3)$$

where

D_{ij} = the distance between i and j

Z_j = the force of attraction of destination j

and k = a constant of proportionality.

In this model, the migrations vary with the inverse square of the distance as in the gravitational force model. It also hypothesizes the pull, or attractive force, of the destination.

Further work by J. D. Carroll (1955) popularized the idea that the inverse square law of the gravity model might be too limiting. He introduced the push effect of the origin. Briefly, he stipulated that:

$${}_jU_i = k \frac{P_i}{D_{ij}^\alpha} \quad (4)$$

where

U = the urban influence of center "i" upon any point "j";

α = a constant;

and k and D are defined as above.

Note that when $\alpha = 1$, this is a gravity potential mode. When $\alpha = 2$, it is similar (though lacking a pull component) to the gravity force model.

Ellis and Van Doren (1966) present a current version of the recreation travel gravity model in a form equivalent to:

$$v_{ij} = k \frac{P_i A_j}{D_{ij}^\alpha}$$

where

v_{ij} = the recreation trips between origin i and destination j ;

α and k = constants. Sometimes k is written as the gravitational constant, G .

D_{ij} = trip impedance in terms of time and/or distance and/or cost;

P_i = population and/or socioeconomic characteristics of i
(push component);

A_j = attraction¹⁷ of j (pull component).

This is one form of the gravity model used in current recreational travel studies.

The work of Ullman and Volk (1962) and Ellis and Van Doren (1966) indicated that the push and pull effects may be independent. Leonhardt's analysis of the trip patterns of campers using gravity models in Washington state and southern California also indicated that "the number of trips attracted to an area is not satisfactorily predicted solely on the basis of the physical attributes of the area" (Leonhardt, 1973).

The distance component of the gravity model, D_{ij} , has become the subject of recent research. The *National Transportation Survey* (USDOT, 1973-1974) indicates that recreation trips are significantly longer than work, shopping, or other types of trips. Wolfe (1972) has suggested that the traditional distance function be compensated in order to explain the larger (than expected) number of long distance recreation trips.

This variation has the form:

$$v_{ij} = k \frac{P_i A_j}{D_{ij}} D_{ij}^{\left| \frac{\ln(D_{ij}/m)}{n} \right|} \quad (6)$$

where

m and n are empirically derived constants.

As described by Wolfe and reviewed in Wilkinson (1973), the ratio D_{ij}/m results in more trips when $D_{ij} > m$ and fewer trips when $D_{ij} < m$ in comparison to the results of the conventional gravity model.

Beaman (1974; 1976) has researched the possible forms of the distance component including the power and exponential forms such as D_{ij}^λ and $\sigma^{-\lambda} D_{ij}$, respectively. Two studies which have compared the two (Deacon et al., 1972; McAllister and Klett, 1976) have found that the power function is the better descriptor of the interaction between origin and destination for long trips. McAllister and Klett (p. 33) recommend the use of the exponential form for trips of less than 200 miles in length.

The Attraction Model¹⁸

The attraction model is very similar to the gravity model. As reviewed by Cesario (1969), it takes the general form:

$$v_{ij} = f(P_i, E_i, D_{ij}, A_j, O_j) \quad (7)$$

where

E_i = a measure of the socioeconomic status of the residents of population center i . E_i and P_i and other variables may be combined into a factor called the "emissiveness." It is a push component described by Cesario (1975c).

O_j = a measure of "competing opportunities" of recreation site j and with the other variables defined as before.¹⁹

The distinguishing feature of attraction models is that they will take the form:

$$v_{ij} = a P_i^b E_i^c D_{ij}^d A_j^e O_j^f \epsilon \quad (8)$$

or

$$v_{ij} = a + bP_i + cE_i + dD_{ij} + eA_j + fO_j + \epsilon \quad (9)$$

where

a, b, c, d, e, f , are constants and ϵ is the error term.

Usually the data is fitted to these equations and the constants are evaluated using regression techniques. Note that Equation 8 takes on the form of the gravity model; Equation 5, for certain values of the constants a through f .

Attraction models which use site visits as an independent regressor for recreation travel may yield inconsistent results. An example of this may be found in the Golden Gate Recreation Travel Study (GGRTS). Cesario (1974, p. 1258) comments on this practice.

Probabilistic Models

Probabilistic models indicate the probability that a trip beginning at origin i will terminate at destination j . They can also be viewed as giving the proportion, or number, of total trips from " i " which will be completed at j . These models are known under several names.

Gravity type. One form of the probabilistic model is a variation of the gravity and attraction models (Huff, 1965). Using the general form reviewed by Cesario (1969):

$$v_{ij} = V_i \frac{\frac{A_j}{D_{ij}^\alpha}}{\sum_{m=1}^M \frac{A_j}{D_{ijm}^\alpha}} \quad (10)$$

where

V_i = total recreational trips originating in population center i ;

M = total number of recreational sites;

m = a dummy variable having a value corresponding to one of the recreational sites including j .

The quantity in parentheses is a ratio which gives the fraction of V_i trips that will have destinations at j .

Another similar but not equivalent form of Equation 10 has been used by Ellis and Van Doren (1966):

$$v_{ij} = k \frac{P_i A_j}{D_{ij}^\alpha} \times \frac{\sum_{m=1}^M \frac{D_{im}}{A_m^\alpha}}{\quad} \quad (11)$$

with all items defined as before. Ellis and Van Doren found the use of Equation 11 preferable to Equation 10 in the description of a known recreational trip distribution.

Intervening opportunity. In this model, the difference in a regional probability function that allocates trips from origins to destinations when a particular site is excluded and then included, provides the basis for the distribution of recreational trips. It is expressed as:

$$v_{ij} = k V_i \frac{\sum_{m=1}^{j-1} V_m}{\sum_{m=1}^L V_m} \frac{\sum_{m=1}^j V_m}{\sum_{m=1}^L V_m} \quad (12)$$

where

L = the probability per trip of reaching one acceptable site in the region;

V_m = the number of trips to site m where m varies from 1 to $j-1$ in one case and to j in the other.

The probability that trips will be made from i to j is the difference between two regional probability terms (in parentheses, above), which account for the effect of alternative or intervening sites on trips to the j th site.

Sullivan and DeKalb (1974) have studied auto travel to National Forests based on an intervening travel time. An approach like this may be useful in coastal zone recreation modeling efforts.

Entropy maximizing models. Using the total trips leaving each population center (V_i) and the total trips arriving at each destination (V_j), this relatively new modeling approach assigns the trips from each origin to each destination using the principal of entropy maximization. The variables V_i and V_j constitute the macrostate or state variables of the system. In attempting to infer the microstate of the system (the values of v_{ij}), a process akin to the thermodynamic principle of entropy maximization is used. It results in the selection of values of v_{ij} such that the values of V_i and V_j are the most probable, or close to their expected values. Cesario has reviewed this type of modeling (1975b). No recreational models of this type exist at present, but it seems inevitable that one will eventually be developed.

Network or Flow Models

Many methods are available for the assignment of flows to transportation networks. One model of this type used in recreational planning is called the Systems Theory Model developed by Ellis and

Van Doren (1966), and is based on the theory of operation of electrical networks. Cesario (1969, pp. 40-42) reviews the method and speaks of "through" variables (which correspond to electrical currents) and "across" variables (which correspond to electrical voltages).

Once the system of origins and destinations has been defined as a large network with population centers and parks at given potentials (voltages) and with links of various impedances connecting them, then levels of recreational travel flow (current) which reflect these parameters will occur in the links.

The model is an application of Kirchhoff's laws, or the laws of electric networks.²⁰ Despite the somewhat obvious differences between electrons and people, this methodology appears to be useful in explaining recreational travel patterns which follow a path of least resistance. Ellis and Van Doren have reported that the method may be superior to that of the gravity model. However, its calibration may prove to be a difficult and costly endeavor.

Linear Programming

Tadros and Kalter (1971) have developed a linear programming approach that distributes spatially projected "market demand" for specified water-based recreation activities. Estimates of recreation demand are assigned to attraction zones and then to specific recreation sites disaggregated by occasion type, but constrained by site capacities and time, distances and cost considerations. A related approach is discussed by Penz (1975).

The problem takes the form (using the author's notation):

$$\begin{aligned} \text{minimize } & \sum_{i=1}^I \sum_{j=1}^J \sum_{k=1}^K d_{ij} X_{jk} & (\text{impedance}) \\ & + C \sum_{j=1}^J AC_j & (\text{cost of additional capacity}) \end{aligned}$$

and/or

$$\begin{aligned} \text{maximize } & \sum_{i=1}^I \sum_{j=1}^J \sum_{k=1}^K A_j X_{ijk} & (\text{attractiveness}) \\ & - C \sum_{j=1}^J AC_j & (\text{cost of additional capacity}) \end{aligned}$$

subject to:

$$\sum_{j=1}^J X_{ijk} = D_{ik} \text{ for all } i \text{ and } k \quad (1)$$

$$\sum_{i=1}^I \sum_{k=1}^K X_{ijk} \leq S_j \text{ for all } j^{21} \quad (2)$$

$$\sum_{j=1}^J (d_{ij} - d_{ik}) X_{ijk} \leq 0 \text{ for all } i \text{ and } k \quad (3)$$

$$\sum_{j=1}^J (t_{ij} - t_{ik}) X_{ijk} \leq 0 \text{ for all } i \text{ and } k \quad (4)$$

and

$$\sum_{j=1}^J (c_{ijk} - c_{ik}) X_{ijk} \leq 0 \text{ for all } i \text{ and } k \quad (5)$$

$$\sum_{j=1}^J X_{ijk} = P_{km} D_{ik} \text{ for all } i, k, \text{ and } m \quad (6)$$

$d_{ij} = m$

where

i = origin (I total origins)

j = destination (J total destinations)

k = occasion²² (K total occasions)

QD_{ik} = the projected demand from origin "i" for destination "j"

S_j = capacity of the jth destination zone in a given time period (e.g., a design day)

d_{ik} = distance value used to project demand QD_{ik} from the ith population zone for the kth occasion

t_{ik} = time value used to project demand QD_{ik} from the ith population zone for the kth occasion

c_{ik} = cost value used to project demand QD_{ik} from the ith population zone for the kth occasion

d_{ij} = distance from the ith population zone to the jth destination zone

t_{ij} = time required to travel from the ith population zone to the jth destination zone

c_{ijk} = dollar cost (transfer costs plus entrance fees) per visitor to go from the ith population zone to the jth destination zone to engage in the kth occasion

D_{ik} = number of visitor days (demand) at a given point in time (e.g., an average Sunday in a summer quarter) from the ith population zone for the kth occasion given the price variables d_{ik} , t_{ik} , and c_{ik} used to derive QD_{ik}

X_{ijk} = a visitor (visitor day) from the ith population zone to the jth destination zone to engage in the kth occasion

M_j = number of mileage categories where $m = 1, 2, 3, \dots, M$ (e.g., 0-40, 41-80, and so on)

A_j = some measure of attraction at the jth destination

P_{km} = percentage of total visitor days engaged in the kth occasion traveling a given mileage category m

AC_j = a unit of additional capacity for the jth destination zone

C = cost of additional capacity.

The model was applied in twenty-two counties in New York state in which all of the recreation in the area was assumed to be undertaken by local residents. The main benefit of the study was the introduction of linear programming, which allows the straightforward consideration of

many variables under various constraints, into recreation planning. Primary weaknesses were restrictive assumptions and the form of the constraining and objective equations, weaknesses shared by most quantitative recreation models.

Psychological Models

The perception of recreational facilities, activities, and travel routes has been recognized as a key part of the recreation of an individual. Mercer has reviewed the concept of perception in the recreational experience (1971). A psychological approach may lead the recreational planner to view his role as providing the individual with various ways of fulfilling complex needs through recreation.

Lambe proposes that the Thurstone method is best for analyzing a person's choice of action. This method has each person selecting the course of action that he perceives as best, and assigning a relative value to each alternative. The chosen values are held to be normally distributed across each population group. The probability that a person will select a certain alternative (e.g., a specific travel route) considers the normal distribution of values for each alternative and finds the probability that other alternatives have lower values (higher "costs") for an individual.

The mathematics involved in the computation of probabilities and expected values is somewhat more complicated than previously noted techniques. Lambe believes, however, that this approach most clearly describes travel behavior. He also claims that it is superior to the intervening opportunity model or the probabilistic version of the gravity model (Lambe, 1969). This method is a type of probabilistic model, but the psychological basis used in the determination of that probability merits a separate category.

Due to its complexity, this methodology, as far as it can be determined, has not been used in recreational planning. Reports of the use of psychological techniques generally refer to population-specific economic modeling data collection techniques in which recreation preferences are associated with socioeconomic characteristics. However, its appeal is such that one may expect to see its application in future recreation studies.

Simulation Models

A simulation model refers to a set of statements, usually parametric equations, from which the behavior of an individual component of a system is described when various conditions are met. A simulation model in recreation would consist of a set of equations describing the travel and activity patterns for types of individuals and possibly the "behavior" patterns of the site (e.g., pollution effects, etc.).

Individual behavior can be modeled using the gravity, attraction, intervening opportunity, and other types of models, and one might expect to see these methodologies incorporated into a simulation model. As opposed to the "black box" approach, which is based on parametric relationships, the "feasibility" approach describes individual behavior, under various conditions, which is aggregated to describe the behavior of the system as a whole. The end result may or may not be feasible according to policy, budget, or other constraints.

The value of simulation models is their capability to predict the effect of a change in the system such as the addition of a new facility or new access road. They allow decision-makers to evaluate alternatives comprehensively and to obtain a reasonable idea of the effect of their actions. Simulation of behavior is very difficult to model, and only a

small number of contributions have emerged. Among these is the work of Stern (1973), Gaumnitz et al. (1973), and Howitt et al. (1974).

Site Use Models

The previous theoretical methods consider recreation trips from origins to destinations, emphasizing particular characteristics. For some methods, these trips were disaggregated by activity. This section briefly considers models of activities and events within a recreation area.

One type of model (fully developed in the operations research literature) that may have applicability to recreation areas is the scheduling model. This methodology schedules the numbers and departure times of individuals undertaking activities such as hiking, backpacking, and canoeing. Wilderness amenities which are threatened by overcrowding are the constraining features. Its application is discussed by Romesburg (1974). Quadratic programming, linear programming, and goal programming algorithms schedule use of hypothetical wilderness trail and river systems. Management implementation of scheduling may be met with hostility by those who associate freedom with wilderness.

Another application of operation research methodologies to site-related problems is the consideration of the optimal mix of activities on a site. The optimal mix problem has been called the knapsack problem because it describes the problem of packing a knapsack (or any container, submarine, or spaceship) with the minimum necessary items. It has been solved using dynamic programming and network (or graphic) algorithms. Branch and bound techniques may also be used to solve the problem, although the set-up would be extremely

difficult and costly. The major assumptions would involve personal activity preferences at particular locations.

Utility Maximizing Models

Utility maximization is conceived as a type of economic behavior. It holds that each individual will act to maximize his net benefits or utility. Niedercorn and Beckdolt (1969) have used it to derive the gravity law of spatial interaction. With respect to recreation, Menchick (1973) has used this approach constrained by the potential ecological damage to each site, individual leisure time and money, and equity considerations. It is a quadratic (non-linear) programming problem that distributes activities at a site.

Specifically, the problem is:

$$\text{maximize } Z = \sum_i^m \sum_j^n (q_{ij} x_{ij} - x_{ij} \sum_k^n d_{ijk} x_{ik})$$

subject to the constraints:

$$\sum_{j=1}^n c_{ij} x_{ij} \leq h_i \quad (i=1\text{---}m) \quad (\text{carrying capacity})$$

$$\sum_{i=1}^m x_{ij} = N_j \quad (j=1\text{---}n) \quad (\text{potential demand})$$

$$-\sum_{i=1}^m g_{ij} x_{ij} \leq -e_j \quad (j=1\text{---}j^*) \quad (\text{equity})$$

$$x_{ij} \geq 0 \quad (i=1\text{---}m, j=1\text{---}n) \quad (\text{non-negativity})$$

where

i = site i

j = activity j

q_{ij} = quality of site i for activity j as perceived by a party of type j

x_{ij} = congestion acting on a party of type j at i

d_{ijk} = reduction in dollars bid on trip type j , at i , per party type " k " ($k \neq j$) (e.g., others' congestion)

c_{ij} = damage coefficient--activity j at i

h_i = site and sensor characteristics at i

N_j = maximum number of party trips of type j in the time period of the model

g_{ij} = a constant

e_j = minimum welfare level of activity type j

m = total number of sites

n = total number of activities.

METHODOLOGICAL CONSIDERATIONS

The parameters of a model are estimated through calibration, which is accomplished in two ways. One method is the use of trial and error. The second is the use of statistical techniques such as regression analysis. Ellis and Van Doren (1966) used trial and error methods of fitting data to gravity, probabilistic gravity, and system theory models. Deacon et al. (1972) used regression techniques to fit data to probabilistic gravity and intervening opportunities models. Either technique may be used, but in the case of complex data manipulation as with the system theory model or simulation models, trial and error is the only practical approach.

The participation model typically uses regression techniques. Attraction models (sometimes called regression models) also use regression techniques of parameter estimates, usually the log linear least squares or the non-linear least squares estimation methods. The log linear approach, the traditional method of parameter estimation, involves a logarithmic transformation of the model, after which the parameters are estimated by ordinary least squares in a regression analysis. By comparison, McAllister and Kett (1976) claim that the non-linear least squares technique is superior to the log linear method. However, this superiority may depend on the specification of the model. Quandt and Young (1969) have indicated that when the stochastic terms are additive, the non-linear least squares approach should be used; when they are multiplicative, log linear least squares are appropriate.

In addition to estimating parameters, regression analysis also computes measures that may be used as indicators of how well the data fits the model. If, for example, the model explains all of the variance of the data, then the regression coefficient assumes a value of 1. If the model explains a lesser degree of the variance, it may be reconstructed by throwing out some of the variables and perhaps adding others. This is sometimes done without regard to a theoretical basis for the phenomenon that is being modeled.

Some recreation research findings have been based on faulty statistical analysis. Crandall (1976) describes a typical misuse of step-wise regression. McCuen (1974) describes the difficulty of using correlation analysis and the effect of spurious correlations in recreation research. Regression analysis is a form of model calibration through statistical inference. At best the results can only support a particular hypothesis.

The quantitative methods of recreation analysis have basic similarities. As Cesario (1969) noted, because the various theoretical constructs presented here explain the same phenomena, it is not surprising that the models should be equivalent under certain conditions. Cesario makes this claim for the regression (attraction models and the participation approach), probabilistic gravity, and the Ellis "system" (network or flow) models. In another paper (1975b), he claims that the probabilistic gravity model and the entropy maximizing model are equivalent. Ellis and Van Doren (1966) indicate that both forms of the gravity model and the "system" model give nearly equivalent results under certain conditions. Wilkinson (1973) reiterates this. Niedercorn and Bechdolt (1969) state that the gravity model may be derived from utility maximization (utility theory). Beckman and Golob (1971) claim that the entropy and probabilistic gravity models can also be derived from utility theory. Finally, Lambe (1969) indicates that the probabilistic gravity model and intervening opportunity models are actually slightly different interpretations of the Thurstonian model.

One weakness shared by nearly all the models is the failure to disaggregate for user, trip, and site characteristics. They may forecast an "average" number of recreationists, regardless of activity preference, trip duration, or site attractiveness characteristics. The gravity model, in particular, does not consider the capacity of each site, the type of recreation trip (such as vacation, weekend trip, or daily trip), or the effect of intervening opportunities (Kalter, 1971). The network model improves on the gravity model by considering the interaction between sites.

Another characteristic of the models is their overt simplicity. They clearly do not address the background issues of Section II. Should they be more comprehensive? Brewer (1973) and Lee (1973) have pointed out the danger of models that attempt to be complete. They are costly to operate, incomprehensible and misleading to decision makers, and require highly skilled specialists for operation. Increased complexity is not the answer. Rather, a model that is reliable and cost-effective should be sought. Invariably it would provide a coarse level of information--sufficient for some recreation decisions--as well as identify areas of further analysis for the more complex situations.

A SPECIAL CASE--BENEFIT ESTIMATION

As previously mentioned, the economic approach pervades the recreation methods literature due to a familiarity with economic concepts, the influence of its proponents, and the type of data thus far collected. It is a special case, however, because it is not concerned with predicting participation; rather, it attempts to estimate current and future benefits based on some level of participation for use in cost-benefit analysis or as a justification for pricing schemes.

Recreation benefits have been associated with a marginal analysis of the recreationists' "willingness to pay." The methods used to measure willingness to pay are interview techniques and estimates of consumer surplus. Interviews conducted on the site, in the vicinity of the site, and at origins attempt to establish the value of the experience, how much more the recreationist would be willing to pay, or how "big a bribe" he would accept to stay away (Knetsch and Davis, 1966). The weaknesses of these methods, as previously discussed, lie in the interpretation of the responses of users and would-be users as valid measures of behavior.

Consumer surplus, the additional price that recreationists would be willing to pay, is derived from participation data. The chief proponents of this technique are Clawson and Knetsch (1966). They hypothesized that demand for a particular site can be measured through the frequency and costs of visits to the site.²³ The frequency of visits is usually measured in visits per 1,000 population in the zone of origin (Figure 1) in order to obtain a participation measure that is not distorted by differences in population levels. A demand curve (Figure 2) is then constructed from the cost differentials from various zones. Different demand curves may be generated through the disaggregation of income, leisure time available, conditions of access roads, or management policies at the site. This approach has been investigated and extended to include the establishment of pricing policies based on benefit estimation (Becker, 1975; Binkley, 1977; Nautizal and Chowdhary, 1975; Willis et al., 1975).

Fisher et al. (1974) have used the Clawson-Knetsch methodology in a study of beach use in the Melbourne area of Australia in relating the distance to the visitation rate with some success. In this case, cost of travel was the primary component of total costs. The method provides an initial basis for evaluating levels of investment in beach resources.

Moncur (1975) conducted a similar analysis of the use of parks, primarily beaches on the island of Oahu, in the state of Hawaii. In addition, the effect of added costs at one beach on attendance at the other beaches is incorporated into the method. The study indicates that the Clawson-Knetsch approach can be used even with short travel distances.

Figure 1: Demand Curve for the Recreation Experience

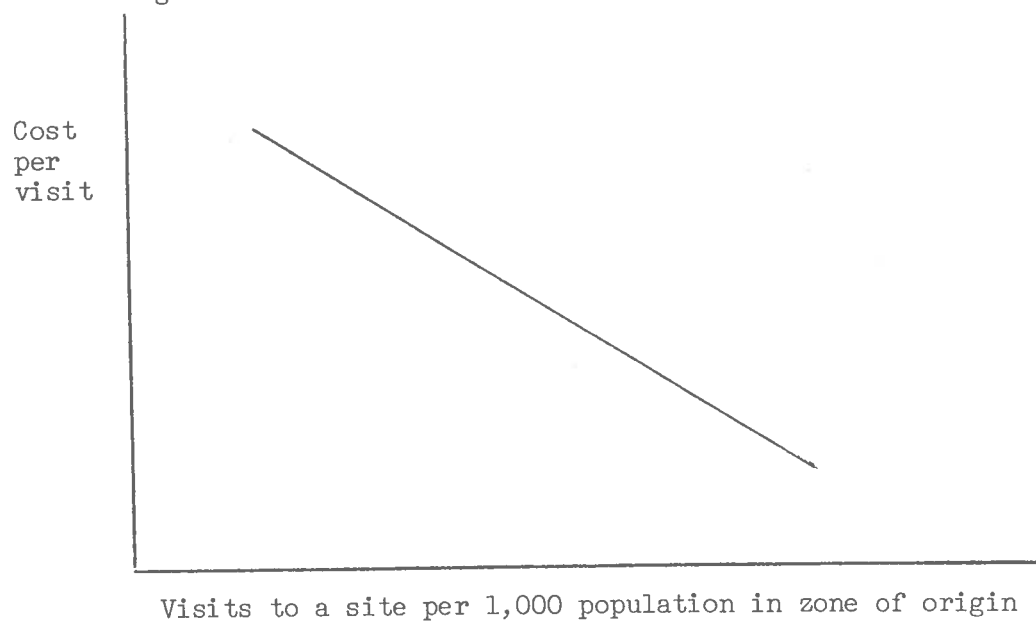
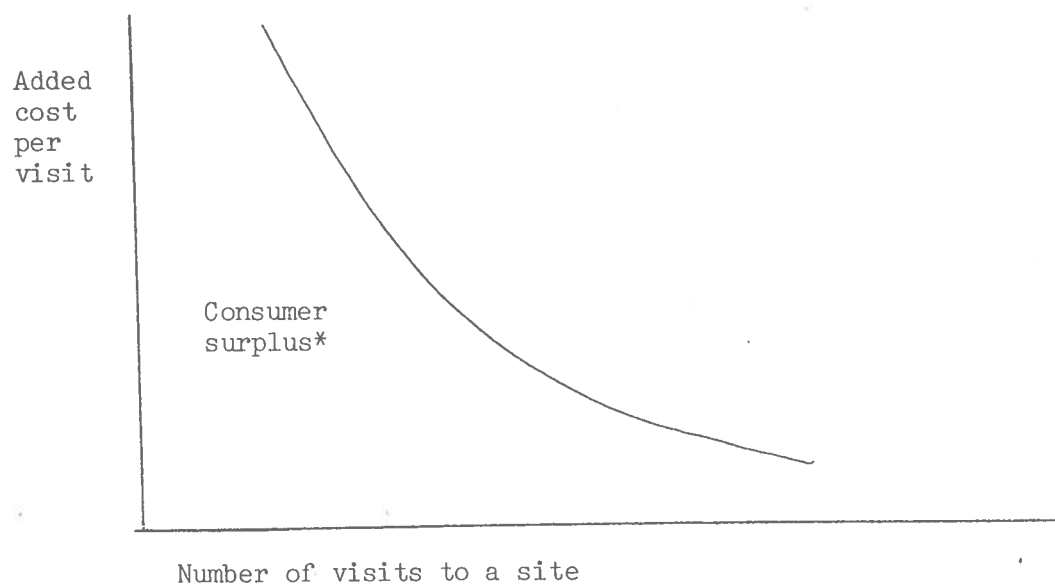


Figure 2: Site Demand Curve



*Willingness to pay additional costs--an estimate of site benefits.

Usher et al. (1974) developed a Clawson-Knetsch demand schedule to estimate the benefits derived from a nature reserve on the Yorkshire coast in England. The benefits computed for the months of July, August, and September 1970 amounted to only 2,000 Pounds!

Criticisms of Benefit Estimation

Although it has been reported that travel costs and travel time are highly correlated (Knetsch, 1963), it has become increasingly clear that the omission of time costs leads to an inaccurate, but conservative, measure of benefits (Cesario and Knetsch, 1970; McConnell, 1975). Initial attempts to measure the opportunity cost of time have put it at five to ten times the magnitude of travel and on-site costs (Keith and Workman, 1975), and has also estimated it between one-fourth to one-half of the wage rate (Cesario, 1976).

The aggregation of individual responses into a single consumer surplus implies that individuals respond in the same manner regardless of socioeconomic differences or origin. One response to this criticism has been the development of a technique by Pearse (1968), in which he computes consumer surplus taking account of the differences in costs faced across income categories.

Consumer surplus estimations are assumed to occur under unconstrained market conditions; that is, no capacity or congestion effects influence the participant. This effect is actually part of an overall complex interaction between demand and supply that results in various participation levels. As a result, latent demand may lead to a substitution of activities that is unaccounted for.²⁴ Thus, attempts to estimate a demand schedule from participation or consumption schedules may lead to erroneous results.

The benefit estimation of Clawson and Knetsch assumes that the recreationist is willing to pay the costs of the visit to the site. However, drawing inferences based on the recreationist's "willingness to pay" may prove to be a serious error in judgment by the recreation planner. That is, willingness to pay should not be confused with "ability to pay." Many low income groups may not be able to participate in costly activities whether or not they want to (Lavery, 1975).²⁵ The Clawson and Knetsch method lumps all types of activities together; in reality, some sites lend themselves to particular types of activities in either a physical or social sense. Finally, the approach does not address the complex question of intervening opportunities, and does not consider the effects on the primary site, of other sites, or the introduction of competition either in the form of new sites or improvement in old ones.

V. RECREATION POLICIES AND INFORMATION²⁶

REVIEW OF POLICY EXAMPLES

A circular relationship exists between policies and information. Policies affect the generation and analysis of information which in turn serves as a basis for future policies. Some policies readily indicate the type of information to be collected but may be without a theoretical or empirical base; or, policies may be so general that they become meaningless and unenforcible. In the latter case, analysis of data is likely to be bypassed, and decisions are made on a purely political-judgmental basis. Policies made without information are based on expectations instead of reality. Thus the information-policy "round" provides numerous means for the recreation planning process to go awry. Goals are not achieved, and issues are created rather than resolved.

The policies that guide recreation development are the policies of a bureaucracy in competition for funding and political leverage with other organizations. They are not the policies of "the public" per se, but are strongly influenced by their organizational environment.

Specificity may be built into the organization or into the profession with which its individual members identify. The position of the agency in the government hierarchy and the scope of its mission also influence policy and its use of information. The nature of the mandate or enabling legislation greatly affects the use of policy in the planning and decision-making process. Agency policy also may

directly or indirectly influence recreation planning and implementation in other agencies. Finally, policies may reflect spatial specificity and have site-use, access equity, pricing, and acquisition characteristics.

The policy examples which follow are selected from the organizations having jurisdiction within the Orange County coastal subregion, an area currently under study by the California Coastal Commission.²⁷ It contains a diversity of planning issues and a wide range of policies which serve as examples of what one might find in any coastal planning area. Although the exact policies and policy conflicts might not be duplicated in other areas, the types of policy attributes which are brought forward are likely to be found throughout the coastal zone in the United States.

Policy Specificity

Many of the policies promulgated by governmental agencies relate to planning goals, objectives, or processes. The policies that state a position with regard to societal or environmental goals are the least specific. The policies relating to objectives are more specific in that the fulfillment of the policy, and in some cases, its degree of fulfillment, can be measured. Finally, the most specific policies indicate which processes are to be followed in order to realize the goals of the organization. Often standards are included in these specific policies. Some examples follow.

Least specific or goal oriented: "Provide Access to Recreational Facilities" (California Transportation Plan, draft, July 1975).

Somewhat specific or objectively oriented: "Only those uses which require shoreline location, or in which shoreline location is highly desirable, will be permitted on the shoreline" (Newport Beach Shoreline Element, 1971, p. 6).

Most specific or process oriented: "Existing public access to the beaches should be retained, and additional easements acquired such that they are not more than approximately 1,000 feet apart. Signs directing the public to access points should be posed at locations adjacent to Coast Highway..." (Laguna Beach Open Space Element, 1973, p. 24).

Policies that contain standards are most readily adapted for analysis. Care must be taken, however, to see that these standards are not incorrect, but are based on current information. As in the third example above, it may be difficult--if not impossible--to determine "the most correct" standard for use. Obviously, nonspecific policies do not necessarily depend on an information base. However, specific policies, in order to be effective, do depend on reliable and sufficient information.

Agency Hierarchy

Recreation policies are promulgated by different levels of government as well as the private sector. Federal, state, regional, local (including cities, counties, and special districts), and private agencies play a major role in the formulation of recreation policy. The type of information derived by an agency reflects its position in the hierarchy. The federal government will develop information on topics of federal concern; cities will develop city-wide information. Agencies at the top of the hierarchy will set review standards, and also fund, or recommend funding to, agencies further down the list. As funds travel downhill, so do work requirements. Due to the work load required of local agencies, only a nominal data collection effort may be possible for any one project. As a result, lower level agencies may produce plans which barely fulfill the letter of the law or the administrative requirements of a higher agency.

Agency Mission

Policies affecting recreation may be made by multi-purpose or single-purpose agencies. Examples of single-purpose agencies are the Army Corps of Engineers, the Bureau of Outdoor Recreation (BOR), California Department of Parks and Recreation, and the California Department of Transportation (CALTRANS). Multi-purpose agencies are the county and city governments.

Multi-purpose agencies will promulgate policies and generate information that will correspond across agency function. Single-purpose agencies will often conflict on both counts with other single-purpose and multi-purpose agencies. The picture becomes even more confusing when single-purpose agencies begin operating outside their mandated missions as, for example, when the Army Corps of Engineers functions as a recreation planning agency. As jurisdictional problems emerge among agencies, policy conflict will become obvious, and information generated may be used to support one position against another.

An agency may have regulatory or review powers that enable it to enforce its policies with additional effectiveness. Dedications and easements for recreational use can be a condition for permit approval if they mitigate a policy-oriented deficiency; or, public works funding may depend on the fulfillment of recreation requirements. Often confusion results when sweeping policy statements are applied to specific development proposals. Not only is it difficult to determine project or plan adequacy, but also the selection of mitigating action becomes a political transaction based on expectations or tradition without the appropriate background information. At this point, if one of the adversaries is unhappy with the outcome and unconvinced with the available information,

the case may be taken from the hands of the planning establishment and settled in the courts.

Direct Versus Indirect Policies

Direct recreation policies are most obviously made by single-purpose recreation agencies such as BOR and the California Department of Parks and Recreation. Indirect policies are made by agencies that control the ability of recreationists to reach their destination or control the construction of recreation facilities. One agency that indirectly affects recreation in the California coastal zone is the California Department of Transportation (CALTRANS). In the past, road building decisions were based almost entirely on work-trip-related policies. Hopefully, CALTRANS' view is being broadened to consider the effect of recreation trips. For the present, however, CALTRANS' road building plans have disappeared in the California coastal zone due to economic considerations and the emergence of resource conserving transportation proponents in state government. Until the effect of highways on the use of recreation facilities is fully appreciated, many transportation planners may continue to use traditional methods, such as those which input and process work trips to provide circulation information for coastal cities and counties.

Indirect policies are established and used independently of the recreation issues they may engender. Feedback that points out the indirect effect of its policy should be provided to any offending organization.

Spatial Specificity

One of the major criticisms of policy planning is that policies are not usually geographically specific. Actually, four levels of

spatial specificity are involved. A policy may have no geographic references whatever, such as:

The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance (California Coastal Act, 1976, §30251).

Occasionally, some physically identifiable natural components, such as a beach or marsh, are mentioned:

The rocky portions of the beaches should remain in their natural state; and the sandy portions should remain open and available for public use (*Laguna Beach Open Space Element*, 1974).

Infrequently, policies are geographically specific, such as:

To focus recreation beach facilities at Crystal Cove and Moro Beach and... (*Orange County Approved Policies for the Irvine Coastal Area*, June 1976).

Finally, a policy may refer to a map, be mappable, or area-specific.

For example, the *Newport Beach Open Space Element* is mapped at a scale of 1 inch : 1500 feet, which should prove sufficient for most purposes, provided the boundaries are properly drawn. Even so, the boundary for public beaches is approximately 1/8 inch wide on the map, which corresponds to a width of nearly 190 feet! Even more remarkable, this may be the most reasonable resolution one should expect. Certainly, it is better than maps with less detail.

Site-Related Policies

Five types of site-related policies exist. The first type is intended to resolve conflict between the recreation and other possible uses of a site. These policies often do little more than indicate that conflict between values exists and that some reasonable tactic of resolution be attempted. For example:

Oceanfront land suitable for recreational use shall be protected for recreation use and development unless present and foreseeable future demand for public or commercial recreational activities that could be accommodated on the property is already adequately provided for in the area (California Coastal Act, 1976, §30221).

These policies have a basic similarity to that of the acquisition policies that are discussed in a following section.

The second type of site-related policy considers the conflicts among different forms of recreation:

Increased recreational boating use of coastal waters shall be encouraged, in accordance with this division, by...limiting non-water-dependent land uses that congest access corridors and preclude boating support facilities (California Coastal Act, 1976, §30224).

Third are policies that determine the priority of site use based on natural site factors:

Only those uses which require shoreline location, or in which shoreline location is highly desirable, will be permitted on the shoreline (*Newport Beach Shoreline Element*, 1971).

Fourth, the priority of site use may vary with its urban, suburban, or rural location. For example:

...highest priority will be given to seeking access to beach and coastal lands near urban areas (*California Outdoor Recreation Resources Plan*, 1974, p. 167).

This is also an example of an access policy discussed below. The California Coastal Plan policy, "Provide a Variety of Recreational Facilities near Metropolitan Areas (#137)" is another example.

Fifth are policies that establish allowed levels of use at a recreation site, sometimes specifying carrying capacities, or use standards. These policies are based on the premise that use levels exist at which environmental degradation or a loss of enjoyment on the part of the recreationist occurs. Implicit in them is a trade-off

of recreation use and natural or social-psychological factors of carrying capacity. Examples are:

Limit Access and Recreational Use Where Necessary: Use of the coast for recreation and education shall be controlled where necessary to prevent significant damage to natural resources by tidepool collecting, underwater fishing, trampling of marshes, traffic on dunes and bluffs, etc. The controls shall seek to ensure continued productivity and recreational enjoyment of those resources and to protect public safety. Where information is available to determine the environmental carrying capacity of a coastal resource, the level of use of roads, parking areas, and other support facilities shall be kept within this capacity (*California Coastal Plan*, 1976, Policy #142).²⁸

Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes (*California Coastal Act*, 1976, §30230).

The potential use of a site is one of the central aspects of recreation planning. These policy characteristics direct the social-social, natural-natural, and social-natural trade-offs that occur in the determination of site use. In such cases, a consistent level of information with which to implement the policies may be difficult to obtain. Its existence or absence makes formulation and use of site use policies a very sensitive area of recreation planning.

In the analysis of the supply of recreation facilities, the potential effect of site use policies will be necessary to determine, and conceivably limit the recreation potential of an area.

Access, Equity, and Pricing Policies

Access, equity, and pricing policies also affect the participation patterns in coastal recreation. These policies address the equity issues

of beach access and of the allocation of the costs of the demanded recreation facilities.

Most plans that consider recreational factors have at least one access policy. Two examples which indicate the diversity of such policy are:

Development shall not interfere with the public's right of access to the sea where acquired through use, custom, or legislative authorization (California Coastal Act, 1976, §30211).

Existing public access to the beaches should be retained, and additional easement acquired such that they are not more than approximately 1,000 feet apart. Signs directing the public to access points should be posted at locations adjacent to Coast Highway... (*Laguna Beach Open Space Element*, 1974, p. 24).

Equity policies in recreation typically consider issues where access is denied due to excessive participation costs (e.g., "Provide Lower-Cost Tourist Facilities in the Near Coast Area" [California Coastal Plan, 1976, #125]). Another example follows:

Lower cost visitor and recreational facilities and housing opportunities for persons of low and moderate income shall be protected, encouraged, and, where feasible, provided (California Coastal Act, 1976, §30213).

Programs such as the California Park and Recreation Department's "Minority Outdoor Recreation Study" have led to recommended policies, such as:

New strategically located recreation areas should be added to the State Park System...which are intended to increase social equity (California SCORP, 1972, p. 32).

However, because potential coastal facilities are limited, alternative courses of action, such as the implementation of an education program regarding coastal resources, will become more important. Also, the little understood but naturally evolving uses of facilities

by minorities which, for example, has led to the image of Dockweiler Beach in Los Angeles County as a "black beach" should be encouraged. Significant Chicano populations exist in Santa Ana, Orange County, and in the San Diego areas that might find coastal recreation more understandable and enjoyable if culturally attractive beaches were available. At present, however, no policies encourage the development of such beaches.

From a review of recreation plans, policy-setting bodies seem reluctant to promulgate an overt pricing policy, which may be due to the public's image of recreation as a free good. That such policies do exist can be readily seen in the parking and camping prices at county and state facilities. The basic issue is whether the user should bear the cost--or at least part of the cost--or whether a local or statewide public should completely subsidize his recreation. The cost sharing inequities among governments as noted in the *California Coastal Plan* emphasize this issue further:

Ensure Equity in Cost of Maintaining Coastal Recreation Facilities: Because in extreme situations local taxpayers can inadvertently be penalized when a municipality is responsible for maintaining coastal recreation facilities (e.g., beaches, trails, parks, services for commercial recreational facilities) used heavily by inland residents, county, state, or federal governments shall assume greater responsibility for paying some of these costs in communities where it can be established that this inequity exists (1976, #139).

It is easy to see how some communities, either due to cost or other considerations (i.e., crime), might inhibit the use of recreation facilities by the public.

When the recreation analyst considers the effects of access, equity, and pricing policies and the issues they address, typical measures of impedance between recreationists and recreation resources

cannot meaningfully describe the distribution of recreation trips.

People simply do not always go to the nearest beach.

Acquisition Policies

One action that a government can undertake to increase recreation that is straightforward and easily understood by the public is the acquisition of open space or desirable lands for the purpose of recreation. Every open space and recreation element is replete with acquisition policies. Indeed, its emphasis is so great that one might be led to believe that it is the only viable governmental policy for recreation. An illustrative policy follows:

The federal government will continue to utilize the Land and Water Conservation Fund to acquire federal lands and to assist the states in acquiring and developing recreation lands and facilities (BOR, 1973, p. 62).

Acquisition of public lands for recreation may occur by methods other than simple purchase as described in the following *California Coastal Plan* (1975) policy:

Use Appropriate Techniques for Expanding the Public Use of the Coast: Public use of the coastline shall be acquired through public purchase, dedication from land owners as reasonable conditions of appropriate development, purchase and leaseback, scenic and open space easements, scenic restrictions, resource management contracts, and incentive zoning (#156).

Sometimes acquisition policies are made without regard for their implementation. For example:

The strip of land between Back Bay drive and the tidelands, in the Upper Bay, will be acquired for public use (*Newport Beach Shoreline Element*, 1971, p. 5).

Although such policies may prevent potential recreation areas from being used for other purposes, without an implementation mechanism they are little more than wishful thinking.

Finally, a policy may allude to a deficiency of recreational opportunity that must be corrected. The policy may refer to standards that can be used to determine whether a deficiency exists,²⁹ as seen in the Southern California Association of Governments (SCAG) *Conservation and Open Space Plan* (1976):

Continue to place emphasis on the provision of recreational opportunities in impacted areas and in areas of greatest deficiency (p. 59).

Work with all concerned agencies and the public to meet recreation land standards as defined in this respect (p. 59).

Those who project recreation usage should realize, however, that acquisition policies can never be complete and specific with respect to future sites because the process of acquisition is always a form of negotiation which may have unforeseen results. Typically, the site under the gravest threat of development will receive a priority for acquisition.

POLICIES AND METHODS: IMPLEMENTATION CONSIDERATIONS

As this section has indicated, the policies of various types of organizations have a strong influence on the role of information in recreation planning. Policies direct what data are to be collected, and influence how it is to be collected and the degree of accuracy and precision achieved. Policies indicate a preference for a type of information that can be processed from the data, how the information is processed (e.g., with computers), and how it is presented. Finally, policy determines how the information will be used. The belief that

information forthcoming from organizations is "objective" is an illusion. The generation of information is clearly influenced by policy; these policies, in turn, depend on information, expectation, or political considerations.

Recreation planning decisions are made regardless of the issues discussed and with or without the assistance of predictive methods. These decisions are often required from a legal point of view, or at least in a societal or organizational context. Policies serve to guide the decision maker, and may be based on complete information or may be made with an understanding that many uncertainties exist. These uncertainties, in fact, may lead to opposing points of view in policy formation, and the resultant policies will clearly indicate the effect of compromise.

The policies and issues facing the decision maker differ by agency type. Multi-purpose or single-purpose, federal, regional, or local agency characteristics help determine the focus and scope of the decision making environment facing a recreational planner. Certain types of recreation methods may be useful or affordable, or may generate politically important information.

Within this framework, two major difficulties exist. The first concerns data. Data may not be available and, if not, are too expensive and typically take too long to collect. Existing data may have been collected for other purposes, or they may simply be in error! But when the information reaches the end of the analytic process on computer print-out sheets, many people accept it as authoritative--much less true--and little concern is paid to the validity of the input data.

The analyst is also faced with the problem of establishing parameters for his method. The first inclination is to use standards and in any case some hard numbers must be obtained to represent specific costs, times, capacities, distances, etc., which reflect recreation behavior. They are entered into the program and used for comparative purposes with internally generated values. The analyst may be forced to make up his own decision criteria if his agency, his profession, or the literature do not provide him with some basis for estimation. Even if everyone tacitly agrees to the parameters that are used in the method, that, obviously, does not mean that its predictions are correct. It does, however, mean that they are acceptable in a political sense.

Policies often lead to conflicting solutions when they are applied in a straightforward manner. Conflict occurs between policies of different agencies, between the policies of a single agency, between central and local government policies, and between general and specific policies. These conflicts are caused by incompatibilities in the previously discussed policy attributes.

An analysis of the Southeast Orange County Circulation Study (SEOCCS) reveals that its four land use alternatives conflict with the California coastal policies in ten separate locations with respect to residential development. All four alternatives also exceed the development guidelines developed by the Southern California Association of Governments (SCAG). Projections of air quality for each scenario indicate that in each case the Federal Ambient Air Quality Standards will be exceeded in 1995 in all of South Orange County to a point higher than presently exceeded despite the introduction of better smog emission control devices.

Among the intra-agency policy conflicts is the introduction of a freeway corridor in the Circulation Element Amendment for Orange County that will penetrate an open space, the Laguna Greenbelt, proposed in its Open Space and Conservation element. This element of the General Plan as well as the land use, safety, noise, scenic highway, and housing elements, will have to be changed to accommodate the circulation element.

How does policy affect one who analyzes recreation information? First, it forces the analyst to recognize that he may be working in an unstable decision making environment. Perhaps he will be limited to analyzing conflicts that arise in order to project their effects onto future alternatives for recreation. Second, it indicates that the solution to a planning problem that is optimal in accordance with a set of predetermined criteria may not be a solution--or may not be the only solution--to the planning problem at hand. The outcome may depend on organizational and socio-political considerations as much as the available data and the technique used.

VI. RECOMMENDATIONS FOR "BOTTOM UP" RECREATION PLANNING IN THE COASTAL ZONE

The governmental framework that encompasses coastal zone planning disregards the large scale and systematic characteristics of coastal recreation. The emphasis is on "bottom up" planning, in which local governments make decisions having implications far beyond their jurisdictional boundaries. These decisions affect issues that are beyond local interests and cannot be analyzed due to limited money, time, and personnel. Those functions not entrusted to local government are administered in an indirect and overlapping manner by agencies at the regional, state, and federal levels. The lack of coordination between the governments and agencies having jurisdictions in the coastal zone continues to be a critical problem.

In California, the Coastal Act of 1976 calls for the direct involvement of local governments in the detailed planning of the coastal zone. Each government is preparing a land use plan and zoning ordinance to indicate the type and location of future development in the coastal zone. This effort is being funded as a Local Coastal Program to be carried out within guidelines set forth by the California Coastal Commission.³⁰ However, local governments are coming up with different interpretations of the guidelines and are attempting to shift the planning process to local issues. At this point it seems possible that recreation and transportation issues of regional and statewide concern will not be addressed in the planning process.

To date the main thrust in recreation planning has been provided by funding to states from the Land and Water Conservation Fund for the

preparation of a State Comprehensive Outdoor Recreation Plan (SCORP) and to local and regional governments from "701" planning grants. However, the analytical methods of recreation planning have been developed through the efforts of federal agencies and focus on the "big picture" of recreation. While they may be occasionally found in a SCORP, little emphasis on their implementation exists at the local level. Whether local governments would use these methods must be realistically evaluated in terms of local needs. Their desirability to date reflects only that of higher level agencies which have supported their development.

Local government will play a decisive role in future coastal zone planning. For example, the local attitude in encouraging or discouraging tourists is likely to be reflected in the local coastal plan. Many coastal areas in the United States thrive on the recreation/tourist industry. The governments in these areas are usually influenced by local business interests and will work to enhance local attractions and remove inconveniences which visitors might face. Carmel-by-the-Sea and Laguna Beach are two coastal cities in California which have attained statewide--if not national--recognition for their charm and extensive tourist and recreation facilities. They represent models for municipalities that wish to attract visitors beyond what might be expected from an analytical approach which allocates statewide demand based on travel impedance or from a likely distribution of recreationists throughout the coastal zone.

Local governments have also tried to downplay the attractions of their areas to outsiders. These are the governments which maintain beaches and parks and incur heavy use of highway, water, and sewerage

facilities; or experience the inconvenience of traffic jams and large pedestrian crowds. Unless the city is heavily commercialized, it is likely to find these activities a net expense. Citizens from Bolinas, California briefly blocked the main access highway in order to keep out outsiders who were using local resources and services. However, the merchants quickly came to the defense of the tourists; a similar scene took place briefly in Carmel-by-the-Sea. Both examples indicate that each coastal town has proponents for and against outside visitors.

Fortunately, most local governments seem willing to accomodate recreationists, provided that their goals (usually growth and commercial development) can be attained and that special concerns (e.g., expenses) can be met through federal, state, or regional assistance.

Local coastal management programs such as those in California are being developed on a "learn as you go" basis. The following recommendations for local government are made in order to enhance the possibility of effective recreation planning as the programs in each coastal state evolve.

Local governments should be willing to participate in a comprehensive planning program for coastal recreation initiated by a state or regional agency.

The planning and decision making environment that the local planning program faces might eliminate any comprehensive or integrative approach to recreation planning. In particular, an analytic approach, or participation in an analytic approach, might be rejected out-of-hand by the local decision making body (e.g., Board of Supervisors). This is likely where a view against any type of planning predominates. In this case there is little advantage in entertaining a recreational

analysis beyond the low-keyed effort one finds in many General Plan Open Space elements. However, local planners should still consider cooperation with the recreation planning programs of other agencies. The value of the information they might receive should not be underestimated. The advocacy of a position before even the most hostile of decision making bodies can be substantially supported with an appropriate presentation of "hard" information.

If the local decision makers are openly receptive or neutral to an analytic approach, then the capability of the local planning program to contribute to its application must be considered. It appears that the role of most governments will remain limited even if they are enthusiastic supporters of analytic methods. A local government usually has neither the funding, manpower, or skill pool to make a commitment to anything except a "crisis."

State and regional agencies have often been insensitive to the limits of the local planning program. In the case of coastal zone planning, funding has been passed on to the locals along with criteria for a coastal management program. However, money alone will not guarantee success. Agency posture and interaction with respect to policy and information, as influenced by local politics, and the availability of qualified planners and managers will limit even the most advanced planning program.

Local government should undertake a policy analysis of all agencies affecting recreation within its jurisdiction.

The policy analysis as described in Chapter V indicates the agencies which overlap local government in jurisdiction and interest,

and discloses various site and user criteria and the potential effect of actions by "outside" agencies. The policy analysis should begin with the identification of all agencies having jurisdiction within the local area, the relationship of one agency to another in the government hierarchy, and the type of agency function (single- or multi-purpose). The next step is the determination of the direct and indirect effect of agency policies on recreation in the area. Special emphasis should be placed on highway departments and on water and sewerage agencies in areas where drought conditions exist. Finally, policies which affect site use--such as those which are spatially specific, site-related, or concerned with access, equity, pricing, or acquisition--must be analyzed for constraints and parameters.

Policy analysis, a step that many methodologists skip, should precede detailed data analysis. When an analytic approach ignores a policy, it is subject to question. If it is in violation of policy, its results must be discarded.

Local governments should assist and encourage the collection of recreation data.

A local government can support data collection, even within the strict constraints it may face. It can collect useful information at little or no cost. Much of the data described in Table 2 need be collected only once or on an infrequent basis. Recurring data requirements can be met using spot checks by on-site personnel or through a volunteer program using Boy Scouts, students, or other groups. An example of what might be done is the collection of license plate numbers of beach users or tourists during a peak recreation period. In California, this data could be processed by the

Department of Motor Vehicles in order to locate the origins by census tracts and traffic zone without identifying the recreationists.

Additional measurements can be taken at local public and private facilities. Traffic counters can be placed with state assistance on major thoroughfares during high use periods. Private resorts can be encouraged to place traffic counters at ingress and egress points, as is done in trip-ends generation research. Local businesses can help recreationists indicate preferred locations and activities and to voice complaints. Local shops, motels, and restaurants are prime sources of information and would probably appreciate additional knowledge of customer trends.

If possible, a program of data collection can be established on a periodic basis. However, "program" implies funding and expertise requirements and may shift the burden from the "locals" to an agency higher in the hierarchy. A very promising method of data collection is the recreation poll, similar to the political poll, which would be taken throughout the state on a periodic basis.

Local governments should evaluate data collected by other agencies.

The local planning program can also assist in the analysis of data collected by other agencies. For example, state beach usage figures can be examined and compared to local usage figures. Additional comparative information is available from other state and regional agencies and from consulting reports. For example, in its Orange County subregional analysis, the California Coastal Commission used information from state departments of parks and recreation and transportation(CALTRANS), the Southern California Council of Governments (SCAG), Orange County and local government general plans,

and consulting reports that supported the general plans or other government programs such as the U.S. Department of Transportation Traffic Operations Program to Increase Capacity and Safety (TOPICS). Information tends to be "recycled" in planning reports of this sort. One begins to wonder how many actual sources of information really exist, because the referenced reports usually cite each other. "Recycling" will continue to occur--even when it is incorrect--unless the local planners (or someone familiar with the local area) can call it to question.

Local planners can also point out difficulties in valid data. For example, it might be impossible to disaggregate state or regional data for local use. Or, data on specific activities in a local area may be deficient; other data may be superfluous. The "locals" can provide a useful insight which is lacking in state and regional analysts who are typically removed and perhaps insensitive to the actual recreation experience.

Local government should analyze recreation data and set local standards where possible.

Any analysis undertaken by "locals" is most effective when it portrays current local issues in a straightforward manner. For example, the weekend traffic problem can be investigated in an origin-destination survey and presented in tabular form to show which local areas are affected by visitors from various origins. The issue might be resolved at a local level by re-routing traffic or by installing a signal light. If the issue were beyond the local government's control, it could be brought to the attention of the appropriate regional and state agencies.

Information generated at the local level can also be used to formulate standards which can be passed on to higher level agencies in order to prevent the blanket use of standards in jurisdictions which are clearly different. As previously mentioned, these standards must be based on evidence. The authority of a local government will not be a sufficient basis for standards in the long run. For example, standards should not be used to limit visitors unless a substantial problem, such as insufficient water or sewage facilities, exists. In any case, the emergence of standard-oriented issues will be a clear signal to a higher authority to mitigate the problem if possible. Therefore, standard-setting may be used by "locals" as a means of initiating a desired response when other approaches fail.

Local government should play a major role in the evaluation of the parameters, benefits, and costs of analytic techniques used by a higher level agency.

The resource limitations of the local planning program may eliminate or severely cut back on efforts at analysis and standard setting. Even if there are sufficient resources, the analysis should still be limited in scope. Local planners will recognize that the activities taking place in their area represent only a small part of the coastal recreation experience available to regional recreationists. A detailed analysis by the local staff would probably disregard the effect of the other recreation opportunities while wasting valuable resources, but detailed analysis should take place at a higher level where the entire picture can be pieced together without a duplication of effort. However, *local governments should not relinquish the prerogative of selecting an analytic technique to a regional or state agency without some influence on its objectives, the kind of information produced, and the*

input and output formats. The information should be timely and topical for local decision makers and the analysis should not ignore local issues as is frequently the case when it is performed by a single-mission agency.

Every planning process requires the establishment of criteria which are subjective and issue-laden. An example in coastal planning is the determination of a "fair share" of highway capacity for local residents and visiting recreationists during a peak recreation period. Should existing proportions of each group for a peak, or averaged, time period (hour, day, etc.) be prorated into the future? Should the projected growth rates of local and day-trip (within two hours' drive under normal conditions) populations be taken into account? Many other questions can be asked. Unless local governments show their interest in such decisions, they will have to accept the decisions made by the staff of a higher level agency. In practice, when a point is reached in the decision making process such that the basic parameters cannot be rejected, it is too late for constructive local government participation.

Different perspectives exist on the benefits and costs of a comprehensive analysis of recreation in the coastal zone. The local decision makers and planners will view such a program with a "what's in it for us" attitude. Local government decision makers may see a new source of funds to be used in solving a wide range of problems--where

recreation is seen in a relatively low position on a list of priorities. Local planners will be hesitant to increase their workload and can be expected to welcome the program only under duress or when they are sufficiently impressed by its potential.

Decision makers and planners at higher levels will probably favor an analytic approach -- the politicians because they recognize a favorable stance for public support, the planners because they are "hungry" for information. It seems that the higher-than-local levels of government are less concerned about costs. While the "locals" are under the scrutiny of their constituents, their regional, state, and federal counterparts are not, and are more apt to receive their criticism from the bureaucracy rather than from the public. Another well-known aspect of the problem is public inconsistency over the desire for recreation facilities and the aversion of their costs-- while politicians who favor recreation projects get elected, bond issues to finance them are often defeated.

For some local jurisdictions, coastal recreation development options may be so limited that the costs of a local or regional planning program would cause it to be inefficient. Funds might be better spent to purchase the remaining piece of land or to improve existing facilities rather than to support a sophisticated planning program. This is a decision to be made on an area-by-area basis by all levels of government concerned with the region. The "locals" have had little influence in such decisions in the past.

The use of consultants also merits a careful review. Their work might duplicate that of a comprehensive state-regional-local planning program. In addition, the fact that they operate on a one-time basis--often without continuity from previous efforts--should be considered.

The benefits of a well-run coastal recreation planning program will be shared by visitors and local population alike. Visitors will have better access to facilities which will be better equipped to handle large crowds and to provide the desired activities. Local citizens will feel less disruption as visitors are quickly guided to their destinations. Also, local business would obviously welcome any increase in sales brought about by improvements in access and facilities.

In summary, the involvement of the local planning effort in comprehensive recreation planning varies, depending on:

1. the local attitude regarding the use of facilities by outsiders;
2. the decision making environment faced by the local planning program;
3. the willingness of the local planning program to participate, even at a reduced level;
4. the available resources: funding, manpower, and ability; and
5. any analysis which takes place, at any level, is limited by the policies of all agencies having jurisdiction and influence within the local coastal area.

In any case, the participation of the local agency is limited to:

1. data collection on a small scale, often in a piecemeal fashion;
2. encouraging data collection and dissemination by local business;
3. evaluation of information about the local area published by other agencies and governments; and
4. setting standards.

Finally, local governments should strive to participate in the planning process to the fullest extent possible. In particular, they should not relinquish the prerogative of selecting an analytic technique that will affect local planning without some influence on its objectives, results and information, and input and output formats. Local governments should also participate in the establishment of assumptions and parameters used in the analysis, as well as perform an independent review of the costs and benefits of recreation planning; local governments should not be required to accept an inequitable solution dictated by higher authority.

VII. THE FUTURE OF COASTAL RECREATION PLANNING:
ACTIVITIES, POLLS, AND CENSUSES

Recreation planning currently consists of attempts by various government agencies to predict future demand as a basis for acquiring additional acres of parkland. Two aspects of the process which are likely to undergo intensive investigation in the near future are the lack of understanding regarding recreation and the lack of information on how and by whom recreation sites are used.

The first area of research may reveal that many of the recreation activities which take place in the coastal zone are not dependent on coastal resources. For example, there is some evidence of a positive crowding coefficient at some beach facilities; i.e., the major attraction of a recreation setting may be the presence of other people. If this line of reasoning is valid, then the predicted crush of recreationists in the coastal zone could be eased with the construction of large outdoor recreation complexes at inland locations by public and/or private developers. These might differ from the traditional park in that they would provide opportunities for active recreation (wave machines, skateboarding, etc.) along with an attractive social setting. In California, an outdoor recreation "Disneyland" to the east of Los Angeles might divert many potential coastal visitors, although it would be difficult to design a facility that would be more attractive than the beach for a variety of social groups.

There is a growing interest in who uses and who does not use existing recreation facilities. Although it may be clear that some

parks are heavily used and some are not, it is not clear why and how the development of additional facilities will affect demand. Recreation planning is now largely a guessing game that is all too readily susceptible to political influence. The development of reliable usage information is the first step toward the efficient use of existing and future parks.

The drawbacks of past efforts at recreation data collection will help shape its future. Too many "one-shot" studies have been made, and in general they are not comparable--they were originated for different reasons and explore different types of recreation in different locations while employing different types of analysis. There are also problems that are typical of recreation information systems. For example, in California the Parks and Recreation Information System (PARIS) has never been fully operational due to budgetary constraints. It was designed to mechanize statewide recreation planning and was overly cumbersome and expensive. It contained a questionable procedure of matching participation with supply to obtain needs. The raw data would go in one end and the locations for new parks were to be printed out from the other. Not surprisingly, the system has been reduced to a more practical role of analyzing attendance records.

What is needed is an intermediate form of data collection and analysis; something more than a "one-shot" effort and something less than a complete information system. Two possibilities exist: a recreation poll and a recreation census. The recreation poll would be similar to the political poll. It is versatile and uses the most advanced types of scientific sampling techniques. Its scheduling and question format can be changed from year to year; its respondents can be stratified by metropolitan region, age, income, race, etc.; it can be conducted by an existing opinion research organization under government guidelines.

The recreation census is a much more intensive project that would be undertaken by a government agency, perhaps modeled after the California Population Research Unit. It would provide detailed information and a continuing update of projections based on new information.

In the short run, the recreation poll is preferred to the census. First, the poll is flexible; as more is learned about recreation, the nature of the questions is likely to change. Some baseline data should be collected in succeeding years, but the emphasis would be on discovering as we proceed, rather than on collecting a complete data base of information each year. Second, the poll appears to be the less expensive alternative. For \$200,000 per year a substantial poll could be conducted by a research organization, but this amount would just begin to man a state census project and still not collect any information. Third, the poll would be more responsive to legislative--and thus local--concerns. It could be administered by an existing agency and could be guided by local, regional, and state interests along with "public-at-large" and "expert" appointments. Its effectiveness could be spurred by direct control of appropriations. However, once the poll became routine to the satisfaction of its clients, it would seem appropriate to shift to the census approach. The flexibility and visibility of a poll would no longer be required. What this means to local governments is that they can expect to see substantial recreation information about their areas; moreover, they should expect to participate in its development.

Recreation planning in the future cannot be considered separate from the economic, sociological, and technical changes which lie ahead. Recent experience has shown us that the "gas crisis" of 1974-1975 had

a definite effect on recreation trips. It is possible that recreation travel will be the target of future conservation programs, and has been estimated that a 10 percent reduction in non-urban recreation trips would save 150 million gallons of gasoline in California alone (Gold, 1977, p. 174).

The current drought in California will close some recreation areas in the mountains and may cause increased attendance in coastal areas. Other, less predictable factors, such as the emerging role of women in society, will also need consideration. However, before recreation can be tied into a scenario approach or a cross-impact analysis, the effects of societal and technological trends on recreation require further analysis. Relevant research could affect the methods of predicting recreation in the coastal zone.

Recreation planning is a field of growing importance and one that is ready for an infusion of new ideas. The special circumstances of the coastal zone cause it to be the prototype for recreation planning. The changes in policy and information development which will occur through all levels of public decision-making will serve as a model in other types of planning in the years to come.

NOTES

¹This definition first appeared in Driver and Toucher (1970).

²Need is also used in a pragmatic context in recreation, as the difference between the supply and the demand, or projected use of facilities in a system of recreation resource allocation. For an example, see PARIS, the California Parks and Recreation Information System.

³Chappelle (1973) amplifies this view.

⁴For example, Cicchetti et al. (1972, p. 840) refer to recreational demand as "the schedule of quantities that the community will desire at all possible prices," and consumption or use as "the realization of both demand and supply considerations."

⁵Becker (1976, p. 113) takes a somewhat critical view of Hendee and Burdge in emphasizing that it is the individual's perception of activity benefits, not an objective capacity of that activity to fulfill motives, needs, and preferences, that leads to acceptable substitution.

⁶Cicchetti (1973) has emerged as its major proponent.

⁷There is no indication that the revenue sharing program has changed the availability of recreation opportunity in poor neighborhoods.

⁸Driving for pleasure and sightseeing are invariably found to be the most popular recreation activities. However, to provide for more opportunity for driving is reminiscent of Robert Moses' plan to provide access to the countryside for the city dwellers of New York through the construction of a parkway system. However, those who could afford to, moved to the suburbs and used the parkway to commute to work. The plan is thought to have begun New York's social, environmental, and financial demise. See Robert Caro's *The Power Broker* (1974).

⁹In an authoritative work on the concept of leisure, Kaplan (1975) has proposed relationships between time, selection, function, meaning, social group, values, and leisure.

¹⁰Carrying capacity also has another usage, in addition to its ecological and recreational contexts, as the ability of a region to support a human population and its accompanying development. The confusion and futility of the meanings of carrying capacity are examined by Godshalk and Parker (1975). Schwarz et al. (1976) reviewed the various definitions of carrying capacity with emphasis on natural and recreational uses.

¹¹For an economic approach to the management aspect of carrying capacity, see Fisher and Krutilla, "Determination of Optimal Capacity of Resource-Based Recreation Facilities" (1972).

¹²Lavery (1975, pp. 197-198), discusses the lack of management guidelines in this regard. However, BOR (1977) has published a set of guidelines for determining the optimum recreation carrying capacity (level of use, in this sense). It is a "nuts and bolts" approach for designers and managers based on existing conditions and standards throughout the county. It has all of the problems implicit in the concept of carrying capacity and it serves to provide a false sense of security for the recreation professional.

¹³Attendance figures for California state parks obtained from the California Department of Parks and Recreation.

¹⁴Cicchetti (1973) calls these data types site specific and population specific, respectively.

¹⁵Hendee et al. (1971) caution against the assumption that observed on-site activities are actually desired by their participants.

¹⁶Direct education is similar to the "learning by doing" concept postulated by Davidson, Adams, and Seneca (1966).

¹⁷Attraction is usually measured as a function of size or of the amount and type of facilities available.

¹⁸Coomber and Biswas (1973, pp. 43-45) describe *attractivity models* to indicate the relative attractiveness of sites. User participation rates are used as a basis for comparison rather than as measures of physical access or impedance.

¹⁹Cesario (1975b) views the distance function $f(D_{ij})$ of the gravity model as a correction to account for violations of the assumptions on the emissiveness of population center and the attractiveness of the recreation distributions.

²⁰These laws are: (1) The current flowing to a given point in a circuit is equal to the current flowing away from the point. (2) The algebraic sum of the voltage drops in any closed path in a circuit is equal to the algebraic sum of the electromotive forces in that path.

²¹If $\sum_{i=1}^I \sum_{k=1}^K D_{ik} < \sum_{j=1}^J S_j$, or else a feasible solution may not exist. Alternatively, constraint (2) can be modified to:

$$\sum_{i=1}^I \sum_{k=1}^K X_{ijk} - AC_j < S_j \quad \text{without condition.}$$

²²An indication of the duration of the recreation: day, overnight, or vacation.

²³The hypothesis that urban parks have negligible travel costs has led Darling (1973) to attempt to measure benefits based on property values and interviews.

²⁴According to Hendee, Gale, and Cotton (1971), activities may be substituted at the same site and therefore on-site observation is not a sufficient method for estimating demand. Activities may also be substituted between sites. Alternative site selection for the same activity may be based purely on preference (demand) or on the effect of intervening opportunities (supply). Burton (1971) classifies this effect under the heading of *diverted consumption*.

²⁵Krieger (1974) discussed social equity and recreation facilities. As he points out, Clawson and Knetsch (1966) were well aware of the inequities in recreation. The poor could not afford to go to national parks because the amount spent on recreation is five to six percent across income groups. However, the point that the poor lack recreation facilities in the inner cities is controversial. Gold (1976; 10ff) has noted that inner city parks are available but not used for various reasons.

²⁶This chapter does not encompass legal aspects of beach access and use. For a discussion of the history and policies of judicial decisions, see Owens and Brower (1976).

²⁷The exact coastal area under consideration extends from Newport Beach to San Juan Capistrano. It includes the Irvine Co.'s coastal planning area and Laguna Beach, as well as other unincorporated portions of Orange County.

²⁸Although the policies of the Coastal Plan have been superceded by the Coastal Act (1976), they provide good examples for this section and are representative of the view of the Commission.

²⁹See Gold, *Urban Recreation Planning* (1973, pp. 143-181) for a thorough discussion of acquisition standards based on population density.

³⁰California Coastal Commission, Interpretive Guidelines for Coastal Planning and Permits, adopted May 3, 1977; Local Coastal Program Manual, July 1977, San Francisco, California.

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