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RECREATIONAL DEMAND FUNCTIONS:  
CONCEPTS, PROBLEMS AND USES

BY

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## RECREATIONAL DEMAND FUNCTIONS: CONCEPTS, PROBLEMS AND USES<sup>1</sup>

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The admonition by economists to recreation planners that knowledge of recreation demand functions is necessary for meaningful planning has never been accepted with open arms. The reasons are numerous, usually overlapping and often associated with basic differences in the value system that individuals (or in this case, two groups of professionals) use to evaluate questions pertaining to public goods. My task today is to set this problem in some perspective. This will require a review of the pertinent conceptual and empirical issues. From such a review, it is hoped that the relevance of demand functions to practical recreation planning situations will be better understood.

### The Conceptual Issues

At the risk of repetition, let us begin with the economists' concept of demand. Demand (or a demand schedule or function) is the relationship between various quantities of a good or service that consumers will take off the market and alternative market prices during a given time period. Usually, an increase in market price for a particular good will result in a reduced quantity being purchased by the consumer and vice versa. Thus, to estimate consumer wants for a good or service (as expressed

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in the market place), knowledge of the product price and the demand schedule (which is also influenced by other factors, such as consumer income, tastes, and substitute products) is essential.

Note well, however, that demand in economics means a need or want backed up by sufficient funds to pay for the product desired. Demand must be effective in the market place and cannot be a consumer wish or desire for which he has no purchasing power. A parallel notion is that demand is estimated under the assumption of a fixed distribution of income; for if it were not, effective demands would be constantly changing with changes in the distribution of purchasing power.

Using this concept of demand, values can be assigned to the availability of various quantities of a good or service. This, then, can provide guidance to market participants on the proper courses of action to follow in making purchasing, investment and management decisions. Even though they are usually not sold in the context of a private market, public services, like outdoor recreation, also have a definite value to the public. The political market must take cognizance of such values when allocating scarce public resources. For outdoor recreation, it is now well accepted that the demand function, and the type of values associated with it, can be approximated by techniques which use the cost of the entire recreation experience to the participant. By coupling demand and associated value estimates for outdoor recreation with the traditional decision criterion of economic efficiency, questions of public investment and management can be considered and decided in a logical and socially optimal fashion. This, at least, is what many welfare economists would lead us to believe [Knetsch 1969]. The decision criterion in question and the value premise on which it is based must, however, be explored further

before we can accept such a position.

The economist recognizes that public budgets are restricted (as are all resources) and that decisions on the allocation of these scarce resources among various problems demanding attention must be made. Thus, even if it is implicit, public decision makers are forced to place relative values on public outputs. No public good or service can have non-existent values or, at the other extreme, be priceless when considered in the light of alternative uses of scarce resources. More specifically, then, how are decision makers to decide on the quantity, type, location and timing of new recreation capacity to meet social demands or needs? Using a decision criteria based upon the value premise of consumer sovereignty and the assumption that only effective demand is important, the traditional answer is to maximize social value as estimated by those demand functions (with appropriate allowance for externalities). Thus, economic efficiency or the misleading phrase "the greatest good for the greatest number" becomes the practical goal and benefit-cost analysis the tool to assure achievement of the goal through program evaluation.

Here, the basic disagreement between the traditional economist and the recreation planner becomes more easily understood. To the economist economic efficiency is based on effective demand or need, while to the planner the term "need" takes on a different connotation. People can have a need for a good or service even though they have no purchasing power to translate this need into effective demand. Government often operates in such a way as to satisfy such needs and in the process effectively causes a redistribution of income. The standard economic decision criteria, then, has ignored an equally important component of the social welfare function--economic equity [Weisbrod 1968]. Using

economic efficiency as the decision criterion may result in non-optimal decisions from the social point of view. Although this is often recognized, little has been done until recently to provide a better conceptual and quantitative base for planning [Marglin 1962 and 1967; Maass 1966; Steiner 1969; Kalter and Stevens 1971]. The planner has thus been secure in his knowledge that the economist was only providing him one component of the necessary information for making decisions, but insecure in his lack of quantitative information about other components and, more importantly, in how to solve conflicts which might arise between components (for example, the appropriate tradeoff between economic efficiency and distributional considerations). Now both the theory and practice of multiple objective planning is becoming well established. For example, witness the recent efforts of the Water Resources Council in this area [Water Resources Council 1970].

What then of the demand concept? Is it outmoded and of limited practical use? Should planners ignore the information that economists can and have been providing them? Conceptually, the answer is obviously no for several reasons. First, introduction of equity or distributional considerations into a decision framework does not eliminate economic efficiency as an important social objective. It merely removes it as the sole consideration. Thus, demand information and its use in benefit-cost formulations is still an important requirement for multiple objective planning. Second, data obtained from recreation demand functions can serve as the basis for an equity evaluation of project or program effects. Coupled with an analysis of use distribution and, perhaps, modified by some form of marginal utility of income weights, the value of program changes to various distributional classifications (income classes, racial

classes, regions, etc.) can be ascertained [Kalter and Stevens 1971]. Conceptually it can be argued that this type of analysis gives biased results if the distribution of project output is nonproportional to existing income distribution, because this could cause a change in relative prices and values existing in the ex ante project world. Practically, however, such changes can be assumed small and to have a negligible effect on overall income distribution and, thus, on relative prices. Therefore, demand functions can provide the information which serves as the basis for another type of quantitative analysis; one which is based on different value premises than economic efficiency evaluations but which is also important to social welfare. By combining both types of information (as well as data on non-economic impacts such as environmental quality), decision makers are in a better position to make the necessary tradeoffs and arrive at sounder decisions.

Finally, knowledge of recreation demand functions can be helpful in providing information on the "non-market recreational needs" or wants of groups with less purchasing power than other groups in society. Projections can be made by assuming that increased income is available to such groups and that the relationship between various socio-economic variables and recreation demand is similar for both groups. The latter assumption may not be totally satisfactory, but it does permit guideline estimates to be made. Of course the political process (not the economist or planner) must still decide how benefits from public goods should actually be distributed.

To summarize the conceptual argument, public provision of a service like recreation means that the built-in discipline provided by the private market in the allocation of resources is largely lost. The normal price

incentives of such a market are submerged to a significant degree because they produce an outcome largely unacceptable to society as a whole. On the other hand, the demise of a system of private market indicators for large portions of the outdoor recreation market has historically let public decisions affecting the provision of outdoor recreation services be made in an information vacuum. The result can be public programs which are no more acceptable than the private market alternative. Thus, the public provision of recreation, which the proponents of recreation's public good nature promote, cannot be systematically carried out in a way that will promote the objectives making up society's social welfare function. This is clearly unacceptable when dealing with a constrained public budget, which by necessity has to be used for competing social uses. The need is for planning and evaluation of proposed expenditures; but society's multiple objectives have to be considered. The recreation demand function is one piece of information which is required to make such evaluations. It is the foundation of an analysis based on economic efficiency, but also provides data prerequisites for the use of other decision criteria.

As the discussion pertaining to the public provision of recreational opportunities has increased with increasing pressure on existing facilities and recognition of growth factors which can lead to further increases in demand, the argument over whether recreation could or should be evaluated for the public decision making process has receded as an issue. The conclusion of most professionals has also become a matter of official governmental policy [U. S. Congress 1962]. Recognition of this need opened the door for the development of conceptually sound techniques for forecasting demand and estimating its economic value. However, an end to



the conceptual arguments over whether recreation could be forecast with respect to future magnitudes and given an economic value for use with various types of evaluation techniques has not necessarily led to the use of adequate or appropriate measurement methods. This, then, is another reason for a lack of confidence by the professional planner in the advice tendered by the economist. It will pay us to briefly explore the reasons for this situation.

### The Empirical Problems

For sake of exposition, let us reduce the empirical problems to four key issues. First, the difference between demand and consumption functions; second, the level of market specificity encompassed in estimated demand functions; third, measurement problems with respect to identifying demand functions; and fourth, the activity mix covered by estimated demand functions.

The first point that has often made use and value projections for outdoor recreation unacceptable to the professional economist and dangerous for the planner to utilize has been the confusion over whether demand or consumption functions were utilized. Consumption functions show the correlation between recreation use and a number of socio-economic factors related to the relevant population. However, they ignore an important causal factor--the price or cost of recreation participation. As I indicated earlier, this is a relevant consideration even for non-market goods like outdoor recreation, when the experience is taken as a whole and not isolated to the site entrance fee. Because different types and qualities of recreation experience will have different values to participants and because price will influence demand, knowledge of the actual

demand functions for different types of experiences is required to make legitimate comparisons and evaluations for planning. The problem of associating the concept of demand with the extrapolation of consumption data is now well recognized in the literature and in most planning circles [Clawson and Knetsch 1966]. However, this recognition does not provide a solution to the measurement problem involved in the estimation of actual demand functions. It is not enough to indicate that the concepts of supply and demand must be separated for accurate quantification of the latter; the functional relationship between quantities demanded and socio-economic factors (including price or cost) must be estimated. When correctly derived from existing situations, such an estimated relationship may permit projections of future use and associated economic value to be calculated for use in recreation planning.

Several approaches to the recreation demand issue do, however, exist. The most widely accepted is to use transfer cost information (in conjunction with "use" data) to estimate demand schedules for individual recreation sites and utilize such schedules for projection at "similar" proposed locations [Clawson 1959]. This has been the focus of substantial research over the past decade. At the more aggregative level, however, the site specific approach has the limitation of ignoring overall "market" demand and, thus, could result in double counting projected use and value when a number of proposals for recreation expansion are being considered for a given region. A solution to this problem is to constrain the results forthcoming from site oriented functions by the use of market information derived from market or population specific demand schedules [Cicchetti et al. 1969; Kalter and Gosse 1969]. Alternatively, market demand forecasts can be coupled with spatial allocation models to provide estimates of use

and associated economic value for proposed recreation investments at specific sites within a region [Kalter and Gosse 1969; Tadros and Kalter 1971 (2)]. The latter approach is less well developed for planning purposes but appears to offer some advantage to site specific methods in that comprehensive planning information can be obtained and sensitivity analyses are more easily carried out, without the disadvantage of potential double counting.

Numerous difficulties, however, attend the use of all the approaches to quantifying recreation demand schedules. The research literature identifies appropriate model specification and data requirements for empirical implementation as the main limitations. The former includes both the specification of variables for inclusion in a demand model and their precise definition. Although a number of variables may be correlated with recreation demand and can be suggested from knowledge of economic theory, the data and statistical techniques to show that correlation may be absent, resulting in the specification of less complete models and potentially inaccurate forecasts due to their use. For example, inclusion of appropriate socio-economic demand "shifters" like income, education, sex and race into a prediction model for recreation demand; inclusion in the model of important cost factors (like money costs, time and distance) which go to specify demand schedules; and consideration of other demand shifters like quality and competition by alternative uses of resources can all be considered important to model specification.

Finally, for purposes of public policy, one would often like information corresponding to different definitions of use variables than the available data can provide. Thus, the appropriate definition of recreation use to permit identification of activities and/or the length of

the recreation visit is important for planning purposes. Often, estimated recreation demand functions have aggregated activities for both specific sites and broader market areas in such a way as to destroy the value of the function for planning and management purposes. The disaggregation of demand functions by activity and length of visit is an important and desirable effort upon which recreation researchers need to embark.

Much of the research over the past 10 years has been concerned with the issues raised above. Recent research has done an outstanding job in attempting to correctly specify a model of the recreation market. Moreover, substantial efforts have been made to provide additional information on market as well as site specific demand situations. Both, of course, are useful for planning and evaluation purposes. Although the means of evaluating recreation investment alternatives has progressed rapidly since the late 1950's, the use of this knowledge at the grassroots planning level has not been substantial. This has resulted from many factors, including both conceptual and empirical issues. However, the stage now appears to be set for a major reduction in the numerous empirical problems that have only been touched upon above. If planners can reconcile themselves to the fact that demand information is useful for more than the traditional economic efficiency evaluation, the stage will be set for the wider application of knowledge which we have gathered through research to concrete social problems from the viewpoint of multiple objectives. The credibility gap that has existed between researchers in this area and potential users of research results should be bridged.

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