TRENDS OR METHODOLOGICAL DIFFERENCES?[1]

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Abstract.--Inconsistency in data collection has confounded attempts to identify and forecast outdoor recreation trends. Problems are highlighted through an evaluation of the methods employed in national outdoor recreation participation surveys and projections. Recommendations are advanced for improving data collection, trend measurement, and forecasting within outdoor recreation.

INTRODUCTION

Forecasting is an exciting and challenging endeavor. This is especially true in an environment as dynamic and complex as that which surrounds outdoor recreation in North America. For some, forecasting is merely fun and interesting while for others, it is an integral part of the decisionmaking and planning process.

Planners may be classified into three groups based upon their views of forecasting. Incrementalists do not try to forecast, generally reacting to events instead of trying to anticipate and guide them. For comprehensive-rationalists forecasting is essential. Their view of planning is based upon an ability to identify goals, formulate alternative courses of action, forecast, and evaluate the alternatives within a changing environment. Trend identifiers assume a compromising stance recognizing both the difficulties of forecasting as well as its importance. They typically monitor changes over time, extrapolating from these observations to produce short-range forecasts on which to base planning decisions.

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We shall ignore the incrementalists based upon a belief that there is no such thing as "not forecasting" (Mendell 1969). A willingness to observe and explain outdoor recreation systems leads to an ability to predict their behavior. This may take the form of trend identification or forecasting by means of formal or informal models.

Recent attempts to identify outdoor recreation trends and to forecast the future provide some guidance for planning and decisionmaking. These efforts also raise many questions, suggesting that both historical trend data and forecasts of outdoor recreation be interpreted and applied with considerable caution.

Those who use trend information and forecasts must be aware of the underlying methods in order to evaluate the quality of the information and its applicability to a given decisionmaking situation. Our purpose here is to provide guidance to users of trend information and to make recommendations for improving the quality and applicability of outdoor recreation trend monitoring and forecasting efforts. While the focus is upon methods, the final objective is to contribute to the provision and utilization of better information to aid decisionmakers who must cope with and plan for a changing outdoor recreation system.

The title of our paper embodies several questions, some related to data collection and measurement and others related to the selection of a forecasting method or model. For trend identification, the basic question is whether the outdoor recreation participation data collected in the past is indicative of trends or merely reflects a wide range of differences in data collection methods.

Forecasting involves the application of a model to an existing data base. In evaluating forecasts one must be concerned with both the quality of the data base and the tenability of the assumptions underlying the forecasting model.

Our ability to predict where we will be in the future depends significantly on knowing where we were in the past and where we are today. Thus, we begin with a discussion of trend identification and trend measurement before delving into the more complex field of forecasting.

TREND IDENTIFICATION

Trend identification is based upon past measurements of outdoor recreation participation (and related events) and present monitoring of these same variables, as a guide to predicting future participation rates. Attempts to identify outdoor recreation trends from secondary data sources have met with numerous problems.

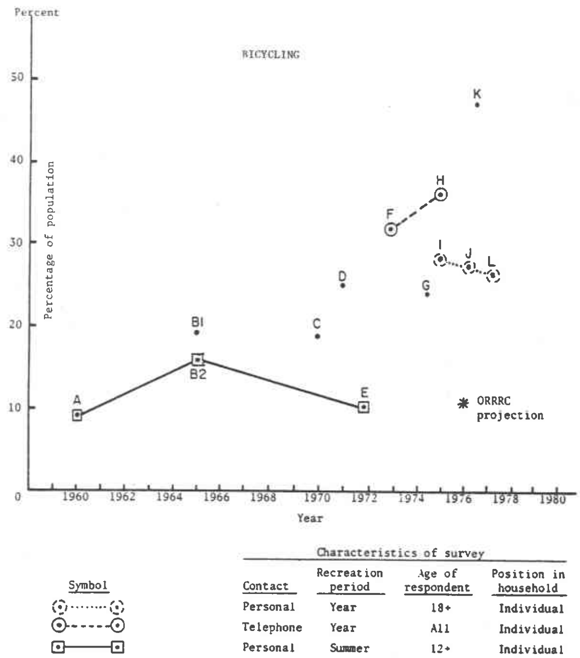
Trend identification is dependent upon reliable and valid data collected in a consistent manner over time. For outdoor recreation most basic data is either not collected, is inaccurate due to poor measurement techniques, or is collected inconsistently over time using non-comparable methods. Much historical data is not documented sufficiently to permit evaluations of its quality or applicability.

The state of existing outdoor recreation data bases suggests that trend identification and forecasting have not been the primary purposes of most data collection efforts. Most data collection is aimed at solving current problems. Potential use of such data for trend identification and forecasting is largely accidental. A good case in point is the series of nationwide outdoor recreation participation surveys.

Trend Identification from Nationwide Participation Surveys

Bevins and Wilcox (1979) have examined 22 national outdoor recreation participation surveys conducted between 1959 and 1978 in an attempt to identify trends in American's participation in a variety of outdoor recreation activities. The surveys examined include the Outdoor Recreation Resources Review Commission (ORRRC) studies, five nationwide surveys sponsored by BOR (now HCRS), three national camping market surveys (USFS), four surveys of hunting and fishing (USFWS) and seven market surveys conducted by private organizations.

Trend data for 28 different activities were examined, revealing some trends and a host of trend identification problems. The difficulties involved in discerning trends from nationwide surveys may be illustrated by an example. Figure 1 graphically depicts trend data for bicycling participation from 13 different surveys. Lines connect those surveys employing similar methods. The sponsor and methods for each survey are summarized in Table 1.



A, B, C, . . . letters refer to surveys as identified in Table 1.

Figure 1. Bicycling—trend lines connecting surveys with similar methodologies, 1960-77.

SOURCE: Bevins and Wilcox (1979)

No clear trend emerges for bicycling. Participation rates range from a low of 9 percent in the 1960 ORRRC survey to a high of 47 percent in the most recent BOR (HCRS) telephone survey. Some of the differences are partially explainable by differences in methods, survey populations, or the period for which data was requested. We expect participation rates from surveys of year-round activity to be higher than for surveys restricted to the summer months. Studies including younger age groups should yield higher participation rates in youth-oriented activities than surveys of adults. Other differences in measured participation rates over time may reflect legitimate trends. Sorting out which differences are due to methods and which are the result of trends is a difficult, if not impossible, task.

Table 1.--BICYCLING-participation rates according to nationwide recreation surveys, 1960-77.

Code	Year	Name	Characteristics of survey: Type of bicycling	Contact	Recreation period	Age of respondent	Position in household	Percent of population participating
(A)	1960	ORRRC	All	Personal	Summer[a]	12+	Individual	9
(B1)	1965	BOR	All	Personal	Year	12+	Individual	19
(B2)	1965	BOR	All	Personal	Summer[b]	12+	Individual	16
(C)	1970	BOR	All	Mail	Year	12+	Individual	19
(D)	1971	BOR	All	Personal	Year	10+	Individual	25
(E)	1972	BOR	All	Personal	Summer[a]	12+	Individual	10
(F)	1973	Nielsen	All	Telephone	Year	All	Individual	32
(G)	1974-75	TGI	All	Personal	Year	18+	Individual	24
(H)	1975	Nielsen	All	Telephone	Year	All	Individual	36
(I)	1975	TGI	All	Personal	Year	18+	Individual	28
(J)	1976	TGI	All	Personal	Year	18+	Individual	27
(K)	1976-77	BOR	All	Telephone	Year	12+	Individual	47
(L)	1977	AFI	All	Personal	Year	18+	Individual	26

[a]The summer period is June-August.

[b]The summer period is June-Labor Day

SOURCE: Bevins and Wilcox (1979)

Privately sponsored market surveys have shown greater consistency in methods than those sponsored by BOR. Nielsen measured an upward trend in bicycling between 1973 and 1975. Studies by Simmons Market Research Bureau (TGI) and the American Forest Institute (AFI) indicate a slight downward trend since 1975. The BOR surveys illustrate a rather amazing variety of methods and results, providing little guidance for trend identification.

For selected other activities long term trends are more readily identified. Camping exhibits a gradual upward trend in all data series (Fig. 2) and hunting shows a fairly consistent gradual decline since 1960 (Fig. 3). Bevins and Wilcox (1979) report similar graphs for participation in 28 activities and sales of selected recreation equipment. The interested readers should consult that report for further details.

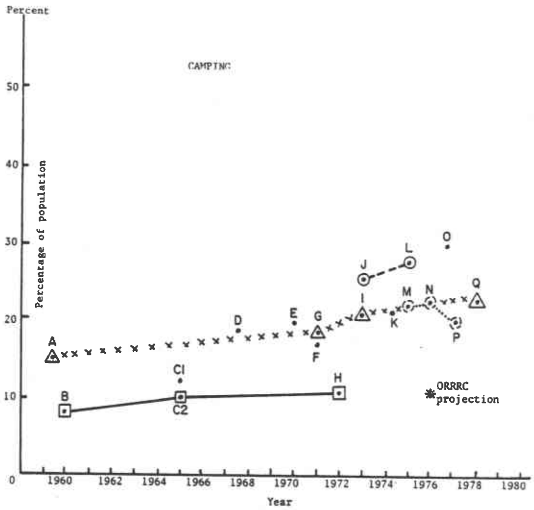
Influence of Survey Methods on Results

Examination of these nationwide studies may tell us more about the effects of alternative survey designs than about trends in participation. Unfortunately few users of the data produced in these surveys carefully examine the underlying methods in order to accurately interpret and evaluate the results. Participation rates are often reported without specifying the time period represented, the age groups included, the data collection method, the sample size, and other pertinent information. The resulting figures are thus prone to misuse.

Although we know that the methods employed will affect survey results, methodological research to date does not yield conclusive information on the magnitude of these effects. In comparing surveys conducted on different populations at different points in time, it is impossible to separate methodological effects from trend effects. A clearer picture of the potential influence of methods upon results is best obtained through controlled experimental designs. Little such research has been carried out with respect to recreation participation surveys, although some guidance is available in the general survey research literature.

Lacking controlled experiments, some insight may be gleaned by comparing surveys with similar methods conducted during the same year. This opportunity was provided in 1977 when both HCRS and NE-100[3] conducted surveys of outdoor recreation participation. Stynes (1979) addresses questions of survey comparability in the two studies.

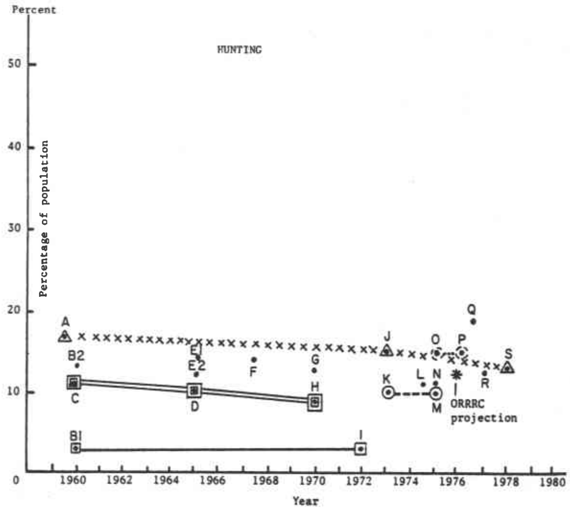
[3]NE-100 is a Northeastern Regional Research Project examining "Recreation Marketing Adjustments in the Northeast."



		Characteristics of survey		
Symbol	Contact	Recreation period	Age of respondent	Position in household
⊙·······⊙	Personal	Year	18+	Individual
⊙-----⊙	Telephone	Year	All	Individual
⊡——⊡	Personal	Summer	12+	Individual
△xxxx△	Personal	Year	18+	Head

Figure 2. Camping—trend lines connecting surveys with similar methodologies, 1959-78.

SOURCE : Bevins and Wilcox (1979)



		Characteristics of survey		
Symbol	Contact	Recreation period	Age of respondent	Position in household
⊙·······⊙	Personal	Year	18+	Individual
⊙-----⊙	Telephone	Year	All	Individual
⊡——⊡	Personal	Summer	12+	Individual
⊡══⊡	Personal	Year	12+	Individual
△xxxx△	Personal	Year	18+	Head

Figure 3. Hunting—trend lines connecting surveys with similar methodologies, 1959-78.

SOURCE: Bevins and Wilcox (1979)

The NE-100 survey included persons 18 years of age and older living in the Northeastern United States, while the HCRS survey was national in scope and included individuals 12 years and older. By selecting only those national survey respondents 18 or older and residing within the Northeast, a subsample comparable to the NE-100 population was obtained. Allowing for sampling errors in the two surveys we would expect (at a 95% confidence level) that the estimates of participation in outdoor recreation activities from the two surveys would be within from two to four percent of each other. Table 2 shows this to be the case for activities that were defined in a similar manner (those above the dotted line).

Of the 22 activities included in the NE-100 survey and 30 in the HCRS study, only 12 are directly comparable. Of these dozen activities, only picnicking reveals differences significantly greater than sampling error tolerances. The variation in the definition and grouping of activities below the dotted line (Table 2) illustrates a common problem in comparing the results of two surveys. When definitions or groupings of activities change even slightly from survey to survey or year to year, few clues about recreation trends for these activities can be discerned.

Differences in recall periods, response rates, question wording, question sequencing, timing of the survey, and a variety of method-related variables will also affect survey results. Examination of the variety of nationwide survey methodologies suggests that many differences in survey findings over time are due to methodological differences and are not necessarily indicative of outdoor recreation trends.

This means that those who use survey data must exercise caution in their interpretation and application. As a guide we offer a checklist of factors to consider in comparing or evaluating outdoor recreation survey results for the purpose of identifying trends (Table 3).

In using a given survey result for a planning or management decision both the quality of the survey methods and the generalizability of the results to the situation at hand must be evaluated. In trend identification it is important that each survey employ comparable methods on comparable populations. Differences in outdoor recreation participation measured in two surveys may result from different survey populations, different contact methods, or minor differences in question wording or recall periods. Differences may simply reflect sampling error, may be due to non-sampling errors, or may be indicative of a trend.

TABLE 2. -- COMPARISON OF HCRS AND NE-100 OUTDOOR RECREATION PARTICIPATION ESTIMATES

NE-100		HCRS	
Activity	Percent Participating	Percent Participating	Activity
Bicycling	42	42	Bicycling
Boating (sailing)	11	14	Sailing
Golfing	16	13	Golf
Hunting	11	13	Hunting
Picnicking	60	69	Picnicking
Skiing (downhill)	11	9	Downhill Skiing
Skiing (cross country)	4	3	Cross Country Skiing
Skiing (water)	10	12	Waterskiing
Snowmobiling	8	10	Snowmobiling
Ice Skating	22	24	Ice Skating outdoors
Tennis	30	30	Tennis outdoors
Canoeing	12	13	Canoeing, Kayaking, River Running
Fishing (freshwater)	24	40	Fishing
Fishing (saltwater)	19		
Boating (motor)	11	32	Boating (other)
Camping (RV)	11	20	Camping in a developed area
Camping (tent)	16	14	Camping in a primitive area
Camping (backpack)	8	27	Hiking or Backpacking
Hiking	25		
Jogging	27	68	Walking or jogging for pleasure
Motorcycling	11	21	Driving vehicles or motorcycles off-road
		63	Outdoor Pool Swimming or Sunbathing
Swimming	59	48	Other Outdoor Swimming or Sunbathing

SOURCE : Stynes (1979)

FORECASTING

Inconsistencies in data collection have made trend identification difficult. Since trend data is a basic input to forecasting models outdoor recreation forecasting has been similarly constrained. The lack of time series data on recreation participation and explanatory variables has limited the types of forecasting models that might be used. In evaluating a forecast one must evaluate the accuracy of the data inputs (the base period figures, for example) and the validity of the forecasting model assumptions.

Given a set of historical data, different models applied to this data may yield different results. Differences in forecasts will be due to the different assumptions of each model. An understanding of these assumptions is essential to evaluation of the forecast. Ideally one evaluates the tenability of the various assumptions for the situation under study in order to evaluate the applicability of alternative models. Practically, questions about the quality or availability of data inputs for outdoor recreation have often preempted evaluation of forecasting model assumptions themselves.

Recreation Forecasting Methods

There are a variety of both qualitative and quantitative forecasting models to choose from. Martino (1972) provides an excellent summary of long-range technological and social forecasting techniques and Wheelwright and Makridakis (1973) review shorter range techniques widely applied in business management.

Moeller and Echelberger (1974) review the forecasting techniques most often applied in outdoor recreation. These tend to be middle-range forecasts. For predicting future levels of outdoor recreation participation, two basic types of forecasting models dominate: (1) trend extension models and (2) structural models relating participation in outdoor recreation to explanatory variables that are more readily forecasted. Each method has advantages and disadvantages.

Trend Extension

Trend extension follows naturally from trend identification and monitoring, and is highly dependent upon the quality and consistency of trend data. As its name implies, the method simply involves the extension of trends as revealed in historical measurements of use or participation. The method works well as long as the underlying forces producing a given trend do not change significantly. This assumption is generally valid for making projections one to three years into the future

TABLE 3: CHECKLIST FOR EVALUATING OR COMPARING OUTDOOR RECREATION SURVEYS

1. What is the study population?
   - the study region
   - the minimum age for inclusion
2. What is the method of contact?
   - telephone
   - personal interview
   - mailed
   - on-site or household design
3. For household designs, how was the respondent selected within the household?
   - person who answers
   - household head
   - randomly selected
   - based upon quotas
4. How successful was the sampling design?
   - representativeness of the sample
   - response rate/possibility of non-response bias
   - weighting procedures
5. Sampling Errors
   - are confidence intervals reported for population estimates?
   - on how many respondents is each figure based?
6. When was the survey conducted?
   - time of year
   - interviewing on weekends -weekdays; afternoons-evenings?
7. Measurement
   - definition of recreation activity categories
   - time period for which data is requested
   - length of recall period
   - wording of questions
   - open or closed-ended questions
   - question sequencing
8. Reporting of Results
   - Are methods clear enough so that you could replicate the study?
   - Are non-sampling errors discussed?
   - Are study limitations discussed?

and when the system under study is reasonably stable.

Even in trend extension, one must consciously or unconsciously make assumptions. Figure 4 illustrates several distinct projections based upon observations from three time periods. With data for only three previous years, assumptions of a linear, exponential or logistic (S-shaped) growth pattern all seem reasonable. These different assumptions yield quite different projections. Selection of the form of the equation must be based upon logical as well as statistical considerations. Do we expect the trend to exhibit a linear, exponential, or logistic growth pattern during the years for which we are projecting? Too often linear models are selected based upon statistical convenience or ignorance of alternative growth curves.

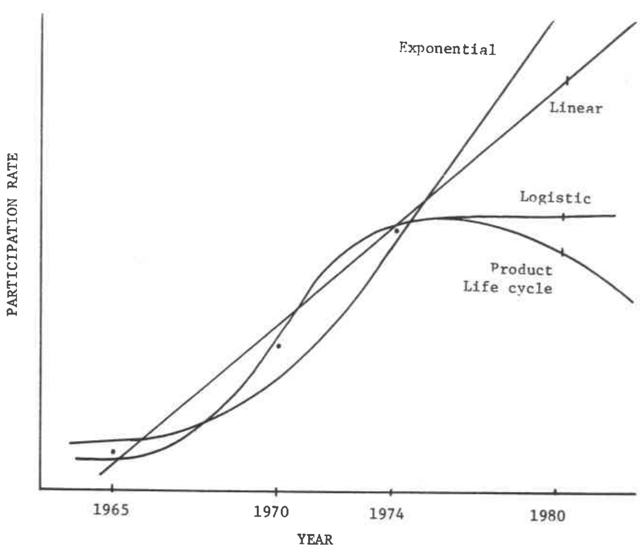


Figure 4. Trend Extension - Alternative Growth Equations

In fact, very few processes grow linearly. Logistic and exponential growth are much more characteristic of population and diffusion processes. Product life cycle curves often exhibit logistic patterns of growth, usually with a decline towards the end of the life cycle. We expect the adoption of outdoor recreation activities to exhibit similar patterns of growth.

The advantage of trend extension methods is their simplicity. However, these methods do not address the underlying forces that are producing the trend. Clearly an understanding of these forces should result in much better and much more useful forecasts, especially within a changing environment.

Structural Forecasting Models

More complex models are generally required to forecast further than five years into the future. In this case the assumption that the pattern of causal forces behind the trend remains unchanged no longer holds and an understanding of these forces becomes an important component of the forecasting model.

The most widely applied outdoor recreation forecasting model (other than seat of the pants) is the two step linear regression technique. The method was applied in the ORRRC studies (Report #26) and has subsequently been refined and further expounded by Cicchetti (1973) among others.

For a person with a given set of characteristics and recreation opportunities his or her probability of participating in a given recreation activity is estimated in the first step. Then in the second step the frequency of participation is estimated for those who participate. Both steps employ linear regression techniques to estimate coefficients in an equation of the form:

y = f(socioeconomic characteristics,
recreation opportunities,...)

where y is the probability of participating in the first equation and the frequency of participation in the second. Recreation survey data is used to statistically estimate the model parameters and the resulting equations are applied to forecasts of each independent variable in order to forecast future participation.

The independent variables are selected based upon their influence on participation and the ease with which they may be measured and forecasted. Age, income, and gender have proven to be the best predictors of outdoor recreation participation in such models. These variables are convenient for forecasting since predictions of future age-sex structures, and income levels are generally available. More recent applications have incorporated supply and price variables, although measurement and forecasting of these variables are more problematic.

The merits of these models, their problems, and the underlying assumptions will be discussed using the ORRRC projections as an example.

Although accuracy should not be our prime criterion for judging forecasts[4], the evaluation of how close these forecasts come to predicting 1976 participation rates will shed some light on the two-step linear forecasting model.

Evaluation of the 1976 ORRRC Projections

Brown and Hustin (1979) evaluated the ORRRC projections by comparing them with participation rates measured in the 1976 HCRS national telephone survey. A comparison of projected versus measured participation rates finds that the ORRRC study grossly underestimated participation in virtually all activities. For many activities the measured 1976 participation rate is more than double the rate projected by ORRRC (Table 4).

Table 4. Comparison of Proportion of Persons 12 Years and Older Projected to Participate in Outdoor Activities in 1976 vs. Number Participating in 1976 Survey

Activity	Projected by ORRRC[1]	Participating in 1976 Survey	z score[2]
Driving for pleasure	56%	69%	28.68
Swimming	55	70	31.38
Walking for pleasure	37	68	67.51
Sightseeing	47	62	32.76
Picnicking	57	73	33.45
Fishing	32	55	51.33
Bicycling	11	47	122.04
Attending outdoor sports events	27	61	81.26
Boating (not canoeing or sailing)	28	35	15.73
Nature walks	16	49	95.24
Hunting	14	20	18.23
Camping	11	37	88.67
Horseback riding	8	15	27.59
Water skiing	9	17	29.11
Hiking	8	28	78.15
Attending outdoor concerts, plays, etc.	12	40	90.89

[1] From ORRRC Study Report 26, pg. 27.

[2] Normal approximation of a binomial proportion, corrected for continuity (Snedecor and Cochran, 1973). The null hypothesis of equal proportions projected vs. surveyed can be rejected for p $\geq$ .99 at z = 2.33.

SOURCE : Brown and Hustin (1978)

The ORRRC projection model was based upon six independent variables: (1) income, (2) education, (3) occupation, (4) age-sex, (5) urban-rural residence, and (6) leisure time. Relationships between participation in each activity and the six variables were estimated based upon a 1960-61 survey of outdoor recreation participation. A linear model was assumed.

Projections to 1976 were then made for each of the six independent variables and the model was applied to these projections to derive the 1976 estimates of participation for each activity.

Three types of errors are involved in this forecasting process.

1. Measurement, sampling and other errors in the 1960 and 1976 surveys.
2. Errors in the forecasts of the independent variables.
3. Model specification errors.

The accuracy of a forecast always depends upon the accuracy of base period fugures (1960 in this case). It should be noted that the model parameters were determined solely from a single survey conducted in 1960-61. This survey is subject to measurement and sampling errors. In evaluating the accuracy of the forecast, we also assume that the participation rates measured in the 1976 HCRS survey are accurate.

A more subtle difference between the 1960 and 1976 surveys is easily overlooked. The ORRRC projections are based upon a survey of activity between June and August 1960. Projections are therefore participation rates for the summer months of 1976. The 1976 HCRS survey measured participation over the entire year. It is not possible to separate out the summer months and hence any comparison of the ORRRC projections and the 1976 survey must be based upon assumptions about differences between summer and year-round participation rates.

We should expect summer rates of participation (i.e. the proportion of the population participating at least once during that period) to be less than year-round participation rates. The magnitude of these differences will be greater for activities with substantial non-summer use (eg. fishing and hiking) and relatively insignificant for predominantly summer activities like swimming and boating. In the following we assume no difference between summer and year-round participation rates.

The second source of error is in the projections of each independent variable. Comparing the ORRRC projections of these variables with actual estimates for 1976 reveals that income, education, occupation, and age-sex distributions were projected fairly accurately. No comparable 1976 estimates are available for residence or leisure time, making the projections somewhat suspect.

Model specification errors are the most serious in this case. A principal assumption of the two step method is that the relationship between the explanatory variables and

[4]Forecasts should be judged on their usefulness in decisionmaking, not their accuracy (Martino 1972).

participation, as estimated from 1960 data, continues to hold in 1976. Specifically, this assumes constant participation rates by demographic segments over time. Any change in participation rates predicted by the model must be due solely to changes in the explanatory variables. The increasing participation of women in many outdoor recreation activities (Bevins 1979) is one example of a direct contradiction to the model assumptions.

Model formulations that include supply and price variables are an improvement, but introduce additional measurement problems. The linearity of the relationship might be questioned, but logit and probit forms of the participation equation do not yield much improvement (Smith and Munley 1978). The use of these types of models for forecasting involves six common problems.

(1) A failure to include substitution effects. Separate and independent equations are generally developed for each outdoor recreation activity. A few of the models that include a price variable also include prices of close substitutes or complements, but these are rare (Talhelm 1973). Recent research into substitution among outdoor recreation activities does not yet provide much help for forecasters.

(2) Difficulty of incorporating supply factors. One's likelihood of participating in a given recreation activity is clearly related to the quality, quantity and price of available opportunities. Cicchetti (1969) and Beaman (1976) discuss the inclusion of supply variables and the accompanying problems.

(3) Reliance on cross-sectional data. Cross-sectional surveys are clearly not the best way to measure change or the forces producing change. Projecting 16 years into the future based upon observations during a single year is clearly suspect. Brown and Wilkins (1975) demonstrate that more accurate forecasts can be developed using structural models estimated from time series data, when this data is consistent and accurate and corresponding time series data is available for the explanatory variables. Unfortunately such data rarely exists.

(4) Other missing explanatory variables. The identification of explanatory variables continues to be a subject for research. For long-term forecasting a variety of social and economic variables seem relevant. Changing value systems, energy policies, family structures, and leisure time patterns are seldom included in recreation forecasting models. West (1977) suggests the addition of variables related to fad and fashion in leisure activity.

(5) Aggregation problems. Selecting the appropriate aggregation level continues to trouble recreation planners and forecasters. Regression models are generally estimated using data about individuals and then applied to aggregate populations. The ORRRC and most other similar projections apply the resulting equations to forecasts of the means of the explanatory variables.

The participation rate of a person with average income, average age, and an average amount of leisure time will not necessarily be a good estimate of the participation rate of the population as a whole. A more valid technique is to develop rates of participation for various population subgroups and apply these to the forecasted numbers of people within each subgroup. This requires future distributions of the population over all explanatory variables rather than just the projected population means for each.

(6) Statistical rather than process models. The structural models developed to date are for the most part statistical rather than process models. They do not capture the underlying decision processes that determine outdoor recreation participation. An individual clearly does not take a weighted sum of his income, age, occupation, and leisure time in deciding whether or not to participate in an activity. These models therefore yield little incite into the dynamics of outdoor recreation participation decisions.

Systems and simulation techniques are better suited to the identification of feedback effects, timelags and other dynamic characteristics of recreation systems. An examination of activity adoption, participation, and dropout decisions in the light of changing family structures and recreation opportunities might yield a better understanding of the dynamics of recreation participation. Models relating participation to equipment sales also seem promising.

CONCLUSIONS

The stimulus for this paper was the question of whether outdoor recreation participation data collected in the past is indicative of trends or merely reflects differences in data collection methods. We must conclude that some data series indicate changing patterns of participation and others are the result of measurement errors or methodological differences. The problem is that the task of telling which is which is not an easy one, and in many cases is impossible.

Those attempting to divine trend information from published research must exercise considerable caution. An understanding of data collection methods and an ability and willingness to dig into documentation of survey results in order to evaluate the quality and applicability of the findings is advised. Better data collection techniques and documentation of results are also needed.

Multiple sources of trend data should be sought and compared before drawing conclusions. Consistency and comparability of findings from different sources increases our confidence in the conclusions. This is especially true when distinct methods independently yield similar results.

Many of our recommendations for improving data collection, trend measurement and forecasting have been made before. The need for more consistent and comparable data collection efforts over time is clear. Before this can happen the importance and utility of trend information and forecasts must be recognized. There have been few systematic efforts to collect outdoor recreation data for the purpose of identifying trends. Available data has been collected primarily for other purposes. The data requirements for trend identification and forecasting are somewhat unique. Unless data is collected for these purposes the chances are that it will be inadequate or useless for forecasting.

Given the costs of data collection and the vast amount of trend data that might be collected, a systematic examination of trend information needs is required. This must be based upon an identification of the kinds of planning decisions that trend information might contribute to, and an assessment of the likely improvement in planning decisions as compared with the costs of data collection. Institutional frameworks must be established to ensure periodic and systematic collection of the data and to develop appropriate information systems to facilitate its wise use.

Research is also needed: (1) to develop clear standard definitions of recreation terms, (2) to improve measurement techniques and develop acceptable measures for variables that are difficult to quantify, (3) to identify variables that may help explain changes within outdoor recreation, and (4) to experiment with forecasting models that more fully capture the processes that are taking place within outdoor recreation.

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