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USE TRENDS INDICATED BY STATISTICALLY CALIBRATED RECREATIONAL SITES IN THE NATIONAL FOREST SYSTEM

Abstract.--Trends in statistically sampled use of developed sites in the National Forest system indicate an average annual increase of 6.0 percent in the period 1966-69. The high variability of the measure precludes its use for projecting expected future use, but it can be important in gauging the credibility of annual use changes at both sampled and unsampled locations.

The increased use of forested lands for outdoor recreation is well documented (1, p. 7), and recent studies of demand at both the State (5) and Federal (2) levels of government indicate that continued increases are to be expected on our public lands. Such forecasts are essential to the development of wise policies for public lands, and there are few administrators who would claim to operate efficiently without them. Recreation managers and planners find indicators of use trends and demand important in determining the existence of future markets and in allocating funds for future development on the basis of where the greatest impacts can be expected. The importance of such information is not limited to administrators of public lands. It is also important in the field of private development where trends developed for public holdings can be an important indicator to the private entrepreneur regarding the direction of forest recreation.

Large increases in recreational use have been recognized and reported since World War II. Clawson (1) has reported annual increases since that time as high as 10 percent for selected facilities on National Forest lands. Such figures were derived, however, from use reports based almost wholly on experience and observation because few tested techniques of sampling were available for statistically calibrating use. Most of the early, long-range projections of use suffered the same deficiency because they were also based on subjective estimates and did not have the advantage of statistically measured criteria.

Recognizing these weaknesses and realizing the vital need for improvement, Forest Service administrators and researchers began the development of a servicewide Recreation Information Management (RIM) system (6) in 1965. This program has been designed to provide improved

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information on recreation at all managerial and planning levels and also to afford the Forest Service, a highly decentralized agency, with a vehicle for more rapid dissemination and analysis of information. An integral part in the development of the RIM system has involved the implementation of a sampling program for quantifying recreation use, together with associated measures of error.

A primary objective in this sampling program has been to direct emphasis toward established and accepted methodology for use estimation. Through this program, Forest Supervisors of all 164 National Forests have been encouraged to sample at least one major developed site on each Forest. In this way, a broad segment of managerial personnel has been exposed to statistically oriented sampling procedures. Also, sound measures of recreational use have been established which can help managers gauge use at unsampled, developed sites.

Although a wide variety of sampling methodology is available (4), Forest Service sampling on developed sites has been generally limited to two techniques. These techniques, described by James (3) and Wagar (7), have been successfully applied on several hundred developed sites since the sampling program began in 1966.

The estimates of recreational use and associated error terms have been incorporated into an annually updated master sampling file which is part of the RIM data bank. This file provides not only historical documentation of the sampling program but also a source of use data, by type and place of occurrence, over a period of time which can be used for analyses of the program. Among these is an analysis of changes in use which have taken place over the sampling period. The use trends presented in table 1 are derived, for the first time, from a body of measured use which exists over a period of time and which can serve to support or question earlier use projections.

The figures shown in table 1 were developed in a manner similar to the following hypothetical case. Assume that, for site A, 800 visitor-days[1] of use were estimated in 1966, the first sampling year, and 1,300 in 1969. The net change over this 3-year span is 500 visitor-days, and the average annual change 166.7. For site B, assume an initial estimate of 1,000 visitor-days in 1968 and 1,200 visitor-days in 1969, yielding a net and average annual change of 200.0 visitor-days. Finally, for site C, assume an initial estimate for 1967 of 400 visitor-days and a 1969 estimate of 750 visitor-days with the estimates being separated by a 2-year span. The net change indicated for site C is 350 visitor-days, and its average annual change in use is 175.0 visitor-days. The total initial use for sites A, B, and C is 2,200 visitor-days (800 + 1,000 + 750). The total average annual change indicated for these sites is 541.7 (166.7 + 200.0 + 175.0). Total average annual change divided by total initial use (541.7/2,200) yields an average annual change of 24.6 percent.

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[1]The presence of one or more persons on recreational areas for continuous, intermittent, or simultaneous periods aggregating 12 hours.

Table 1.--Average annual percentage of change in use from 1966 to 1969 for three types of developments and for all measured uses combined[1]

Region	Campgrounds		Picnic grounds		Complexes[2]		All sites and complexes	
	Samples	Change	Samples	Change	Samples	Change	Samples	Change
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1	6	-3.0	0	0	9	15.4	15	4.3
2	42	3.1	2	4.1	1	34.4	45	4.2
3	26	1.1	7	16.1	2	-5.9	35	2.3
4	70	2.4	7	-7.6	6	15.1	83	3.6
5	29	11.2	1	34.4	5	3.3	35	10.7
6	29	3.5	1	2.9	9	11.4	39	5.8
8	9	26.0	3	-6.7	31	2.0	43	6.3
9	15	9.1	4	11.5	29	6.5	48	7.6
10	3	-4.7	1	-38.3	1	-3.2	5	-9.0
Servicewide	229	6.0	26	4.2	93	6.1	348	6.0

[1] Not all elements in the master file have been included. To insure the validity of the data subjected to analysis, only those samples with standard error terms less than ±25 percent or with use changes less than ±50 percent in any succeeding years are included.

[2] A complex is generally two or more developed sites contiguously grouped so as to lend themselves to common management practices and to sampling as a group.

One point of interest to be noted in table 1 is the close agreement in average annual percentage of change for campgrounds and for site complexes. Ordinarily, complexes consist of more facilities and a greater variety of facilities which typically afford a broader array of recreational opportunities. Because of this array, such developments might be expected to create more visitor appeal and result in greater annual increases in use. This expectation, however, is not borne out in this analysis.

At the onset, it was hoped that the average annual percentage of change, as developed here, could be employed to project use several years into the future, but the high variability from region to region in rate of change and problems in extending this information beyond the limits of the sampling program would seem to preclude such projections. For example, if reported use throughout Forest Service lands for 1966 (150,728,900 visitor-days) is used as a base and the 6.0 average annual percentage of increase shown in table 1 is applied in projecting the base to 1969, the projection indicates that 179,520,531 visitor-days of use would have been expected. On the contrary, reported use in 1969 indicates a total of only 162,838,100 visitor-days of use. Reasons for this rather large discrepancy are difficult to interpret but could occur because the sites sampled are not as representative of activities occurring on dispersed areas and other kinds of developed sites as are those included in this analysis. The relatively high variability apparent in table 1 also may indicate that a reliable, overall indicator of average annual percentage of change has not yet been developed.

As the volume of data included in the RIM sampling file grows to include a greater number and variety of sites, reliable use projections may result. One interesting analysis that could result from subsequent data would involve comparing the trends shown here, which occurred in an economy typified by low unemployment and high profits, with current use trends which are occurring in a less favorable economy. Also, sampled use might even be employed in a more comprehensive econometric study, particularly if it can be coupled with important variables of demand and supply.

Although developed over a relatively short span, the information presented here can be helpful to Forest Service managers in future use reports. In many cases, because of money or manpower limitations, managers are not able to employ statistically based sampling procedures to generate reliable estimates of use. In such cases, managers can use the average annual percentages shown here as a guide. In those instances where empirical use estimates indicate changes differing greatly from the 6.0 percent shown in table 1, the manager would be well advised to review critically the assumptions which led him to his empirical estimate. Even for those cases in which reliable sampling is employed, the information here can have meaning. When large departures occur, managers should consider whether sampling equipment has worked properly; if so, they should carefully consider possible changes in use patterns which might demand recalibration of the sample.

In using the results presented here, managers should be aware of certain limitations. The data from which the results derive represent only a small segment of the variety of recreational opportunities offered on Forest Service and other public lands. Also, the sites making up the master Forest Service file of use sampling are, generally, those deemed locally important by Forest and Ranger District personnel. Thus, the selection of sites without the benefit of random processes prohibits any broad or conclusive statistical inference developed from the group of sample elements. For these reasons, the present data should be interpreted as indicators of change and should not be adhered to when valid evidence indicates departure.

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