

INVENTORYING RECREATION USE

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ABSTRACT. Part I is a general discussion about the estimation of recreation use, with descriptions of selected sampling techniques for estimating recreation use on a wide variety of different sites and areas. Part II is a brief discussion of an operational computer-oriented information system designed and developed by the USDA Forest Service to fully utilize the inventories of recreation information available from over 21,000 recreation elements (sites and areas) of the National Forest System.

INVENTORYING

THIS PAPER is composed of two parts. Part I includes a general discussion about the estimation of recreation use, with descriptions of tested sampling techniques for estimating recreation use on a wide variety of different sites and areas. Sufficient detail is given so that interested persons will be able to decide which technique or techniques might be most suitable for their particular needs. It is likely that other excellent sampling techniques have been designed and tested by other federal, state, university, and private investigators, as well as foreign nations; but for one reason or another information about them is not readily available.

Part II is a brief discussion of an operational computer-oriented information system designed and developed by the USDA Forest Service. This system has been geared to fully utilize the inventories of recreation use which have been carefully and painstakingly gathered.

The need to gather reliable information about our recreating public—the kind and amount of use that occurs and the places where this use occurs—is urgent and critical. It will never subside. The things that we

need to know a great deal about are becoming *more* numerous and *more* complex because *more* people engage in *more* activities *more* frequently on *more* developed sites and *more* classified areas with *more* kinds of facilities costing *more* money and occupying *more* land and *more* water under *more* intensive management while *more* stringent budgetary requirements demand *more* specific information to satisfy *more* public interest in *more* types of programs coordinated with *more* agencies involved in *more* efforts.

Inventories are an essential and expensive requirement of all business ventures. Inventories of recreation use, users, and the physical resource serve many useful purposes and are vital to recreation-oriented federal, state, and municipal agencies, individuals and private organizations, congressional committees, highway departments, chambers of commerce, newspapers, travel agencies, economic and market analysts, research scientists, writers, and a host of others.

Recreation planning and financing are based on the planner's access to reliable data about the total use of an area, the use of various facilities provided, the nature of

the visitation pattern, and an understanding of the socio-economic-ethnic characteristics, behavioral patterns, and motivations of the recreating public. Management and policy decisions can be improved greatly if the total planning process is based on reliable and current information.

Good inventories of use, and of the physical resource that provides such use, are essential for establishing cleanup and maintenance schedules; for predicting rate of facility depreciation and resource deterioration; for determining relationships between supply and demand and the need for providing additional activities and facilities and enlarging existing areas; for determining the number, kind, design, and location of future areas; and for alleviating existing conflicts between use and users. Sound budget planning, allocation of funds and manpower, and economic analysis depend upon complete and up-to-date information. And any effort to predict future use of the Nation's land and water areas, regardless of location or ownership, must be based on a comprehensive picture of current conditions that help to identify trends and patterns of use.

Much of the basic recreation-use data on which past management decisions were based were obtained by experience and observation. Many of these use estimates were very likely good; others probably were misleading. Under the increasingly complex current situation, such "guesstimates" will not suffice and must be replaced by information that is precise, reliable, and uniform. In fact, federal recreation agencies were directed by legislation in 1964 (Land and Water Conservation Fund Act, PL 88-578) to improve their estimates of visitor use as rapidly as time, funds, and talent permit. One significant accomplishment was the development of a rationale and procedures for the uniform reporting of outdoor recreation data on a nationwide basis. (A Uniform Method for Measuring and Reporting Recreation Use On the Public Lands and Waters of the United States, 1965; prepared by Recreation Advisory Council Study Committee Number Two; 56 pp.) These procedures provided individual agencies with a frame of reference and a set of guides that permitted them to

gather and report recreation information in common terms.

It is neither practical nor desirable to obtain a complete inventory of use and users on most sites and areas by counting all the visitors and recording their activities. The cost of this Herculean task would be prohibitive and all but impossible where recreation use occurs over large forest areas. Sampling is the logical approach for obtaining estimates of the desired parameters. If properly drawn, the sample provides the necessary information for making sound estimates of use and recreational activity. Sampling cost and the precision of the technique used must be commensurate with planned use of the data; that is, the least expensive method that will produce sufficiently reliable results should be used. Nor is it advocated that all sites be sampled. In most cases, sampling can be applied to selected representative sites; and the estimates can be utilized as yardsticks to use on other unsampled sites.

Use-sampling techniques might employ one or more of several methods of data collection, including mechanical and electronic counting devices, optical scanners and cameras, telephone and mail surveys, existing or special records, observation, self-administered questionnaires and permits, and interview surveys. These in turn can be further classed into three principal types of enumeration systems: (1) self-counting, (2) direct-counting, and (3) indirect-counting.

Examples of self-counting systems, in which the recreationist provides use information about himself, include campground registration books and boards; charge areas where permit-vending machines, meter boxes, or automatic gates are installed; and self-registration questionnaires and forms. Direct-counting systems include census and sample counts, television and camera observation, aerial observation and photography, mail and telephone surveys, and similar procedures. Indirect-counting systems include such devices as electronic-eye and mechanical counters; self-activated or time-lapse photographic equipment, remote sensing devices, and such related indicators as water consumption and volume of refuse.

Recreation use on developed sites (including campgrounds, picnic grounds,

organization sites, hotels and resorts, commercial-public-service sites, recreation residences, observation sites, swimming sites, playground-park-sports fields, and recreation visitor centers) represents one of the simpler and less-costly sampling situations because the sites are of small size, vehicular and foot access to the sites are generally good, and recreationists as well as the activities in which they engage can easily be observed. Considerable research, beginning in the early 1960's, has been directed towards designing and testing sampling techniques for estimating intensive use that occurs on such developed sites.

Less intensive use on dispersed areas such as generally undeveloped country, large bodies of water, recreation roads and trails, natural lakes, ponds, reservoirs and other impoundments, and rivers and streams is generally difficult and costly to estimate. Such use is usually thinly scattered on land and water areas, which may be several hundred square miles in extent, highly mobile, and constantly in flux. Examples of recreation activities in dispersed areas including hunting, fishing, boating, hiking, mountain climbing, and driving for pleasure.

The following section contains a listing of selected sampling techniques that have been used successfully to estimate recreation use on both developed sites and dispersed areas. Coverage includes literature citation, a brief discussion of what the technique does and how it works, cost (where available), and general comments. All the sampling techniques discussed deal strictly with the problem of developing a complete and accurate picture of *current* conditions, not with the larger question of future projections. The sampling techniques discussed are satisfactory for short-term projections, but we need to know a great many more basic facts about our society and its behavior before long-term projections can be made.

(A bibliography on recreation use sampling techniques is available upon request from the Recreation Research Project, USDA Forest Service, Southeastern Forest Experiment Station, Asheville, N. C. 28802.)

ESTIMATING USE ON DEVELOPED SITES

Citation: James, George A., and Thomas H. Ripley. 1963. INSTRUCTIONS FOR USING TRAFFIC COUNTERS TO ESTIMATE RECREATION VISITS AND USE. USDA Forest Serv. Res. Pap. SE-3, 12 pp., illus. SE. Forest Exp. Sta. Also: James, George A. 1966. INSTRUCTIONS FOR USING TRAFFIC COUNTERS TO ESTIMATE RECREATION VISITS AND USE ON DEVELOPED SITES. (revised). USDA Forest Serv. SE. Forest Exp. Sta., 12 pp.; DOUBLE SAMPLING, FSH 2309.11 RIM HANDBOOK (Section 124.72), April 1970, Amend. 16.

What It Does: Designed to produce estimates of amount of use, by activity, on unsupervised developed sites, this technique makes it possible to update estimates from vehicle counts only during a several-year period following calibration. The sampling technique, called double sampling, was first developed and tested in 1961. It has been used to estimate use on approximately 1,000 USDA Forest Service developed sites.

How It Works: Each developed site and each recreation-use period for which estimates are desired must be sampled for a minimum of 12 days, each 12 hours long. Traffic counters are placed at each entrance of each site to be calibrated. To obtain the estimates, a ratio is developed between the desired statistic (visits, use by activity, total use) and traffic counts by simultaneously measuring both on each sampling day. On days when someone is not on the site counting people and recording what they do, the traffic counter alone provides the basis for use estimates. The regression formulas developed during the first year of site calibration can be used to provide estimates during the next several-year period from vehicle counts only, provided relationships between axle counts and associated uses are strong and there are no major changes in the site.

Cost: Average cost per site for first-year calibration is approximately \$650 for labor and supervision, and approximately \$75 each for pneumatic traffic counters. If relationships between use and the

traffic-flow pattern are strong, estimates can be updated for a 3- to 5-year period following calibration, thus reducing sampling costs to approximately \$150 to \$200 per year.

Many developed site groupings can best be handled for sampling purposes as "sampling complexes" consisting of two or more kinds of sites. For example, Alexander Springs Recreation Area, Ocala National Forest, Florida, consists of several kinds of contiguous sites; i.e., campground, picnic ground, swimming sites, and boating site. It is less expensive to sample a site complex as a whole than to sample its component parts separately. Total use indicated from the sampling process should be comparable in either case.

Comments: This technique can provide good estimates of use by activity, but does not provide a true estimate of number of visits because visitors may enter and leave a site several times during a given sampling day. The technique counts them as new visits each time they enter, and thus provides an estimate of number of *entries*, not a precise estimate of number of *visits*. Success of the technique depends upon an accurate traffic-count record. Frequent checking and adjustment of all traffic counters is essential. A slide-lecture presentation has been produced commercially to describe this sampling technique.

Citation: Bury, Richard L., and Ruth Margolies. 1964. A METHOD FOR ESTIMATING CURRENT ATTENDANCE ON SETS OF CAMPGROUNDS . . . A Pilot Study. USDA Forest Serv. Res. Note PSW-42, 6 pp. Pacific SW. Forest and Range Exp. Sta.

What It Does: Provides estimates of daily attendance (and corresponding precision of estimates) for a test set of several campgrounds from attendance measured in only one bellwether campground. Total daily attendance for a test set of 23 campgrounds was estimated from attendance measured in only one of them in a 1961 pilot study. Estimates of daily and seasonal attendance were within 10

percent of true attendance at a confidence level of 67 percent.

How It Works: The method consists of three steps: grouping campgrounds into sets, calibration, and estimation of attendance. Calibration consists of counting attendance in each campground in the group (on a minimum of 20 randomly selected days throughout the season for correlation-regression and 30 randomly selected days for ratio analysis); testing for relationships by correlation or ratio analysis; selecting indicator campgrounds; and computing equations for estimating attendance. The method can be used to update use estimates on all sites for a several-year period following calibration by measuring only one or two bellwether campgrounds.

Cost: Initial cost for calibrating all campgrounds is high, but generally less than cost of other sampling methods that require estimating attendance at individual campgrounds. Sampling cost per campground will vary with the number of sites included in the set, but they can be prorated over a several-year period.

Comments: The method can provide good estimates of daily and seasonal attendance, but does not provide estimates of kind of use. Standard procedures have not been devised for applying the method. The authors say that specific procedures must rest on examination, and possible modification, of statistical models for conformance with field conditions.

Citation: Wagar, J. Alan. 1964. ESTIMATING NUMBERS OF CAMPERS ON UNSUPERVISED CAMPGROUNDS. USDA Forest Serv. Res. Pap. NE-18, 16 pp. NE. Forest Exp. Sta.

What It Does: Estimates number of campers on several unsupervised campgrounds from information collected from one or a group of unsupervised campgrounds. The method was successfully pilot-tested in 1961 with one campground on which season-long number of campers was available, and eight unsupervised campgrounds.

How It Works: Campers were counted each evening on approximately 18 ran-

domly selected dates on one or more unsupervised campgrounds. Most of these counts must coincide with records from at least one unsupervised campground on which full counts are made throughout the season. Regression and ratio estimation procedures are used to produce estimates of number of campers on all unsupervised campgrounds in the area.

Cost: Estimated at approximately \$75 to \$100 per campground. Cost will vary, depending on number of campgrounds available for calibration. Where season-long records of number of campers using unsupervised campgrounds are available from self-registration or ticket sale records, considerable reduction in data-collection costs may be realized.

Comments: The sampling technique produces estimates of number of camper-nights only, not estimates of hours of use by activity. It can produce precise estimates of number of campers. The 1961 pilot study produced estimates within approximately 10 percent of actual number of campers at a confidence level of 95 percent.

Citation: James, George A., and John L. Rich. 1966. ESTIMATING RECREATION USE ON A COMPLEX OF DEVELOPED SITES. USDA Forest Serv. Res. Note SE-64, 8 pp., illus. SE. Forest Exp. Sta.

What It Does: Produces estimates of visits and use (by activity), and has use updating features, for a test set of developed sites from traffic-count records obtained from one or two locations. In a 1964 pilot test, good estimates of use were obtained for eight developed sites from a vehicular traffic-count record at one key location.

How It Works: Use estimates (by visits, by activity, etc.) are obtained by determining the relationship between traffic counts and the desired statistic by simultaneously measuring both on several developed sites. Analytical procedures, described by James and Ripley (1963), produce season-long estimates of use for individual sites and for all sites com-

bined. The final step is to determine the effectiveness of one or more traffic counters in estimating total seasonal use for all sites combined. The method can also update use estimates on all sites for a several-year period following calibration.

Cost: Average cost per site for first-year calibration is approximately \$325 for labor and supervision. One observer can calibrate two sites at one time. Most cost reduction in sampling is not immediate, but comes after the first-year period of calibration. The economic gain lies in the fact that traffic counters need not be installed, maintained, and read periodically on any but the indicator site during the next few-year period.

Comments: The technique provides use estimates for almost any kind of developed site; i.e., the set of sites need not all be campgrounds. The method provides an estimate of number of entries, not a true estimate of number of visits.

Citation: James, George A. 1967. INSTRUCTIONS FOR USING TRAFFIC COUNTERS TO ESTIMATE RECREATION USE SIMULTANEOUSLY ON TWO NONCONTIGUOUS DEVELOPED SITES. Unpublished report, available from Recreation Research Project, Southeastern Forest Experiment Station, Asheville, North Carolina 28802.

What It Does: Designed to produce estimates of amount of use, by activity, on unsupervised developed sites, it makes provision for updating estimates during a several-year period following calibration from vehicle counts only. Good estimates of use were obtained on approximately 12 sites in a 1966 pilot study.

How It Works: Procedures are the same as for the double-sampling technique, but two developed sites are calibrated during the same sampling day. On each sampling day, the observer spends approximately 6 hours on each of two sites, rather than 12 hours on one site. The two sites must be within approximately 15 minutes travel time of each other.

Cost: A single observer can calibrate two sites at one time, thus reducing sampling

costs by approximately 50 percent over the double-sampling technique.

Citation: James, George A., and Gary L. Tyre. 1967. USE OF WATER-METER RECORDS TO ESTIMATE RECREATION VISITS AND USE ON DEVELOPED SITES. USDA Forest Serv. Res. Note SE-73, 3 pp. SE. Forest Exp. Sta.

What It Does: Produces estimates of amount of use, by activity, on unsupervised developed sites and makes provision for updating estimates from water consumption records only during a several-year period following calibration.

How It Works: Procedures are the same as for the double-sampling technique described previously.

Cost: Average cost per site for first-year calibration is approximately \$650 for labor and supervision, and approximately \$150 for the water meter. If relationships between use and water consumption are strong, estimates can probably be updated for a 3- to 5-year period following calibration, thus reducing sampling costs to approximately \$150 to \$200 per year.

Comments: Water use on developed sites is generally correlated highly with recreation use. Estimates of use based on water-use records can generally be expected to be more accurate than those based on vehicular traffic counts. Though initial cost of a water meter is higher than that of a pneumatic traffic counter (approximately \$150 vs. \$75), total site-calibration cost might be less because only one water meter is generally needed per site, or site complex, regardless of the number of site entrances. Compared to traffic counters, water meters are less subject to vandalism, require less maintenance, and are not affected by snow or ice.

Citation: Crapo, Douglas, and Michael Chubb. 1969. RECREATION AREA DAY-USE INVESTIGATION TECHNIQUES: Part 1, A Study of Survey Methodology. Mich. State Univ., Dep. Park and Recreation Resources Tech. Rep. 6, 125 pp. (Avail-

able as a reprint from University microfilms, \$5.55).

What It Does: A test of various self-administered questionnaire techniques to determine their reliability in collecting information about park-user characteristics, use patterns, attitudes, and opinions.

How It Works: Use parameters were obtained by random-systematic sampling procedures, by a combination of voluntary "hand-in" questionnaire techniques, and by interviewing nonrespondents at eight sample state and regional parks in Michigan. The accuracy of voluntary questionnaire information was high, and estimates of good precision were obtained for the entire park-using population.

Cost: Approximately \$11,000 (plus contributed time) to carry out elaborate tests in eight state and regional parks, including field work, analysis, and report preparation.

Comments: Results indicate that by changing questionnaire design, content, and retrieval methods, questionnaire responses and data reliability can be significantly increased. Agencies with contact-station, controlled recreation areas can get good user information on a continuous basis at relatively low cost.

Citation: Wagar, J. Alan. 1969. ESTIMATION OF VISITOR USE FROM SELF-REGISTRATION AT DEVELOPED RECREATION SITES. USDA Forest Serv. Res. Pap. INT-70, 27 pp. Intermount. Forest and Range Exp. Sta.

What It Does: Produces estimates of total visitor use from self-registration data obtained from visitors. In a 1967 pilot study, estimates of total use were as precise as those obtained from an earlier method that required six times the man-hours in sample counting. Estimates are provided for (1) a site the season it is sampled, (2) the same site in subsequent years when no sampling is done, and (3) for a site never sampled but similar to nearby sampled sites.

How It Works: Use information is obtained from visitors through self-registration (predictor variable) and on 24 randomly selected on-the-hour counts

during the recreation season; 12 for daytime, 12 for evening. Regression estimation procedures are used to produce estimates of total use and use by activity. The method can update use estimates for a several-year period following calibration from self-registration information.

Cost: Average cost for first-year calibration is approximately \$75 per site. The updating feature reduces cost to approximately \$25 to \$30 per year over a several-year period for collection of self-registration cards, data preparation, and computer analysis.

Comments: The method can provide good estimates of use at low cost. Information obtained through self-registration includes ZIP Code of individual or group, thus making it possible to determine visitor origin and travel distance between site and visitor origin for self-registration sites where the fee system is enforced.

Citation: Wagar, J. Alan, and Joel F. Thalheimer. 1969. TRIAL RESULTS OF NET COUNT PROCEDURES FOR ESTIMATING VISITOR USE AT DEVELOPED RECREATION SITES. USDA Forest Serv. Res. Note INT-105, 8 pp. Intermount. Forest & Range Exp. Sta.

What It Does: Produces estimates of total visitor use for the usual activities, for occupancy of camp units by daytime and nighttime, and for camping equipment by types. The method was tested with good results for three seasons at a 27-unit campground, and for one season at a recreation complex consisting of 117 camping units, plus picnicking, fishing, boating, a lodge and cabins, and a trail head to an adjacent primitive area. Future usefulness of the method depends on the availability of suitable, reasonably inexpensive counter equipment which is not presently commercially available.

How It Works: The net count system relates randomly scheduled counts of visitor use to mechanical traffic counts for the same times, and applies the resulting relationships to the season-long traffic-count record to obtain an estimate of season-long visitor use. The method dif-

fers from the double-sampling technique in that only 20 randomly selected, on-the-hour counts are taken instead of 12 daylong sequences of counts. A traffic counter is used to record the vehicles actually present at specific times rather than one that records the total flow of traffic during a period of time.

Cost: Estimated at approximately \$100 to \$125 per site for field work, supervision, travel, and servicing of traffic counters. The largest cost is the electric traffic counter, though not presently available commercially, which is expected to cost from \$200 to \$500.

Comments: The net-count visitor sampling method could be highly effective for selected situations but, as mentioned, it is contingent upon counting equipment that is not commercially available at this time.

Citation: Cordell, Harold K., George A. James, and Russell F. Griffith. 1970. ESTIMATING RECREATION USE AT VISITOR INFORMATION CENTERS. USDA Forest Serv. Res. Pap. SE-69, 8 pp. SE. Forest Exp. Sta.

What It Does: Designed to produce estimates of amount and kind of recreation use at visitor information centers, this makes provision for updating estimates for a several-year period following calibration based on several easily obtained indicators.

How It Works: Information is obtained on 12 randomly selected sampling days concerning number of visitors and use, by activity, which occurs in the visitor center building, along trails, and in the parking lot. Regression-estimation procedures produce use estimates based on such indicators as number of people entering the exhibit hall, vehicle counts, and bus ticket sales.

Cost: Total cost of the 1969 sampling effort was \$1,700. The updating feature makes it possible to spread the benefits and costs over several years. Total cost prorated over a 5-year period will average approximately \$340 annually.

Comments: The method yields good estimates of seasonal use, by activity, for

almost any kind of visitor information center, including use that occurs in theaters, in parking lots, along trails, etc.

Citation: Elsner, Gary H. 1970. CAMPING USE-AXLE COUNT RELATIONSHIP: ESTIMATION WITH DESIRABLE PROPERTIES. *Forest Sci.* 16: 493-495.

What It Does: Describes a refinement for increasing the precision and value of use estimates based on the double-sampling technique described by James and Ripley (1963). The method, based on a general nonlinear function, increases the complexity of office computations only slightly.

How It Works: The general model for predicting campground use from axle-count data includes three desired properties: (a) zero intercept, (b) fixed upper limit, and (c) decreasing campground use with increasing axle count.

Cost: Average cost per site for first-year calibration, based on 12 sampling days, is approximately \$650 for labor and supervision, and approximately \$75 each for pneumatic traffic counters. Use estimates can be updated for a 3- to 5-year period following calibration, thus reducing sampling costs to approximately \$150 to \$200 per year.

Comments: Estimating use by the nonlinear function requires more information than the ordinary regression formulations. It is necessary to know the number of camping units at each campground, and requires close initial estimates of the remaining parameters. Making these initial estimates can be time-consuming if the analyst has little experience with this particular function.

ESTIMATING USE ON DISPERSED AREAS

Citation: Bury, Richard L., and James W. Hall. 1963. ESTIMATING PAST AND CURRENT ATTENDANCE AT WINTER SPORTS AREAS . . . A PILOT STUDY. USDA Forest Serv. Res. Note PSW-33, 7 pp. Pacific SW. Forest and Range Exp. Sta.

What It Does: Produces estimates of attendance at winter sports areas; makes provision for updating attendance estimates for a several-year period following calibration based on business records of tow-lift tickets or restaurant receipts. In a 1961-62 pilot study, estimates of total attendance over a 2-month period were within 8 percent of true attendance at the 67-percent level of confidence.

How It Works: During a calibration season, an observer counts the number of persons and total number of vehicles on randomly selected days. The average length-of-stay and average number of persons per vehicle are derived from these. These are converted to visitor-days or visitor-hours of use and are correlated with routinely collected daily figures of number of lift and tow tickets issued, restaurant receipts, and receipts from equipment rental obtained from resort operators. Regression and correlation estimation procedures are used to produce estimates of attendance.

Cost: The technique is relatively expensive because one full-time person is required at each entrance (and exit, if visitor-hours are desired) during sampling days of the calibration season. Attendance can be estimated inexpensively for a several-year period after the estimation equations are derived.

Comments: This technique provides estimates of attendance only, not estimates of use by activity. The authors say that the pilot study was useful primarily to illustrate the form of results, to identify problems, and to suggest general levels of attainable precision.

Citation: Cushwa, Charles T., and Burd S. McGinnes. 1964. SAMPLING PROCEDURES AND ESTIMATES OF YEAR-ROUND RECREATION USE ON 100 SQUARE MILES OF THE GEORGE WASHINGTON NATIONAL FOREST. N. Amer. Wildlife & Natur. Resources Conf. Trans. 28 (1963): 457-465. Also: Cushwa, Charles T., Burd S. McGinnes, and Thomas H. Ripley. 1965. FOREST RECREATION ESTIMATES AND PREDICTIONS IN THE NORTH RIVER AREA, GEORGE WASHING-

TON NATIONAL FOREST, VIRGINIA. Va. Agr. Exp. Sta. Bull. 558, 48 pp., illus.

What It Does: A technique for generating estimates of dispersed use on large units of land. In a 1961-62 pilot study, good estimates of number of visits and use, by activity, were obtained for a 100-square-mile section of the George Washington National Forest. In addition, considerable information was obtained about socio-economic characteristics of the forest visitors.

How It Works: Use information was obtained by personally interviewing forest visitors as they departed the area along roads and trails during each of 648 randomly selected sampling periods. The 1-year period for which use estimates were desired was stratified by day of week (weekend days and holidays, and weekdays) and season of year. Exits were stratified into three major groups: paved roads, unpaved roads, and trails. Length of time of sampling unit was adjusted inversely to expected flow of traffic, and varied between 1 and 4 hours. Stratified random-sampling estimation procedures were used to produce year-long estimates of visits and use.

Cost: Although less than 1 percent of all sampling opportunities were sampled, costs were high because of the large number of sampling opportunities available and the large amount of travel involved in interviewing visitors. Total cost of the study is estimated at approximately \$8,000. Cost will depend upon size of the area selected, duration of the study, and level of accuracy desired.

Comments: Study results revealed that a stratified random-sampling model (with no prior knowledge of how to optimize sampling effort) can produce good estimates of total and component recreational uses. In addition, the study detected significant relations between users and uses as a basis for providing decisions for present and future recreational management. The pilot study made no provision for testing relationships between use and use indicators on which estimates might be updated annually for a several-year period following calibration.

Citation: James, George A., and Robert A. Harper. 1965. RECREATION USE OF THE Ocala NATIONAL FOREST IN FLORIDA. USDA Forest Serv. Res. Pap. SE-18, 28 pp., illus. SE. Forest Exp. Sta.

What It Does: Produces estimates of amount and kind of use, both mass and dispersed, which occur on areas as large as entire National Forests.

How It Works: Two sampling models were employed to measure visits and hours of use, by activity. The double-sampling technique (*op. cit.*) was used to estimate use on three developed sites. Simple stratified random sampling, which entailed interviewing visitors as they left the forest at established interview checkpoints, was employed to measure all other use. The two sampling techniques, used simultaneously, worked well. In addition, the interviews yielded considerable information about socio-economic characteristics of forest visitors.

Cost: The intensive year-long sampling effort cost approximately \$15,000.

Comments: The sampling effort provided a necessary followup test of the already pilot - tested stratified random - sampling technique (*Cushwa and Meginnis 1964*) for estimating use on large areas. Although the model produced good estimates of use, a serious limitation was high cost and inability of the model to update estimates in future years. In subsequent study, James and Henley (1968) investigated this feature.

Citation: James, George A. 1968. PILOT TEST OF SAMPLING PROCEDURES FOR ESTIMATING RECREATION USE ON WINTER-SPORTS SITES. USDA Forest Serv. Res. Pap. SE-42, 8 pp. SE. Forest Exp. Sta.

What It Does: Produces estimates of visits and use, by activity, (including difficult-to-measure skiing use) at winter-sports sites. Makes provision for updating use estimates for a several-year period following calibration based on vehicular traffic-count records and such concessioner records as restaurant and ski-lift ticket sales.

How It Works: The recreation season is sampled on approximately 18 randomly

selected days. Daily and season-long records are obtained of restaurant and ski-lift ticket sales and vehicular traffic count. Regression procedures produce use estimates for such variables as number of visitors; amount of skiing and snow-play use; and amount of use occurring in restaurants, lodges, equipment-rental shops, parking lots, etc. A short questionnaire (self-addressed, franked postcard) is administered to determine average hours of skiing per day per skier and other variables of interest.

Cost: Total cost of the 1966-67 pilot study was \$1,865, not including the traffic counter (\$700) installed at the site entrance. Estimates can be updated annually for a several-year period following calibration, thus reducing average annual cost to approximately \$375.

Comments: Each winter-sports site represents a unique sampling situation and the sampling technique must be modified to fit each site. Pneumatic traffic counters do not work in snow and ice; and more expensive counters, such as magnetic loop or electric-eye, must be used to obtain accurate traffic-flow information.

Citation: James, George A., and Robert K. Henley. 1968. SAMPLING PROCEDURES FOR ESTIMATING MASS AND DISPERSED TYPES OF RECREATION USE ON LARGE AREAS. USDA Forest Serv. Res. Pap. SE-31, 15 pp. SE. Forest Exp. Sta.

What It Does: produces estimates of dispersed (and massed) use on large units of land. Makes provision for updating use estimates for a several-year period following calibration based on vehicular traffic-count records. In a 1966 pilot test on the Pacific Ranger District, Eldorado National Forest, in California, use estimates and sampling errors were determined for 37 recreational activities on Forest Service land and for 33 activities occurring on "other" land within District boundaries.

How It Works: A stratified random sampling technique is used which incorporates road checkpoints at which exiting recreationists are interviewed. Interviews

are conducted on approximately 20 days during the use season for which estimates are desired. Vehicle counts are obtained mechanically from one or more key roads to establish relationships between use, by activity, and traffic on which estimates might be updated in future years. Use on important developed sites within recreation area boundaries is estimated by the double-sampling technique.

Cost: Cost of the study, not including cost of traffic counters and signs, was \$13,700. Use estimates can be updated annually for a several-year period, thus reducing average annual cost to approximately \$3,000.

Comments: The sampling model was used successfully on three large areas during 1967, 1968, and 1969. Improved sampling procedures and reduced sampling intensity lowered calibration costs to approximately \$6,500 on each site. Although not pilot-tested, the technique can be used to estimate use on snowmobile areas.

Citation: McCurdy, Dwight R. 1970. A MANUAL FOR MEASURING PUBLIC USE ON WILDLANDS—PARKS, FORESTS AND WILDLIFE REFUGES. S. Ill. Univ. Dep. Forest. Pub. 5, 48 pp.

What It Does: Produces estimates of dispersed use on large tracts of land.

How It Works: Estimates are generated by a stratified random-sampling model, stratification including time of day, day of week, and season of year. Roads within the area are patrolled on randomly selected days and times; vehicles are counted; and questionnaires (containing a stamped, self-addressed envelope and a letter explaining the purpose of the study) are placed on the vehicle windshields of area users. Completed and returned questionnaires form the basis for use estimates. Questionnaires should be used every 3 to 5 years so that recreational trends can be accounted for in the estimates. Formulas are included in the publication for producing estimates of use.

Cost: Cost is minimal if a patrol system is already in use by the managing agency.

Comments: The author recommends that the method be used in conjunction with the double-sampling technique described by James and Ripley (1963).

Citation: James, George A., Peter H. Wingle, and James D. Griggs. 1971. ESTIMATING RECREATION USE ON LARGE BODIES OF WATER. USDA Forest Serv. Res. Pap. SE- (in press). SE. Forest Exp. Sta.

What It Does: The sampling model produces estimates of recreation use on large bodies of water, including estimates of number of persons, use by activity, type of boat, number and kind of fish caught, etc. Makes provision for updating use estimates for a several-year period following calibration.

How It Works: Five systematic flights (in light, single-engine aircraft) are made over the water area on each of 10 sample days. On each flight, the aerial observer makes an instantaneous count of all boats on the water. Boaters are interviewed at random times and locations as they return to landing areas. Vehicle counts are obtained on one or more key roads. Simple linear-regression estimation procedures are used to generate estimates of use.

Cost: Cost of sampling two lakes in the pilot test, by aerial and ground observation techniques, was \$4,400. Cost prorated over a 5-year period for which use estimates can likely be updated will average approximately \$880 annually. The largest cost is for use of aircraft. Cost can be reduced substantially where several water bodies can be observed on each flight, or where the water body is of such size and shape that ground observers (using binoculars) can count number of boats.

Comments: The technique was used successfully during 1969 on two large reservoirs in Tennessee and Pennsylvania.

ESTIMATING USE ON WILDERNESS AREAS

Citation: Lucas, Robert C. 1964. RECREATION USE OF THE QUETICO-SUPERIOR AREA. USDA Forest Serv. Res. Pap. LS-8, 50 pp., illus. Lake States Forest Exp. Sta.

What It Does: Describes a sampling procedure for estimating amount and type of use, overnight accommodations used, and distribution of use on a large area, most of it a roadless canoeing area.

How It Works: A modified roadblock system and interview approach measured use directly at points of concentration on approach routes, rather than over the entire area. A nonrecording-type pneumatic traffic counter was installed at each of six major access checkpoints to obtain a record of vehicular traffic. Motorists were interviewed on 14 randomly selected days at four checkpoints and on 7 days at two additional lightly used points. Estimates were generated from the composition of traffic on sample periods applied to total traffic recorded by the traffic counters for the entire season. For example, if 5 percent of outbound traffic occurred during sample periods, the sample data were multiplied by an expansion factor of 20.0. Error terms were not calculated for use estimates.

Cost: Approximately \$3,000 for salaries, travel, and counters. Tabulation and analysis cost about \$1,500.

Comments: Details of the sampling design and estimation procedures are available in mimeographed form upon request to the North Central Forest Experiment Station, St. Paul, Minnesota. The system worked well in the study area, but several unusual conditions contributed to its success: almost all the roads dead-ended near the wilderness-type area; nonrecreational traffic was a small part of the total; night traffic was light and could be omitted from the sampling effort without serious bias; and traffic speeds on the roads were low and thus drivers could be easily and safely stopped by one field interviewer.

Citation: Wenger, Wiley D., Jr. 1964. A TEST OF UNMANNED REGISTRATION STATIONS ON WILDERNESS TRAILS: FACTORS INFLUENCING EFFECTIVENESS. USDA Forest Serv. Res. Pap. PNW-16, 48 pp., illus. Also: Wenger, Wiley D., Jr., and H. M. Gregersen. 1964. THE EFFECT OF NONRESPONSE ON REPRESENTATIVENESS OF WILDERNESS REGISTRATION INFORMATION. USDA Forest Serv. Res. Pap. PNW-17, 20 pp., illus.

What It Does: Objectives of the 1961-62 study were to determine if unmanned registration stations might be employed effectively to obtain information from recreationists on wilderness trails, and to test different types of registration boxes, forms, and signs to determine which combination produced the best response.

How It Works: Recreationists were interviewed personally on randomly selected days and locations, uptrail from the registration station, after they had had an opportunity to respond to the signed request to register. Response rate and quality of information varied greatly by type of box, registration form, and wording of sign. The publication contains recommendations concerning placement of stations, type of registration box, registration form, and wording of sign.

Cost: Not available.

Comments: Though Wenger did not convert registration data into use estimates, he concluded that self-registration information could be used effectively for use-estimation purposes. The study was an important contribution to the wilderness use literature and an essential first step in the design of later studies relating to estimation of wilderness use.

Citation: Thorsell, J. W. 1967. WATERTON LAKES NATIONAL PARK VISITOR USE SURVEY, 1966: PART II, WILDERNESS RECREATIONAL USE. Canada Nat. Parks Serv. Planning Recreation Res. Rep. 24, 57 pp. Also: Thorsell, J. W. 1967. RECREATIONAL USE IN WATERTON LAKES NATIONAL PARK. M.A. thesis, Univ. Western Ontario, 1967, 188 pp. (Reference is basis of Chapter V of thesis.)

What It Does: The general survey objective was to assess the patterns of use in the Waterton Lakes National Park and to determine characteristics of park users.

How It Works: Eight unmanned, self-registration boxes and signs were placed in the interior of Waterton Park. Use of trails was calibrated by projections of recorded use (self-registration forms) based on an assumed 75-percent response rate. Additional information on trail use was collected from field observation and discussions with wardens, naturalists, and group camp leaders.

Cost: Allotment of time for the survey amounted to 1 day each week for approximately 11 weeks for data collection and servicing of registration stations. Total cost was approximately \$6,500, including all field sampling phases, data analysis, and report preparation and publication.

Comments: The survey demonstrated that unmanned self-registration stations can provide useful information about wilderness use and users, and served as a pilot study for subsequent trail-use surveys on Banff/Yoho National Parks. Error terms could not be calculated because use estimates were based on an assumption that three out of four entering groups complied with registration. Useful information was obtained concerning characteristics of the park visitors.

Citation: Thorsell, J. W. 1968. A TRAIL USE SURVEY, BANFF AND YOHO NATIONAL PARKS, 1967. Canada Nat. Parks Serv. Planning Recreation Res. Rep. 33, 57 pp., illus.

What It Does: Describes methodology for estimating amount, distribution, and season of use and determining characteristics of trail users.

How It Works: Unmanned self-registration stations were placed at 55 locations within the parks. To determine visitor response to the trail registers, six stations were observed from a distance with binoculars without the knowledge of the visitors during a total of 95 hours. A separately conducted survey of roadside campers and motel guests was also taken

to provide a comparative sample with the main study.

Only 35 percent of the visitors registered at the unmanned self-registration stations, a much lower rate than in Wenger's 1961-62 study. Thorsell partially attributes this to the long form used, which contained 19 questions. To obtain estimates of use, registration stations were classified into three rate-of-response groups and registration totals were multiplied by the inverse of the assumed rate of response.

Cost: Response rates of visitors to unmanned registration stations, on which use estimates were based, were determined from 95 hours of binocular observation. Four persons spent 3 months operating and maintaining the 55 registration stations, 45 of which were placed well in the interior of the park. Total cost was approximately \$18,000, including all field sampling phases, data analysis, and report preparation and publication.

Comments: The author states that as a result of the study, problems inherent in trail and back-country management can now be defined more easily and a standard base is now available from which future studies will be able to detect trends in use.

Citation: Kovacs, T. J. 1970: SELF-ADMINISTERED PARK VISITOR SURVEY TECHNIQUE. Canadian Outdoor Recreation Demand Study. Canada Nat. Parks Serv. Dep. Indian Affairs and Northern Develop., 23 pp., illus.

What It Does: Describes the park visitor survey technique utilized in the Canadian Outdoor Recreation Demand Study designed to identify and determine the nature of use in all types of parks in Canada and to reveal the characteristics of the users.

How It Works: Employs the self-administered questionnaire method to collect information about park visitors. Questionnaires, distributed to a random sample of visitors at park entrances (at 345 parks), were retrieved by voluntary deposit in collection boxes placed near park exits.

The technique proved to be a valuable method for collecting information on park visitors.

Cost: Depending on the type of park surveyed, the cost per completed questionnaire (which includes all costs for the entire project) ranged from 24 cents to \$1.42. An overall cost of slightly over \$1 per completed questionnaire appears to be a realistic estimate of the expenditure. Over 91,039 completed questionnaires were obtained.

Comments: The technique proved to be a valuable method for collecting information on park visitors. The Canadian National Parks Service recommends that the self-administered survey method, based on the revised (1970) questionnaire format, be utilized continually to maintain standardized, comparable, and up-to-date knowledge of park use and user characteristics in the National Parks of Canada.

Citation: Lucas, Robert C., Hans T. Schreuder, and George A. James. 1971. WILDERNESS USE ESTIMATION: A PILOT TEST OF SAMPLING PROCEDURES ON THE MISSION MOUNTAINS PRIMITIVE AREA IN MONTANA. USDA Forest Serv. Res. Pap. INT- (in press). Intermount. Forest and Range Exp. Sta.

What It Does: The primary objective of the study was to develop and test a sampling design to provide estimates of current wilderness use and to establish relationships between use and several indicators that might be utilized to update estimates in future years, within specifiable levels of precision. Interview and self-registration forms provided considerable information about characteristics of the wilderness user.

How It Works: The basic sampling design was stratified random sampling, with stratification including day of week, season of year (summer/fall), and expected use of trails. Variables of interest were measured by means of a personally administered questionnaire in interviews with groups entering and leaving the trail during 110 randomly selected 2-day

sampling units. Supplementary (covariate) information was obtained by establishing registration stations on each trail and giving entering groups a chance to register and fill out a wilderness registration card. Mechanical counters, placed on some of the most heavily used trails and access roads, provided additional covariate information.

Cost: The calibration cost of \$11,500 can be prorated over a several-year period because of relatively strong relationships between registration and interview information. Assuming that relations between use and registration information remain constant, estimates of use can be updated annually for a 3- to 4-year period based on self-registration only, without interviewing entering visitors. Average annual cost for use estimates thus becomes approximately \$3,000.

Comments: The study resulted in a useful sampling tool for obtaining estimates of current recreation use on wilderness areas. The sampling model, however, is not yet recommended for general use because of high cost and weaknesses that must be corrected. The study yields information that should make it possible to substantially reduce costs and to improve sampling efficiency in future studies.

Citation: James, George A., and Hans T. Schreuder. 1971. A 1969 PILOT TEST OF SAMPLING PROCEDURES FOR ESTIMATING RECREATION USE OF THE SAN GORGONIO WILDERNESS IN CALIFORNIA. (Proposed for "Journal of Leisure Research.")

What It Does: Pilot test of a sampling model for estimating the amount of dispersed recreation use that occurs on wilderness areas. Prototypes of an experimental electric-eye trail counter were placed on all entrances to determine their effectiveness in estimating use and to determine whether a mechanical count of all persons (and stock) entering and leaving the area might successfully determine user compliance with self-registration.

How It Works: The study was a followup to the 1968 pilot study on the Mission Mountains Primitive Area, and sampling procedures were similar. Information obtained during the 1968 pilot study, however, made it possible to reduce costs substantially because of improved sample allocation and reduced sampling intensity.

Cost: Cost of the test was \$4,800, not including cost of the prototype electric-eye counters. With regression equations generated during calibration year, the initial cost of \$4,800 can be prorated over a 5-year period based on self-registration information alone. Average annual cost for use estimates thus becomes approximately \$1,200, including an annual cost of about \$250 for servicing unmanned registration stations.

Comments: The sampling technique produced use estimates of good precision, based on interview and self-registration information. The electric-eye counters did not produce a satisfactory record that could be used for estimation purposes. Notwithstanding failure of the study to furnish a complete test as planned, it still offers valuable evidence that unmanned registration stations and personal interviews of entering groups can provide precise estimates of wilderness use. Other than the relatively high price tag involved, it can be said at this time that a sound sampling technique is available for estimating wilderness use.

MANAGEMENT OF RECREATION INVENTORY INFORMATION

The rapid expansion in recreation use, sites, and facilities has been accompanied by comparable growth in the magnitude and complexity of handling the vast volume of data that have become available. Consider the procedures used by the USDA Forest Service to handle recreation inventory information collected from the lands and waters that it administers. The very size of Forest Service operations, coupled with the complexities involved in multi-

resource management for wood, water, forage, wildlife, and recreation, made a comprehensive inventory system imperative.

For administrative purposes, the land and water resource base of 186 million acres is divided into nine Regions, 130 National Forests, and 767 Ranger Districts—an area equivalent in size to the land surface of France, plus most of Great Britain. More than 97 percent of this land and water complex, which is located in 42 states, is available and used for some form of outdoor recreation. The developed site complex alone has the capacity to accommodate more than 1 million persons at one time for a wide variety of recreation activities.

The Washington Office Division of Recreation and the Southeastern Forest Experiment Station joined forces in 1965 to develop a Servicewide recreation management system. Known as RIM (Recreation Information Management), the system is a computer-oriented approach to the accumulation, storage, manipulation, comparison, retrieval, and display of information about PEOPLE, PLACES, AND THINGS over periods of time. The Division of Recreation, acting with Regions and National Forests, determines the kinds of information needed. A RIM Project, headquartered at Asheville, North Carolina, provides technical advice on how to collect and manage inventory information, and, using computer facilities at the University of Georgia and at Huntsville, Alabama, carries out the data-management process.

The RIM System provides current and meaningful information on the identification, location, condition, and use of each recreation site and area in the National Forest System, currently consisting of over 21,000 different population elements. It stores this information in quantities that would be impractical to manage by manual methods, and virtually eliminates the burdensome and costly compilation of information at all levels above the actual source of data. In effect, it relieves the resource manager from data-manipulation chores and frees him for the important job of USING information by (1) furnishing a reservoir of information upon which management can draw for a current disclosure of the

pertinent facts, (2) by assembling information in reports or in other meaningful arrays, and (3) by organizing information so that interrelationships are disclosed.

RIM is a system designed to yield an almost limitless variety of resource information in any array to meet both internal and external needs and requests; and it makes possible the rapid production of lists, summaries, and analytical comparisons that can improve the quality of managerial decisions affecting the allocation of funds and utilization of resources. RIM is designed to retrieve any characteristic or combination of characteristics ever stored in the system.

RIM has been in operation since 1965, and its operational data banks currently include:

1. BASIC ADDRESS (location, identity, size, capacity, access, etc., of all sites and areas by name and serial number)
2. FACILITY INVENTORY (kind and amount of recreation facilities and improvements in place)
3. CONDITION SURVEY (degree that each facility and physical improvement meets existing standards, the cost of routine maintenance, and the cost of any action required to correct unsatisfactory or unacceptable conditions)
4. DIRECTORY (information about campgrounds and picnic grounds, including type of facilities provided, nature of opportunities available, fees, etc.)
5. RECREATION USE (quantity, timing, and location of recorded use on a site-by-site and area-by-area basis)

All data banks are updated annually to provide a perpetual inventory of up-to-date information.

Future RIM data banks will include: (1) a PROGRAM file, which will be an inventory and record of facts about potential sites and areas to assist managers in planning future developments; (2) a HISTORICAL file, which will relate passage of time to physical and environmental changes on sites and areas; (3) a SATELLITE file to create satellite data banks with services closely associated with recreation; and (4) a RESEARCH file, which will be

a source of basic data for studies relating to biological-physical relationships, cost/benefit relationships, supply/demand, use projections, user satisfactions, and others.

Additional information and detailed instructions for implementing the program are found in FSM 2311; RIM Handbook (FSH 2309.11); and Recreation Information Management, In-Service Training Guide, Forest Service, U.S. Department of Agriculture, March 1968, 127 pp.

RIM recognizes some 30 kinds of recreational elements where use takes place; i.e., campgrounds, picnic grounds, swimming sites, winter-sports sites, wilderness areas, trails, waters, etc. Data are stored in the system for each of the approximately 21,000 population elements by approximately 52 activities (camping, hiking, hunting, fishing, etc.). Use input into the system

comes from estimates developed for each individual site and area. Use outputs are arrayed to reflect the total amount of use on a particular site or area and the quantity of each type of activity that occurred in that place. Approximately 20 different recreation use summaries and tabulations are produced annually (on a calendar-year basis) and include kinds and volume of use (by activity) and where it occurred (by individual site and area) Servicewide, by Region, by Forest, by District, by population element, by State, by Congressional District, by county, by river basin, by size and capacity of developed site, use by minority groups, and other categories. An example of use information available from RIM is shown in table 1, a Servicewide summary of estimated National Forest recreation use for CY 1970.

Table 1.—*Estimated National Forest recreation use, Servicewide Summary, 1970*

Activity	Public use	
	Visitor-days ¹	Percent
Camping	46,454,100	26.9
Picnicking	7,494,800	4.3
Recreation travel:		
Automobile (33,801,900)		
Scooter & motorcycle (2,139,700)		
Ice & Snowcraft (1,950,400)		
Other machines (130,400)	38,022,400	22.0
Boating		
Powerboats (3,086,800)		
Other boats (1,405,200)	4,492,000	2.6
Games and team sports	578,100	.3
Waterskiing and other water sports	743,100	.4
Swimming and scuba diving	3,459,100	2.0
Winter Sports:		
Skiing (5,515,800)		
Other (1,029,800)	6,545,600	3.8
Fishing	15,239,100	8.8
Hunting	14,308,400	8.3
Hiking and mountain climbing	5,592,300	3.2
Horseback riding	2,387,800	1.4
Resort use	4,082,900	2.4
Organization camp use	4,312,500	2.5
Recreation residence use	7,553,800	4.4
Gathering forest products	1,362,600	.8
Nature study	952,800	.6
Viewing, scenery, sports, environment	7,299,300	4.2
Visitor Information (exhibits, talks, etc.)	1,673,800	1.0
Total	172,554,500	

¹Recreational use of N.F. land and water that aggregates 12 person-hours. May entail 1 person for 12 hours, 12 persons for 1 hour, or any equivalent combination of individual or group use, either continuous or intermittent.

The 1970 use estimate of 172.5 million visitor-days is composed of a mixture of statistically reliable estimates (where tested sampling techniques were used) and other estimates based on observation, experience, and comparison. The quality and reliability of Forest Service use estimates have increased substantially during the past several-year period because carefully controlled and statistically sound sampling procedures have been used on more and more sites and areas each year. Overall improvement of use estimates will continue as research develops better and cheaper sampling techniques and as these, in turn, provide estimates of use on a larger proportion of population elements.

CONCLUSIONS

We have come a long way during the past 10 years in recreation-use estimation. Many of the sampling models, modified as needed to meet local situations, have universal application. Research on sampling techniques is continuing, and the overall reliability of data in future years will be progressively improved as it becomes possible to apply statistically sound sampling techniques to an increasingly larger proportion of total recreation use.

Yet none of the current sampling techniques is without need for improvement, and much remains to be done. Continuing effort is needed to design and test new techniques and to improve techniques already in use. In addition, there are several kinds of sites and areas for which no sampling experience is available. Sampling models must be developed and tested to cover the gamut of sampling problems that exist. Because mechanical, electrical, and photographic telemetry offers considerable promise for recording several kinds of hard-to-measure recreation use, improve-

ment in operation and reduction in cost of these devices is important. Perhaps the most urgent need lies in substantially reducing sampling cost of tested and new models. The cost of several excellent models is currently too high for general use.

Another very real obstacle is the highly scattered nature of work in this field, and the considerable difficulty staying abreast of new developments. It is difficult even for the researcher in this field, and perhaps next to impossible for most others. There is need to coordinate efforts of the numerous persons and agencies working in this field to avoid duplication of effort.

There is perhaps a need to create a central clearinghouse for publications and reports on use sampling techniques emanating from federal, state, and municipal agencies, universities, foreign governments, and others. A small panel of interested persons might be appointed to keep up with all developments. A standardized reporting format, possibly in the form of a loose-leaf notebook, might be considered for purposes of updating, revising, and amending tested sampling models. I propose the preparation of a "cookbook of use sampling techniques" that would contain detailed instructions for implementing tested and recommended sampling techniques. These suggestions would not be easy to implement, but I firmly believe that the importance of the information clearly warrants a genuine effort in this direction.

Hopefully, the brief description of the Forest Service RIM System will suggest, especially to recreation managers and planners with large and complex holdings, other systems that will enable them and their agencies to maintain a continuing description, with a satisfactory level of precision, of past, present, and future information and relationships between people, places, and things.

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