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Preface

The work reported herein was conducted as part of the Natural Resources Technical Support (NRTS) Program. The NRTS Program is sponsored by the Headquarters, U.S. Army Corps of Engineers Waterways Experiment Station (WES) under the preview of the Environmental Laboratory (EL). Funding was provided under Department of the Army Appropriation No. 96X3123, Operations and Maintenance. The NRTS Program is managed under the Environmental Resources Research and Assistance Programs, Mr. Russ Tillman, Manager. Technical Monitor during this study was Mr. Bill Irwin, HQUSACE.

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The work was performed under the direct supervision of Mr. Roger Hamilton, Chief, Resource Analysis Branch, EL, and under the general supervision of Dr. Robert Engler, Natural Resources Division, EL, and Dr. John Keeley, Director, EL. Ms. Ann Habeeb, EL, WES, Ms. Melissa McSparrin, U.S. Army Engineer District, Pittsburgh, and Ms. Tracy Trichell, DynTel, DynCorp., provided technical support in the production of the report. Technical reviewers include Mr. William J. Hansen, U.S. Army Engineer Institute of Water Resources, John Marnell, U.S. Army Engineer District, Tulsa, Mr. Greg Mollenkopf, U.S. Army Engineer District, Baltimore, and Mr. Richard Kasul, EL, WES.

This report should be cited as follows:

Perales, M. K., and Jackson, R. S. (1993). "Recreation use-estimation; Report 1, Procedures for developed recreation areas," Technical Report R-96-, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

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1 Introduction

Attendance reporting is a required function for many sporting events and amusement activities. Often times attendance is used as a means of tracking the revenues generated and trends over time. The task is simplified at many of these settings by the restricted flow of entry, e.g., the selling/collecting of tickets. Public lands provide recreation opportunities but are not conducive to attendance measurement. These lands and waters in public ownership are under the auspices of a governing agency or in partnership with one. The Corps of Engineers is one of these agencies. One of the benefits of public parks is the unrestricted of access, which by its very nature makes attendance reporting at best difficult.

The Corps of Engineers (CE) manages over 11 million acres of federal lands that provide recreation opportunities for the general public. Attendance reporting has been carried out by the CE since 1957, when 85 million recreation days of use was first reported (Department of the Army, no date). It was in the 70's when the CE established a database management system to begin monitoring recreation facilities and use (Department of the Army, 1974). Today the Natural Resource Management System (NRMS), is the database used to maintain information on 463 CE water resource projects across the country. In 1995, over 385 million visits were reported by projects in the system (NRMS 1995).

Rangers at CE projects are assigned the task of preparing estimates of recreation use. Typically, monthly reports are sent to District offices with annual reports to the Division and Headquarters (HQUSACE) offices through annual updates of the NRMS. From these NRMS databases, annual visitation reports are prepared by HQUSACE for upward reporting including interagency reporting to the U.S. Congress and the Office of Management and Budget (OMB).

In order to measure the amount of recreation use at CE facilities, a protocol was established in 1979. "A Handbook for conducting recreation surveys and calculating attendance at Corps of Engineers Projects" was developed by Mischon and Wyatt (1979). The report set out to standardize and simplify the collection and reporting of recreation use statistics for CE projects.

Mischon and Wyatt (1979) standardized the terms, settings, sampling, and questionnaire to be used. Recognizing that recreation use at CE projects varied, they categorized ten sources of visitor use indicators. These ten types included:

office records, second party records, membership listing, self-registration record, traffic counters, predetermined vehicle counts, random vehicle counts, special events, organized camps and walk-in visitors (page 48 and 49). The focus of their report were the types of settings where use could be monitored by traffic counting devices. Four types of areas were identified as conducive to the procedures: developed parks, overlook and observation areas, launching complexes and other access points (page 16). The procedures recommended by Mischon and Wyatt for these areas consisted of periodic surveys of visitors exiting these facilities in order to produce weighted averages (load-factors) used to calibrate the traffic counters. These weighted averages, e.g., average number of axles per vehicle, the percentage of recreation vehicles and average persons per recreation vehicle, would be applied to the raw traffic count to estimate the number of recreation visitors. Based on the recreation use patterns, the average number of visitors boating, swimming, etc., would be estimates.

The focus of the standardized surveys was the collection of project level information with interviews at recreation areas. Project visitation would then be the summation of the project use summed across areas. Four seasons of sampling were established as standard with the organization of months left to the project's discretion. The standard set 20 hours of data collection (10 weekday and 10 weekend day) for each area being sampled (page 28). Recreation areas (i.e., developed parks) were categorized into three types: camping only, multipurpose camping, and day use only (page 32). An alternate stratification scheme was provided for four settings: dam areas, two developed areas one with Class A Campground, concessions, the other with more primitive camping, and boat launching ramp areas (page C2). Procedures to take survey information and perform hand calculation of use estimates were also provided.

During the early 1980s a number of various questionnaire prototypes were developed and tested. HQUSACE required project level information within the NRMS, while project managers wanted area information, so a compromise instrument was constructed listing both project and area fields. The procedures were developed as a course under the CE Proponent Sponsored Corps Training (PROSPECT) training program in (Jackson, et. al 1982). The course title is Recreation Use Estimation Procedures. Under the Paper Reduction Act, all federally funded surveys conducted with the general public (10 or more persons) must be reviewed and approved by the OMB. The OMB approval process was conducted in tandem and the standard was set and the final approved instrument Engineering (ENG) Form 4835 emerged, dated Aug 83. The Engineer Regulation (ER) 1130-2-430 authorized the collection of visitor data and analysis using the standardized system (HQUSACE 1984). Periodic approval of the data collection instrument is conducted with OMB and current authority extends to 30 September 1998.

At that time mainframe computers including the Honeywell and Harris systems were used in the editing, analysis and reporting of these surveys. The advent of the microcomputer proved an opportunity to modernize and improve the efficiency of the system. In the early 1990s, an effort was undertaken to develop a microcomputer based entry, analysis and reporting system based on

the existing procedures for determining recreation use. The Visitation Estimation and Reporting System (VERS) was developed and distributed to the CE in 1992 in a series of HQUSACE sponsored workshops.

This manual sets out to provide practical guidelines for implementing the procedures developed by Mischon and Wyatt (1979). This manual includes the following:

- a. An overview of a recreation use estimation planning process.
- b. An identification of recreation use measurement terms.
- c. An evaluation of advantages and disadvantages of data collection techniques (Jackson, Propst, and Fritschen 1982).
- d. Descriptions of typical resource settings at CE projects where recreation use is known to occur.
- e. Procedures for implementing traffic metering and survey techniques for developed recreation areas with modifications to the Mischon and Wyatt (1979) report.
- f. A step by step approach to the development of a project sampling plan.
- g. Procedures for the evaluation of existing meter locations and identification of potential survey sites.
- h. The procedures for conducting visitor use surveys using either ENG Form 4835 or the computerized Direct Data Entry System (DDES).

Chapter 2 of this manual includes items *a* through *d*, which serve as the introduction to use estimation. It describes some of the decision-making alternatives for selecting an appropriate survey technique for use estimation. This chapter defines and compares the recreation units of measurement most often used. A variety of measurement techniques and their strengths and weaknesses in use estimation relative to the units of measurement are explored. Six resource settings, typical of CE projects are identified and suitability of the metering and surveying combination are evaluated.

Chapter 3 of this manual reviews the use-estimation tasks for developed recreation areas suited to traffic meter monitoring (item *e*). Recreation areas with high visitor use, mostly vehicular traffic access, and limited entrance and exit points are most effectively measured using the procedures outlined in this report.

Chapter 4 discusses the implementation of the Mischon and Wyatt (1979) project survey plan. A standardized set of procedures (item *f*) focuses directly on the sampling plan development. The components of the plan include the area listings, area maps, interviewer instructions and survey schedules. This section

includes standards to assist in the evaluation of existing traffic meter locations, the identification of survey sites, the development of survey schedules (item *g*).

Chapter 5 directs the survey preparation and data collection using either ENG Form 4835 or the DDES (item *h*).

The companion manual Recreation Use Estimation: Report 2, The Visitation Estimation and Reporting System outlines the software used in the data analysis and reporting of use. The VERS is a family of computer programs for collecting and analyzing survey data collected in procedures outlined in this manual. The DDES is a component of the VERS.

2 Use-Estimation Model

This section reviews the decision-making criteria that the project survey coordinator will apply in determining the use-estimation procedure that best fits the recreation area to be surveyed. Figure 1 illustrates the various recreation use-estimation tasks in a standard procedure, followed by a description of recreation use units of measure, measurement techniques, and resource settings for use estimation.

Figure 1 illustrates the sequence of events for developing a standardized evaluation of the use-estimation process. An evaluation of the reporting requirements is the first step in determining the technique(s) most appropriate to measure use. By determining project or area level reporting and evaluating planning or management requirements will direct the effort and type of information required. In addition to the level of detail, the unit of measure for reporting (e.g., visit, trip) must be determined.

Once the unit of reporting is defined, a number of survey techniques may be eliminated, limiting the available options. Existing systems may need to be adapted to accommodate the reporting needs. A project level evaluation of the geographic (spacial) and seasonal (temporal) use patterns will help distinguish the relative importance of use and the level of effort required. Depending on the relative importance to total visitation estimates, focusing on a high-visitation season of use at developed areas with precision may be more important than spending the increased sampling effort required to estimate low visitation of backcountry trail use.

A review and elimination of measurement techniques for each geographic setting will focus the development of the sampling plan. Next is the identification of the scope of recreation use or population under study; defining the nodes of use, or range of households, etc. The development of the sampling plan is the synthesis document defining the decisions made in the previous steps. Interviewer training will allow surveying to be conducted in an efficient, effective, and consistent manner. Through quality controls, such as interviewer monitoring and follow-ups, surveyor reliability can be evaluated. Processing and reporting the findings, follows with the periodic evaluation causing the cycle to begin again.

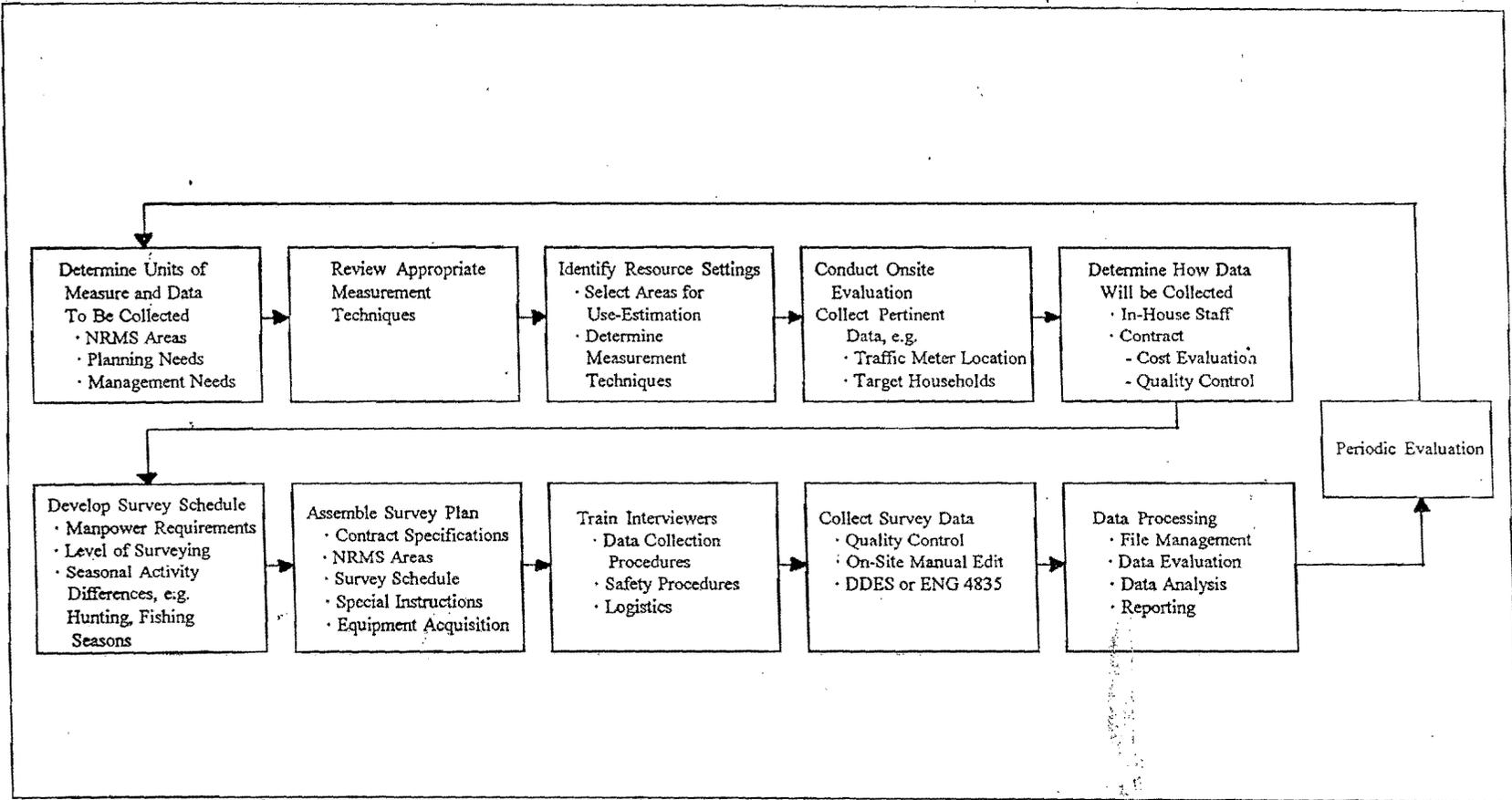


Figure 1. Recreation use-estimation process

Recreation Use Measures

Measurement units for recreation use are described. Understanding the definition of each unit of measure is essential in evaluating if a data collection technique can provide the needed information.

Visit

The entry of one person into a recreation area or site to engage in one or more recreation activities is known as a visit. Visit is simply a "head count" of visitors and does not indicate duration of use or length of stay. The number of visits can be readily collected using various measurement techniques, including observation.

Visitor-hour

A visitor-hour is defined as the presence of one or more persons on an area of land or water, engaging in one or more recreation activities aggregating to 60 min. Aggregation to 60 min may be by intermittent use, simultaneous use or continuous activity. Visitor-hour incorporates both the number of participants and duration of use, providing an estimate on the "amount" of use.

Twelve-hour visitor-day

An aggregation of twelve visitor hours is known as a visitor-day. This term is used to report use, but the data are typically collected as visitor-hours. The 12-hr visitor-day is the straight mathematical function of visitor-hours divided by 12.

Recreation-day

A visit by one individual for recreation purposes during any reasonable portion or all of a 24-hr period is known as a recreation-day. Recreation-day is the unit of measure for determining recreation benefits at Water Resource Development Projects. This unit is a better measure of duration of use than the visit, but it is not as precise as the visitor-hour.

Activity-hour

Like a visitor-hour, the activity-hour is an aggregated 60 min block of time. It is different in that it is limited to a single recreation activity. Activity-hour is the most specific unit of measure discussed; an activity-hour combines information on number of people, length of time and activity into one unit.

Activity-day

One person's participation in one recreation activity at any time during a calendar day without regard to how long or how many times that person participates in that activity is known as an activity-day. If that person participates in more than one activity on a given calendar day, each activity is counted as a separate activity-day. Activity-day does not measure duration of participation.

Trip

The unit of measure, trip, typically refers to all activity by all individuals in the group from the time they left their permanent residence to their return home.

Figure 2 depicts the relationship between the most commonly used units of measure. Under current guidelines, the CE reports recreation in visits, visitor-hours and visitor-days. Planning efforts are legislatively mandated to report recreation days.

Sources of Visitor Information

Selection of the correct measurement technique is of primary importance to the recreation use-estimation process. Requirements such as units of measure, precision desired, and available manpower are determined and evaluated to choose the appropriate technique for each resource setting. This section will review various measurement techniques, discuss the use of a combination of techniques, and identify the tools required for each technique.

There are three general strategies to measure recreation use:

- Existing data.
- Observation.
- Formal survey methods.

Existing data

Beginning with an evaluation of data on hand is always useful. Existing data are typically easy to obtain and may be historic in nature, providing information on general trends. Two primary sources of existing data are self-registers and receipts and permits. Table 1 provides a summary of advantages and disadvantages of these data.

Self registers. Visitor registers are one information source used to estimate visitation. The advantage of registers is that cost is low because of minimal or

	3 People Fishing and Boating for 3 Hours	3 People Fishing, Boating and Camping for 3 Nights
Measurement Unit	Day Use Calculation	Overnight Use Calculation
VISITS	3 = people	3 = people
VISITOR -HOURS	9 = 3 people X 3 hours	216 = 3 people X 3 nights X 24 hours per day
RECREATION-DAYS	3 = 3 people X 1 day	9 = 3 people X 3 days
VISITOR-DAYS	0.75 = 9 visitor hours / 12	18 = 216 visitor hours / 12
ACTIVITY -HOURS	9 fishing activity hours = 3 people fishing X 3 hours 9 boating activity hours = 3 people boating X 3 hours	216 camping activity hours = 3 people X 3 nights X 24 hours ? fishing activity hours = 3 people fishing X ? hours ? boating activity hours = 3 people boating X ? hours
ACTIVITY -DAYS	3 fishing activity days = 3 people fishing X 1 day 3 boating activity days = 3 people boating X 1 day	9 camping activity days = 3 people X 3 nights 9 fishing activity hours 3 people fishing X 3 nights 9 boating activity hours = 3 people boating X 3 nights
TRIPS	1 = 1 party trip	1 = 1 party trip

Figure 2. Relationship of measurement units

no staffing requirements. However, many visitors fail to register; those who do, have been shown to be typically different from those who do not, resulting in biased estimates (Leatherberry and Lime 1981). In addition, this type of data is usually collected in a well-defined setting (e.g., at the start of a trail) before the user recreates. Visitors must estimate their anticipated length of stay and the

Table 1 ¹ Existing Data Measurement Techniques		
Technique	Advantages	Disadvantages
Self-Registers	<p>Low cost (little or no staffing required)</p> <p>Useful in recreation measures that do not require length of stay component, e.g., visit</p>	<p>Cannot ensure that all visitors register</p> <p>Reporting bias-those who do register have different characteristics from those who do not</p>
Fee Receipts and Permits	<p>Provides a complete census of users in a fee activity</p> <p>Imposes minimum burden on respondent</p> <p>Allows low marginal cost for obtaining additional information (gate attendant must fill out receipt anyway)</p> <p>Provides data in a form that can be readily stored and retrieved</p> <p>Anticipated length of stay can be included providing greater use measurement, e.g., recreation day</p>	<p>Provides no information on nonfee users</p> <p>Makes no adjustments for over reporting by use in multiple areas double counting (not a problem for area visitation)</p> <p>Proves useful only in controlled access areas with 100 percent receipts</p>

¹ Adapted from Jackson, Propst, and Fritschen 1982.

activities in which they will participate unless the registration process is delayed until their departure. For many Corps projects, register data are available only at visitor centers.

Receipts and permits. Fee receipts and permits are another form of secondary data that can be used to estimate visitation. Each provides a complete census of users as long as a mechanism to collect fees or issue permits exists. If permit registration is not supervised, compliance problems may ensue (Lime and Lorence 1974).

Lucas and Kovalicky (1981) found that there was a strong association between the visitor's length of stay and self-issued mandatory permit registration. Day users spending long periods of time and campers were more likely to register than the short-term day user. Visitors traveling alone were found to comply poorly in registration.

Limited access and conscientious attendants will help ensure accurate data on the number of participants. Additional questions on activity participation and length of stay can be added to the registration process with little extra visitor burden. If receipts are collected at the start of a recreation experience, the problems of visitor estimates of length of stay and activity participation remain.

Consideration must be made to eliminate double-counting problems that exist using this method, when users visit other nonpermitted areas on the same trip.

In the dispersed-use setting, the efficiencies of receipt and register data are limited for many Corps projects. These methods are not efficient, primarily because access is not limited to provide effective registration and few projects collect this type of special use fee.

Observation

A number of observation techniques provide varying degrees of information applicable to estimate use. The benefit of observation methods is that they place the least amount of burden on the visitor. The problems in the technique include the degree of training required and the responsibility of the observer to record accurate, unbiased information (Kerlinger 1973). In addition, the visitor cannot be asked to clarify information recorded by the observer. Adjustments to avoid double counting are difficult to obtain. The types of observation techniques available include direct observation, observation of behavior traces, and participant observation. Table 2 provides a summary of advantages and disadvantages in observation techniques.

Direct observation. Direct observation occurs when a person or camera watches and records data on visitors. This method can be effective provided the area is not so large that viewing is difficult or obstructed. Watching users, one can collect information on activities, party size, and visitor-hour length of stay (James and Quinkert 1972). This technique can be employed in dispersed-use areas. Problems that arise with this technique include the reliability of the observer and expense of training and data collection. If use is sporadic, sampling must be extensive to collect enough data to be representative. If the observer is in plain view, visitors may be affected by the presence of someone watching, and their participation may change. Behavior may not be affected if the visitor does not perceive that the observer is judging the visitor's behavior (Kerlinger 1973). Information that is not observable cannot be collected. An example could be double-counting considerations—was this the only area on the project visited by the user during the stay (Schreuder, Tyre, and James 1975). If cameras are employed, reliance on a mechanical device and the threat of vandalism are considerations. If use is not limited to a finite number of sites, the installation and maintenance expenses of cameras may not be warranted.

Indirect observation. The technique of observing behavior traces does not involve the observation of people in action but rather remnants of their visit. The counts on a traffic meter, the amount of trash in an area, the rate of soil erosion on a trail, firewood usage, and water or power consumption are all examples of behavior traces that can be observed. In and of themselves they provide only relative usage estimates, (Moore 1980). Additional problems in using trace observations include equipment failure and vandalism. The observation of behavior traces must be coupled with other measurement techniques to estimate visitation in terms of people, hours, and activities.

Table 2¹
Observation Measurement Techniques

Technique	Advantages	Disadvantages
General Observation	<p>Imposes minimum burden on respondent (visitors not disturbed by long, formal questions)</p> <p>Often leads to unexpected findings that can later be studied more formally</p>	<p>Cannot probe visitors to clarify information received</p> <p>Makes no adjustments for double counting; thus, difficult to separate area from project visitation</p>
Direct Observation (e.g., observer records use according to some prearranged schedule, such as remote cameras)	<p>Can be used to measure visitation in a given area</p> <p>Can be used in areas where visitors do not cross traffic meters (e.g., hunter access areas, vehicle pull-offs along roadways, boat access on navigation projects)</p> <p>Can obtain some other information besides use (e.g., sex, race, age class, activities)</p>	<p>Can measure only in observable terms such as hours or portions of a day</p> <p>Is ill-suited for large area in which visitors are difficult to see</p> <p>Is affected by presence of observer (e.g., people may avoid someone with a clipboard)</p> <p>May be expensive in remote areas or areas of low visitation</p> <p>Requires that observers be trained and subjected to reliability checks</p> <p>Cannot obtain information that is not readily observed; "unobservables" (e.g., attitudes, preferences, satisfaction)</p>
Observation of Behavior Traces (e.g., amount of effluent, trail erosion, rate of firewood and foliage loss, number of brochures picked up, pressure plates, number of times bathroom door opens and shuts, traffic meters)	<p>Eliminates worry about people reacting to presence of observer because visitors do not have to be present</p> <p>Is low cost</p> <p>Proves useful as a measure of group or aggregate behavior</p> <p>Is effective in measuring use by relating actual use (from surveys or other types of observation) to trace measurements</p>	<p>Exposes equipment to possibility of tampering, destruction, or malfunction (e.g., if metering the number of bathroom door operations, people swinging bathroom doors open and shut will distort result)</p> <p>Often must be combined with other techniques (e.g., traffic meter and traffic-stop surveys)</p> <p>Used alone, can reveal only relative amounts of use (i.e., more than/less than)</p> <p>Must be calibrated at each recording site (e.g., water usage not consistent across recreation areas or users-day user verses camper)</p>

(Continued)

¹ Adapted from Jackson, Propst, and Fritschen 1982.

direct the study's outcome. A summary of advantages and disadvantages in formal survey techniques is provided in Table 3.

Personal interviews. Face-to-face or personal interviews have the highest manpower cost of the formal survey techniques, requiring a person to conduct each interview. However, in comparison to other techniques, the total cost may be less because the sample size required may be reduced. The advantages of this method are that follow-up questions may be asked of the visitor; the visitor can ask for clarification, and surveys can be conducted in the field when recall does not present a problem. The technique requires well-trained interviewers whose questions must be carefully worded so as not to direct possible responses.

Telephone interviews. Telephone interviews also require a person to conduct each interview. Cost is decreased over the face-to-face method because travel expenses are not incurred; however, trained interviewers are still required. The advantages of probing for clarification on the part of the interviewer and respondent are still possible although visual cues are removed. Refusal rates may increase because of the increase in telephone solicitations and the ease of saying no to someone on the telephone. Obtaining the list of potential phone numbers to contact may present a sampling and bias problem (e.g., excluding potential users who either have no phone or have unlisted numbers). If a user or panel of users is identified, tracking use over time can be readily assessed by time series phone contacts.

Mail questionnaires. Of the types of formal survey methods mentioned, the mail questionnaire can be the most economical. Distribution can be onsite, or the questionnaire can be mailed to the population under consideration. The problems with mail questionnaires include the inability of the visitor or interviewer to clarify questions, the high level of nonresponse (where follow-ups are not possible), and the cost to administer follow-ups to increase response rates. A benefit of the technique is the ability to reach a large number of people at a moderate cost. Since the questionnaire is self-administered, data can be biased if the population being sampled includes persons who are illiterate or non-English literate.

Diaries. Another type of formal survey is the diary in which the visitor is asked to maintain an activity record. Problems of recall are eliminated provided the visitor is conscientious in maintaining the diary. Changes in use patterns over time can be observed using this technique. Problems with this method result from the burden on the visitor. Instead of a few trained interviewers, the entire population being sampled must be trained to record data accurately.

The factors that influence the selection of the survey technique are as follows: (a) location where use is occurring (resource setting), (b) an individual's method of entry access, (c) where the user came from (user group), and (d) the reporting requirements (visitor-hour unit of measure).

Table 3¹
Formal Survey Methods Measurement Techniques

Technique	Advantages	Disadvantages
General Interview or Questionnaire	<p>Tends to be less expensive than observation methods in terms of amount of data collected per unit of time invested</p> <p>Can provide accurate information on amount of use, descriptive characteristics (age, sex, group make-up, etc.), and "unobservables" (preferences, attitudes, and motivations)</p> <p>Has ability to generalize the population from which sample was drawn</p> <p>Can be used to estimate use in areas where visitors do not cross meters</p>	<p>Requires skill and experience in developing sampling plan and reliable and valid survey questions</p> <p>Cannot necessarily infer behaviors from attitudes (e.g., people who say they are opposed to littering may still litter)</p> <p>Can be rather poor at measuring actual behavior when people are asked to recall past events because of tendency to forget or define events differently.</p> <p>Requires an assessment of degree of nonresponse bias</p> <p>Can bias visitor response as visitors are aware they are being studied; they may try to outguess the purposes of the study and not respond honestly</p> <p>Can discourage visitor response (visitors may not answer potentially threatening or embarrassing questions, e.g., "Do you keep your dog on a leash?")</p>
Personal (face-to-face) Interviews	<p>Can ask follow-up questions and probe when answers are unclear</p> <p>Provides better visitor recall than by phone or by mail because visitation questions are asked on-the-spot</p> <p>Usually offers high response rate</p>	<p>Is highest cost per respondent of all survey methods; however, may not always be highest total cost because, for visitation surveys, a smaller sample is required for personal interviews than for mailback</p> <p>Requires trained interviewers (potential interview bias problem)</p>
Telephone Interviews	<p>Can alleviate expense on personal interviews while retaining the advantages of being able to probe and obtain a fairly high response rate</p> <p>Is useful for monitoring change over time (can call a sample of people periodically and assess trends)</p> <p>Can code data as questions are being answered</p>	<p>Requires trained interviewers</p> <p>May bias samples by not including those who do not own phones or whose numbers are unlisted or unattainable</p>

(Continued)

¹ Adapted from Jackson, Propst, and Fritschen 1982.

Technique	Advantages	Disadvantages
Mail Questionnaires (sent through mail, handed out onsite, placed on windshield, etc.)	<ul style="list-style-type: none"> Is easy to administer initially Can be distributed to a large number of people Is least costly of all formal survey methods 	<ul style="list-style-type: none"> Can be high nonresponse rate (potential for nonrepresentative results) Requires much time invested in administering follow-ups and checking for nonresponse bias Requires great care, and sometimes cost, in developing sampling frame Has higher total cost than personal interviews for estimating visitation because nonusers are generally included in mailing samples
Diaries	<ul style="list-style-type: none"> Reduces problems of behavior recall because people record their activities soon after they occur Can "observe" someone from geographic location to geographic location Is good for collecting information on people in remote or lightly used areas or where the location prevents easy observation Is excellent as a measure of time spent in various activities; people can also be asked to record their motives Can be good for measuring changes in use over an extended period of time 	<ul style="list-style-type: none"> Must train each respondent providing visitors with specified and detailed instructions about the kinds of information to be recorded Received responses that are likely to reflect only those behaviors that are legally or socially approved Can prove an inconvenience that will preclude accurate recording

Combination of techniques

No one measurement technique can offer all the information necessary to provide exact measurements of all project participation; each has its advantages and disadvantages. A combination of methods may be desirable to account for local project variability. The ability to combine measurement techniques will vary for each project based on manpower, budgets, acceptable levels of accuracy, and type of information required. Each situation requires a review of the various techniques to understand how they differ and how they complement each other. The best method may be a combination of methods that build on each other's strengths and alleviate each other's weaknesses. If more than one method is used, caution is advised in summing the results. Independent visitation figures should be in the same units to ensure compatibility. For example, using visitor-hours as a unit of measure from a traffic-stop survey and adding it to recreation-days from direct observation, would be incompatible.

When mixing methods, the surveyor must also take care to avoid double counting. An example of this error would be if visitation at a controlled access

day use area were measured by the traffic-stop survey/traffic-meter technique, and if visitation from adjacent subdivisions were measured by using door-to-door interviews without regard to access. The error would occur if a subdivision user drove a vehicle to a developed area and was counted in both the traffic survey and the door-to-door interview.

The six examples below describe situations in which mixing methods would be appropriate:

- a. Conduct brief personal interview onsite, then mail lengthier questionnaire to a sample of visitors to obtain more detailed information; enables you to collect some basic information on everyone, minimizes respondent burden onsite, and simplifies later testing for nonresponse bias.
- b. For non-developed parklands, "dispersed use" (e.g., wildlife management lands) areas, place a mailback questionnaire on the windows of vehicles parked onsite; later, count vehicles by roving ranger patrol (a direct observation technique), and multiply number of vehicles by survey results obtained from the questionnaire.
- c. Observation may be first used to see whether nearby subdivision residents are walking onto a recreation area. If so, estimate the amount of use from a walk-through survey (instantaneous count), from diaries kept by a sample of subdivision residents, or from a telephone survey of a panel of residents.
- d. For areas where traffic meters (a trace-observation technique) are used, employ a traffic-stop survey to obtain estimates of group use patterns. Use weighted results to calibrate traffic meters so that total visitation can be estimated from periodic meter readings.

Use measurement requirements

Certain tools are always needed to ensure that collected data are reliable and valid. Table 4 outlines some essential requirements for the measurement techniques described.

Resource Settings

Total project visitation encompasses any recreation use on CE land and water resources. This use occurs on both developed and undeveloped lands. Developed recreation areas include all designated parks on CE-managed lands where recreation facilities are maintained. These facilities can be under the management of the Corps or may be leased to local, state, or Federal agencies or quasi-public organizations. Undeveloped lands that provide opportunities for dispersed-recreation use include all lands inside the project boundary and outside

Table 4¹	
Measurement Technique Requirements	
Technique	Minimum Requirements
Existing Data a. Self-registers	Registration station, notebook, and pencils in plain view near entrance of trail or recreation area Someone stationed nearby to remind people to register (e.g., information desk in a visitor center) Periodic estimate of the number of nonregistrants
b. Fee receipts	Controlled access, registration station or gatehouse, gate attendants, or roving rangers
Observation Strategies	Sampling plan that randomizes observation times according to all days of the week, all times of day, and all pertinent locations onsite Systematic record-keeping system Guidelines for observers Observer training Pretest of the sampling plan and recording system, reliability checks to see whether two different observers are recording the same information Sampling plan or recording form redesign if necessary Data processing system (coding, editing, and analysis)
Formal Survey Methods	Sampling plan to select times, locations, and visitors at random Instrument (instructions, questions, and recording form) Pretest of the sampling plan and instrument Sampling plan or instrument redesign if necessary Data processing system (coding, editing, and analysis)
In addition to above: a. Mailed Questionnaire b. Interviews (telephone or face-to-face) c. All Procedures	a. Follow-ups or other prompts to improve response rates b. Guidelines for respondent selection and questioning and recording techniques c. Interviewer training Check for response and sampling bias Elimination of double counting when users visit more than one area

¹ Adapted from Jackson, Propst, and Fritschen 1982.

designated parks where few or no facilities are provided or maintained. Wildlife management lands would be included in the undeveloped lands category. Undeveloped lands may be leased as described above or managed by the Corps.

There are six resource settings typical of CE projects. These settings, which are described in Table 5, are differentiated based on access, intensity, and fees. Figures 3 through 8 depict the six primary resource settings with descriptions of recommended measurement techniques for estimating use in that setting. Within

Table 5 ¹ Resource Settings for Use Estimation		
Resource Settings	Definitions	Situations
Intensive use, controlled-vehicle access	Developed recreation areas where a majority of visitors arrive in motor vehicles through a single or limited number of access points. Traffic-counting devices may be used to monitor the amount of use	Most developed Corps recreation areas
Vehicle access to dispersed-use areas	Designated parking areas, usually small, from which visitors disperse into undesignated lands. Characterized by fairly low amounts of use on a given day with peak use being seasonal (hunting, fishing, seasons, etc.). Difficult and expensive to maintain traffic meters because of vandalism and large numbers of areas	Hunter or off-road vehicles access areas Small boat ramp areas on remote parts of project
Vehicle access, pull-off on through road	Nondesignated parking areas along sections of roads that cross the lake or are near enough to the resource to provide easy and immediate access for certain activities (fishing, hunting, sightseeing, etc.); usually accounts for small percentage of total project use; traffic meters are relatively ineffective because of the high percentage of non-recreation traffic.	Roads across lake or portions of lake Roads across dam with overlook pull-offs Roads near or through wildlife management areas
Walk-on access from adjacent homes to intensive use or developed areas	Public access areas in or near subdivisions or other concentrations of dwellings. Walk-on use from these dwellings is often substantial. Traffic meters are often ineffective because of the unlimited nature of walk-ons and because of multiple access	Houses and parking areas adjacent to but not in intensive-use areas
Walk-on from adjacent homes to dispersed lands	Visitors from nearby homes do not walk through public access areas to get to the lake. Traffic meters are ineffective. Walk-on "traffic" can be a source of substantial use. Special permits such as boat docks or clearing may increase use to shoreline or lake	Subdivisions along shorelines Lakefront lots Private boat dock owners Subdivisions near lake but not along shoreline (some may have community property along shoreline) Individual dwellings near lake
Fee areas	Areas where user fees are charged and fee receipts issued	Developed campgrounds Group camps Special use areas

¹ Adapted from Jackson, Propst, and Fritschen 1982.

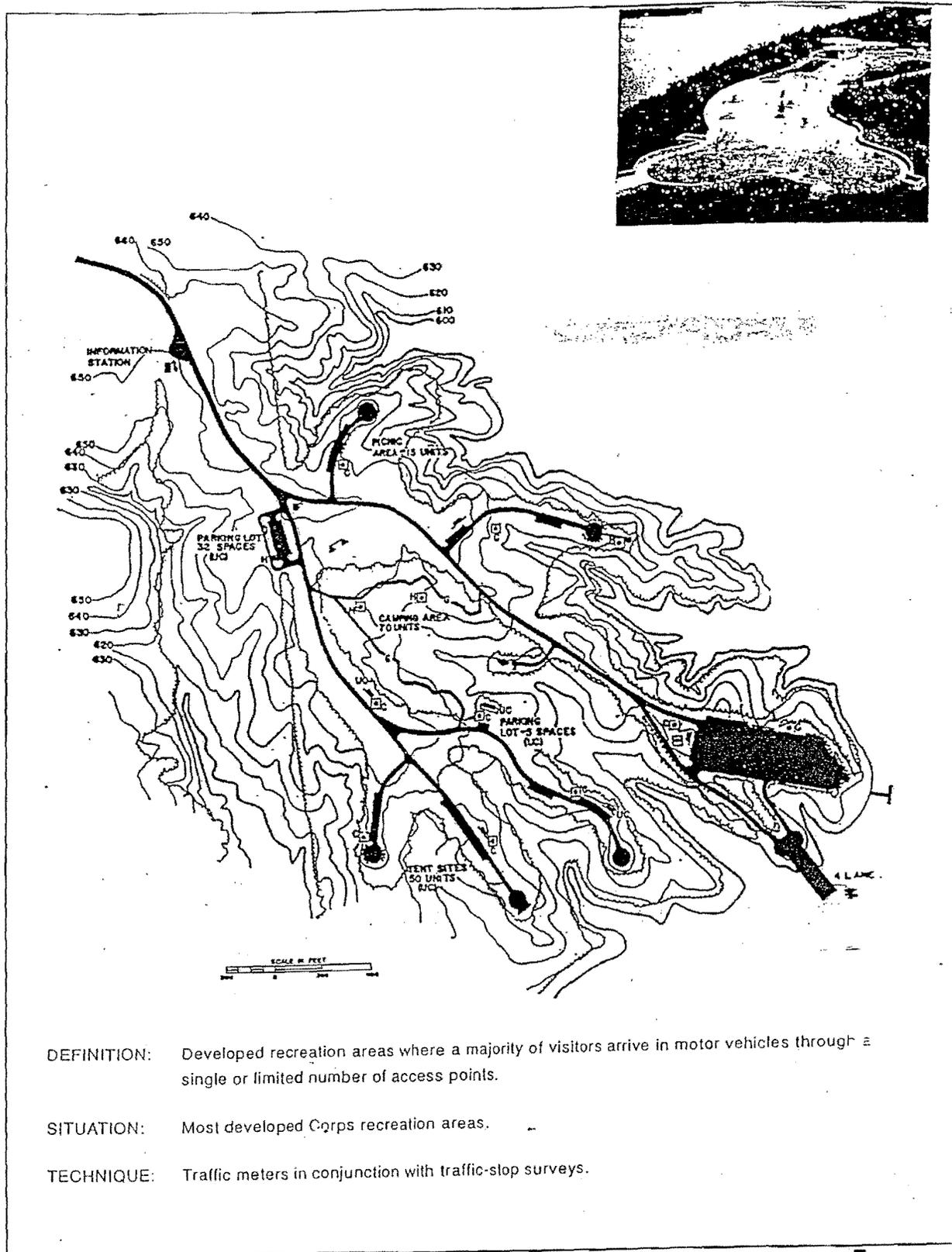


Figure 3. Intensive use, controlled-vehicle access (developed area; vehicular access)

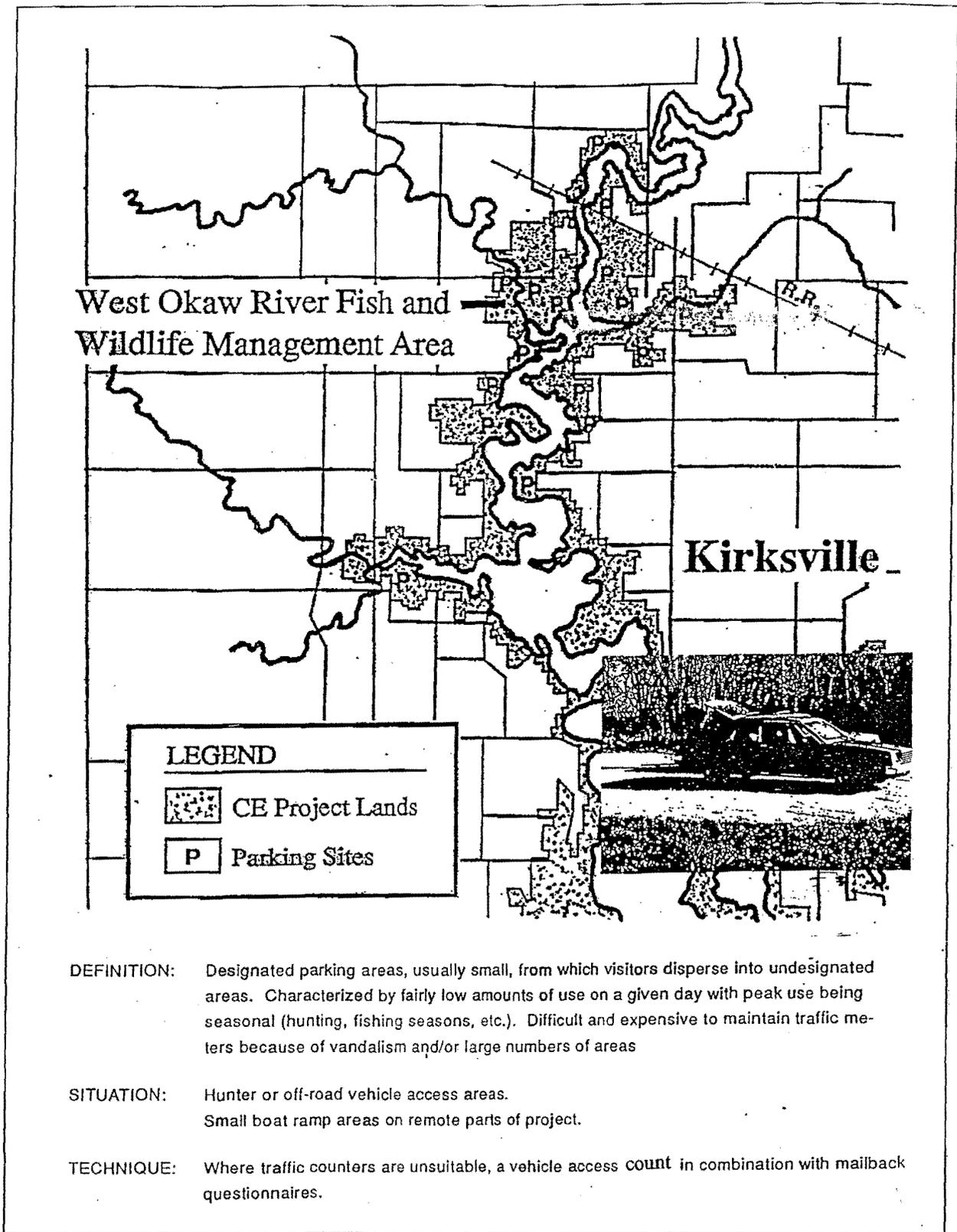


Figure 4. Vehicle access to dispersed-use areas (undeveloped lands; vehicular access)

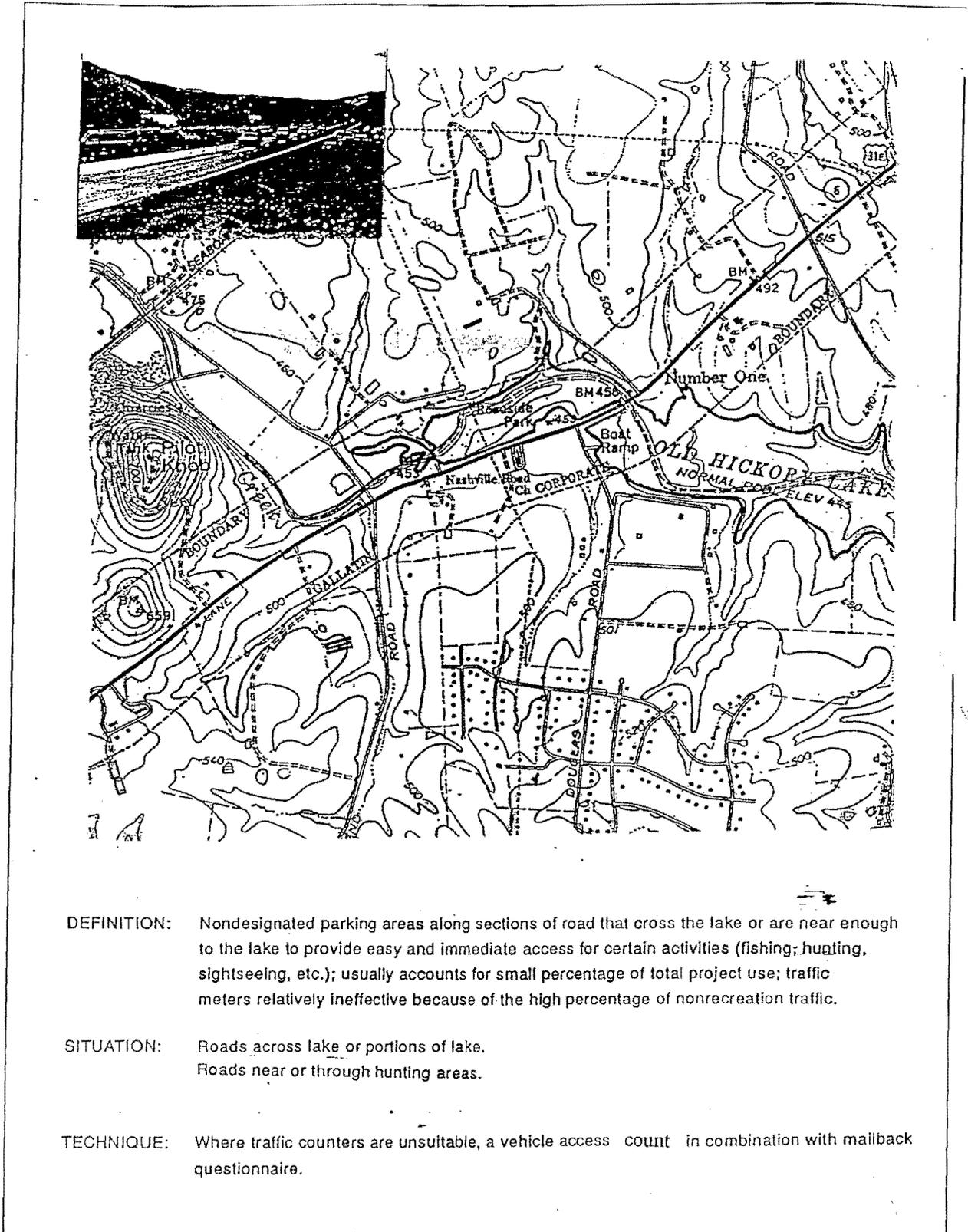


Figure 5. Vehicle access pull-off on through road (undeveloped lands; vehicle access)

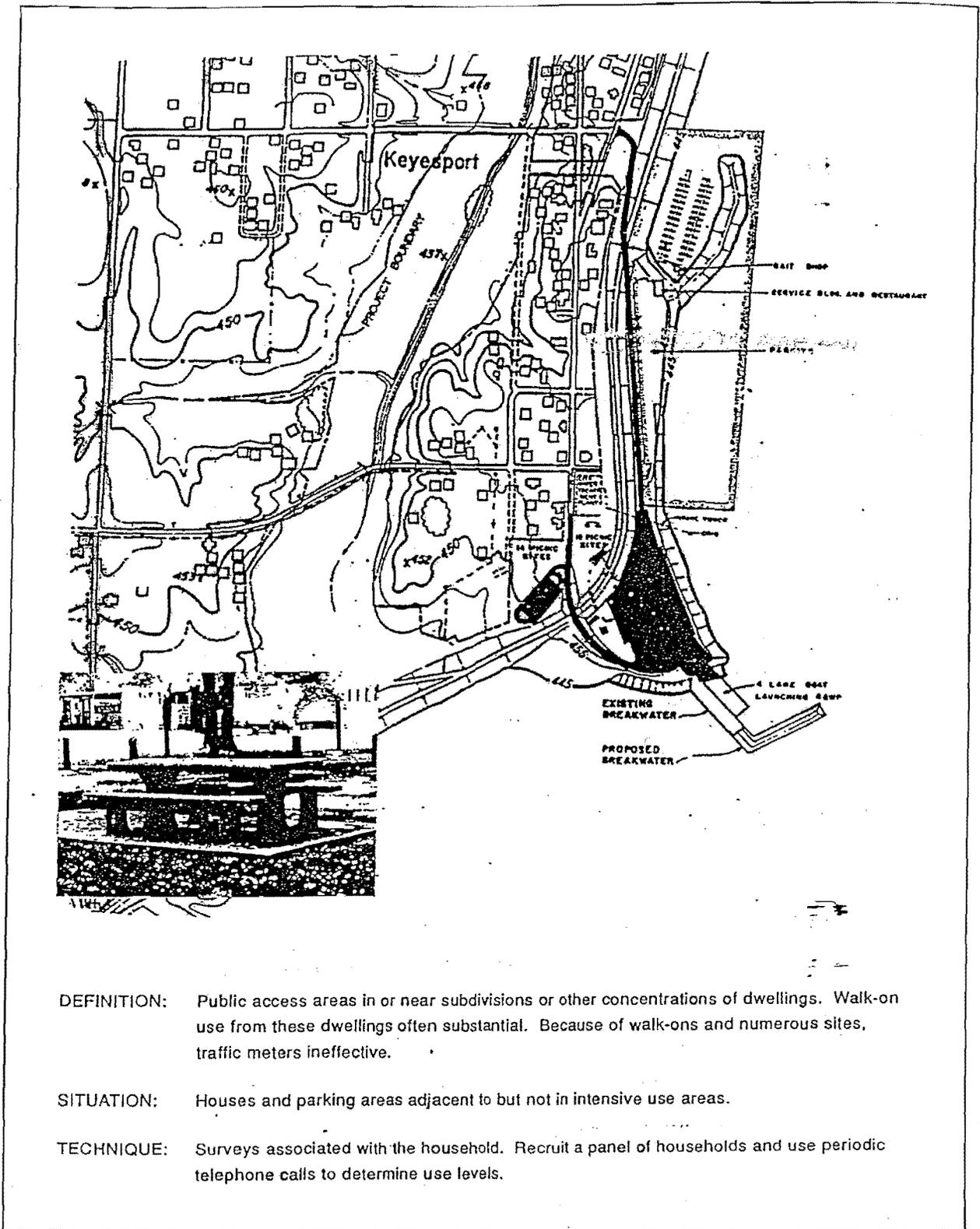
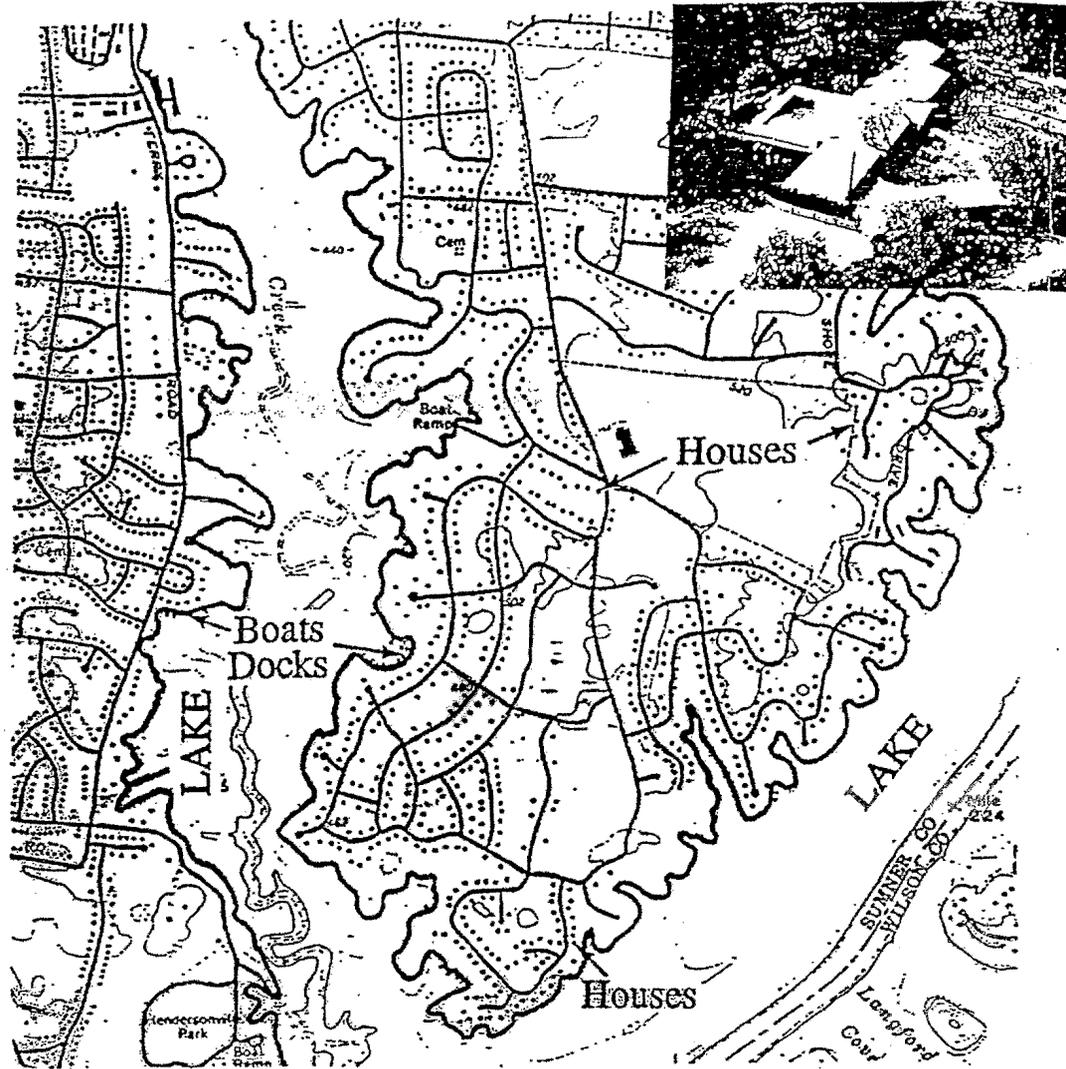


Figure 6. Walk-on from adjacent homes to intensive use or developed areas (developed areas; walk-on access)



DEFINITION: Distinguished from Figure 7 in that visitors from nearby homes do not walk through public access areas to get to the lake. Traffic meters ineffective. Walk-on "traffic" can be a source of substantial use. Homes usually a result of the lake being built.

SITUATION: Subdivisions along shorelines.
 Lakefront lots.
 Private dock owners,
 Subdivisions near lake but not along shoreline (some may have community property along shoreline).

TECHNIQUES: Surveys associated with the household. Recruit a panel of households and use periodic telephone calls to determine use levels.

Figure 7. Walk-on from adjacent homes to dispersed areas (undeveloped lands; walk-on access)

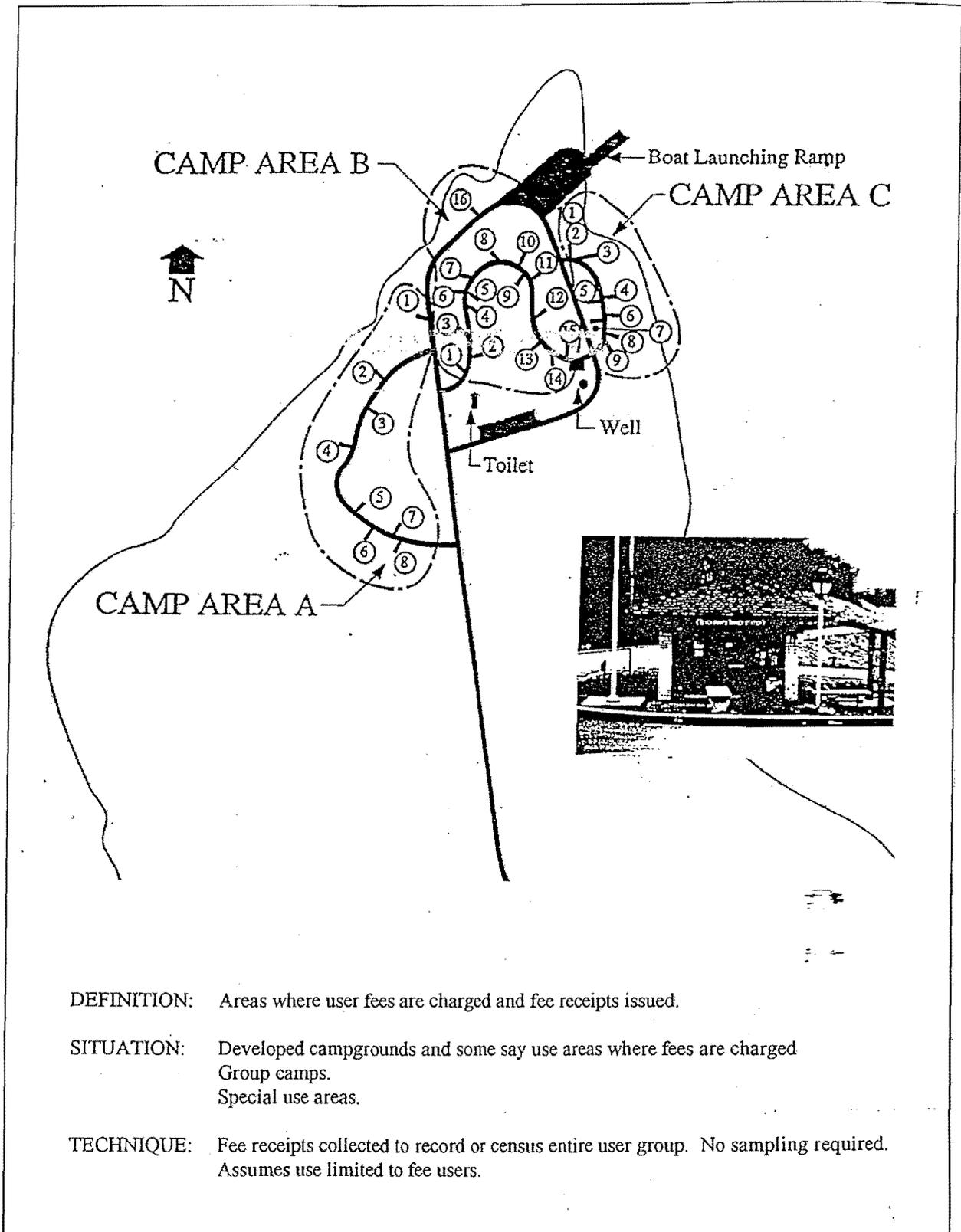


Figure 8. Fee areas (developed lands; vehicle access)

each of these situations, visitors primarily can gain access to project resources either by using a vehicle or by walking.

Currently, the CE actively monitors recreation use at over 4,300 areas (NRMS 1995). At the majority of these areas, visitors gain access to CE land and water resources by vehicle. Visitation is estimated with visitor surveys and traffic-counting devices at many of these areas. These surveys, referred to as traffic-stop surveys, involve stopping traffic exiting developed recreation areas and interviewing the vehicle's occupants. The surveys provide a mechanism for correlating survey data (identifying use patterns) to traffic counts (recording volume of traffic) to provide estimates of use. Currently the CE is conducting visitor surveys at developed recreation areas to update project recreation use-estimates and to convert to the visitor-hour unit of measure required for reporting purposes by ER 1130-2-430 (HQUSACE). ER 1130-2-550 dated August 96 will supersede ER 1130-2-430. The Engineering Pamphlet (EP) 1130-2-550 identifies the Visitation Estimation and Reporting System (VERS) as the reporting system for the Corps. The Direct Data Entry System (DDES) is the exportable program from VERS that is used for data collection.

The development of the DDES has standardized this type of data collection and eliminated data keypunch and editing responsibilities. Visitor surveys, traffic-counting devices, the development of project sampling plans, and the DDES will be discussed in this report. However, these surveys provide estimates of use only for developed recreation areas that have controlled access and that can be monitored by traffic-counting devices.

Settings in which the traffic-stop surveys are inappropriate include subdivisions that surround CE lakes and undeveloped lands where access is not limited and traffic-counting devices are either not suitable or cannot be maintained. If the recreation use associated with these areas is to be estimated, another means must be employed. This type of visitation is referred to as "dispersed-recreation use." Use-estimation procedures for each of these settings require a different survey approach and sampling design based on the geographic distribution of the user groups and the method of access to the resource.

Dispersed-recreation use of CE projects contains aspects similar to dispersed use identified in previous literature, but it has a flavor all its own. Previous studies conducted by other agencies (e.g., the U.S. Forest Service) have estimated visitation in dispersed-use settings by sampling visitors as they enter or exit via a roadway, a trailhead, a launch site, or as they pass a segment of waterway. Some CE projects have dispersed-use areas where these methods are appropriate. However, previously developed techniques may be inappropriate at many CE projects because of the nature of recreational use patterns. Unlike use identified in these studies, the dispersed use associated with many Corps projects is not limited to well-defined areas like trails or segments of a waterway. Use is characterized by a noncontiguous, narrow band of shoreline around a reservoir and small parcels of undeveloped land. Estimation for undeveloped areas is divided into two types: (a) visitation associated with vehicle pull-off on through roads and vehicle parking in dispersed-use areas, and (b) recreational use

associated with residential development adjacent to CE projects. The companion manual provides findings from previous studies for evaluation and incorporation into the Visitation Estimation and Reporting System (VERS) for dispersed use-settings.

This manual will focus on standardized procedures for developed recreation areas, or resource settings with intensive use and controlled vehicle access.

3 Developed Areas with Vehicle Access – Traffic Stop Surveys

Overview and Suitability

Visitors to Corps projects enter the majority of developed recreation areas or parks by a finite number of access roads servicing each area. For many of these areas, traffic counters on access roads can provide a method of counting the number of motor vehicles. Counters do not provide information on recreation use. The survey is designed to supply recreation statistics by stopping traffic and surveying visitors as they exit the recreation area. Periodic sampling of the visitors exiting these areas provides a snapshot of the composition traffic being monitored by counters. In areas served by limited access roads, traffic meters in conjunction with survey data provide a mechanism to estimate recreation use. Hence the name traffic-stop surveys.

This chapter provides criteria to determine if the project being evaluated can utilize traffic-stop procedures for estimating recreation use, steps for the development of sampling plans, and the procedures for the collection of traffic-stop survey data. Figure 9 depicts a use estimation process for developed recreation areas designed to meet CE reporting requirements.

Traffic meters provide a relatively inexpensive mechanism to monitor volumes of use within a recreation area. The face-to-face survey, designed to ask a limited number of questions is used to calibrate the counters. Together surveys and metering were determined to be the most cost-effective and efficient procedure for the majority of CE recreation projects.

Traffic meters and traffic-stop survey procedures are most appropriate for:

- Developed recreation areas.
- Areas with mostly vehicular traffic.
- Areas with limited entrance and exit points.

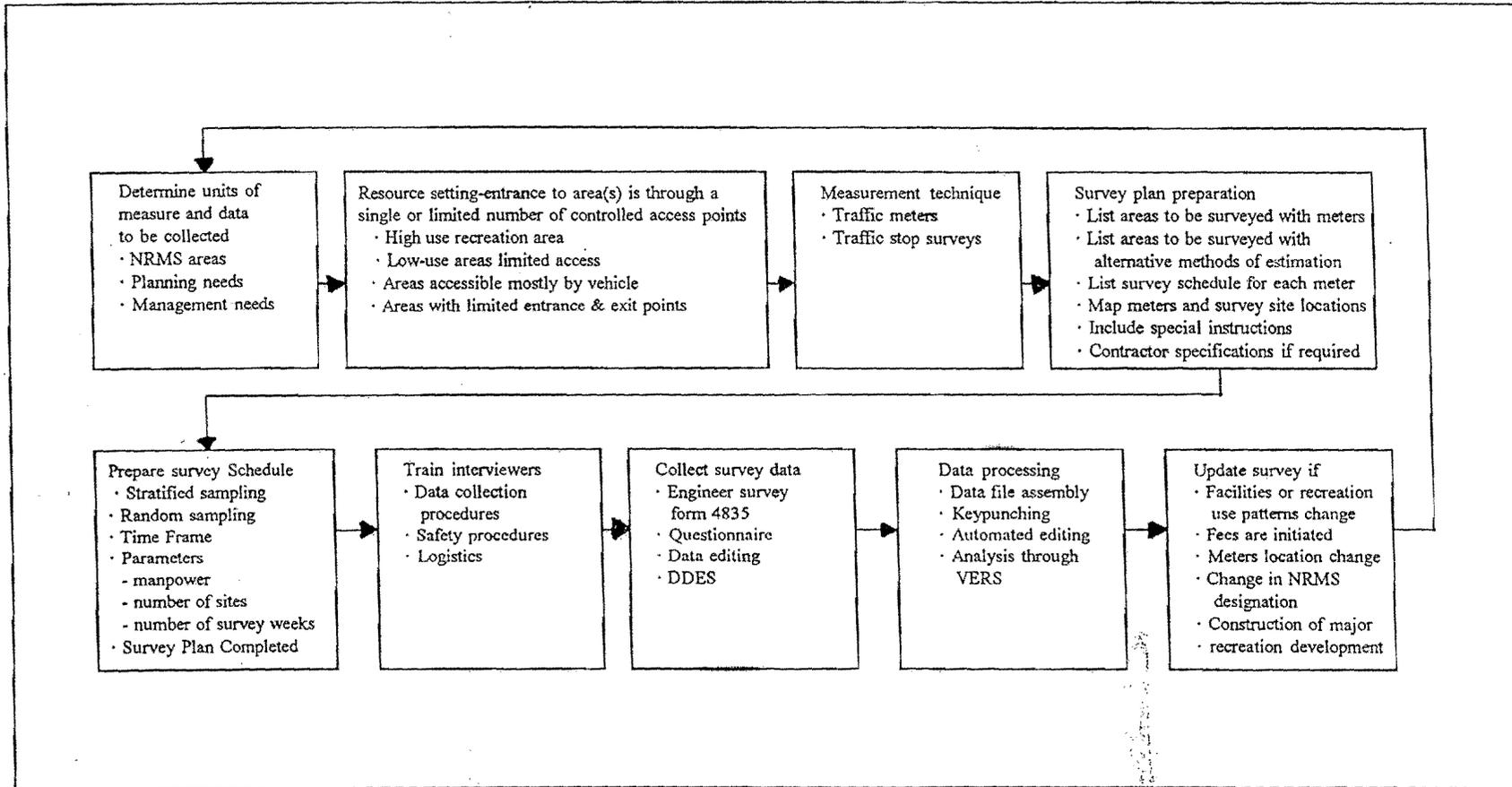


Figure 9. Process for use estimation for developed recreation areas

Adaptations and Limitations

There are a number of assumptions that go into the utilization of these procedures and techniques. One of the most fundamental assumptions is that recreation use to a site can be monitored by traffic counting devices. All or the majority of area users entering or exiting the area must activate the counter; hence the need for limited access by vehicular traffic. An area should have a high volume of use to justify the expense of meter placement, maintenance, and assurance of suitable sample sizes.

The key component of the traffic composition is the percentage of vehicles there for recreation purposes, eliminating the nonrecreation or service vehicles and return recreation counts. This will not only eliminate nonrecreation traffic, but will avoid the double counting of visitors using more than one area. Since the analysis does not expand the sample to a population, total use estimates cannot be done without a meter, nor should they be done with a temporary meter.

These procedures may be adapted to some low-use areas. If low-use areas have limited access points that may be monitored effectively by traffic counters, the traffic-stop metering method may be used. It may be necessary in low-use areas, to increase interview sampling levels, aggregate like areas for sampling, or apply proxy results to these areas.

Traffic-stop surveys and metering cannot be used to estimate visitation in association with subdivisions or housing developments with private docks or recreation areas that receive walk-on use. Surveys in association with traffic in and out of a subdivision will not provide useful information on recreation visitation by subdivision residents. Telephone surveys of households would be more appropriate for use measurement. The estimation procedure described in this chapter is a management tool to provide information on use for the project. The procedures provided for conducting visitor surveys are an expansion of the procedures developed for the Corps of Engineers (Mischon and Wyatt 1979). The process has been developed as a series of compromises to provide the project manager the means to simplify and standardize data collection and monitoring. Assumptions described should be evaluated at the project level to determine if the project needs are met.

The Visitation Estimation and Reporting System (VERS), which supports the traffic-stop surveys, allows for a maximum of four seasons or sets of weighted-factors, to be applied to monthly meter readings. Meters may be read more often than monthly, but the monthly meter readings are used to generate visitation reports. The sampling structures for weekday and weekend days are different and must be sampled separately. Sampling assumes that Monday through Friday are weekdays and Saturday and Sunday are weekend days. Survey days are divided into five equal time periods. All time periods are sampled within each day type. Holiday surveys may be conducted and weighted load-factors applied to traffic counts. The VERS will allow for holiday reports, but the results may not be applied to an area's monthly meter reading. The VERS allows for

flexibility in the following areas: the length of the survey day within each season, the number of surveys that can be done within a season at a meter location, the total number of meters to be sampled, and the number of seasons surveys are to be conducted.

The survey instrument (Direct Data Entry System) has been used in a statistical sampling frame. The frame and analysis in this study were conducted by the Waterways Experiment Station outside of the standard VERS analysis programs (Roberts and Jackson 1994).

Units of Measure

The Corps' reporting requirements direct that visitation be measured at the project level in the units of visits, visitor hours, and visitor days. Historic estimates of visitation are the recreation day unit of measure and the number of visitors participating in select activities. The survey procedure and instruments discussed, are designed to provide results in terms of visits, visitor hours, visitor days, recreation days, and the percentage of visits participating in selected activities for the project.

Definition of Recreation Terms

Certain terms are used throughout this report. Definitions of these terms are essential to an understanding of the traffic survey and meter process.

Project. The project is the largest CE category involved in metering and traffic-stop surveys. The typical project is a water resource development project that was constructed and is managed by the Corps. It characteristically consists of the water body and surrounding lands owned by the CE (Figure 10). Lands may be leased to other federal, state, or local agencies. Congressional authorization may even include downstream recreation as part of the project purpose, extending the project definition.

Recreation area. Recreation areas are located within a project for various recreational activities such as camping, picnicking, fishing, boating, etc. These are represented by the letters A through F on Figure 10. Each of these recreation areas generally has either a single road which serves as the entrance and exit or multiple accesses that lead to and from the area.

Meter. A traffic meter is a counting device used to measure the volume of vehicular traffic into intensive-use areas with limited egress or entry. Two types of meters are currently in use: pneumatic hoses and magnetic loops.

Meter location. Meter location is the place where the meter is positioned to record the amount of traffic into and/or out of an area. Figure 11 illustrates a simplified roadway and meter location.

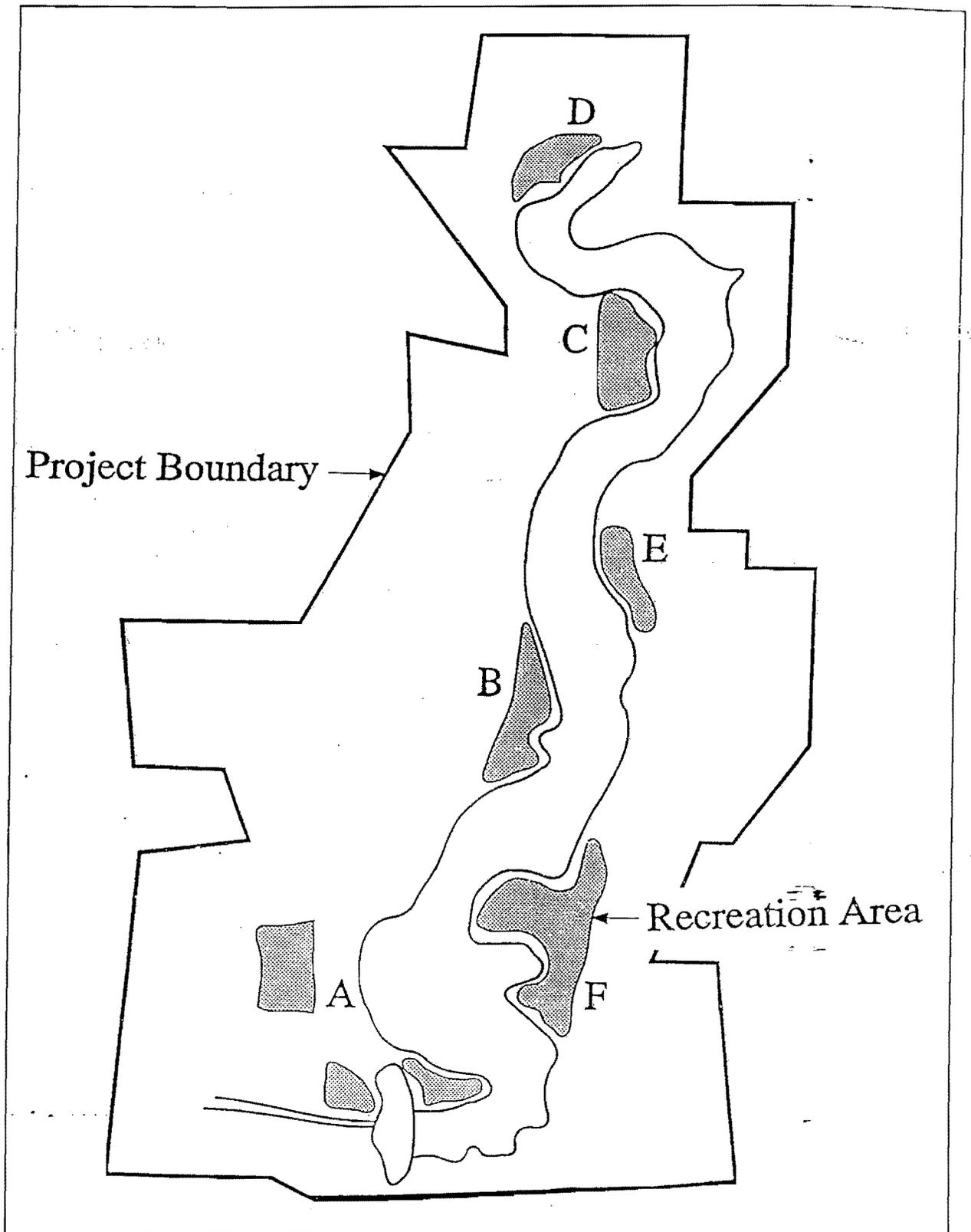


Figure 10. Typical CE project and recreation areas

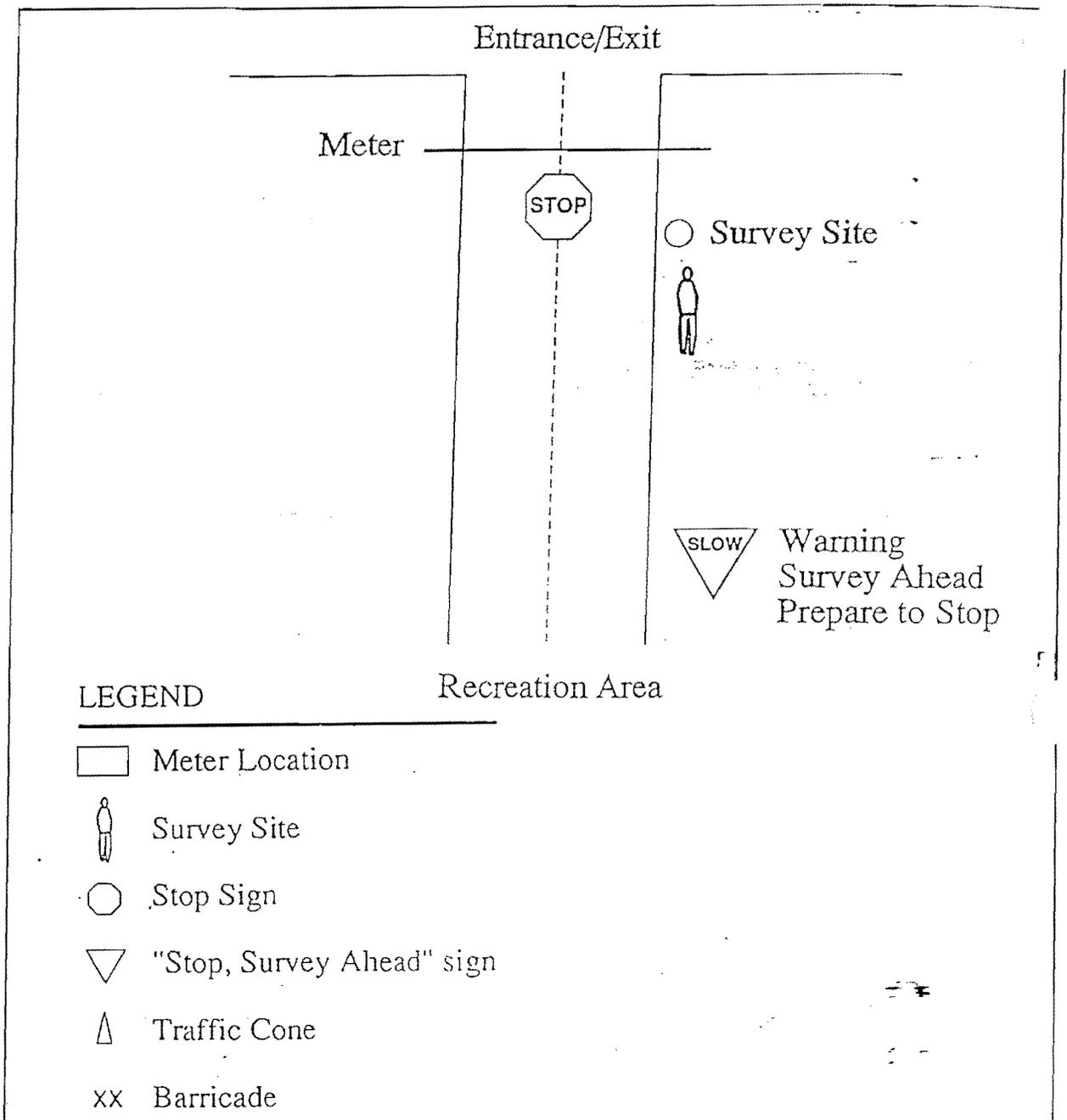


Figure 11. Standard traffic meter and survey site locations

Survey site. The survey site is the location where the interviewer stands to conduct the traffic-stop survey in association with a meter. It is on the shoulder of the road on the side where traffic is exiting the recreation area. The description of the survey site also includes the equipment necessary to conduct interviews safely. See Figure 11.

Load factors. Load factors are weighted results based on the "mix" of recreation use of passengers in the vehicle that cross a meter, as determined by the traffic-stop surveys. The load factor is the result of a mathematical procedure which takes weekday and weekend surveys (each as a percentage of total traffic during the survey period) and combines them to estimate the composition of the traffic for a specific meter. This weighted result is applied to monthly meter readings to determine area and project visitation. Two types of load factors are calculated for each meter: project and area load factors.

- **Area load factors.** Area load factors are applied to the monthly meter reading to obtain an estimate of use in that recreation area. A person who visits several recreation areas on a single trip to a project will be counted separately at each recreation area.
- **Project load factors.** Project load factors generated from surveys are applied to meter readings to provide an area's contribution to total project use. This same process is repeated for all project meters. The portions of project use contributed by each meter are then summed to produce an estimate of total project use. A person who visits several recreation areas on a single trip to a project will be counted only once in project load factors.

Engineering (ENG) Form 4835. One of the two methods of recording data for a traffic-stop survey. ENG Form 4835 is used in conjunction with a questionnaire, and data are hand entered onto the form. Data must then be key-punched and edited before analysis.

Direct Data Entry System (DDES). DDES is the preferred method of recording data in the traffic-stop survey. It is a computer program designed to assist in conducting, editing, and entering recreation use surveys. The interviewer can simply follow the screens and conduct the interview without making decisions about the order of the interview questions. All logic flows and many of the error checks are included in the program. The DDES is one component of the VERS.

Visitation Estimation and Reporting System (VERS). The overall software product for CE visitation reporting. Components include ENG Form 4835 data entry and editing; DDES data entry; data analysis for both instruments; file management; load factor development; and visitation reporting. It generates the standard CE visitation report in Visits, Visitor Hours, Visitor Days for Total, Overnight and Day Use categories, and Visits by Activity.

Created load factors. Load factors developed by entering the best estimate of usage based upon personal knowledge of the site.

Proxy load factors. Load factors created by copying existing information from one site to another.

Survey week. The period time beginning on a Monday and ending the following Monday in which the traffic-stop surveys are conducted.

Survey crew vehicle. Any vehicle passing the survey location exclusively as a result of the survey crew being at the recreation area.

Meter increment. The count recorded by the traffic counter when a vehicle crosses it. The standard count for pneumatic hose counters is one for each axle, or one for every two axles. Magnetic loop standard increment is one for each vehicle, car, and trailer included.

Season. Identifies which category of time is being sampled and reported. Four seasons are used to define the reporting year: spring, summer, fall and winter.

4 Survey Plan Development

The survey plan will direct the traffic-stop survey data collection from beginning to end. It describes the where, when, and how surveys are to be conducted; documenting the decisions made by staff in developing survey strategies. The more detailed the document, the fewer the questions or concerns that will arise. Copies of this document should be retained at both the project and district level. The survey plan should be retained until a new plan takes its place.

The key components in the survey plan include:

<u>Section</u>	<u>Section to Include</u>
Cover	Project name, NRMS number, date of development and authors
Table of Contents	
Maps	Project Map identifying recreation area locations Standard Meter and Survey Site Setup For each recreation areas: Meter and survey site location maps
Areas & Meters	Listing of all NRMS reporting areas and meters, including: Area NRMS number, name, Site/Meter name, meter type, direction of traffic, and meter increment. This should be similar to the VERS Monthly Meter Reading Report (see Report 2, VERS, Appendix G)
Instructions	Special Instructions, to include: Meter and Survey site locations, roadway closures, additional surveyors, reporting area definitions (e.g., multiple areas behind counters), interview/activity definitions (e.g., other overnight includes houseboat rental), District requirements, and safety and hazard reports.

<u>Section</u>	<u>Section to Include</u>
Checklist	Equipment checklist to include what is required and what will be provided by the government.
File Structures	Listing of filenames, by meter or survey site location, by season
Months & Averages	Listing of which months sampling will be conducted and results will be applied to upon completion. This should match the VERS Seasonal Reporting Configuration Report (see Figure 17 or Appendix A)
Seasonal Schedules	For each season of sampling (Spring, Summer, Fall, and Winter) Different from Areas & Meters, this listing identifies which areas/meters will be sampled each season, or stratification, or comments identifying alternative load-factor source. Sampling dated within the season, and dates to be omitted with commentary. Survey Schedules.

In order to develop these components the following steps are undertaken:

Step 1 - Determine reporting areas and suitability.

Step 2 - Evaluate traffic meter locations.

Step 3 - Identify survey site locations and requirements.

Step 4 - Develop area map.

Step 5 - Determine survey time limitations.

Step 6 - Evaluate survey requirements.

Step 7 - Develop the survey schedules.

Step 1 - Determine Reporting Areas and Suitability

The survey plan begins with the decision concerning which recreation areas are suitable for the traffic-stop method and meter utilization.

Table 6 assists in the evaluation of all NRMS reporting areas to determine which are to be included in the traffic-stop survey procedures. Identify and define all reporting areas, determine which areas are suited to the traffic-stop survey. To complete the following table:

Area Number	Area Name	Managing Agency	Vehicle Access Yes/No	Number of Exits	Number of Meters	Suited for Survey

- Use the NRMS database AR_MAIN to provide an inclusive listing of all reporting areas on the project (completing Columns 1 through 3).
- Determine if the majority of recreation accesses to the area is by vehicle. Complete Column 4 with a yes or no answer.
- Identify the number of roadways into and out of the area. Project master plan or operation master plan maps may be useful for this step.
- Enter the number of meters currently maintained in the area.
- Determine if the area meets the "suitability" test: developed recreation area, mostly vehicular access, limited entrance and exit points suitable to traffic counters. An evaluation of meter placement will follow to determine if any changes are required.

Step 2 - Evaluate Traffic Meter Locations

Equipment

Two types of meters are currently in use at CE projects: pneumatic hoses and magnetic loops. Each type has advantages as well as disadvantages that are factors in determining use and meter placement.

Pneumatic-hoses detect impulses as vehicles pass over pneumatic (air) tubes. They are relatively inexpensive and tend to be more effective in lightly used areas. Hoses may be damaged if placed on gravel roads, and are susceptible to vandalism due to their visibility. Since these units are calibrated to count axles, a vehicle and trailer is recorded as three.

Magnetic loops are more expensive than hoses; and may not be cost effective for lightly used areas where vandalism is low. They require less maintenance, drain battery power more slowly and are more accurate in counting. If not adjusted correctly, they may be triggered by metal objects off the roadway.

Since they are embedded in the pavement, they cannot be easily moved making them less prone to vandalism. They are better suited to wide expanses of roadway and road segments that are curved. Magnetic loops count a continuous metal pass as one unit, a vehicle with a trailer is counted as one. If sensitivity is too low, bicycles and motorcycles may not register.

Meter placement

Meters should be installed according to factory standards. Only permanent meter locations on CE property should be considered for sampling. Meters should be recording traffic continuously. Review each of the meters on the project with the following guidelines and cautions in mind:

- a. Pneumatic hoses record the number of axles; therefore, they should be placed on straight segments of the road where vehicles are unlikely to cross at an angle. Avoid curves, parking lot entrances, and intersections. These situations are included in Figure 12 as improper meter locations (dashed lines). If a meter must be placed at a wide intersection or on a curve, it is preferable to use a magnetic loop meter.
- b. All traffic must cross the meter and the meter count must be identifiable as either: all traffic, all exiting traffic, or all entering traffic. Avoid placing meters (pneumatic hoses and magnetic loops) across one lane of traffic if visitors drive down the middle of the roadway. Inconsistent counts will result from meters on one lane if visitors cut corners or do not remain in their lane. If meters are placed on one lane, it is better to locate them on incoming lanes than exiting lanes. Many factory specifications require that the vehicle be traveling at a minimum rate of speed to ensure accurate counting.
- c. In the event of multiple access points, ensure all traffic entering and exiting an area crosses a meter. Utilize the same type of meter (hose or loop) at a single recreation area with multiple access roads. If only one lane of traffic on each road is being metered at a recreation area with multiple access roads, the meters must all be recording the same direction of traffic (e.g., all meters on entrance lanes only).
- d. Avoid placing meters where through-traffic (non-recreation traffic) can cross it. For example in Figure 12 the dashed lines on the through road near the entrance to the recreation area are inappropriate because an excess number of non-recreation vehicles would be recorded. A meter at location A eliminates the excess non-recreation traffic and provides a more precise count of vehicles to the recreation area. Normally meters should not be placed on roadways encompassing subdivisions. In some instances, however, the recreation area and the subdivision share a common roadway. Try to place the meter in such a way that subdivision vehicles are eliminated. When recording subdivision residents is

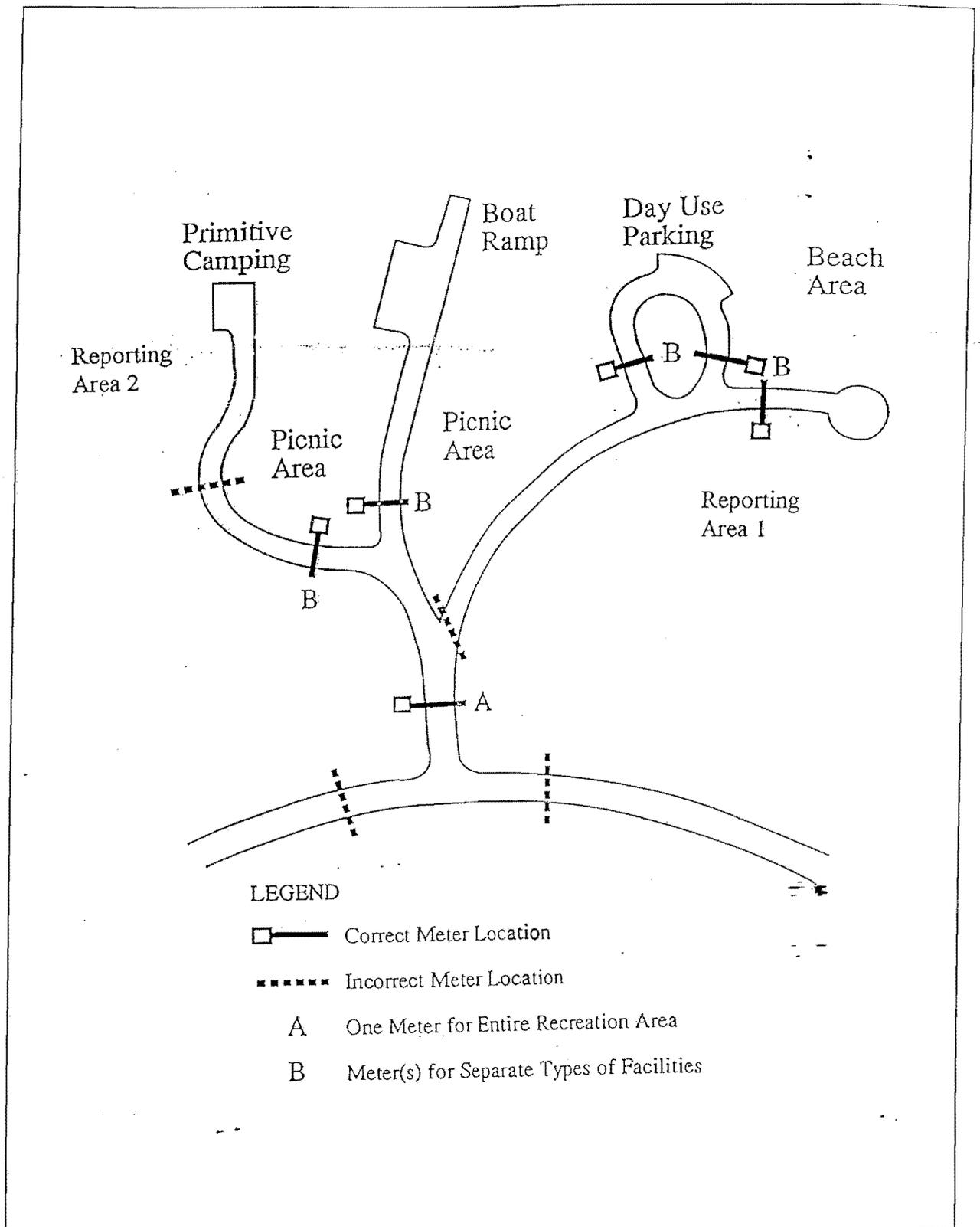


Figure 12. Meter placement (adapted from Mischon and Wyatt (1979))

unavoidable, record subdivision residents as non-recreation vehicles during survey periods. It will not be possible to determine the extent of their recreation use by surveying them as they leave the area (to go to work, school, stores, etc.). Another sampling method must be used to estimate their contribution to the area and projects' visitation.

- e. Avoid placing meters where excess return-recreation vehicle traffic crosses the meter. In Figure 13 a management policy at a campground requires the visitor to pick a site and return to the fee booth. The number of non-recreation counts will increase if the meter is in position #1. A meter placed at location #2 is more desirable for an area with this management policy.

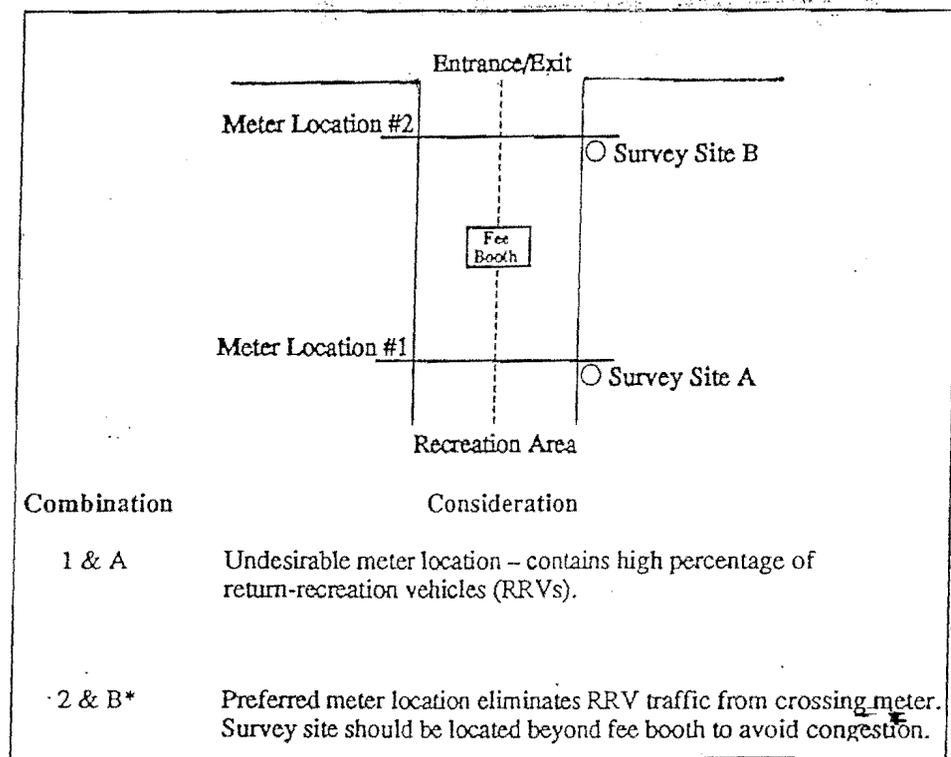


Figure 13. Meter placement eliminating excess return recreation vehicle traffic

- f. It is not necessary to have two meters on a single roadway to determine the use at two separate NRMS reporting areas. Figure 14 illustrates a situation where two meters were placed on a single roadway to estimate the use of the second area behind the fee booth. The second meter may be eliminated. It will be necessary to develop special instructions for the interviewer to determine which recreation area was used primarily and assign use to one area if both are used. Although this will not provide accurate estimates of use at each area (from users of both areas), the total project use will be correct and the total area use will be recorded. The

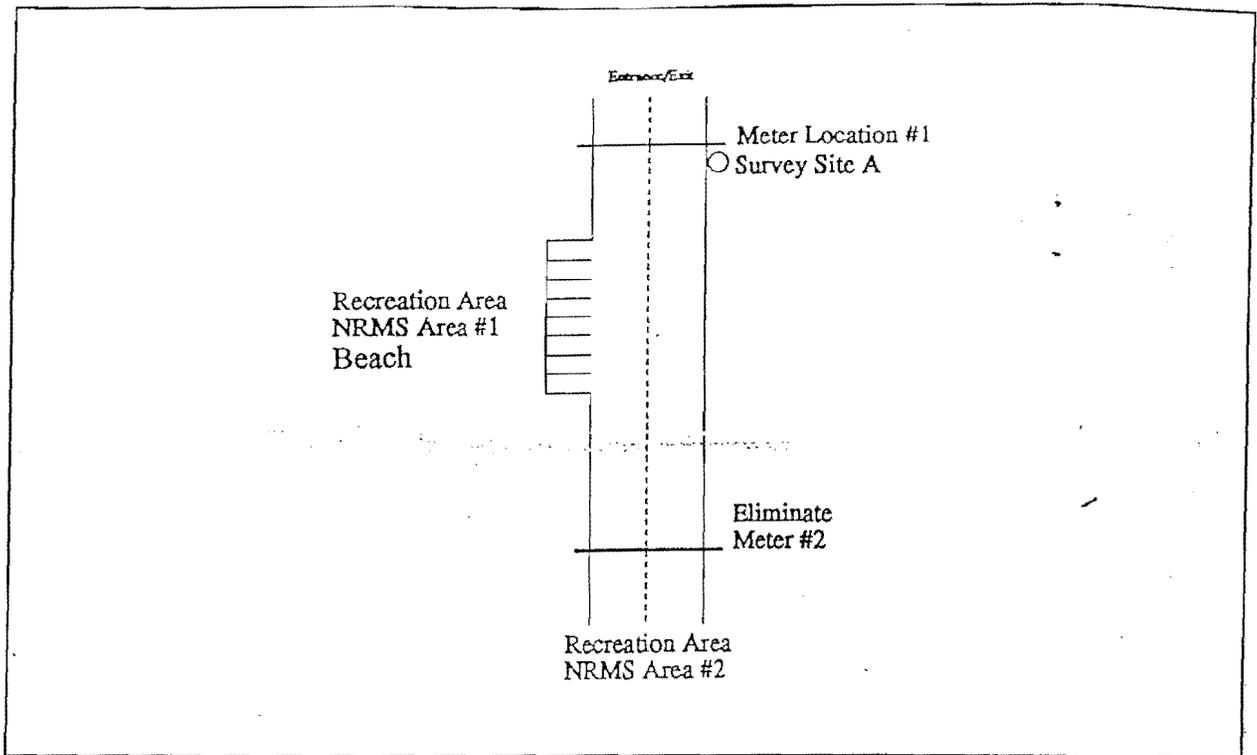


Figure 14. Meter placement with more than one reporting area

limitation is that the use will be arbitrarily designated to one area or the other if both areas are used. As with Figure 12 a single meter at Location A will provide estimates for the entire area behind the counter. But meters at the locations marked B will provide much more specific information for each facility. It will also complicate the survey unnecessarily for the interviewer and the respondent. At Location A the visitor is asked in which activities they participated in; a review of the data would provide information on the facilities used.

Maintenance

Before the beginning of the survey inspect each meter and battery. Replace low batteries to reduce the potential for malfunctions during the survey.

At a minimum, meters must be calibrated and tested for accuracy yearly. An assumption of the procedure is that the counter accurately and reliably records the number of vehicles (or number of axles) in the area.

Meters should be logged in before the survey as to their type, the lane coverage, the direction of traffic across the counter, and the increment of reporting (one or one-half). These variables are required each month during the visitation-reporting process. Should any of these variables change during the course of the

year, they must be noted in the log and reported to the visitation coordinator in order to determine if any reporting corrections are required.

Once the reporting areas that are suited to the procedure have been defined, it is time to evaluate all the meters on the project. Table 7 identifies the area, meter and meter information required. Complete the meter information and note any changes required (e.g., elimination). This listing should become a part of the Survey Plan.

Area Number	Area Name/ Meter Name	Meter Type Hose, loop	Meter Inc. 1 or 1/2	Direction Traffic 1 or 2 Way	Entry, Exit or Both	Changes Required

- Area number (the three digit NRMS number for the recreation area).
- Area and meter name (unique name for each meter in a recreation area).
- Meter type (pneumatic hose or magnetic loop).
- Meter increment (one or one half count per vehicle or axle).
- Direction of traffic crossing the meter (one or two way).
- Entry, exit or both (assists with determining direction of traffic: entry (1 way), exit (1 way) or both (2 way)).
- Special conditions or changes required.

Traffic meter summary

Traffic meters are used to measure traffic volume entering and/or exiting a recreation area (refer to Figure 11). The meter location should satisfy the following requirements.

- Only permanent meter locations are under consideration for calibration.
- Record all vehicular use and as much of the total recreation use in the area as possible.

- Eliminate as much nonrecreation and return-recreation vehicle traffic as possible (e.g., homeowners or multi-area users).
- Inside the government boundary. Obtain local clearance as required for all meters outside the government boundary.
- Be placed so that consistent and accurate counts are recorded. Meters should be calibrated yearly.
- Be maintained monthly and reevaluated annually to ensure consistent measurements.
- Placement must be reviewed and corrections diagrammed on area maps for the project survey plan being developed. All changes in meter location must be made prior to the start of the surveys.

Step 3 - Identify Survey Site Locations and Requirements

The survey site is the location where the surveyor must stand to interview visitors as they exit the recreation area. Since the surveys are designed to determine the composition of traffic across a meter, they are located in proximity to the meter they are calibrating. Figure 11 diagrams a standard and meter survey site locations.

Prior to conducting a survey a review of potential hazards should be conducted. EM 385-1-1 (HQUSACE/OCE) requires a hazard analysis for assignments that may have a hazard in order to reduce risk to a minimum level. Figure 15 is an example of a documented hazard analysis. This applies to both Corps of Engineer employees and contractors. Each interviewer should read and initial the form prior to conducting a survey.

Survey site placement

The foremost consideration of the survey site location is the interviewer's safety. The interviewer will stand on the shoulder of the road, surveying exiting traffic. The following guidelines should be used in determining the appropriate survey site.

- a. For safety, the survey site should be located on a flat, straight segment of road, so that both the interviewer and oncoming traffic are highly visible.
- b. The survey site should be located on the shoulder of the road, on the side that traffic is exiting the recreation area; irregardless if the meter is measuring entering traffic. The survey is conducive with visitors leaving the area.

ACTIVITY TITLE TRAFFIC STOP SURVEYS
 PROJECT/BRANCH _____

DATE _____
 PREPARED BY _____

KEY STEPS IN ACTIVITY	HAZARDS	SAFE WORK PROCEDURE	PROTECTIVE CLOTHING AND EQUIPMENT
Setting up survey site location.	Surveyor being hit by vehicle during set-up. Back injury unloading vehicle.	Park vehicle where it will not interfere with traffic, obstruction of view and personal safety. Proper lifting techniques.	Vehicle with survey equipment. Orange reflective vest.
Placement and removal of survey signs, cones and barricades.	Hit by passing traffic.	Wear reflective vest when placing signs. Walk well off the burm of the road to place signs.	"Survey Party" signs orange reflective vests.
Stopping and interviewing visitors.	Hit by passing vehicles. Environmental conditions. Negative visitor response.	Conduct survey from passenger side of vehicles only. Adequate protective clothing i.e.; hat, gloves, sunblock, coat, rain gear, knowledge of heat stroke, heat exhaustion, frostbite, hypothermia, symptoms and basic first-aid procedures. Use standard procedures for approaching vehicles with caution.	Computers, tripod stand, clipboards campaign hat, portable chair, portable 2-way radio, reflective vest, stop sign, adequate fresh water, first aid kit, blanket, protective covering for computer or ENG 4835 forms, file organizer, and watch.
Traffic control (day and night).	Hit by vehicles.	Use proper hand signals for traffic direction, use flashing blue light for night traffic control. Be alert for wide turning vehicles. Watch for vehicles passing survey site, ex: motorcycles.	Flashlight with cone shaped traffic baton flashing blue light, portable radio, barricades.

- c. The survey site should be in association with a permanent meter location.
- d. The site should be located between the meter and the recreation area and should be an adequate distance from the meter. Vehicles waiting to be surveyed should not back up across the meter.
- e. The site must be located so that all vehicles leaving the recreation area must pass the survey site.
- f. Survey sites may not be located at the base or top of a hill, nor may they be located on the bend of a road.
- g. If the survey sites cannot be located adjacent to the meter because of hills, curves, or similar problems it is essential that nothing which will affect traffic (e.g., houses, businesses, or another road) be located between the survey site and the meter.
- h. The site must be adequately marked or signed to alert oncoming motorists.
- i. If surveys extend to early morning or late evening hours it is essential that the site be well lighted.

Alternative survey sites

Examples of alternative survey site locations are diagramed in Figure 16. Any special equipment required (e.g., traffic cones, barricades) should be specified in the survey plan's special instructions and diagramed in the area map.

As with many procedures, no standard instructions apply to all situations. Special situations require special instructions. The survey plan must describe each situation so that it is clear to the interviewers what is required of them.

In some cases even a single meter at a single recreation area in one NRMS reporting area requires special instructions. If the interviewer should be aware of any special considerations, they should be documented in the special instructions. These items could include:

- Channelizing traffic.
- Relocating survey site.
- Other special instructions.

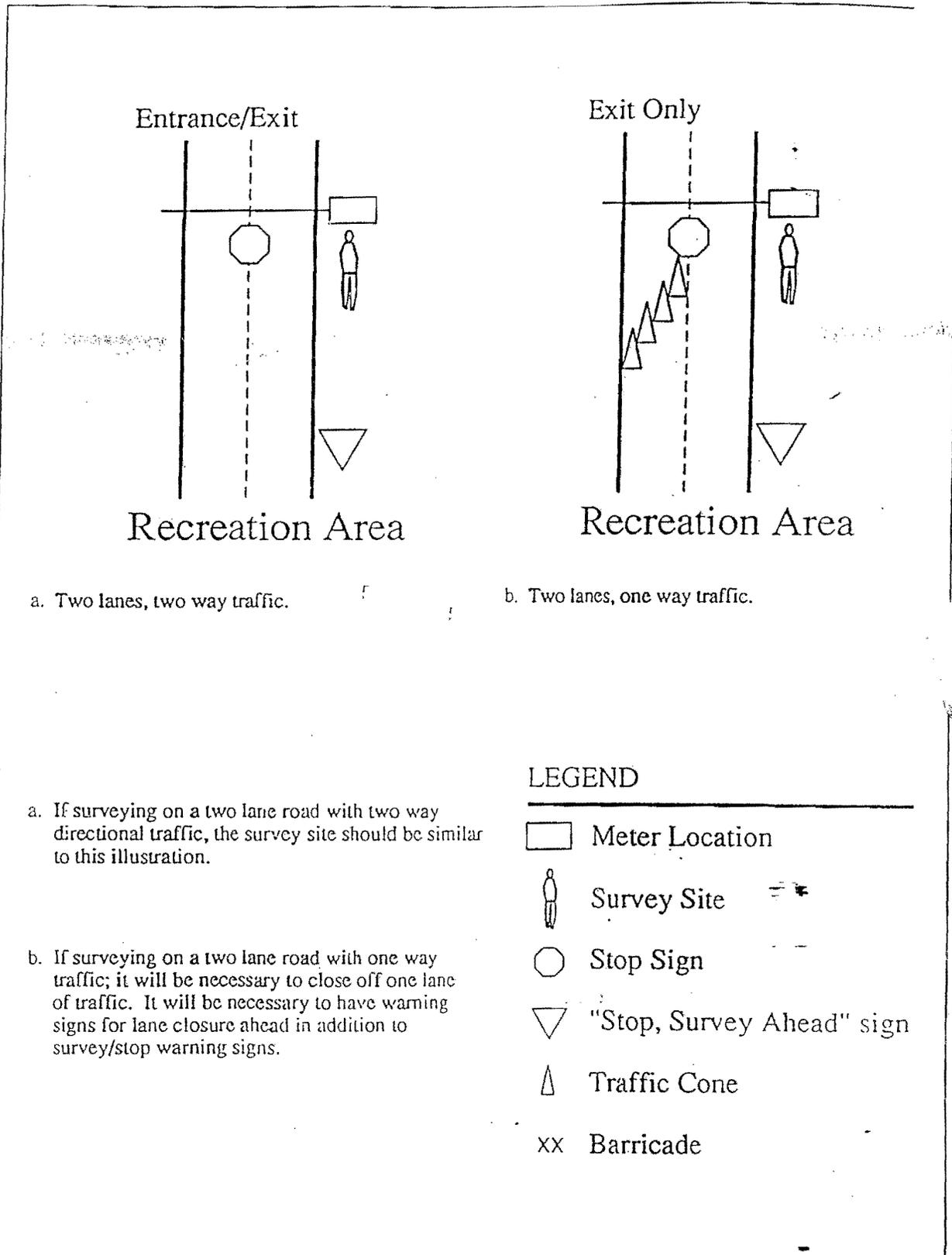
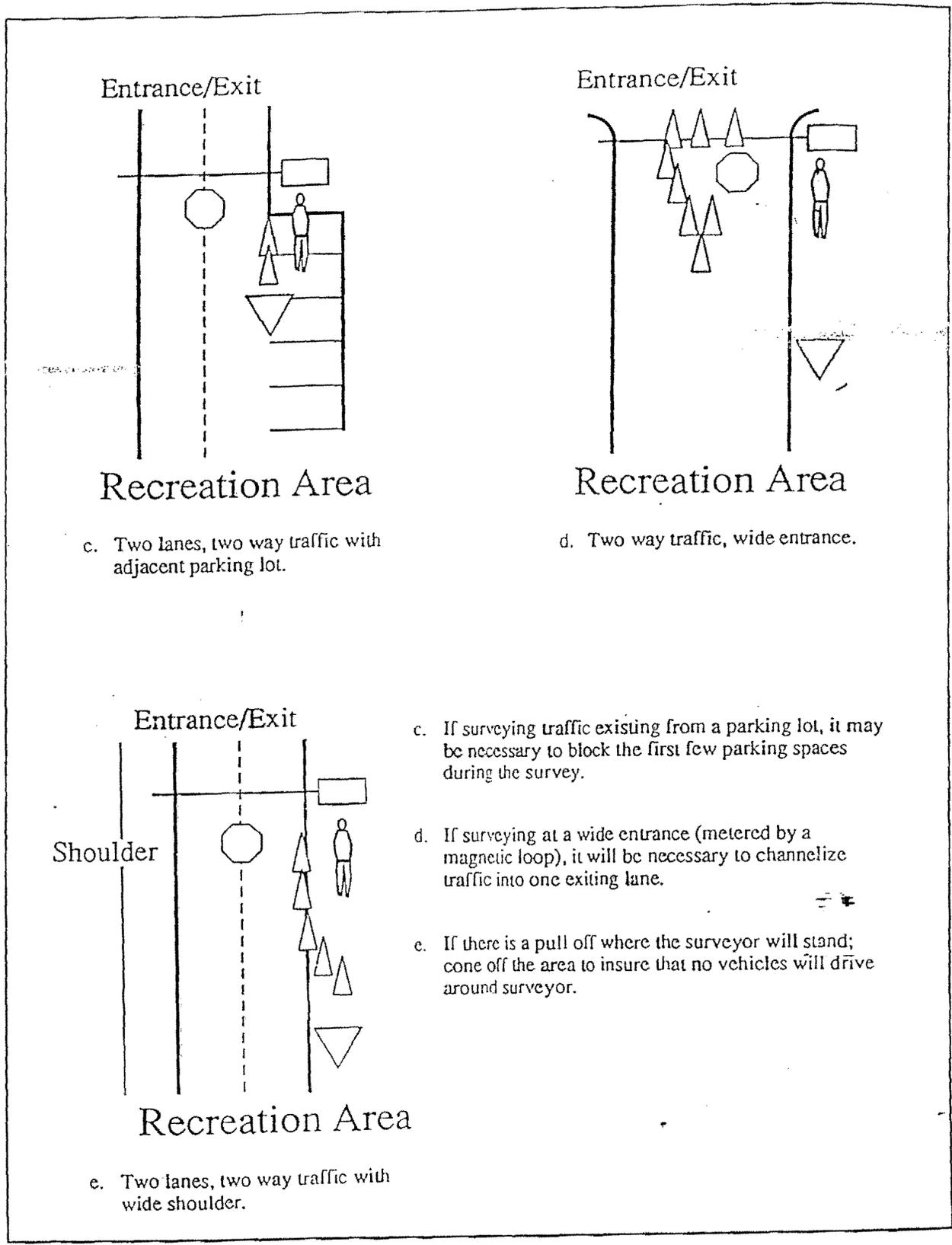


Figure 16. Alternative survey site locations (Continued)



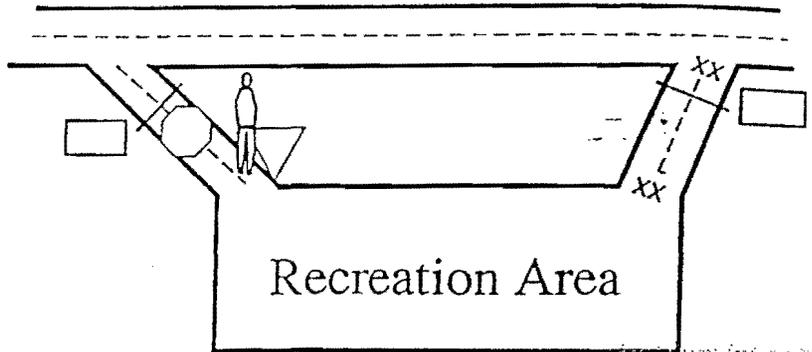
c. Two lanes, two way traffic with adjacent parking lot.

d. Two way traffic, wide entrance.

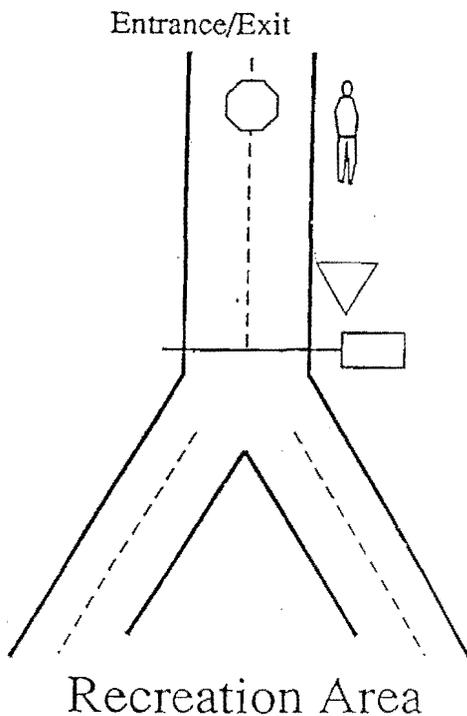
- c. If surveying traffic existing from a parking lot, it may be necessary to block the first few parking spaces during the survey.
- d. If surveying at a wide entrance (metered by a magnetic loop), it will be necessary to channelize traffic into one exiting lane.
- e. If there is a pull off where the surveyor will stand; cone off the area to insure that no vehicles will drive around surveyor.

e. Two lanes, two way traffic with wide shoulder.

Figure 16. (Continued)



f. Recreation area with two entrance/exits.



g. Two lanes, two way traffic with meter at intersection.

f. If an area has two exits, but only one is to be surveyed, the second exit must be blocked during the survey.

g. If a meter is located too close to a recreation area or intersection to permit a safe survey site; the surveyor should stand well beyond the meter location. Be aware that only existing vehicles are to be interviewed, and the survey must be close enough to the recreation area to avoid inclusion of traffic from other sources (e.g. private drives, through roads, etc.) not associated with the recreation area.

Figure 16. (Concluded)

Channelizing traffic

Because of roadway configurations, it may be necessary to channelize traffic into a single exit lane. This usually requires additional equipment (e.g., traffic cones). Area maps should diagram the recommended channelization, in addition to stating the special instructions. Figure 16 of the alternative survey sites illustrates four typical examples of necessary channelization (see diagrams b, c, d, and e). In addition to an illustration, instructions may read:

Seneca Creek Recreation Area. Due to wide roadway shoulders, channelize traffic near survey site location to prevent vehicles from driving toward surveyor; see area map. (Figure 16, diagram e.)

These instructions provide three pieces of information: the problem (wide shoulders), the solution, (channelize based on map), the reason (surveyor safety).

Relocating survey site

In many instances the survey site cannot be in the recommended location because of the distance between the meter and the recreation area. Either the distance is too great (allowing vehicles to speed) or too small (creating congestion) to allow for a safe survey site. Figure 16, diagram g, illustrates a survey site beyond the meter. Instructions should be written to ensure that the vehicles passing the survey site are the same as those crossing the meter. If intervening roads (e.g., private drives) are a consideration, the special instructions should indicate what is to be done, as indicated in the following example:

Yazoo Park. The meter location is too close to the intersection to permit a survey between the meter and the recreation area. At the survey location, interview only those vehicles that are exiting the recreation area and crossing the meter. Make no entry for persons leaving their homes and driving past the survey site. Do not interview them, make no entry. Be certain not to lose vehicles that cross the meter and then turn onto a private drive (Figure 16g).

If a meter location is too far from the recreation area traffic speed may increase causing unsafe conditions for a survey site. The survey site can be moved in toward the recreation area under the following situations:

- Insignificant or no recreation takes place between the meter location and the recreation area.
- The use occurring between the meter and the recreation area is outweighed by the safety considerations involved in having the survey site by the meter.

Longneck Ridge. Due to the distance from the recreation area to the exit, traffic speeds would be unsafe for a site at the meter location. The surveys should be conducted immediately adjacent to the recreation area.

Other special instructions

With 463 projects and over 4,000 recreation areas, there will be occasions where the standard instructions do not meet project needs. Special instructions are designed to provide interviewers with enough information to accommodate an alteration in the survey site location or the actual survey. Four elements that contribute to the need for special instructions are: modifications in the meter location, the survey site location, the number of interviewers, and the required NRMS reporting area. Examples of special instructions that have been used in traffic-stop surveys are provided in Appendix A. The circumstances discussed include:

1. One NRMS area, one meter, one survey site, one interviewer, and other overnight use.
2. One NRMS area, one meter, one survey site, two interviewers.

High use area requiring more interviewers to accommodate traffic in the area.

3. One NRMS area, one meter, two survey sites, two interviewers.

High use area and/or area with tight road configuration requiring two survey sites.

4. One NRMS area, two meters, one survey site, one interviewer.

Recreation area with two entrances/exits can be surveyed with one survey site and one interviewer. This will eliminate the need for simultaneous surveys at the area.

5. Two NRMS areas, one meter, two survey sites, two interviewers.

Two reporting areas sharing a common roadway may be monitored by one counter and at times one survey site. In the example presented, due to the limited roadway configuration, it was necessary to have two survey sites.

6. One NRMS area, three meters, three survey sites, 1 to 3 interviewers and sightseeing on the dam.

Sightseeing on the dam has been controversial. If the project survey coordinator determines that recreation use is to be estimated, the first priority is safety. The second will be modifications to the survey instrument for determining the percentage of traffic that is sightseeing.

Step 4 - Develop Area Maps

Now that proper meter placement and survey site locations have been evaluated, prepare maps for survey plan. Operation Management Plan (OMP) maps, master plan maps or hand drawings may serve as the base. The complete set of survey plan maps should contain: a project map indicating the location of recreation areas, a standard setup for sign placement at the survey site and area maps. Area maps should contain the following information:

- Recreation area name.
- Meter name (if different than recreation area name).
- Roadway network.
- Meter location.
- Survey site location.

Step 5 - Determine Survey Time Limitations

Now that reporting areas that are suited to traffic-stop surveys have been identified and a listing of all project meters has been completed, a determination of appropriate survey seasons must be established. The project survey coordinator must determine which times of the year, or patterns of use, are different enough to warrant surveying.

Three types of stratifications are made based on time.

- *Seasons.* Most projects receive different types of use during different times of the year. Summer surveys are most common, but surveys should be done during times of the year that receive significant use and use is considered different.
- *Day of the week.* The week is stratified into two groups, weekday and weekend, based on the assumption that weekday users are different than weekend users. Surveys are taken from both groups.
- *Time of day.* Since it is likely that the type of recreation use changes through the day, the day is stratified into a number of time periods. Each time period is sampled during the survey period to ensure representativeness of the day.

Seasons

An evaluation of the types of use and the times use occurs on a project must be made. The established reporting system assumes four seasons of sampling: Spring, Summer, Fall, and Winter. A holiday season is provided, but load-factors developed for this time period may not be applied to a monthly meter reading.

It is recommended that each meter be sampled during each season. However, there are times when this is not appropriate due to manpower, money and other constraints. It is also not necessary that all seasons be sampled the same year, or all meters be sampled all seasons. The options remain:

- Sample all meters all seasons.
- Sample some meters all seasons.
- Sample all meters some seasons.
- Sample some meters some seasons.

The starting point is to determine which seasons of use are appropriate for surveying. A decision will be made later as to the level of surveying within each season. Tables 8A and 8B depict a form that may assist in determining the seasons that are appropriate for your project.

From Tables 8A or 8B, a determination of the use seasons, the areas where traffic-stop surveys are appropriate and an initial listing of meters is established. These key factors will help in the establishment of a project survey plan. The next step is to determine which meters are to be sampled with seasons.

It is not necessary to have "conventional" seasons. If the spring season is characterized by boating and fishing; the months that make up the season may be March, April and September. Similarity of season will be based on the recreation use patterns, length of stay and activities.

A table describing the seasons of use for sampling and the months that comprise them should be created and made part of the survey plan (Table 9). The information will be required in the Visitation Estimation and Reporting System (VERS). After integrated into the VERS a comparison of survey plan and VERS Seasonal Reporting Configurations (Figure 17) should be made to ensure consistency.

The ultimate outcome of this season classification is the application of load factors (average party size, average length of stay) from surveys taken during the season to monthly meter readings. Some dry reservoirs have argued they only have two recreation seasons, with and without water. In these instances two arbitrary titles (Summer and Fall) can be used to store the two types of load-factors that will be used to represent use. Most CE projects will require three or

Table 8A Seasons of Use (Form A)					
	Spring	Summer	Fall	Winter	Holiday
Use patterns and activities ¹					
Special events and dates for each					
Months of the year					
Number of weeks					

¹ Reporting activities include: camping, picnicking, fishing, boating, waterskiing, swimming, hiking, winter recreation, other and sightseeing.

Table 8B Seasons of Use (Form B)				
Month	Use Patterns and Primary Activities	Special Events	Season ¹	Number of Weeks
Jan				
Feb				
Mar				

¹ Maximum limit of categories is four. Limited to Spring, Summer, Fall and Winter and Holiday. Holiday surveys may be taken, but cannot be applied to a month's meter readings. Determine months with like activities for grouping.

Table 9 Seasonal Reporting Configuration¹			
Month	Survey Season	Month	Survey Season
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	

¹ Maximum limit of categories is four. Limited to Spring, Summer, Fall and Winter. Determine months with like activities for grouping.

VERS Seasonal Reporting Configuration		Printed: April 4, 1992
Project: Good Time Lake		NRMS: 39180
District: Model		Division: Universal
<u>Month</u>	<u>Survey Season¹</u>	
January	Winter	
February	Winter	
March	Spring	
April	Spring	
May	Spring	
June	Summer	
July	Summer	
August	Summer	
September	Spring	
October	Fall	
November	Fall	
December	Winter	
Reporting year begins in October.		
¹ For illustration only: the project survey coordinator must determine appropriate configuration.		

Figure 17. Seasonal reporting configuration

four seasons to represent year round utilization. The VERS permits and documents this variability among projects.

Holidays. Holiday visitation tends to be different than visitation during the remainder of the season. Holiday weekends should not be included in the regular surveys, but may be surveyed for other purposes. From survey data collected, holiday use patterns are typically shorter than the typical use of the season. The percentages of return recreation vehicle and nonrecreation vehicle traffic are larger due to the high volume of back and forth traffic and the increase in patrols and maintenance during the holiday. This results in a reduction of the percentage of recreation vehicles. Although the volume of use (meter count) is up during the holiday the type of use (lower recreation traffic) is distinctly different from the typical weekend. Applying load-factors from holiday surveys to monthly meter readings would usually underestimate total visitation.

Day of the week

Weekdays. A second structuring of time is the day type. Use patterns of visitors are hypothesized to be different by day type. Monday through Friday are classified as weekday days. This time structuring is standard and cannot be altered by the project survey coordinator.

One controversy lies in the inclusion of Friday as a weekday. Many projects experience an increase in traffic on Friday of overnight guests for the weekend. The sampling focuses on departing traffic, people leaving for the last time. And although Friday entrance patterns may appear to be different the exiting traffic on Friday is assumed to be more like weekday than weekend days and did not warrant a sampling day to itself. The procedures described make no information management distinction between Monday through Friday.

Sampling is conducted as a restricted random sample without replacement, forcing a sample from each weekday. This restriction should also be evaluated by project.

Weekend days. Like the weekday, weekend days are assumed to be similar to each other and different from weekdays. Saturday and Sunday make up the weekend day type. As with the weekdays, sampling is conducted as random without replacement, forcing a sample from each weekend day. Projects may choose to sample differently if their data requirements so demand.

Time of day

The length of the survey day is determined by project staff. Consideration should be given to the use season as a whole. The traffic meter measures visitation on a 24 hour cycle, and although optimum surveying would require a sample to include all 24 hours another series of compromises is developed. You are asked to evaluate the traffic patterns of the project.

Determining when surveys are to begin each day will depend on the time of day when visitors begin leaving the recreation area. In many cases a management policy may dictate use patterns. For example if a project asks that campers checkout between 7 and 9 a.m. a window has been established. If the project bait shop caters to the early bird (opening at 6 a.m.), then an earlier start time may be warranted.

Determining when surveys are to end on a day will also depend on use patterns and management policy, not the end of the business day. If an area is gated at 10 p.m. there is no point in surveying after the area is closed. If day use is the prime activity, then sunset may be a reasonable time for the end of a survey day.

The length of the survey day will vary by season. Table 10 is designed to assist you in determining the appropriate length of survey days for your project.

Although it is not necessary that all areas have the same survey day length, it is recommended that the longest day be used for all areas surveyed during the same season. Again this is a compromise, but it is recommended so that all sampling for the project are equal. Variations in the length of the survey day by meter are more difficult to administer. Meters could be sampled the same week with different time schedules. The opportunity for overlap of time periods and

Table 10 Length of Survey Day				
Visitor Use Patterns	Spring	Summer	Fall	Winter
Time of day visitors begin leaving recreation areas				
Activities or policies which influence when visitors leave				
Time of day visitors stop leaving recreation areas				
Park closure, use, or policies which influencing end of survey day				

scheduling conflicts may increase. It is unnecessary to survey beyond the time when areas are closed or gated.

Once the length of the survey day is established it is divided into five component parts. Another compromise is that all five time blocks will be sampled. The process of determining the length of each block and the scheduling of the five periods will be explained under the survey schedule preparation.

Step 6 - Evaluate Survey Requirements

There are a number of factors that will influence the sampling, the sample size requirement, available manpower, number of sites to be surveyed, number of survey weeks available are just a few. The cost of the survey will also place limitations on the development of the schedule.

Sample size recommendations

It is important that enough surveys are taken to represent the population being sampled. Although there is no minimum number of surveys required, there are several considerations, warnings, and some rules of thumb.

Since variance estimates are not produced, simple testing may be imposed to review representativeness:

- a. A comparison of the number of vehicles surveyed for each day type (weekday or weekend) can be made to the percentage of weekday traffic from the meter readings. The number of vehicles surveyed on the weekday and weekend should be in proportion to the distribution of weekday traffic determined from the meter readings. From the load factor analysis report, compare the number of vehicles surveyed Monday through Friday, to the number of vehicles surveyed Saturday and Sunday. Compare that

distribution to the percentage of vehicles through the week (meter reading calculation). A major difference (e.g., 20 percent or more) in the percent of traffic on the weekday (from the meter readings) and the percent of total surveys conducted on weekdays should result in a reevaluation of the survey day length. A second survey of the area using a longer survey day may be warranted.

- b. From the total number of surveys conducted, generate an axle count (for vehicle count) estimate. Extrapolate to the week (weekday axle counts times five; weekend axle counts times two) and compare the two weeks' meter readings.
- c. If so few surveys are conducted that all interviews for a weekday or weekend survey signal a warning message in the analysis, consider resurveying or grouping the results from similar low use areas to generate an average set of load factors for all grouped sites.
- d. If variance of estimates are required it will be necessary to develop sampling strategies different from the ones outlined in this process (Roberts and Jackson 1994). To test for differences between weeks within a season each meter location should be sampled more heavily. Variance estimates are not a part of the standard outputs.
- e. If time is available or data requirements dictate, meter locations may be surveyed more than once during the season. The added data will likely provide more representative results and allow for determining variance.

Available manpower

The number of surveyors available will influence the number of sites that can be surveyed per week and over the entire season. One person will be able to survey one site each week. With extra help on the weekends, however, this one person could survey up to three sites per week. In determining the manpower necessary, take into consideration breaks for meals, travel time, and overtime restrictions. Figure 18 illustrates a survey week with two areas being surveyed and two interviewers being used with assistance from staff to cover necessary meter readings.

Meter readings must also be taken at the start and end of the survey week and weekend. A total of three meter readings are taken during the survey week outside of the survey time periods. These must be taken into account for total cost estimates as manpower and mileage are impacted.

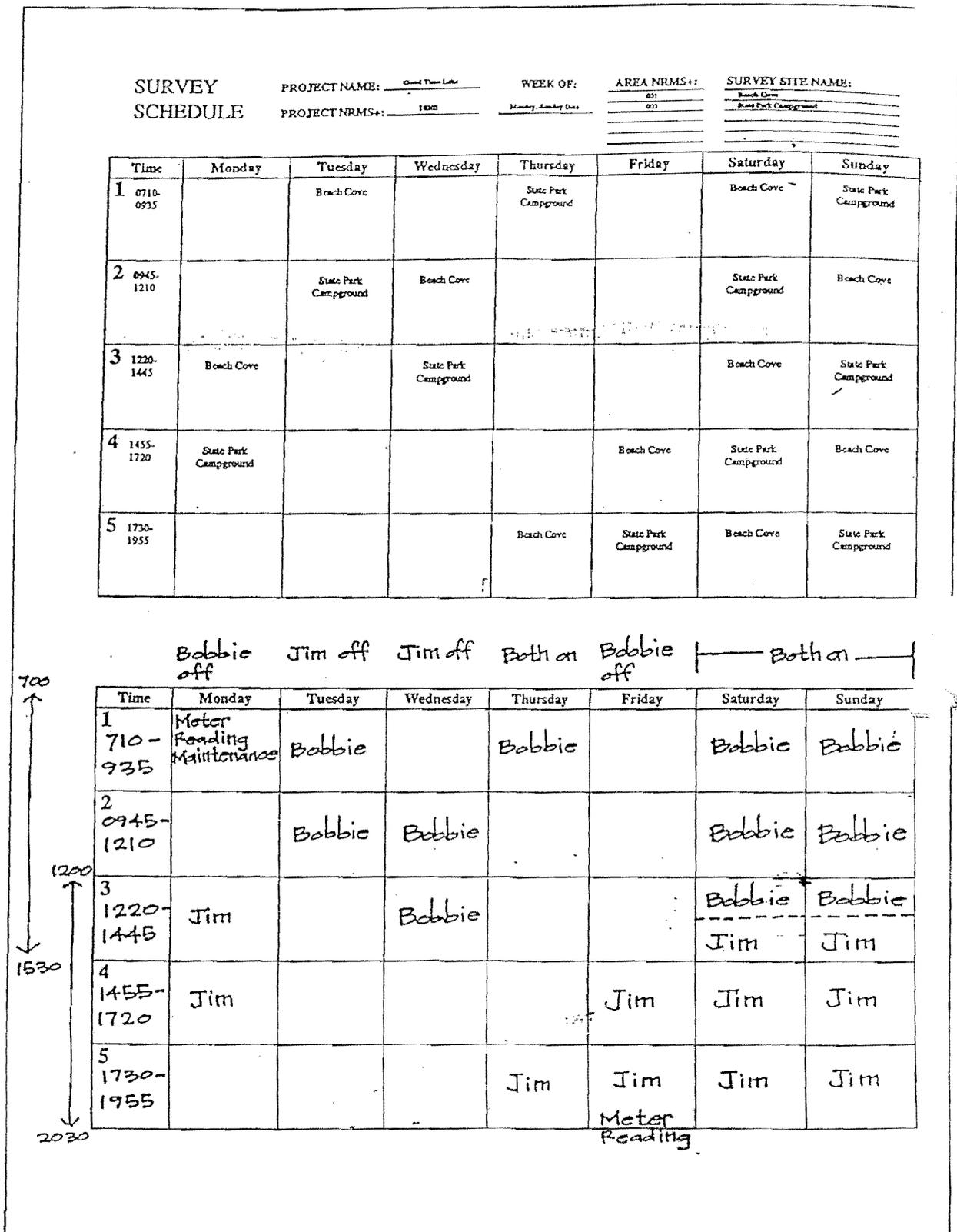


Figure 18. Survey schedule and manpower example

Number of sites to be surveyed

It is recommended that all meter locations have a survey done to calibrate them. Where possible more than one survey per site per season will provide improved information at a location.

However, if there are not enough surveyors, weeks, or funding for all meters to be sampled in the season, areas with similar characteristics may be grouped. The assumptions for grouping areas is that for the survey season being grouped the traffic patterns and recreation patterns are the same across areas. From within this group one area can be randomly selected for surveying. The results from this survey would then be applied to the other areas in the group. If grouping is necessary start with those similar areas which receive the least amount of visitation. Grouping should be limited to within season sampling and not across seasons. See section on stratifying recreation areas.

Number of survey weeks

Over the season there will be a limited number of weeks available for surveying. Since the survey is intended to represent normal traffic composition through the entire season, weeks containing unusual events should be eliminated. Such events include holidays, national fishing tournaments, and construction work. The events identified in Table 8 should be evaluated to determine if those weeks should be eliminated from the list of available dates.

Cost estimate references

Table 11 is provided to assist you in estimating the cost of the survey plan you are preparing. By filling in the blanks, you will estimate the number of labor hours required for surveying. Then by applying an estimated cost per hour, you will be able to determine a rough cost estimate. This estimate will not take into account travel, fringe benefits, profit margin, or the estimated cost of meter readings (travel and time).

Table 11 Estimating Cost				
	Spring	Summer	Fall	Winter
Survey Day Length in Hours				
Number of Meters to Survey				
Sampling Days Per Meter Per Season (2-Weekday, Weekend)	2	2	2	2
Total Hours of Labor = Rows 1*2*3 or (Hours)*(Meters)*(Days)				

Stratifying recreation areas

There are some instances where it is not possible or desirable to survey all recreation areas within a season. In these cases some of the similar, smaller areas may be grouped and an area (or areas) selected to represent the group. Care should be taken that the areas are, in fact, similar. Relatively minor differences, such as location near a major roadway, the absence or presence of a boat ramp, or vegetation differences, may produce different traffic compositions. Figure 19 illustrates a simplified grouping of recreation areas.

The assumptions for grouping areas are based on the similarity of traffic use patterns and recreation use patterns. The traffic use pattern assumptions maintain that the percentages of non-recreation, return-recreation and recreation traffic are consistent across areas. The ratio of day user to campers are in the same proportion across areas. Within the categories of day user and camper the length of stay, and the activities that are participated in are similar across areas.

Other management decisions may render stratification ineffective or biased. For example, a CE multipurpose area and a state park may have similar facilities but because differential fees and management, use patterns may be affected. The state park may attract a different user group due in part to the advertising at state visitor centers, altering the user group and in turn their length of stay and activities. Areas with unique management policies should be sampled separately.

The placement of traffic meters can alter composition. For example, a meter located between a fee booth and a recreation area will have a different traffic composition from an area with a meter between the fee booth and the project boundary (see Figure 13). If the meter is between the fee booth and the recreation area, and the management policy is to have campers choose their site and return to the booth, the return recreation vehicle percentage has been artificially increased and the area should not be stratified with an area whose traffic pattern is different.

Once groupings have been identified, randomly select the recreation area(s) that will represent the group. For example, Frog Run, Bossard, Outflow Camping, and Tub Run recreation areas are in the same group. Assign each area in the group a unique number, as follows:

Recreation Area	Assigned Number
Frog Run	1
Bossard	2
Outflow	3
Tub Run	4

The random selection process can take place in one of several ways:

- Place slips of paper with each number (one number per slip) in a container. Then draw (randomly select) a number.

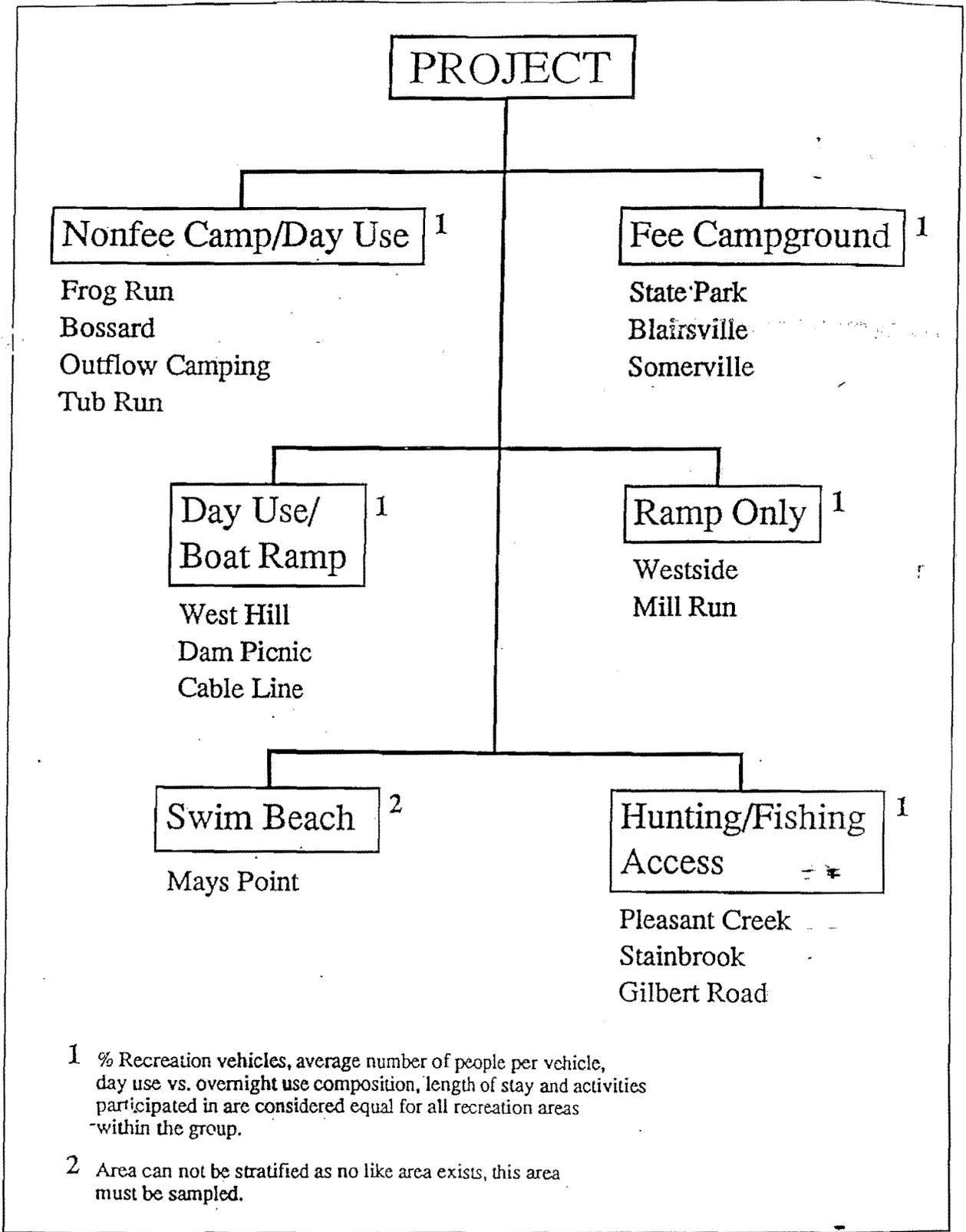


Figure 19. Simplified example of recreation area stratification

- Get a die and roll it. The number rolled between one and four will be the area to be sampled.
- Go to a random numbers table pick a random start, and proceed in any systematic direction (e.g., right to left) until you come a number between one and four.

Repeat any of these processes again to select the second area. These procedures may at first seem unnecessary, but there is a reason for them. This selection process eliminates personal bias between the areas. If, for example, Tub Run is randomly selected and you think that Frog Run would “better” represent the group, then you have created your own bias. The two probably should not have been grouped from the start. The grouping assumes the areas are alike, so the selection process of an area within the group, should not change anything.

Other factors in selection may also be considered. If one of the areas in the grouping has multiple meters (requiring increased surveys) and the purpose of the grouping is to reduce survey burden; then eliminate the area from possible selection. The area would remain in the group and the results from the area selected would be applied to all meters at the area.

Step 7 - Develop the Survey Schedule

The survey schedule (Figure 20) directs the time in which surveys are to be conducted, ensuring a systematic sample of visitors. Factors that may affect the scheduling process include changes in the number of daylight hours, available manpower, the season or seasons for the survey, the number and location of areas to be surveyed each week, survey time periods, and cost estimates. After all NRMS areas and meters have been listed and the survey seasons have been determined, a survey schedule should be constructed for each survey week.

The survey schedule is developed based on decisions that have been made about the manpower, survey sites, and survey weeks. One schedule is prepared for each week during which surveys are to be conducted. When completed it identifies the day of the week and the time of day each site is to be surveyed. Each survey schedule will contain information on all sites surveyed that week.

A survey schedule for each survey season identified will be constructed using the following steps. The description will focus on completing survey schedules for one season. Repeat the steps for the number of seasons that will be sampled.

- Determine the number of weeks available per season.
 - The beginning and ending dates of the season from which survey weeks are to be selected (e.g., weeks between Memorial Day and Labor Day for summer).

SURVEY SCHEDULE

PROJECT NAME: Good Time Lake
 PROJECT NRMS+: 10203

WEEK OF: _____
 Monday-Sunday Date

AREA NRMS+:
001
002

SURVEY SITE NAME:
Beach Cove
State Park Campground

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1 0710-0935		Beach Cove		State Park Campground		Beach Cove	State Park Campground
2 0945-1210		State Park Campground	Beach Cove			State Park Campground	Beach Cove
3 1220-1445	Beach Cove		State Park Campground			Beach Cove	State Park Campground
4 1455-1720	State Park Campground				Beach Cove	State Park Campground	Beach Cove
5 1730-1955				Beach Cove	State Park Campground	Beach Cove	State Park Campground

Figure 20. Sample survey schedule

- Identify any dates within this period that will be excluded from sampling because of holidays, special events, or other logistical considerations.
- Determine the number of meters to be surveyed each week.
- Assign areas to blank survey schedule.
- Assign weekday time periods.
- Assign weekend time periods.
- Assign time block with travel time.
- Randomly select survey week.
- Prepare holiday survey schedules (if required).
- Further assistance in schedule preparation (if required).

Determine the number of weeks available per season

Obtain a calendar for the year that is intended for conducting surveys. Review the seasons of use that have been identified for the project (Table 8). Focus on a single season to be sampled and determine the start and end dates. Review currently scheduled events and determine if they would alter the recreation use pattern of an area(s) on the project. Identify these events and dates on the calendar for the target survey year. An example of this culling process is provided.

For the target year 1997 the summer survey season will be defined to be the time period of Memorial Day to Labor Day for the project Goodtime Lake.

- Select a season - e.g., summer.
- Determine the number of whole weeks within the season identified (a complete week is a Monday to Sunday listing with one exception).¹
- Exclude all partial weeks if a season does not contain continuous Monday to Sunday days.
- Eliminate all special events and holiday weeks within the listing.

¹ If a holiday occurs on Friday, Saturday, Sunday, or Monday, a regular survey cannot be conducted for that week. If more survey weeks are needed, a survey may be conducted during the following week. Instead of beginning the survey on Monday, (the holiday) it is begun on Tuesday. The time periods that would normally be assigned to Monday are then randomly assigned to another weekday during that week. On that day each site would be surveyed during two time periods.

- Consecutively numbered the weeks within the season.
- Count the number of available weeks in the season.

In the example presented (Table 12) a listing of summer season days are identified. In this example of the 14 weeks available only 11 are suitable for survey.

Week Number	Month	Monday Date	Sunday Date	Remarks
Omit	May-June	26	1	Memorial Weekend (Mon)
1	June	2	8	
2		9	15	
3		16	22	
4		23	29	
Omit	June-July	30	6	July 4th Weekend (Fri)
5		7	13	
6		14	20	
7		21	27	
8	July-August	28	3	
9		4	10	
Omit		11	17	Art Weekend (Sat and Sun)
10		18	24	
11		25	31	

Delete from this range the numbers of any weeks that are to be excluded from sampling because of holidays, special events, or logistical considerations that would influence visitor use. Determine the number of weeks available for surveying.

Determine the number of meters to be surveyed each week

From the preceding step, a total number of weeks available per season has been developed. Divide that number (weeks available) into the total number of meters to be sampled to determine the average number of meters per week to be surveyed.

It is better to survey over the entire season than to survey all areas over a shorter period. The entire survey season is used to account for minor differences in use patterns throughout the season. It also reduces the number of people that require training and the data lost in each individual's learning curve.

For Goodtime Lake, in order that the projects 25 meters are sampled during the 11 week summer season, a minimum of two meters per week must be scheduled.

$$25 \text{ Meters}/11 \text{ Weeks} = 25/11 = 2.2 \text{ meters/week (more than 2 per week)}$$

$$2 \text{ Meters} \times 11 \text{ Weeks} = 22 \text{ accounted meters}$$

$$\text{Total - Accounted Meters} = 25 - 22 = 3 \text{ Meters}$$

3 Meters unaccounted for, requiring one extra meter per week for 3 weeks

$$11 \text{ weeks} - 3 \text{ weeks} = 8 \text{ weeks of 2 meters per week or 16 meters}$$

$$\text{Leaving} = 3 \text{ weeks of 3 meters per week or 9 meters}$$

$$\text{TOTAL} \quad 11 \text{ weeks} \quad \text{and} \quad 25 \text{ meters}$$

If there are fewer meters than weeks (e.g., 11 weeks and 5 meters), it is recommended that each meter be surveyed during a different week. The weeks may be randomly drawn or run continuously with a random start week.

Assign areas to blank survey schedules

Having determined the number of meters to be sampled each week in the season, areas may be assigned to blank survey schedules. For our example 11 blank survey schedules would represent an 11-week season. Individual meters should be randomly assigned to the blank survey schedules. Using our example, 8 schedules (weeks) should be assigned two meters and 3 schedules (weeks) would be assigned three meters each. If areas are near enough so that travel time is less than 30 minutes (rule of thumb) random assignment may occur. If larger travel times are required, then geographical grouping of areas may be undertaken.

Guidance for selection of pairs of areas is that travel time should not exceed 30 minutes that is 20 minutes for travel and 10 minutes for survey site set-up. If all recreation areas are within this guidance randomly select meter names to be assigned each schedule.

Randomly selecting three weeks with three meter locations and 8 weeks with 2 areas. Complete the top right hand portion of the survey schedule, labeled survey site name (Figure 20). No dates have been assigned to the schedules, this will occur later. Appendix B contains blank survey schedules.

Assign weekday time periods

Since the total number of areas that are to be surveyed each week have been determined, proceed by assigning each meter/survey site name with a corresponding letter.

If two or more meter sites are to be surveyed during the same week each should be assigned a sequential letter identification (ID). These ID's will be used in the following tables to assign sampling times for each site. If there are five

meter locations to be sampled, they would be identified as sites A, B, C, D, and E. If there are more than five meters per schedule, the ID's are repeated skipping A (e.g., A, B, C, D, E, B). Make sure to list the site names and corresponding ID.

If more than 30 minutes travel time is required between sites, assignment to weekday surveys may allow for travel time equal to one time block. This is done by assigning an area to Row A and Row C rather than A and B for weekday assignments. The weekend would require additional personnel to cover weekend time blocks. No travel time would be assigned to each time period in this situation, as an entire time block would serve as adequate travel time during the week. Weekend surveys would require additional personnel.

For each day of the week, randomly select a number from 1 to 5, roll a die between 1 and 5 or use random numbers table. This number indicates the Column in Table 13 to use in assigning survey time periods to each site. If there is only one site, use Row A. If there are two sites in a group, use Rows A and B. If there are six sites in a group, use Rows A through E, repeating Row B for the sixth site.

Begin with Monday, roll the die and determine a number between (and including) 1 and 5. Suppose 4 is selected. Refer to Column 4 in Table 13. If there is one site to be surveyed, use Row A. At the intersection of Row A Column 4 is the number 4 representing time period 4. The survey time for Monday will be the fourth time period. If there are three sites to be surveyed, the first site (Row 1 - Area A) will be surveyed the fourth time interval, the second site (Row 2 - Area B) will be surveyed the fifth time period, and the third site (Row 3 - Area C) will be surveyed the first time period of the same day. Complete the survey schedule by entering the meter/survey site names in the proper time blocks.

Table 13					
Weekday Time Period Assignment					
Meter/Survey Site	Number To Be Randomly Selected				
	1	2	3	4	5
Area A	1	2	3	4	5
Area B	2	3	4	5	1
Area C	3	4	5	1	2
Area D	4	5	1	2	3
Area E	5	1	2	3	4

On Tuesday, repeat the process excluding the number previously selected for Monday (in this case, 4). Complete the survey schedule. On Wednesday and Thursday, repeat process excluding numbers previously selected. Enter on the

survey schedule. On Friday, use the remaining number. Record the area name(s) on the survey schedule.

Verify that the selection was done properly, select an Area (A) and verify that between Monday and Friday all five time periods have been selected.

For example the die rolled the numbers 4, 1, 5, 3 and 2. If only one area is to be surveyed, focus on Row 1 - Area A. The site name should be written in Block 4 on Monday; Block 1 on Tuesday; Block 5 on Wednesday; Block 3 on Thursday; and Block 2 on Friday.

Check to see that no repeating pattern is found across the schedules, e.g., 1, 2, 3, 4, 5 or 5, 4, 3, 2, 1. Although these combinations are valid in the random selection process they come up 1 every 120 tries. Ensure that no pattern is observed between schedules.

The area names should be recorded in the time blocks rather than the designations A, B, C etc. To assist in the process, have typed (computer generated) labels with the meter name to ensure schedule clarity.

Assign weekend time periods

Table 14 is used to select weekend survey time periods. The process is similar to that used for Table 13. Randomly select either number 1 or 2 with a roll of the die. The number selected indicates the Column to use in assigning the time periods. Both Saturday and Sunday are covered for all time periods. The table will only be used once for each survey schedule. If there is one site, use Row 1 - Area A. If there are two sites in a group, use Rows 1 and 2, Areas A and B. If there are six sites in a group, use Rows 1 through 5, A through E, repeating Row 2B. Fill in the Saturday and Sunday columns of the survey schedule.

Meter/Survey Site	Weekend Day	1	2
Area A	Sat	1, 3, 5	2, 4
	Sun	2, 4	1, 3, 5
Area B	Sat	2, 4	1, 3, 5
	Sun	1, 3, 5	2, 4
Area C	Sat	1, 3, 5	2, 4
	Sun	2, 4	1, 3, 5
Area D	Sat	2, 4	1, 3, 5
	Sun	1, 3, 5	2, 4
Area E	Sat	1, 3, 5	2, 4
	Sun	2, 4	1, 3, 5

For example, suppose the number 2 was randomly selected. If there is one meter location to be sampled (Row 1 Area A), it will be surveyed during time period 2 and 4 on Saturday and time period 1, 3, and 5 on Sunday. If there are three sites, the first and third sites (Rows 1 and 3, A and C) will be surveyed at periods 2 and 4 on Saturday and periods 1, 3, and 5 on Sunday. The second site (Row 2 Area B) will be surveyed at time period 1, 3, and 5 on Saturday and 2 and 4 on Sunday.

Write the survey site names in the selected time period in the weekend columns on the survey schedule.

Assign time block with travel time

The survey schedule standardizes five time blocks for sampling. This is done to ensure that all days of the week and times of the day are represented. The length of the survey day is based on the exiting patterns of recreation visitors and management policies.

The start and end times of the survey day were determined for each season previously (Table 10). The time estimates are divided into the five equal components. Table 15 may be used to assist in the calculations. See section on Further assistance in schedule preparation for assistance in travel block time development.

Table 15 Time Block Development Required for Each Survey Season				
Time Block	No Travel Start - End	10 Min. Start - End	20 Min. Start - End	30 Min. Start - End
1				
2				
3				
4				
5				

In order to complete Table 15 for the season, fill out the "No travel time column first" with both the start and end times for all time blocks. Within each row, select the start time and add 10 minutes, proceed to the right until all columns are completed. A start time of 7:00 in the first column will be 7:10 in the second, 7:20 in the third, 7:30 in the last. Complete each row. All five time blocks must be modified by the travel time described in the column heading. Alternatively the end time could be adjusted by taking the standard time and subtracting 10 minutes. Consistency across the five blocks is all that is required in this procedure.

Table 15 is provided to organize the length of the survey day for each season. The first column is a straight time block with no time adjustments for travel. This arrangement can be used when only one meter location is being sampled per survey week. If travel time and set up time are a factor, then each of the time blocks should be adjusted to reflect it. Record the appropriate times on each of the schedules being prepared.

Randomly select survey week

At this point the areas have been assigned to schedule forms, the travel time and the blocks sampled per day have been identified. The only point remaining is the assignment to dates within the season. With the total weeks identified and the total number of schedules in hand week assignment may be completed. (If surveys are delayed a calendar year; this may be the only step that will be needed to update the plan.)

- Randomly select from the week numbers (see Table 12) a survey week. Enter the dates of this week at the top of the survey schedule. The week number can be randomly selected by use of a random numbers table or other random selection method.
- Continue selecting week numbers randomly, eliminating any previously selected numbers, until the desired number of sampling weeks has been reached. Use one survey schedule for each number selected.

Prepare holiday survey schedules

Holiday schedules are based on a three day week, Saturday and Sunday and Friday or Monday. If holidays are to be surveyed a holiday schedule should be used. Use Table 16 to assign survey times blocks. If the holiday falls on a Monday, the survey dates will be that Monday and the preceding Saturday and Sunday. No other days will be surveyed. If the holiday falls on a Friday, the survey days should be Friday, Saturday, and Sunday.

Procedures for selecting the survey time periods are the same as those for selecting the weekend time periods. Only one random number is selected per holiday weekend. A constraint of six time periods is used instead of five (so that two time periods are sampled per day) with each day type contributing equally to the sample. Appendix B contains a blank holiday survey schedule.

Further assistance in survey preparation

Time periods. Two reference tables are provided to aid in time period assignments for the survey schedules as presented in Table 15. The first, Table 17A, lists the length of the survey day, the calculation of the time period, and the length of each time period rounded to the nearest five minutes.

Table 16 Holiday Time Period Assignments				
Survey Sites	Weekend Day	1	2	3
A	Sat ¹	1,4	2,5	3,6
	Sun ¹	2,5	3,6	1,4
	Mon ¹	3,6	1,4	2,5
B	Sat	2,5	3,6	1,4
	Sun	3,6	1,4	2,5
	Mon	1,4	2,5	3,6
C	Sat	1,4	2,5	3,6
	Sun	2,5	3,6	1,4
	Mon	3,6	1,4	2,5
D	Sat	2,5	3,6	1,4
	Sun	3,6	1,4	2,5
	Mon	1,4	2,5	3,6
E	Sat	1,4	2,5	3,6
	Sun	2,5	3,6	1,4
	Mon	3,6	1,4	2,5

¹ Weekend consists of three days if holiday is on a Friday. Survey days should read 1 Friday, 2 Saturday, 3 Sunday.

Table 17A Survey Time Period Reference: Length of Time Period			
Length of Survey Day In Hours	Determining Time Period Length (Survey Day + 5)		Length of Time Period Rounded to Nearest 5 Minutes
	In Hours	In Minutes	
6.0	1.2	72	1 hr 10 min
7.0	1.4	84	1 hr 25 min
8.0	1.6	96	1 hr 35 min
9.0	1.8	108	1 hr 50 min
10.0	2.0	120	2 hrs
11.0	2.2	132	2 hrs 10 min
12.0	2.4	144	2 hrs 25 min
12.5	2.5	150	2 hrs 30 min
13.0	2.6	156	2 hrs 35 min
13.5	2.7	162	2 hrs 40 min
14.0	2.8	168	2 hrs 50 min
14.5	2.9	174	2 hrs 55 min
15.0	3.0	180	3 hrs
15.5	3.1	186	3 hrs 05 min
16.0	3.2	192	3 hrs 10 min
16.5	3.3	198	3 hrs 20 min
17.0	3.4	204	3 hrs 25 min

Table 17B
Survey Time Period Reference: For Time Block, No Travel Time

Length of Survey Day	Time Period	Examples of (Military Time) ¹	
		Beginning on the Hour	Beginning on the Half-Hour
6 hours	1	1000-1110	1030-1140
	2	1110-1220	1140-1250
	3	1220-1330	1250-1400
	4	1330-1440	1400-1510
	5	1440-1550	1510-1620
7 hours	1	0900-1025	0930-1055
	2	1025-1150	1055-1220
	3	1150-1315	1220-1345
	4	1315-1440	1345-1510
	5	1440-1605	1510-1635
8 hours	1	0900-1035	0930-1105
	2	1035-1210	1105-1240
	3	1210-1345	1240-1415
	4	1345-1520	1415-1550
	5	1520-1605	1550-1725
9 hours	1	0900-1050	0930-1120
	2	1050-1240	1120-1210
	3	1240-1430	1210-1500
	4	1430-1620	1500-1650
	5	1620-1810	1650-1840
10 hours	1	0900-1100	0930-1130
	2	1100-1300	1130-1330
	3	1300-1500	1330-1530
	4	1500-1700	1530-1730
	5	1700-1900	1730-1930
11 hours	1	0700-0910	0930-1140
	2	0910-1120	1140-1350
	3	1120-1330	1350-1600
	4	1330-1540	1600-1810
	5	1540-1750	1810-2020

(Sheet 1 of 3)

¹ The times provided are not intended to be standards, only examples of survey time period assignments.

Table 17B (Continued)

Length of Survey Day	Time Period	Examples of (Military Time) ¹	
		Beginning on the Hour	Beginning on the Half-Hour
12 hours	1	0800-1025	0730-0955
	2	1025-1250	0955-1220
	3	1250-1515	1220-1445
	4	1515-1740	1445-1710
	5	1740-2005	1710-1935
12.5 hours	1	0800-1030	0830-1100
	2	1030-1300	1100-1330
	3	1300-1530	1330-1600
	4	1530-1800	1600-1830
	5	1800-2030	1830-2100
13 hours	1	0800-1035	0830-1105
	2	1035-1310	1105-1340
	3	1310-1545	1340-1615
	4	1545-1820	1615-1850
	5	1820-2055	1850-2125
13.5 hours	1	0800-1040	0730-1020
	2	1040-1320	1020-1250
	3	1320-1600	1250-1530
	4	1600-1840	1530-1810
	5	1840-2120	1810-2050
14 hours	1	0700-0950	0730-1020
	2	0950-1240	1020-1310
	3	1240-1530	1310-1600
	4	1530-1820	1600-1850
	5	1820-2110	1850-2140
14.5 hours	1	0700-0955	0730-1025
	2	0955-1250	1025-1320
	3	1250-1545	1320-1615
	4	1545-1840	1615-1910
	5	1840-2135	1910-2205
15 hours	1	0700-1000	0730-1030
	2	1000-1300	1030-1330
	3	1300-1600	1330-1630

(Sheet 2 of 3)

Table 17B (Concluded)			
Length of Survey Day	Time Period	Examples of (Military Time) ¹	
		Beginning on the Hour	Beginning on the Half-Hour
15 hours (Continued)	4	1600-1900	1630-1930
	5	1900-2200	1930-2230
15.5 hours	1	0700-1005	0630-0935
	2	1005-1310	0935-1240
	3	1310-1615	1240-1545
	4	1615-1920	1545-1850
	5	1920-2225	1850-2155
16 hours	1	0700-1010	0630-0940
	2	1010-1320	0940-1250
	3	1320-1630	1250-1600
	4	1630-1940	1600-1910
	5	1940-2250	1910-2220
16.5 hours	1	0700-1020	0630-0950
	2	1020-1340	0950-1310
	3	1340-1700	1310-1630
	4	1700-2020	1630-1950
	5	2020-2340	1950-2310

(Sheet 3 of 3)

Table 17B lists time period examples for each survey day. For each survey day length listed, an example is provided beginning on the hour and on the half hour. These times are not intended as standards but only examples of survey time period assignments. This may be used as a base line to help prevent calculation errors.

Random Selection. A substitute for the random selection of weekday time periods is to randomly select from the complete listing of possible time period combinations. Table 18 contains all of the possible combinations of 1, 2, 3, 4 and 5. The numbers correspond to the column heading on Table 13 that are randomly selected. The numbers appear on the page in a random order. Therefore it is possible to select a random start for the first schedule and continue until all schedules are completed. The weekend random selection will need to be completed independently.

Table 18
Alternative Random Selection Procedure for Weekday Survey Schedule Assignment

	M	T	W	T	F*		M	T	W	T	F		M	T	W	T	F		M	T	W	T	F
1.	2	3	1	5	4**	31.	4	5	2	3	1	61.	3	2	1	5	4	91.	5	2	1	4	3
2.	4	2	5	3	1	32.	2	4	3	1	5	62.	2	1	3	5	4	92.	3	4	2	5	1
3.	1	3	5	4	2	33.	5	2	3	1	4	63.	4	1	3	2	5	93.	4	1	2	5	3
4.	5	4	3	2	1	34.	1	4	5	3	2	64.	1	4	5	2	3	94.	1	2	5	3	4
5.	3	2	4	5	1	35.	3	1	2	5	4	65.	5	4	1	2	3	95.	2	3	1	4	5
6.	4	2	1	3	5	36.	2	4	5	4	3	66.	3	2	4	1	5	96.	3	5	1	4	2
7.	1	4	3	2	5	37.	3	2	5	4	1	67.	2	1	4	5	3	97.	4	1	5	2	3
8.	2	5	4	3	1	38.	1	5	4	2	3	68.	1	5	3	4	2	98.	5	3	2	4	1
9.	3	4	2	1	5	39.	5	4	3	1	2	69.	4	3	2	1	5	99.	1	5	2	3	4
10.	5	4	2	1	3	40.	4	3	5	2	1	70.	5	4	1	3	2	100.	2	5	4	1	3
11.	1	4	2	5	3	41.	4	5	3	2	1	71.	5	1	4	2	3	101.	5	3	4	2	1
12.	4	3	5	1	2	42.	5	1	3	2	4	72.	4	5	3	1	2	102.	4	2	3	1	5
13.	5	1	4	3	2	43.	1	3	4	5	2	73.	1	2	3	5	4	103.	3	1	4	2	5
14.	2	5	1	3	4	44.	3	5	1	2	4	74.	2	3	4	1	5	104.	1	3	4	2	5
15.	3	4	1	2	5	45.	2	4	1	3	5	75.	3	4	5	2	1	105.	2	4	3	5	1
16.	4	5	1	3	2	46.	3	4	5	1	2	76.	5	3	2	1	4	106.	2	4	5	1	3
17.	5	2	4	1	3	47.	5	1	2	4	3	77.	1	5	2	4	3	107.	1	4	2	3	5
18.	2	1	4	3	5	48.	1	2	3	4	5	78.	4	3	2	5	1	108.	3	1	5	4	2
19.	3	1	5	2	4	49.	4	5	1	2	3	79.	3	5	4	2	1	109.	4	3	1	2	5
20.	1	3	2	5	4	50.	2	3	4	5	1	80.	2	5	3	4	1	110.	5	3	1	4	2
21.	1	2	4	5	3	51.	2	1	5	3	4	81.	2	3	5	1	4	111.	3	5	4	1	2
22.	3	1	2	4	5	52.	4	5	2	1	3	82.	3	4	1	5	2	112.	1	3	5	2	4
23.	2	1	3	4	5	53.	1	5	4	3	2	83.	4	1	2	3	5	113.	5	2	4	3	1
24.	5	1	2	3	4	54.	5	1	3	4	2	84.	1	2	4	3	5	114.	4	2	1	5	3
25.	4	1	3	5	2	55.	3	2	5	1	4	85.	5	2	3	4	1	115.	2	5	1	4	3
26.	2	3	5	4	1	56.	4	1	5	3	2	86.	3	2	1	4	5	116.	2	4	1	5	3
27.	4	2	3	5	1	57.	2	4	5	3	1	87.	5	4	2	3	1	117.	4	2	5	1	3
28.	1	4	3	5	2	58.	3	1	4	5	2	88.	2	5	3	1	4	118.	5	3	1	2	4
29.	5	2	1	3	4	59.	5	3	4	1	2	89.	4	3	1	5	2	119.	1	2	5	4	3
30.	3	5	2	4	1	60.	1	3	2	4	5	90.	1	5	3	2	4	120.	3	5	2	1	4

* MTWTF = Monday, Tuesday, Wednesday, Thursday, Friday

** Listing of all possible combinations of 1, 2, 3, 4, 5 in a random order. Substitute for random selection of column headings from Table 13.

5 Preparing for Surveys

Contracting Preparation

The survey situation must be reviewed to determine what if any of the process is to be contracted. A checklist of items for consideration is provided.

If it is necessary to contract for survey work, specifications should be adequately outlined. The specifications should identify if the surveys are to be done on ENG Form 4835 or under the DDES. The package should include the survey plan (area maps, special instructions, and survey schedules), surveyor conduct and appearance, supervision, orientation, any restrictions, and work schedule. The contract specifications should list all equipment that is being furnished by the government. This may include signs, traffic cones, and barricades; as well as lights for night surveys, questionnaires and survey forms; pencils and erasers, or computer hardware and software; and outfits for the interviewers (safety vests, hats, name plates, etc.).

In developing contract specifications consider the following:

- Number of areas/meters to be surveyed (e.g., numbers of meter locations surveyed by season). Specify if bid submittal is by season or multiple season; for a single project or multiple projects.
- Number of hours to be surveyed each season (e.g., not to exceed x hours).
- Mandatory attendance of contractor and all surveyors at training and orientation sessions (exportable training programs may be used).
- Equipment to be provided by CE (review equipment checklist in survey site preparation section) and any restrictions on that equipment (e.g., no unauthorized software or files to be loaded on computers).
- Equipment to be provided by contractor, including transportation.
- Interviewer instructions (what is required in the interview: meter readings, definitions, etc.).

- Survey plan, including survey site location, special instructions, and the survey schedules.
- What is being contracted and method (ENG Form 4835 or DDES).

ENG Form 4835

- Surveys.
- Meter readings.
- Hand editing.
- Key punching.
- File preparation/organization.
- Machine editing and correction.
- VERS edit evaluation and correction.
- Machine processing.
- Load factor analysis.
- Season, area and meter summary.

DDES

- File structure development.
 - Surveys.
 - Meter readings.
 - Machine processing.
 - Load factor analysis.
 - Season, area and meter summary.
- Product delivery.
 - Original survey forms or files.
 - Meter reading log sheets.
 - Paper or disk products.
 - Standard reports or evaluations on reports.

Survey Preparation

Preparation for the survey includes the logistics required in setting up and safely conducting an interview. Foremost in this process is the training of the interviewer so that a safe and correct survey may be conducted.

Two methods of data collection are maintained by the CE for traffic-stop surveys:

- a. A survey questionnaire, dated March 1986 (Figure 21) in conjunction with the ENG Form 4835, dated August 1983 (Figure 22).
- b. The Direct Data Entry System (DDES).

Proper implementation of the survey instrument and clear and accurate reporting are essential to this type of use-estimation procedure. In order that reliable data be obtained, the survey must be completed according to the questionnaire and instructions outlined in this section and in Appendices C and D.

Appendix C describes the procedures for conducting the traffic-stop survey using the ENG Form 4835. Appendix D describes the use of the Direct Data Entry System software package for data collection.

To assist in the training of interviewers an exportable training package has been developed. This document and training video is entitled: *Visitor Surveys for Developed Recreation Areas* (U.S. Army Corps of Engineers Nontraditional Training and Planning Division, Control #750, January 1992).

Meter Preparation

Any changes in meter location should be made at least one week prior to surveying; preferably prior to the start of the survey season or start of the month. During the week preceding a survey, the meter and batteries should be checked to ensure that they are operational. The surveyors should review the meter locations, survey site locations, and special instructions for each site. For meters located on through roads, it is necessary that the surveyor know which lane of traffic is to be surveyed, understand the recreation area being surveyed, and be able to explain it to the visitor.

Meter readings are taken to determine the percentage of weekday traffic. During the seven days of the survey, the number of vehicles activating each meter will be recorded for the weekday period (Monday morning to Friday evening), and the weekend period Saturday and Sunday (Friday evening through Monday morning). These numbers will be used to calculate the percentage of the weekday traffic relative to the total use. During the week the survey is being conducted, readings are taken as follows for each meter scheduled:

- On the first Monday at approximately the beginning of time block one (not the Monday survey period).
- On the following Friday at approximately the end of time block five (not the Friday survey period).
- On the Monday following the survey week at approximately the beginning of time block one.

CORPS OF ENGINEERS TRAFFIC-STOP RECREATION USE SURVEY
 USE IN CONJUNCTION WITH ENG FORM 4835, DATED AUG 83.

MARCH 1985

• HELLO, MY NAME IS _____ I AM WITH THE CORPS OF ENGINEERS
 WE ARE SURVEYING VISITORS AT _____ (Project Name) SO THAT WE CAN BETTER
 SERVE YOUR NEEDS. MAY I TAKE A FEW MINUTES OF YOUR TIME TO ASK YOU SOME
 QUESTIONS?

COLUMN **QUESTIONS & INSTRUCTIONS**

11-13 Code sequential numbers for every existing vehicle (car, cab & trailer, etc.) passing the survey site.

14 Number of Axles
 Record number of car & trailer axles. CONTINUE.
 If passed vehicle (Refer to trailer) Code "0" END.

15 Vehicle Type
 • DID YOU USE THIS AREA FOR RECREATION TODAY?
 IF RECREATION VEHICLE (RV) Code "0" CONTINUE.
 IF NONRECREATION VEHICLE (NRV) Code "1" END.

16-17 Recreation Vehicle(s)
 • WILL YOU BE RETURNING TO ANY RECREATION AREA ON THIS LAKE TODAY?
 IF NO Code "0" (COL 16 & 17) CONTINUE AT COL 18-19.
 IF YES Code "1" (COL 16)
 • WILL YOU BE RETURNING TO THIS AREA TODAY?
 IF NO Code "0" (COL 17) CONTINUE.
 IF YES Code "1" (COL 17) END.

18-19 People in Vehicle
 • HOW MANY PEOPLE ARE IN YOUR VEHICLE NOW?
 Record number (COL 18-19) CONTINUE.
 Example: A party of 3 would be coded "03"

20-21 Camping
 • HAVE YOU BEEN CAMPING ON THIS VISIT TO THIS LAKE?
 IF NO Code "0" (COL 20 & 21) CONTINUE AT COL 24-25.
 IF YES Code "1" (COL 20)
 • WERE YOU CAMPING AT THIS AREA?
 IF NO Code "0" (COL 21) CONTINUE AT COL 24-25.
 IF YES Code "1" (COL 21)
 • ON THIS TRIP, HOW MANY NIGHTS HAVE YOU CAMPED AT THIS AREA?
 Record number (COL 22-23) CONTINUE AT COL 24

24-25 Day Use
 • HOW MANY HOURS DID YOU SPEND AT THIS AREA TODAY?
 Record number (COL 24-25) CONTINUE
 One hour minimum

COLUMN **QUESTIONS & INSTRUCTIONS**

PHOTOGRAPH USE

26-28 • THE FOLLOWING QUESTIONS RELATE TO THE PEOPLE IN THIS VEHICLE AND THEIR USE OF THE ENTIRE LAKE DURING THIS VISIT.
 • HOW MANY PEOPLE PICNICKED (CAMPERS AT A LOCATION OTHER THAN YOUR CAMPSITE)?
 IF NOT PICNICKING CONTINUE AT COL 29
 IF PICNICKING Record number (COL 28-27)
 • DID YOU USE PICNIC FACILITIES?
 IF NO CONTINUE.
 IF YES Code "1" (COL 28) CONTINUE.

29-30 • DID YOU USE ANY OF THE FOLLOWING FACILITIES?
 Record facility types from survey form.
 IF NO CONTINUE.
 IF YES Code "1" (Appropriate COL) CONTINUE.

31-46 • HOW MANY PEOPLE PARTICIPATED IN THE FOLLOWING ACTIVITIES DURING THIS VISIT TO THE LAKE?
 Record activities from survey form. Record number (COL 31-46) CONTINUE.

47-48 • WHAT OTHER ACTIVITIES DID MEMBERS OF THIS PARTY PARTICIPATE IN? HOW MANY PARTICIPATED?
 Record number (COL 47-48) and activity (Remarks)

49-50 Supplementing: An individual should be recorded as participating only if he or she did not participate in any other activities.
 Record number (COL 49-50) CONTINUE.

56 • IS THIS THE ONLY AREA THAT YOU HAVE BEEN TO FOR RECREATION DURING THIS VISIT TO THE LAKE?
 IF NO Code "0", CONTINUE.
 IF YES Code "1" CONTINUE AT COL 51-55.

AREA USE

56-75 • FOR THOSE ACTIVITIES YOU PARTICIPATED IN AT THE LAKE, HOW MANY PEOPLE PARTICIPATED IN THOSE ACTIVITIES OR USED THOSE FACILITIES AT THIS AREA?
 Record project activities and facility-use questions which the visitors responded to previously (COL 26-50). If the visitor did not participate in any activity recorded at the project (lake, area, camping, etc.) (21), record engineering.
 Record number (COL 51-75) CONTINUE.

ZIP CODE

51-55 • WHAT IS YOUR ZIP CODE? WE NEED TO KNOW WHERE YOU STARTED FROM ON THIS VISIT TO THE LAKE.
 Record ZIP Code (COL 51-55) in city and state in Remarks.

• THANK YOU WE APPRECIATE YOUR COOPERATION END.

Figure 21. Questionnaire used in conjunction with ENG Form 4835

As an example, for the week illustrated in Figure 20, readings would be taken at both the State Park Campground and Beach Cove locations on Monday, at 7:10 a.m.; Friday, at 7:55 p.m.; and the following Monday, at 7:10 a.m (not shown).

For surveys using ENG Form 4835, all meter readings are recorded in the "Survey Log" on the first weekday and weekend survey form used at that area. They do not have to be recorded on all subsequent forms.

For DDES computer entry a meter reading log must be maintained until data analysis are completed. The following information should be included: Area name, Meter name, Date and Day, Time, Meter reading.

Meter readings will be taken as close to the time specified above as possible. Recognize that even with the grouping of areas by geographical proximity, travel between areas will take some time. If the readings cannot be taken at the exact time, they should be taken before the beginning of time period one (for the Monday morning readings) and after the end of time period five (for the Friday readings).

If a meter fails during the survey week, read the meter the same times during the following week. Readings from a substitute week are used unless that week is classified as a different season or includes a holiday.

Holidays that fall on a Friday or Monday will affect traffic during the week before and the week after the holiday weekend. Therefore, meter readings should not be taken either of these two weeks but should be postponed until the following week. Holidays which occur in the middle of the week affect only that week; so meter readings may be taken the following week.

If it is feasible to schedule the last Monday reading, a Sunday night meter reading taken after time block five may be substituted.

Survey Site Preparation

The survey location should be comfortable yet maintain professional status. The surveyor should have drinking water and shelter from rain and wind, as well as some means of calling for assistance in the event of an accident or other problems. For those using the ENG Form 4835, waterproof boxes should be used to store questionnaires and survey forms if they cannot be kept inside a vehicle. For those using the DDES, special care of computer systems should be taken. A good filing and storage system should be developed to prevent loss or confusion of survey forms or disks. A checklist of items to be at the survey site include:

Equipment

There are a number of items that are essential in order that a safe survey be conducted. Below are items that should be a part of the survey site. The project survey coordinator may add to this list of components in the special instructions required for an individual site.

Equipment check list

- Points of Contact _____
- Emergency Phone Numbers _____

- Safety vest
- Identification badge or name plate
- Watch
- Survey plan or copies of:
 - 1) Survey schedules
 - 2) Survey area maps
 - 3) Special instructions for survey area
- "Stop" sign
- "Stop Ahead" sign
- Other specialty signs such as "Tourism Survey Ahead"
- Traffic cones
- Barricades
- Project maps and brochures
- Keys for traffic meter boxes
- Lights for night surveys
- Personal items such as: drinking water, snacks, hat, sun screen
- Other items _____

Items for Paper Surveys

- ENG Form 4835
- No. 2 lead pencils and erasers
- Clipboard
- Folders or organizers
- Questionnaire

Items for MicroComputer Surveys

- Laptop Computer
- Extra computer batteries
- Floppy disks with:
 1. DDES
 2. Survey Area files
 3. Backup disks
- Computer Stand

When conducting surveys, the interviewer should:

- Arrive at the survey location early enough to set up and perform required duties well before the designated starting time.
- Wear a control safety vest from the set-up of warning and other traffic control devices, through the interview period and until the take-down of all equipment.

- Make sure there is adequate room for incoming traffic to pass and for exiting cars to wait. All exiting cars must stop until surveyed or passed by the surveyor.
- Stand on the shoulder of the road, on the side that traffic is exiting the recreation area.
- Conduct interviews through the passenger side of the vehicle. This procedure is necessary for the safety of the interviewer.
- Survey only exiting traffic.
- Survey for the entire period identified in the survey schedule.

Interviewer Monitoring Preparation

On site inspections in addition to data review procedures should be established to evaluate each interviewer. The project survey coordinator could develop a standardized form that can be used by selected inhouse staff for interviewer evaluation. A checklist of items to be included will be based on scope of work requirements which may include:

Surveyor on duty?	Name: _____
Attended training?	Yes No: _____
Proper survey site location?	Yes No: _____
Proper survey site set-up?	Yes No: _____
Proper attire:	Yes No: _____
Interviews observed:	Yes No: _____
If observed, proper procedures used?	Yes No: _____
Comments: _____	

Actions: _____

Name of evaluator: _____

The VERS produces a Survey Schedule Report that describes the start and end times of data collected with the DDES. The report should be compared with the survey plan to ensure all time periods were sampled. (See Report 2, Appendix F). ENG Form 4835 data should be checked similarly by hand to ensure all weekday and weekend day time blocks were surveyed.

Standard Interview Procedures

The specific interview questions are included in Appendices C and D. This section outlines the standard protocol used in each system and the definition of vehicle and level of use classification.

During the designated survey period, a separate entry is completed for each and every vehicle exiting past the survey site (except for survey crew vehicles). Interview instructions are listed on the laptop screen or the questionnaire. The interview procedure is diagramed in Figure 23.

The flow of the interview begins with the interviewer's introduction to the passengers and driver of the stopped vehicle. Next is the identification of the vehicle type based on passengers use of the area. Recreating vehicles (RVs) are identified when the visitors have used the area for recreation purposes that day. The survey continues with RVs occupants. Nonrecreation vehicles (NRV) are those whose occupants **did** not participate in recreation related activities at the area that day. The interview will terminate at this point. The recreation use by the visitors in the RVs are then questioned to determine if use can be assigned to the project or area level. Characterization of their visit in terms of length of stay and activities of participation are obtained.

Key to the survey are the vehicle classification and the level of use (project or area) classification. These concepts will direct the information collected during the survey.

Vehicle classification

All vehicles which cross the traffic meter during the survey are assigned to one of three categories (Figure 24).

Passed vehicles. There are only two reasons to pass a vehicle: (1) the person contacted refuses to answer the questions, or (2) enough traffic backs up so that a lengthy delay for visitors occurs. If a party says they do not want to answer the survey, ask, "Are you sure? It will take only three or four minutes." If they still refuse, pass them, record the refusal and go to the next vehicle.

If more than five vehicles are waiting, complete the interview being conducted, pass the next four vehicles, and survey the fifth. Continue the process until less than five vehicles are waiting. Always select and survey the fifth vehicle, even if it is obvious that it is a nonrecreational vehicle. If the occupants of the fifth vehicle refuse to answer the survey, treat them as any other refusal. If traffic is heavy, efforts should be made to provide additional surveyors and/or traffic control assistance. A long waiting line can be a traffic hazard. In addition, a long wait will annoy the respondent and will result in reduced cooperation. Traffic that is passed means lost survey information. In high-use areas, it is recommended that a second interviewer be on duty to minimize the loss of information.

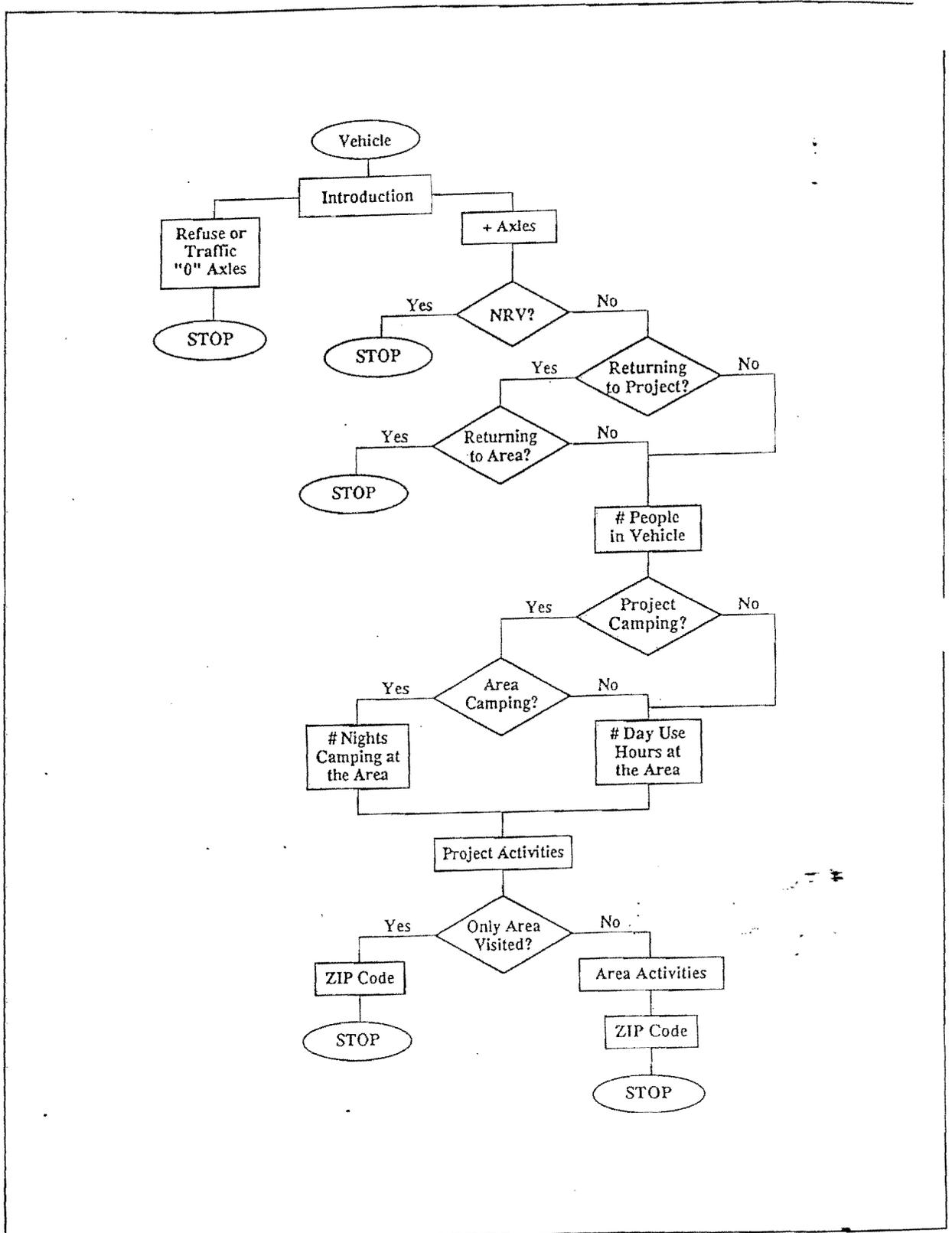


Figure 23. Interview flow chart

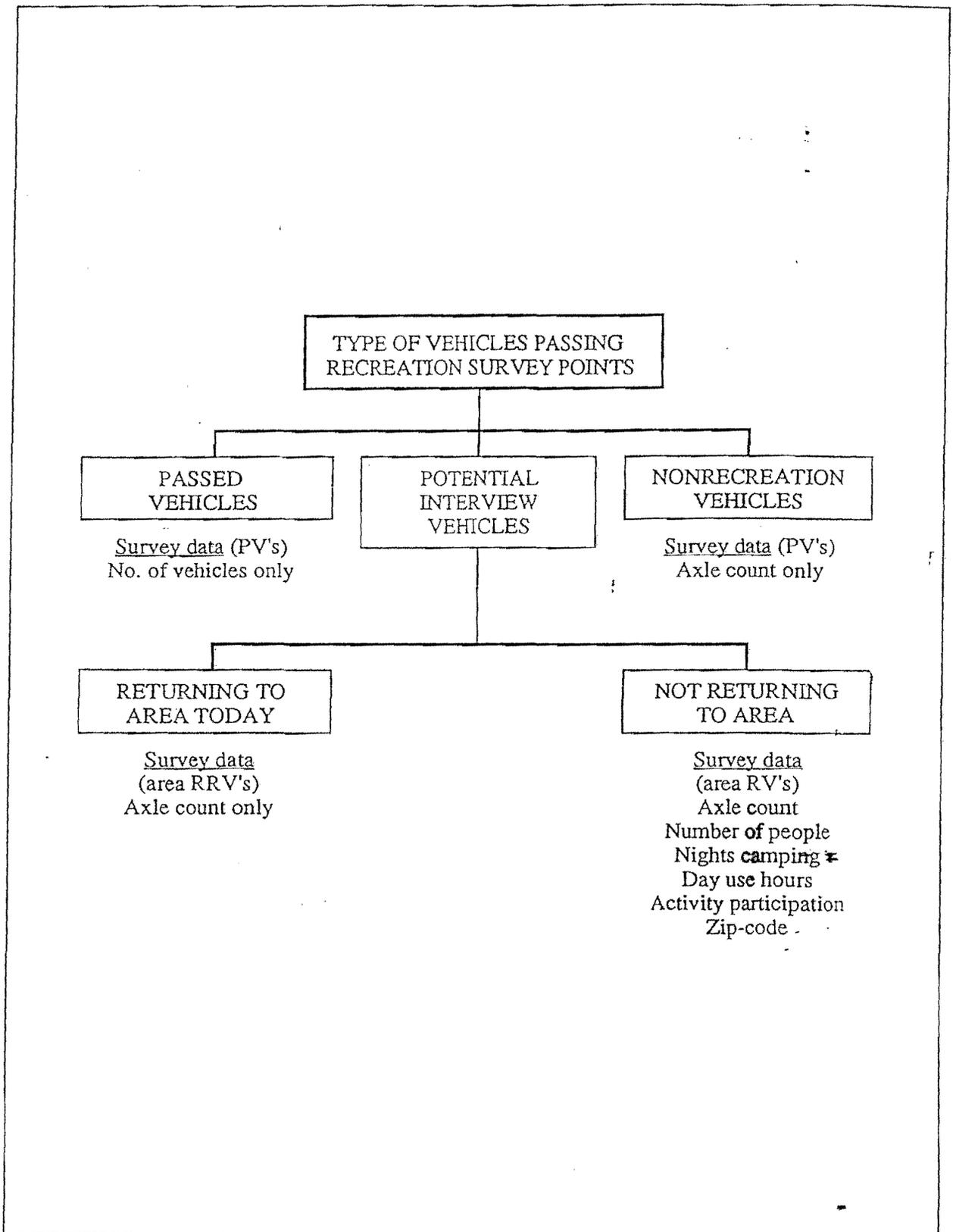


Figure 24. Vehicle classification and data gathered

If two people are interviewing at one site and traffic backs up, it should be handled as described earlier: four vehicles are passed and the fifth is interviewed until less than five cars are waiting. To prevent confusion, only the first interviewer should record the passed vehicles and interview the occupants of the fifth vehicle. The second interviewer can assist by directing traffic. Once the traffic backup is eliminated, the second interviewer can continue interviewing as before.

Non-recreation vehicles. Vehicles passing the survey site location that are in the recreation area for a purpose other than recreation are classified as non-recreation vehicles. This classification includes:

- Employees of the Corps, as well as, contract employees working in the area (and are not off duty recreating).
- Patrol cars, delivery vehicles, etc., that are required to be in the area as a performance of their duties and are not recreating in the area.
- Subdivision residents and associated vehicles (e.g., school buses) that must pass the meter location.
- Recreation parties that are driving through. If meters are on through roads, such as the dam, a vehicle using this roadway solely as a means to get to another recreation area or to travel home, are non-recreation vehicles in the area they are driving through. This does not include driving for the purpose of sightseeing.

These vehicles are interviewed and recorded as not having recreated in the area being surveyed. A brief description of the vehicle and its purpose is required.

Return recreation vehicles. These are the visitors in the area for the purpose of recreation but are leaving the area only to be returning later that day. For example a camper being interviewed at the campground exit and is going to go fishing somewhere else on the lake. Their trip is not over and they will be returning to the area that same day. Their probability of being sampled increases with the number of times they leave an area. For this reason this group of individuals (returning) is not interviewed until they are leaving the area for the last time that day.

Recreation vehicles. These are the visitors that are asked all questions. They are participating in recreation at the area being surveyed, they are leaving the area for the last time that day. It is from this group that area and project load factors are developed.

Level of use classification

Recreation area definition

To avoid the double counting of visitors, all references to "area" on the questionnaire will be interpreted as the entire recreation reporting area. To determine what constitutes each recreation area, check the Natural Resource Management System (NRMS) to determine what constitutes an area on your project. Aggregations of multiple parks or segmentation of facilities within parks may be designated as reporting areas. It must be clear to the interviewer what constitutes a reporting area, so that it can be explained to the visitor during the survey.

In Figure 10 recreation areas B through F may be large developed recreation facilities with a variety of entrances and exits. For reporting purposes each are separate areas. Recreation area A is not a single park, but a series of three separate facilities that are separated by some distance (above and below the dam and away). For survey purposes these three parks are one single reporting area and must be identified for all questions that refer to use of the recreation area in the standardized questionnaire.

Project level use

Project level use will be determined by the responses to one primary question, returning to project. If the visitors are returning to the project but not to the area, their recreation use of the area is completed but not their project visit. Only those visitors leaving the project for the last time are counted toward project recreation use. It is project level reporting that this system is designed to obtain.

Data Processing, Analysis and Reporting

ENG Form 4835

For data collected with ENG Form 4835, the survey forms must be hand edited by the interviewer and project office. The information will then be key-punched. VERS is utilized to check for logic and range errors. The data files must be corrected and found to be free of errors (see Report 2). Once error free the files may be analyzed to produce load factors. After all meters and reporting areas have been accounted for, monthly and year-to-date estimates of use based on monthly meter readings and the load factors can be produced.

DDES

For data collected with the DDES, the information is already entered into a computer so there is no need to keypunch. Logic and range checking errors are a part of the system, so data editing is not required. The files may be transported to VERS for analysis and production of load factors and summary reports. After

all meters and reporting area have been accounted for, monthly and year-to-date estimates of use based on meter readings and load factors can be produced.

Evaluating Survey Updates

From time to time areas need to be resurveyed to reflect current conditions. It is recommended that a site be evaluated every five years to determine if the survey information once collected still adequately reflects the use occurring in the area, but no rule for how frequently to resurvey is provided. The following guidelines help to determine if an update is necessary:

- a. If major construction has occurred in an area that affects the type of recreation use or changes use patterns in some way. For instance, if a beach is developed or a boat ramp constructed.
- b. If camping, pavilion use, or facility fees are initiated at an area.
- c. If traffic meter locations are changed so traffic crossing the meter is different.
- d. If there is some change in the NRMS designation of an area. For example, if a boat ramp and adjacent day-use area covered by one traffic meter are converted from one NRMS area to two, the meter would need to be resurveyed to generate area load factors for each area.
- e. If major new recreation development is constructed nearby (e.g., a theme park adjacent to a recreation area), that affects use patterns throughout the entire project or specific recreation area.
- f. Finally, areas will need to be resurveyed periodically to reflect general changes in use patterns (e.g., smaller party size, longer length of stay). Even technology advances, like the development of jet skis and wind surfers, will alter the use patterns observed.

To monitor potential changes in use patterns, it is recommended that one or two areas (e.g., one day use area and one campground) be surveyed every two to three years to check for possible changes. If major changes in use pattern exist, a more comprehensive survey program should be considered.

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Appendix A

Special Instructions

There are typically three types of special instructions, one relating to the survey site location, the second to the interview and the third to the preparation of data instructions. Included in this appendix are sample special instructions that have been used in the field.

Example 1: One Meter, One Survey Site, One Interviewer, One NRMS Area

Other overnight use

At some projects, a traffic-stop survey can estimate use in association with concessions. Short-term stays (e.g., houseboat use or island camping) up to 14 days can be estimated. This type use can be treated similarly to project and area camping. An example of the special instructions required follows:

Portman Shoals. Record overnight use associated with a houseboat as follows:

ENG Form 4835:

- Code "1" in Column 20 for project camping if the camper spent 1 or more nights on a houseboat.
- Code "1" in Column 21 for area camping if the houseboat is moored at this marina or if the visitors rented the houseboat from the marina operator or launched from this recreation area.
- Record the number of nights spent on the lake in Columns 22 and 23 only the houseboat was used from this area. If not, record day use hours and continue.
- Code "1" in Column 76 for "other overnight use."

- Place a comment in the remarks column concerning houseboat use and its rental (e.g., Rented Houseboat or Own Houseboat).

DDES:

- A category of "other overnight" has been added to the survey. Record overnight use associated with a houseboat as:
 - Did you stay overnight anywhere at Project Name? Yes/No
 - Did you camp at Project Name? Yes/No
 - Where did you stay? Houseboat
 - Does this qualify for overnight use?
 - At the project - Yes
 - At the area - Yes (if launched from the area)

In the preceding example, this use becomes a portion of the area visitation. If "houseboat use" was a separate reporting area in the NRMS, then it would be necessary to amend the instructions. In that case surveys would be similar to having two NRMS areas behind one meter (see Example 5).

Example 2: One Meter, One Survey Site, Two Interviewers, One NRMS Area

The most common of the special instructions is the requirement of two individuals at one survey site in one NRMS area. There is a procedure for passing traffic when there is a back-up (see Appendix C); but in many cases this is not suitable for areas with high volumes of traffic. The main concern is to document the requirement of two surveyors in the survey plan and contract specifications where needed. The elements to be included in the instructions include the following:

- Survey site requiring more interviewers.
- Number of surveyors and/or traffic management staff required.
- The seasons which require the extra interviewers.
- The time periods when multiple interviewers are required.

A typical special instruction will read:

Twelve Mile. To accommodate high volumes of traffic, two interviewers are required during summer survey periods 3, 4, and 5 on weekend days (Saturday and Sunday). Refer to summer survey schedule for this area to see when weekend surveys are scheduled. It is not necessary to have two interviewers during other survey time periods or seasons.

Example 3: One Meter, Two Survey Sites, Two Interviewers, One NRMS Area

In a few cases, it may be necessary to have two survey sites (rather than one), and two interviewers in one NRMS area to help in traffic flow. Special instructions to the interviewers should include the following elements:

- Do not survey any vehicle not crossing the meter (internal traffic).
- Make no vehicle entry for internal vehicle traffic on the survey form.

Figure A1 and the instructions below describe this type of situation.

Shenango Recreation Area. To accommodate high volumes of traffic, two individuals will conduct surveys at both Survey Sites 1 and 2 during summer survey periods 3, 4, and 5 on weekends (Saturday and Sunday). For these time periods, a total of four interviewers will be required.

In addition, while surveys are being conducted in the area, a tally must be maintained on the number of bicycles exiting the recreation area and crossing the meter. It may not be feasible for the interviewer to maintain this tally while surveying; therefore, another person should be assigned the task.

At Survey Site 1, interview only those vehicles that will be exiting the recreation area and crossing the meter. For those vehicles that will not be crossing the meter but are going to the campground, no entry is to be made.

Example 4: Two Meters, One Survey Site, One Interviewer, One NRMS Area

Since loop roads are common at CE lakes (Figure A2), two meters must sometimes be used at one survey site for a single NRMS area. If there are two entrance/exit roads, both are normally metered. A single meter on this type of roadway would not provide accurate counts (unless the roadway was a one way loop). It is not necessary to survey both meter locations when the access roads are close together. It is possible to block one roadway during survey periods (just while surveys are conducted) and thus force all traffic out one exit. In this way, the number of survey sites is reduced. Load-factors generated from the

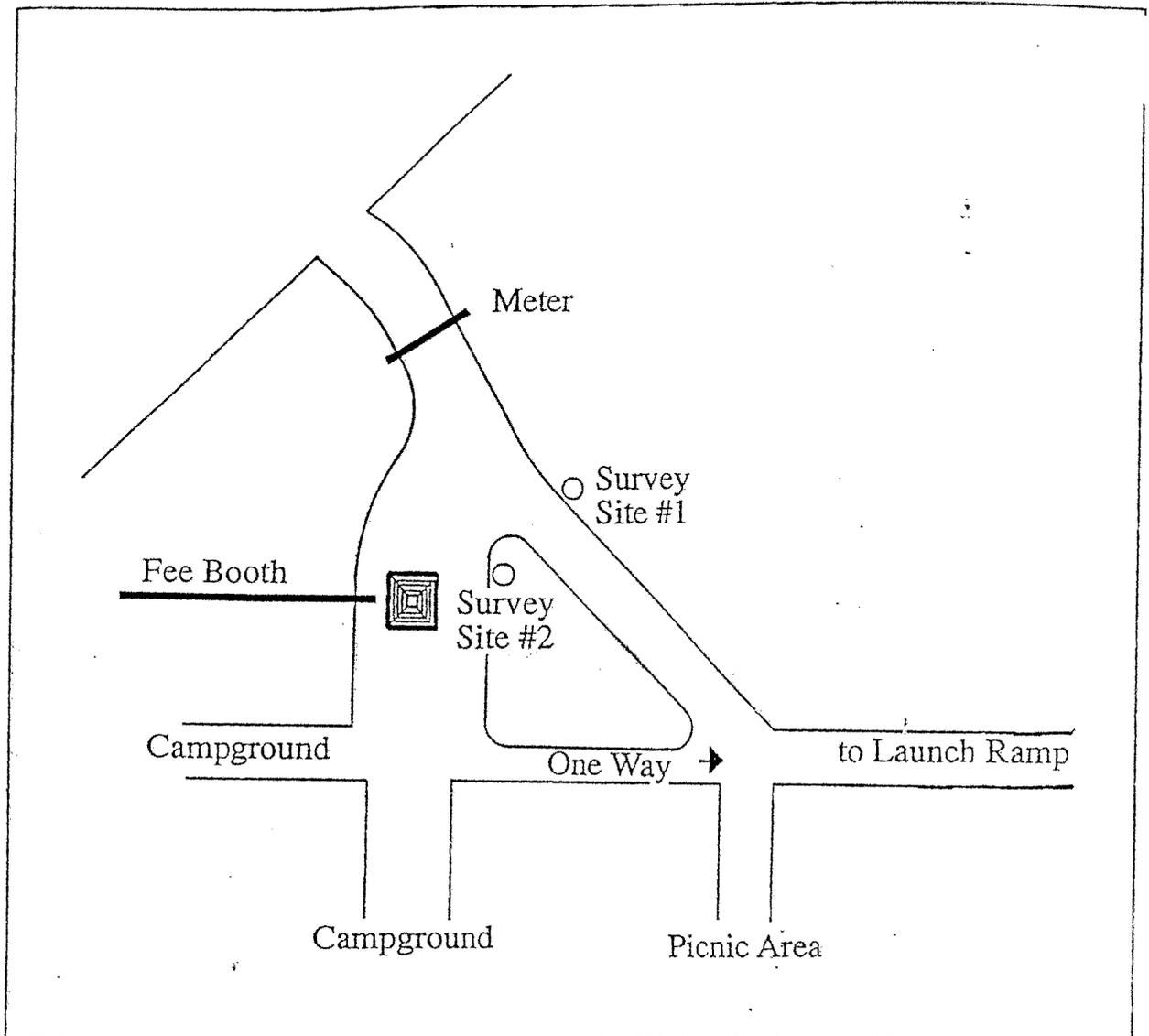


Figure A1. A single recreation area requiring two survey sites behind one meter

survey would be applied to each of the meter readings in the area. During the survey week, both meters must be read.

- The three meter readings required (beginning Monday, Friday, ending Monday) would be taken for both meters.
- The percentage of traffic on the weekday (required in Blocks 17 and 18 of the ENG Form 4835 and in the DDES file merge) would be based on combined meter readings.
- The second roadway would be blocked while surveys were being conducted at the area.

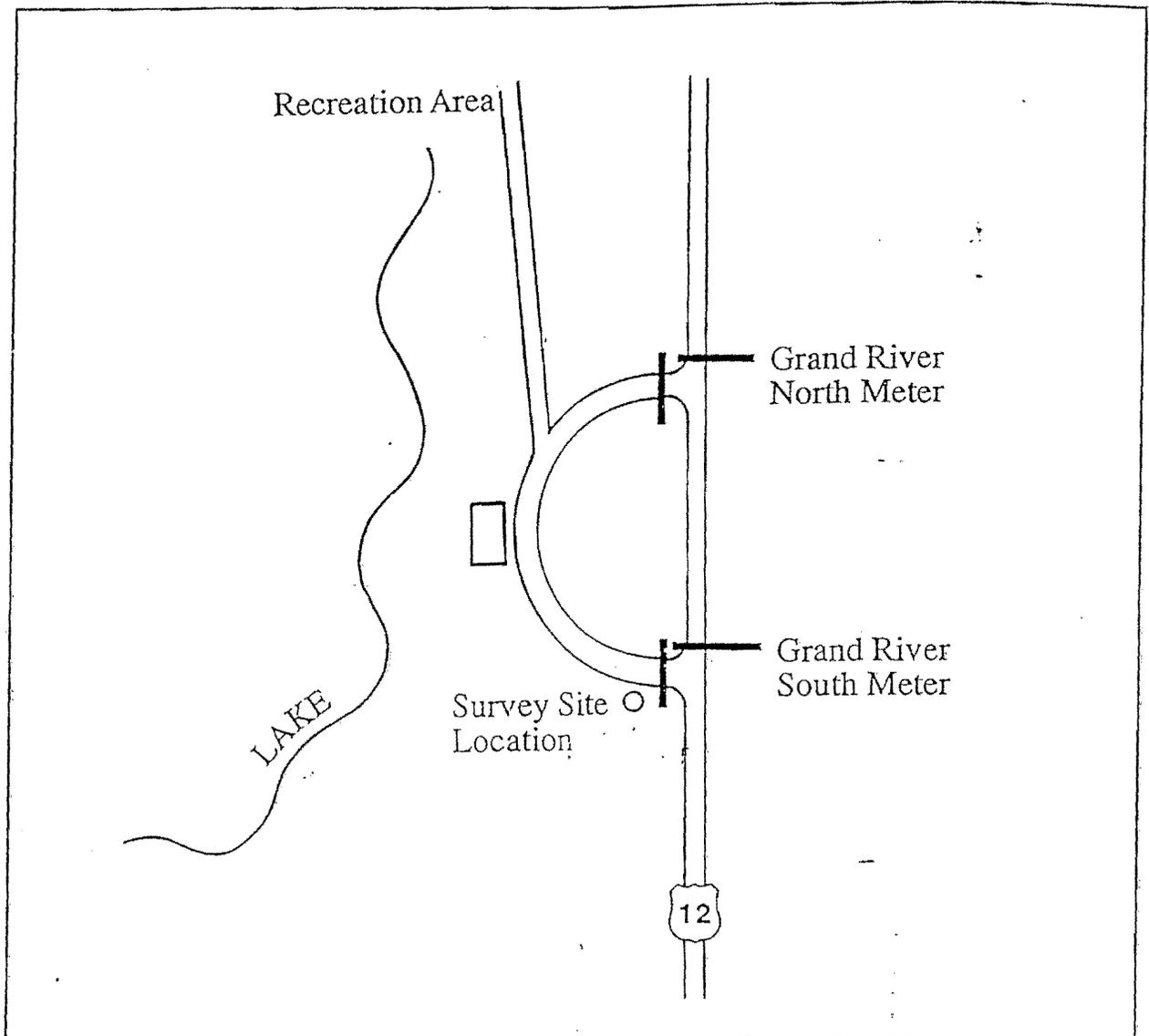


Figure A2. A recreation area having two meters, requiring only one survey site

Figure 16, Diagram F, depicts this situation. Figure A2 and the instructions below can be used as a guide for this survey site/meter configuration.

Grand River. Surveys are to be conducted at the Grand River south meter. The Grand River north entrance road will be blocked while surveys are being conducted. It will be necessary to take meter readings for both locations (using the procedures described in the interviewer's instructions). The chart below will assist in calculating the percentage of weekday traffic required.

	Meter Readings		
	Beginning Monday	Friday	Ending Monday
Grand River North	#	#	#
Grand River South	#	#	#
Grand River Total	X	Y	Z

Use the Grand River Total for determining the weekday traffic distribution.

$$100 * \frac{y-x}{z-x} = \text{Percentage of traffic on weekday}$$

This formula follows the calculations in the interviewer instructions in Appendix C.

Example 5: One Meter, Two Survey Sites, Two Interviewers, Two NRMS Areas

Special instructions may be required in the event that one meter is used with two survey sites for two NRMS areas. Special instructions prepared for the Mill Creek Recreation Area describe a situation where two NRMS areas are behind a single meter. It also gives instructions for maintaining two survey sites at the recreation area. If only one survey site is required at the recreation area, then that segment of the procedures (describing two survey sites) can be omitted.

A clear diagram designating the boundaries of the two recreation areas should be included in the survey plan for the interviewer. Distinguishing characteristics of each NRMS area should be included in the special instructions for the surveyor (e.g., the area behind the fee booth). If this is done, the interviewer can present a clear description of each area to the visitor in order to determine which NRMS area was used.

The ENG Form 4835 survey forms should be organized as described in the Data Editing Instructions below. This format should be completed prior to submitting the survey forms to the District for keypunching.

- Mill Creek Recreation Area special instructions.

As illustrated on the area map, Figure A3, two survey sites have been established at the Mill Creek Recreation Area to aid in traffic flow. For each survey period scheduled, at least one surveyor will be required at each survey site. To accommodate high volumes of traffic on the weekend, two surveyors will be required at each of the survey sites during time periods 3, 4, and 5 (a total of four interviewers).

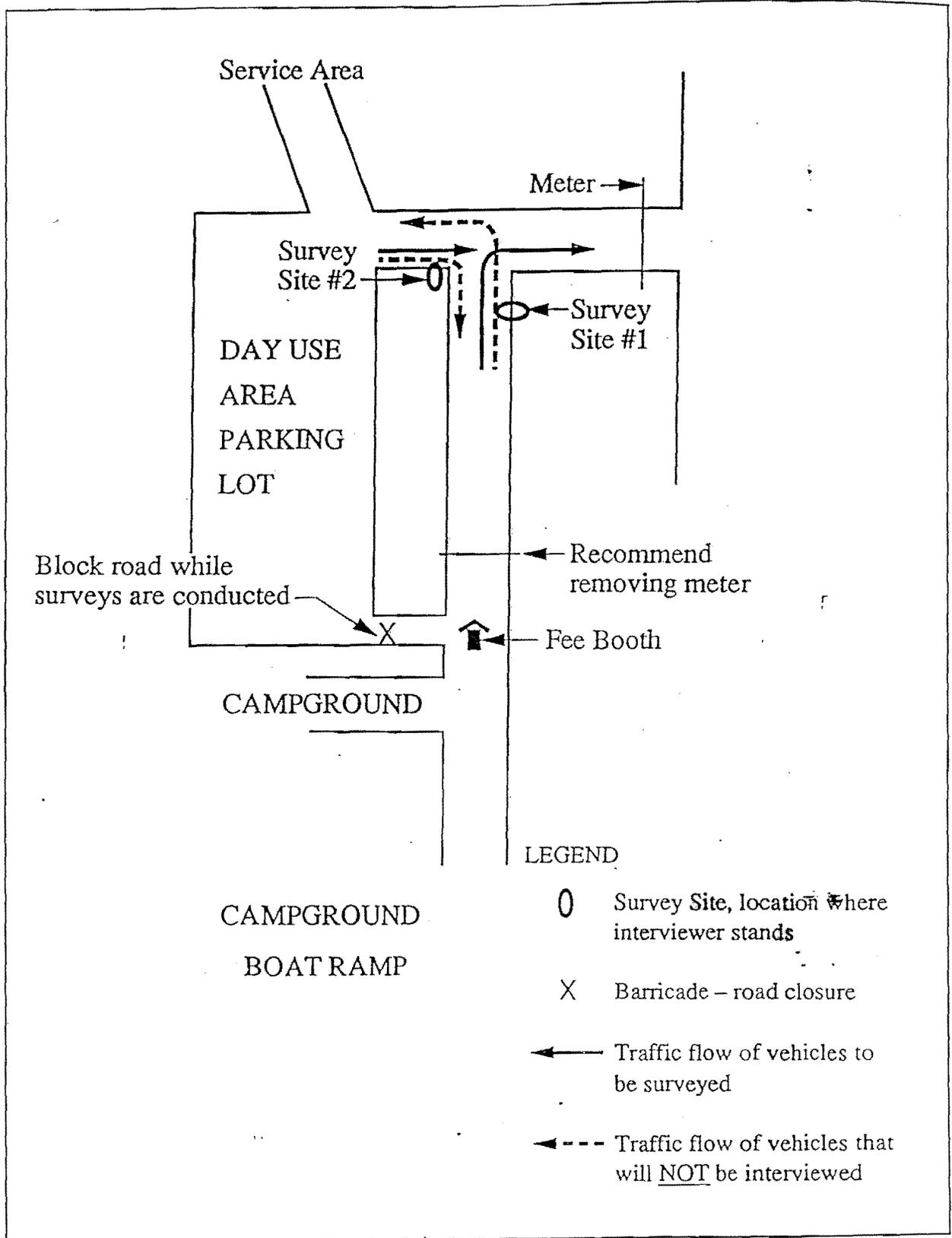


Figure A3. One meter, two survey sites, two areas

When surveys are being conducted, a barricade should be placed at the day use parking lot entrance which is closest to the fee booth, as indicated on the area map. This will force all vehicles using the parking lot to exit past Survey Site 2. Traffic exiting past Survey Site 1 will then be limited to those vehicles leaving the area behind the fee booth.

At both survey sites, interview only those vehicles that will be exiting the recreation area and crossing the meter. This traffic flow pattern is illustrated on the area map by the heavy solid arrows. No survey will be conducted if the vehicle exits one area but enters the other. For example, if a vehicle passes Survey Site 1 but is turning left to enter the day use parking area, no survey is conducted and no entry is made on the survey form. The vehicle is not leaving Mill Creek and will not cross the meter. The same holds true for vehicles exiting past Survey Site 2 but turning right to enter the area behind the fee booth. These traffic flow patterns are illustrated on the area map by the heavy dotted arrows. To determine this type of use, the interviewer will ask "Are you leaving the area now?"

If yes, continue the interview with the introduction and axle count. Determine if the visitors will be returning to the project and area later that day. The question listed above is not a substitute for the questions associated with returning to the project area. It is to be used to determine if the vehicle is exiting the area and crossing the meter.

If no, let the vehicle proceed. This is the only case where no entry is made. No vehicle identification number or axle count is assigned to this vehicle, because it is not leaving and is not crossing the meter.

For ENG Form 4835

To sort out use occurring behind the fee booth from use at the day use area, the interviewer will code each entry as follows: code "C" for campground or "D" for day use in the margin before Column 11. All vehicles, with the exception of passed and nonrecreation vehicles, must be coded with either a "C" or "D" as appropriate. To separate use at the two areas the interviewer will ask "Did you use the area behind the fee booth?"

For DDES entry

For the use of DDES in this example, it must be specified in the setup that there is more than one area behind the meter or toll booth. These would be listed as separate NRMS members and names. The interviewer then follows the instructional flow on the screen in recording the visitation activities (e.g., camping, day-use boaters, day-use campers, sightseeing, or other categories included in the setup).

Mill Creek Recreation Area Data Editing Instructions

ENG Form 4835

After the data editing, but prior to keypunching, it will be necessary to separate data collected at Mill Creek Survey Sites 1 and 2 into data sets for the Mill Creek Campground and Mill Creek Day Use Area. In order to generate a separate set of load-factors for each area, the following steps must be taken:

- a. Make a duplicate of all survey forms.
- b. For analysis, treat Survey Sites 1 and 2 as one site. Therefore place the survey forms in the following order:

SET ONE: Header	
Weekday interviews	Survey Site 1
Weekday interviews	Survey Site 2
Header	
Weekend interviews	Survey Site 1
Weekend interviews	Survey Site 2

SET TWO: Header	
Weekday interviews	Survey Site 1
Weekday interviews	Survey Site 2
Header	
Weekend interviews	Survey Site 1
Weekend interviews	Survey Site 2

- c. Use SET ONE to generate load-factors for the Mill Creek Campground Area. The header on the first weekday data sheet and the first weekend data sheet should have "Mill Creek Campground" recorded in Blocks 46 through 70 and the appropriate area NRMS number in Blocks 6 through 8.

Those entries coded with the letter "D" for day use will be counted as nonrecreation vehicles (NRVs) in generating load-factors for the campground. The vehicle identification number, Columns 11 through 13, and the axle count, Column 14, will remain unchanged. Change the code in Column 15 from a recreation vehicle "0" to a nonrecreation vehicle "1." Cross out Columns 16 through 80 of that line with a heavy marker.

This data set will be made up of only nonrecreation vehicles, passed vehicles, and "C" coded entries of recreation and return-recreation vehicles.

- d. Use the second data set (SET TWO) to generate load-factors for the Mill Creek Day Use Area. Edit it as in Step 3 except for the following:
 - (a) Make sure the area name is "Mill Creek Day Use" and the appropriate

area NRMS number is on the first weekday and weekend data sheets and (b) convert all campground "C" entries to nonrecreation vehicles as described previously.

- e. Process data as described in Report 2 for ENG Form 4835 data.

DDES

No additional measures are required for the editing of data gathered by the DDES procedure. The program is designed so that the interviewer follows instructions on the screen without the need for discussion about the flow of the interview. Error checks, including errors of entry, logic and range, are included in the program. The "C" or "D" designations are made during the interview process and recorded within the system. The analysis procedure will provide separate load-factors for each of the reporting areas. Appendix D provides detailed instructions for the use of DDES.

Example 6: Sightseeing on the Dam

In order to determine the percentage of traffic sightseeing across a dam, a survey must be conducted. In this way a meter on the dam can be calibrated. The interview must remain brief to accommodate the traffic volumes. Considerations include:

- Safety of interviewers.
- Significance of the use.

It is not necessary to survey all meters simultaneously. It is necessary to do so only if a visitor can see the survey and avoid the survey site by leaving in another direction. Figure A4 depicts a typical meter configuration.

If only one meter crosses the dam, it is still necessary to survey both directions of traffic exiting the recreation area. Conduct the survey as any other survey on a through road.

Scenic 333. Three meters (Airport Road, Dam North and Dam South) will be used to estimate the percentage of sightseeing traffic on Scenic Loop 333. Only those vehicles that are area sightseeing will be interviewed. Vehicles using the road as a short cut or through road to a recreation area or home will be considered nonrecreation vehicles. In order to determine the purpose of the trip, the interviewer might ask "What was your reason for driving through this way?"

If the visitor responds, "I'm on my way to work," "We're on our way to Hurricane Branch Recreation Area," "It's shorter to Coffeenville this way," "We just came from Cedar Point; we're on our way home," or something similar, code the

Appendix B Survey Schedules

SURVEY
SCHEDULE

PROJECT NAME : _____

PROJECT NRMS # : _____

WEEK OF : _____

FILE: _____

AREA NRMS # : _____

SURVEY SITE NAME: _____

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1							
2							
3							
4							
5							

SURVEY PROJECT NAME : _____ FILE: _____ AREA NRMS #: _____ SURVEY SITE NAME: _____
SCHEDULE PROJECT NRMS #: _____
 WEEK OF : _____

Time	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday
1							
2							
3							
4							
5							
6							

Appendix C

ENG Form 4835

Interview Guidelines

A survey questionnaire, dated March 1986 (refer to Figure 21), will be used in conjunction with the ENG Form 4835, dated August 1983 (refer to Figure 22), to record data collected during the use-estimation surveys. Proper implementation of the survey instrument, (questionnaire and survey form) and clear and accurate reporting are essential to the use-estimation procedure. To obtain reliable data, the survey form must be filled out completely and carefully according to the questionnaire and the instructions described below. Information in this section covers the standard survey procedure. Instructions for DDES entry can be found in Appendix D. For the ENG Form 4835, a separate line of data or record is entered for each and every vehicle exiting past the survey location, with one exception: any vehicle passing the survey location exclusively as a result of the survey crew will be ignored. Survey crew vehicles should avoid crossing the meter if possible. For example, if the survey team leader or project personnel make a special trip to the site to check on the status of the survey, no entry should be made when they exit. If, however, project personnel check on the status of the survey as part of a routine patrol through the area, then the appropriate entry for a nonrecreation vehicle (described below) will be made when they exit.

If bicycles, motorcycles, or three wheelers activate the meter, their riders must also be interviewed. All exiting traffic must stop until surveyed or passed by the surveyor.

An interview generally takes from 3 to 5 minutes if all questions are asked. This complete interview will occur only when the party is not returning to the area again that day. Survey information pertains only to the vehicle's occupants. No information is collected for members of the party who are not in the vehicle during the interview. No surveys are conducted for parties in non-recreational vehicles.

ENG Form 4835

Care must be taken that all information is legibly written so that it can be transferred by keypunch staff. Failure to follow the format given will increase the chances of collecting inaccurate or incomplete data. Illegible reporting will result in keypunch errors and added man-hours in data editing. To minimize these problems, all survey forms will be thoroughly checked for completeness and legibility before submittal.

Two types of information are recorded on the survey form: Header information identifying where and when the survey was conducted and data collected from the vehicle's occupants.

Header Information

Header information (Blocks 1 through 70, interviewer's name, sheet number, and the survey log) is recorded across the top of the survey form. Most of this information may be coded prior to surveying.

Header information should be completed as follows:

Project name and NRMS number

Enter the project name in Blocks 26 through 45. Enter the NRMS project code in Blocks 1 through 5. The project name and project NRMS number will be the same for all survey forms for a single CE project.

Survey site name and NRMS number

Write in the name of the survey site location in Blocks 46 through 70 (from the Survey Plan). If more than one meter is located in a single recreation area (Figure C1), make sure that the name of the individual survey site, the name associated with that meter, is listed rather than the name of the recreation area (e.g., Big Oaks Marina instead of Big Oaks). Enter the NRMS area code in Blocks 6 through 8 of the survey form. Since the NRMS code will be the same for all survey sites within a recreation area, it would be difficult, if not impossible, to separate completed survey forms without the survey site names.

Weekday/weekend

Block 9 identifies the surveys on the form as being conducted on a weekday (Monday through Friday) or a weekend day (Saturday or Sunday). Enter as follows (Block 9):

Recreation Area: Big Oaks

- Subareas: a. Big Oaks Marina West
b. Big Oaks Marina East
c. Big Oaks Day Use

NRMS3: 003

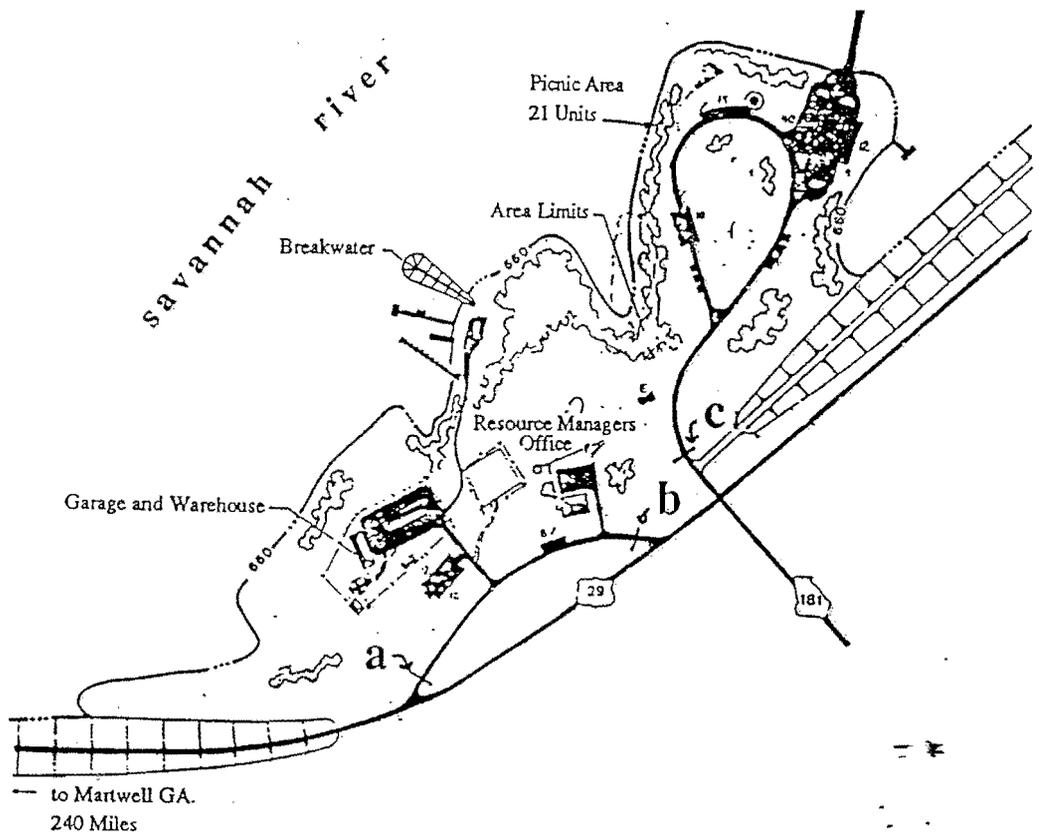


Figure C1. Illustration of a recreation area consisting of three separate subarea, resulting in three separate survey site locations .

1 = weekday survey

2 = weekend survey

Special note: Do not combine survey data from weekday and weekend time periods on a single survey form.

Survey season

The months in which the surveys are being conducted are part of a particular survey season. The survey plan will identify the months included in a given season. In Block 10, record the number corresponding to the appropriate season.

1 = Spring

2 = Summer

3 = Fall

4 = Winter

5 = Holiday (This code is used only when a recreation area is scheduled to be surveyed during a holiday weekend in order to develop holiday load-factors. For example, if a survey is scheduled for July 2 through 4, the survey season code would be 5 rather than 2.)

Survey data

Enter the Monday date of the survey week from the survey schedule in Blocks 11 through 16. The same Monday date will be entered on all survey forms conducted that week, whether they are from weekday or weekend surveys. Note that the survey form enters the data in military format: day, month, year. The actual day surveys conducted are recorded under remarks section in association with the first record recorded.

Percent of total traffic

The value to be placed in Blocks 17 and 18 is computed after taking the final Monday traffic meter reading. Calculate as follows:

$$\frac{FMR - BMMR}{EMMR - BMMR} * 100$$

where

FMR = Friday Meter Reading.

BMMR = Beginning Monday Meter Reading.

EMMR = Ending Monday Meter Reading (Monday reading after the survey weekend).

The percent of total traffic on weekdays should be entered on both the weekday and weekend survey forms. Note: If one recreation area had two entrances and only one survey is being conducted (one entrance is blocked while surveys are in progress), add the three meter readings from one meter to the respective readings from the second meter before using the above equation (see Appendix A, Example 4).

Meter type

Because different traffic meters measure traffic volume differently, it is necessary to note the type of meter being calibrated. Pneumatic hose meters count axles; a car and trailer would be recorded as three (or 1.5 if the meter is set at one count for every two axles). Magnetic loops count continuous vehicles; therefore, a car and trailer would be recorded as one.

Record the type of meter in **Block 19**.

1 = Pneumatic Hose

2 = Magnetic Loop

The meter calibration will be placed above the remark column in the survey log.

Direction of traffic

In **Block 20** record whether the traffic crossing the meter is one-way (1) or two-way (2). For example, if the meter crosses two lanes of traffic on a one way road, record 1 for one way.

Interviewer(s)

Write in the name of the interviewer(s) whose work appears on that form. Any problems can then be cleared with the appropriate interviewer.

Sheet number

Weekday survey forms should be numbered consecutively, starting with one. After the Friday survey period, the total number of sheets can be entered. Numbering should begin again on Saturday with 1. After the final survey period on Sunday, the total number of weekend sheets can be entered.

Survey log

Unlike DDES where a separate survey log is maintained, ENG Form 4835 has a specific section for survey log information. This is located directly under the "Remarks" column title. In the survey log, on the first weekday survey form and the first weekend survey form for each survey location, make a note of:

- a. Meter type (pneumatic hose or magnetic loop).
- b. Traffic flow crossing meter, i.e., one- or two-way traffic.
- c. Meter calibration (Document whether the meter records one count for every continuous vehicle, every axle, or every two axles).
- d. All three meter readings.
- e. Anything which might influence the survey, such as unusual weather conditions, accidents, road repairs, and similar events.
- f. Any changes in survey times or places (These must be explained in detail. If a late start is made, record the exact starting time; then survey until the scheduled end of the sampling period and stop. Do not sample longer to make up the time. If there is any doubt, enter comments in the log and consult the project survey coordinator. The information is important to interpretation of the results).

Items 1 and 2 reiterate information coded in Header Blocks 19 and 20. They are recorded in the survey log for verification purposes.

Survey Data

Vehicle identification

Columns 11 through 13 are used to identify individual survey entries. For each survey location, begin on Monday with "001" and number consecutively through the Friday survey period. Using a new worksheet begin again on Saturday with "001," numbering consecutively through the last Sunday survey period. Numbers may be written in at the beginning of the survey period to save time, but any extra numbers must be removed at the end of the survey period. If

two people are conducting surveys at a meter location at the same time, the first surveyor should number entries as described above. The second surveyor should not record any identification numbers until the end of the survey period. Numbers can then be assigned, starting with the number following the first surveyor's last entry.

Number of axles

Record the total number of axles (including trailers) in Column 14 for each party exiting across the meter, except if a vehicle is passed. If a vehicle has an unusually high number of axles (greater than four), place an appropriate comment in the remarks section (e.g., motor home with trailer). Record "2" axles for bicycles and motorcycles if they activate the meter. Interview each as you would any other vehicle. For a passed vehicle, enter a zero in Column 14 and the reason for passing in the remarks section. Enter "Refused" if the occupants of the vehicle refused to answer the questions or "Traffic" if vehicles were passed because of traffic backup. If a vehicle is passed, no other information is required. For passed vehicles, the survey ends with Column 14. Proceed to the next vehicle.

Recreation (RV) or nonrecreation (NRV)

Determine whether the vehicle's occupants were recreating or were using the area for something other than recreation (e.g., patrolling, cleaning trash cans, or working at the marina). Code either "0" or "1" in Column 15 as indicated on the questionnaire. If the vehicle's occupants are not recreating (nonrecreational vehicles), make a note in the remarks section (e.g., CE vehicle, resident, or concessionaire). At this point, end the survey; no other information is required for nonrecreation vehicles. If the vehicle's occupants were recreating, continue with the interview. The only vehicle not placed on the questionnaire is one that passes the survey location exclusively as a result of the survey crew.

On through roads, be clear about the recreation area. Parties that recreate in one recreation area and are only driving through the second area because it is on a through road are nonrecreation vehicles (NRVs) in the second area. Be careful not to miss unusual users. For example, a police officer who stops at a recreation area for lunch is classified as a recreation vehicle (RV) and should be surveyed. A party that uses area facilities should be surveyed even though they are not strictly recreating (e.g., a local resident uses the campground showers).

Recreation area definition

To avoid the double counting of visitors, all references to "area" on the questionnaire will be interpreted as the entire recreation area. To determine what constitutes each recreation area, check the survey plan. For the purpose of this survey, each separate entry on the report will be treated as a separate recreation

area. Three examples of recreation areas are pictured in Figure C2. Diagram A illustrates a recreation area with a single entrance/ exit. In this case, area questions would refer to that area measured by the meter. In Diagram B, the recreation area has two entrances/exits which are connected. "Area" refers to those facilities located between the two meters. In some cases, as in Diagram C, one recreation area will be composed of separate subareas. Each meter will be surveyed, and all area questions will refer to all subareas. In this case, whether a visitor was interviewed when leaving subarea x, y, or z, area questions would refer to the visitor's activities in subareas x, y, and z. Area questions include the following: returning to the area (Column 17), camping at the area (Column 21), number of nights area camping (Columns 22 and 23), day-use hours at the area (Columns 24 and 25), and area activities (Columns 56 through 75).

It is very important that the visitor understand the distinctions being made. In the example illustrated in Diagram C, if the subarea entrances are located close together, the interviewer can point the subareas out to the visitor. If the subarea entrances are farther apart, it may be necessary to point them out on a map. These distinctions are important to the accuracy of the survey results; it is up to the individual surveyors to see that they are made.

Returning to the project

Columns 16 and 17 on the survey form are used to determine at what stage of the day's activities the visitors have come. Code either "0" or "1" in these columns, referring to the questionnaire for proper phrasing of the questions and coding procedures. These questions reference the day's trip. Note the use of the word "today" in the questionnaire. Only those visitors who are not returning to the area that day are asked the activity questions, since only they will be able to give a complete description of their visit to the area. As referenced in Figure C2, if a survey is being conducted at the meter marked "x," visitors will be coded as returning to the area (Column 17) whether they are returning to subarea x or going to subarea y or z. As long as they stay within the recreation area, they are returning to the area. If the vehicle's occupants state that they will be returning to the area, code as stated in the questionnaire and end the survey.

Number of persons

Code the number of vehicle occupants. Do not include other party members not in the vehicle during the interview. If fewer than 10 occupants are in the vehicle, enter the single digit in Column 19, preceded by a zero in Column 18. For example, a party of three would be coded "03" in Columns 18 and 19. If 10 or more occupants are in a vehicle, a comment (e.g., bus, van, or school group) should be placed in the remarks section to describe the group.

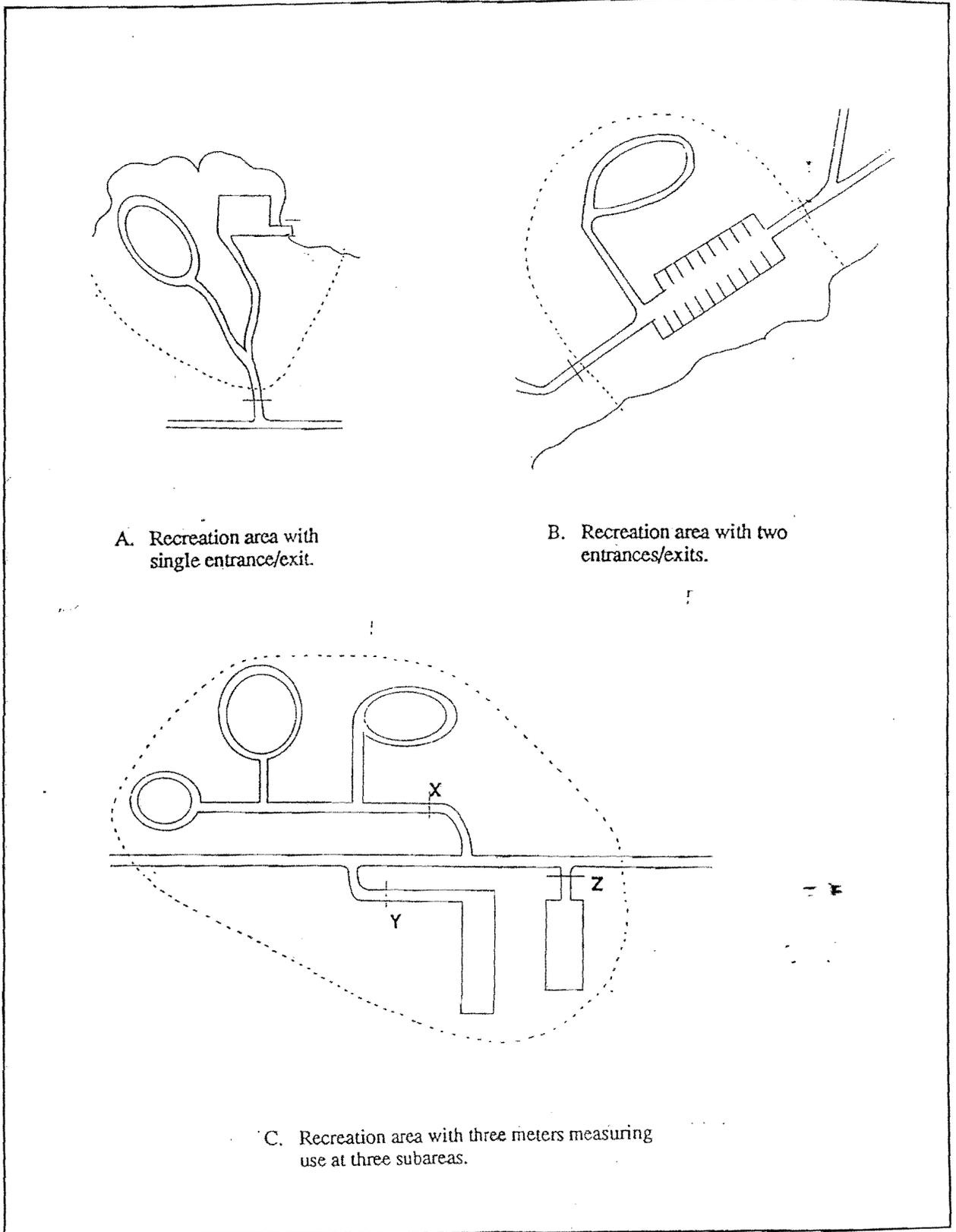


Figure C2. Examples of recreation areas

Length of stay

Overnight

The vehicle's occupants should be asked if they have been camping or plan to camp during that visit to the lake. Their responses will be coded in Columns 20 through 23. Columns 20 and 21 must be completed with either a "0" or a "1" as appropriate. Column 20 refers to camping at the project. Area camping questions (Columns 21 through 23) refer to the entire recreation area (all subareas included), as described in "Recreation Area Definition." If the surveyed party camped in the area, determine the number of nights camped. If they did not camp, leave the number of nights spent camping at the area blank.

Day use

Visitors who have not camped at the survey area will be asked for day-use hours for that area. If an area is composed of subareas, day-use hours in the area should be a sum of the day-use hours spent in each subarea, as described in "Returning to Project." Record answers in **hours**, rounding to the closest hour. If less than 1 hour, round to 1. If midway, round to the even number (e.g., 2 hours and 30 minutes would be rounded to 2 hours, while 3 hours and 30 minutes would be rounded to 4 hours). For boaters, total hours would include time spent putting in and taking out, as well as hours on the lake.

Completing project activity questions

Instructions for completing project activity questions can be found on the questionnaire. Clarifications and definitions are listed below.

- a. *Party size.* All questions on the ENG Form 4835 refer to those people in the vehicle, the number of people participating in any one activity can never exceed the number of people in the vehicle.
- b. *Single digit fields.* For ENG Form 4835, if the number of people in the vehicle is 10 or more and the activity in which they participated is a single column entry (e.g., number persons fishing from shore), code "9" and place a comment in the remarks section (e.g., 12 people were fishing from shore).
- c. *Accounting for people.* Make certain that all visitors are accounted for under activity participation. For example, if three people are in the vehicle and two were swimming while the third watched from shore, the activities would be recorded as "02" under swimming (Columns 37 and 38) and "01" under sightseeing (Columns 49 and 50). If the party is not camping at the project, the sum of the numbers of people listed as picnicking, boating, fishing from shore, swimming, off-road vehicling, hiking, hunting, ice fishing, snowmobiling, cross-country skiing, participating in

other activities, and sightseeing should be greater than or equal to the number of people in the vehicle. If the party is camping at the project (Column 20), then the people in the vehicle have been accounted for as campers.

- d. *Picnicking.* When recording the number of people picnicking, note that campers may be picnicking only if they picnic at a location other than their campsite. Only those visitors who indicated that they picnicked should be asked if they used picnic facilities.
- e. *Facility questions.* "Visited Marina" and "Used Launch Ramp" are not activities; therefore, also record what the person was doing while visiting the marina or using the ramp (e.g., sightseeing, boating, or eating at the restaurant). Code only a "0" or "1" for facility-use questions, not the number of people.
- f. *Boating.* For both, if visitors are doing any sort of boating activity (e.g., fishing from boat), they should be listed under "Number Persons Boating" as well as the boating activity cited. Assume, for example, that five people are in the vehicle. When interviewed, the spokesperson says that five people had a picnic lunch, one went fishing from the boat in the morning, three others went water-skiing in the afternoon, and one person did not go out in the boat at all. Their activities would be coded as follows: "05" picnicking, "04" boating, and "1" fishing from boat, and "03" water-skiing.
- g. *Other activities.* Columns 47 and 48 are used to record the number of people involved in activities other than the ones listed. Such activities may include bird-watching, photography, eating at the marina restaurant, and using shower facilities. Record the number of persons involved in such activities in Columns 47 and 48 and place a comment that describes the activity in the remarks section. If the visitors participated in more than one other activity, make a note of this fact in the remarks section. For instance, if three people are in the vehicle and two went bird watching while one took nature pictures, record "03" in the other column and "2 bird-watching, 1 photographer" in the remarks section. If another party of three individuals stated that they all went jogging and then stopped and ate at the concession area, record the following: "03" in the other column and "3" jogging, 3 eating at restaurant" in the remarks section. In asking about other activities, do not prompt the visitor by listing other activities in which they could have participated.
- h. *Sightseeing.* Sightseeing (Columns 49 and 50) is considered a mutually exclusive category. That is, persons should be recorded as sightseeing if and only if they have not indicated participation in any other activity at the project (including project camping). However, individuals in a group may be sightseeing, even though other group members have participated in other activities, as long as those individuals sightseeing did not

participate in any other activities. None of the other activity categories are considered mutually exclusive.

ZIP code

Code the visitor's ZIP Code in Columns 51 through 55. If the visitor cannot recall the ZIP Code, record his/her city and state of residence in the remarks section. In the case of foreign visitors (e.g., from Canada or Mexico), code "99999" in Columns 51 through 55 and place the country's name in the remarks section.¹ If a vehicle's occupants are from several ZIP Codes, record the ZIP Code of the party head or organizer. This will often be the driver. If the party is composed of local residents with out-of-town guests whose primary trip purpose is to visit the local resident and not the lake, record the ZIP Code of the local resident. For a church or school group, record the ZIP Code associated with the church or school. Record the name of the church or school and the city and state of origin in the remarks section if the ZIP Code is not known by any of the party members.

Only area visited

If the visitors being surveyed have used only one area (as defined in the section "Area Recreation Definition") so far on their visit to the lake, then project and area information will be identical. Code "1" in Column 56, collect the ZIP Code information, and end the survey. If the visitors have used several areas on the lake, it will be necessary to find out which activities the visitor participated in at the area being surveyed; so area activity questions are asked. Note that the purpose of the question is to determine whether the people being interviewed used any other area for recreation. If the vehicle's occupants traveled through area A on their way to area B but did not stop at area A (and were not sight-seeing), they would be considered a nonrecreation vehicle at area A; and area B would be the only area visited.

Completing area activity questions

Columns 57 through 75 under area activities are to be completed only when a visitor has used more than one area for recreation. Most of the project activity information described also pertains to area activities. Differences are listed below:

- a. *Area use.* For each activity participated in at the project, ask how many participated in that activity at the recreation area being surveyed. An

¹ For those projects which are located close to U.S. borders and receive a substantial amount of use from foreign visitors, it may be desirable to obtain more specific information about the visitor's residence. In these cases, the visitor's foreign ZIP Code can be recorded in the remarks section (or the name of the city and province or state). A five number code that would not ordinarily appear as a ZIP Code in that vicinity can be assigned to the foreign ZIP Code at a later date.

area is located within a project for various recreational activities and is usually designated by a unique NRMS number.

- b. *Area users project.* All activities recorded under area information must also be listed under project activities, with the exception of sightseeing (described below, e).
- c. *Area accounting for people.* All occupants of the vehicle must be accounted for under area activities. If the party is not area camping, the sum of persons listed in the following activities should be greater than or equal to the number of persons in the vehicle: picnicking, boating, fishing from shore, fishing from boat, swimming, off-road vehicling, hiking, participating in other activities, and sightseeing. If the party is camping at the area, then they have all been accounted for under camping.
- d. *Area boating.* If the vehicle's occupants used the boating facilities (i.e., launch ramp, dock, or marina) in the area being surveyed, then all boating activities, including water-skiing and fishing from a boat, are listed under area activities for that area.
- e. *Area sightseeing.* Code sightseeing for the survey area only if no other activities were participated in at the recreation area being surveyed. Recall that individuals within a group may be sightseeing, even if other group members participate in other activities. If a visitor is sightseeing at the area but participated in other activities elsewhere on the project, he or she would be recorded as sightseeing at the area (Columns 74 and 75) but not at the project (Columns 49 and 50). Sightseeing is the only activity that does not have to be marked under project activities if it is coded under area activities.

Remarks

The remarks section is provided for the interviewer to comment on unusual conditions. Please utilize this space freely and liberally. If any abbreviations are used by an interviewer, he or she should provide a legend for future reference.

Appendix D

Direct Data Entry System

Introduction

The purpose of this guide is to provide instruction and assistance in the use of the Direct Data Entry System (DDES) for recreation use surveys. The guide is not an independent document. It must be accompanied by training in the use of traffic-stop survey procedures and definitions as described in Appendix C. Variable definitions described in Appendix C are used as a basis of the program (software) information provided in this appendix.

Program Overview

Purpose of the program

The Traffic Stop Survey DDES was designed to assist in conducting, editing and analyzing recreation use surveys for Corps of Engineer projects. The program eliminates the need for handwritten forms that must be keypunched, and edited until all detected errors have been removed. The DDES program will check for entry errors that could not be checked with the previous hand-entered form until office editing. In this way, the integrity of the survey is maintained and efficiency improved. Additionally, the speed of an interview will be increased. The faster the interview goes, the less the burden on the visitor.

The program is designed so the interviewer can follow the procedures without the need for decisions about the flow of the interview. All logic flows and many of the error checks are included in the program.

How the program works

The survey plan contains a complete listing of areas to be surveyed and the dates and times that each survey is to take place. Surveys will be conducted over different time periods within a week, as well as during different weeks within a

season. Each survey period will begin on a Monday and continue through Sunday. Two types of surveys comprise the survey schedule: weekday and weekend. Each meter location will have a weekday and a weekend day component and file structure.

For each meter/survey site location, descriptive information is entered. The survey plan contains the information necessary for data entry. The information should be transferred in the data file as described in this text.

Three levels of information are to be entered, Project, Area and Meter/Survey Site. Project level information accounting for seasonal variation will remain the same for all surveys conducted at the project. The interview will be modified so that activity questions that will only be asked during certain times of the year. Also included at the project level are three activities that are determined by the specific project. Once these are entered in the setup, they will not have to be reentered. Area level information is descriptive data for the meter and area being surveyed accounting for the number of reporting areas. A file is created for each weekday and weekend component for each meter being surveyed each season. Meter or Survey level information is the actual data collected during traffic-stop surveys in the field at each meter location. The data will be used to convert meter counts into estimates of use.

Surveys for both weekday and weekend day files, at a single meter location, should be started on a blank disk. If a hard disk is used in surveying, file transfers can be completed to a floppy for storage. It is important that each disk is labeled properly so that it can be identified later. If a disk is reaching its capacity, the program will instruct the user to replace the disk with a blank disk. The capacity for a low density 5.25 in. diskette will be approximately 500 entries. A low density 3.5 in. diskette will hold approximately 1,000 entries. It is recommended that the program be run off the hard disk rather than off a floppy disk. These disks will be collected later for processing in the "VERS" (Visitation Estimation and Reporting System) program, which is described in the companion document Report 2.

In addition, there are a few standard procedures that are used throughout the DDES program that must become familiar to the user. These procedures include:

- a. All responses to questions asked during the interview process require that the <enter> key be struck to confirm the entry. This allows the interviewer to change or edit the response prior to it being entered in the database.
- b. Some portions of the program setup procedures are password protected. This has been implemented to keep the basic project and area configuration files from becoming altered while in the field. It is suggested that the passwords for these portions of the program be guarded and only be given to those persons responsible for program set-up and configuration.

- c. In the event that the computer locks up during the survey procedure, use a <Ctrl><Break> key combination rather than re-booting the computer. Re-booting the computer can invalidate all of the data collected to that point. Using the <Ctrl><Break> combination will only result in loss of the most recent data record entered.
- d. During many portions of the program, the <Escape> key can be used to exit that portion of the program or exit the entire program. The F10 key is used as an exit key in the project and area configuration components. There are other hot keys that can be utilized at various points in the program identified in various help lines.
- e. The arrow keys can be used at various parts of the program to toggle (move) between screens and/or edit characters in fields.

Definition of terms

Certain terms will be used throughout these instructions. Key terms include:

- **Project NRMS number.** This is a unique five digit number which identifies the project as maintained in the Natural Resources Management System (NRMS) database.
- **Area NRMS number.** This is a three digit number used to identify the recreation area or park.
- **Area name.** The name of NRMS designated area or park under study. The area may be comprised of one or more meter locations.
- **Project name.** The name of lake or project or river system under study.
- **Survey site name.** The name of location where the survey is taking place. If there is **only** one meter and one survey site then the names are synonymous. Unique meter/survey site names are required if there is more than one meter or survey site within the recreation area.
- **Survey season.** This field identifies which category of time being sampled. The survey plan describes the months comprising the seasons being sampled. The choices are: 1-Spring, 2-Summer, 3-Fall, 4-Winter and 5-Holiday.
- **Monday date of survey.** This is the Monday date of the survey week. Only valid Monday dates will be accepted.
- **Meter type.** This field is for the type of traffic meter that is used at this survey site. Valid entries are 1-pneumatic hose and 2-magnetic loop.

- **Direction of traffic.** This is for the direction that traffic is driving across the meter, either one or two way traffic. For example, the meter may be across two lanes, but if the road is one way then the direction of traffic across the meter is one way.

System Requirements and Recommendations

The program is designed to run on a lap top or portable computer, IBM PC/XT or PC/AT, or any other true compatible. The system should be running on DOS 3.2 or any later version. At least 640K RAM on board memory is required. There should be one floppy drive and one hard drive. The floppy drive should be 3.5 inch disk drive.

The following is a computer configuration specification list for the DDES with directions on how to verify that your computer meets these standards:

Configuration	Check
Machine type - Lap top or notebook; ¹ 286 or higher, 15 pounds or less	See users manual
DOS operating system 3.2 or higher	At DOS prompt, type VER
640K RAM memory	At DOS prompt, type CHKDSK/f
Hard disk, 20 Megabytes or higher	At DOS prompt, type CHKDSK/f
One internal 1.44MB 3.5 in. floppy disk drive	See users manual
¹ Battery operated. Battery should be rechargeable and interchangeable in the field. Power adaptor for cigarette lighter use AC adaptor for office use. Full keyboard with function keys F1 through F10.	

Due to the size of lap top computers it is necessary to have a stand for the system. It is recommended that the stand be a modified camera tripod, thereby allowing for interviewers and roadsides of different heights. The tripod should have a plywood top and wheels to allow for movement along the roadway.

Program Installation

To install the programs onto the hard disk, a subdirectory must first be created to contain the programs. For an example, we will name this subdirectory "SURVEY" for traffic stop survey. The new directory is created by the following command:

```
C> MD\SURVEY
```

If a single computer is being rotated between projects, it is recommended that an abbreviation of the project name be used for each project. Do not share a subdirectory with another project.

Next the files from the distribution disk must be copied into the new directory. Place the distribution disk into drive A, then type:

```
C> Copy A:*.* C:\SURVEY
```

This will place the program file in the new directory. Place the distribution disk in a safe place for backup purposes.

Organization of the Program

For organizational purposes the four components of the DDES program will be discussed in the following order:

- a. File maintenance.
- b. Project configuration.
- c. Area configuration.
- d. Conducting the survey.

These individual components are presented in the following sections, including function and purpose of each component and detailed procedures for component operation.

Starting the Program

To begin the program you must first get into the directory where the programs are located. To do this type the following:

```
C:> CD\SURVEY
```

This will place you in the correct directory. The survey should be conducted directly on the hard disk and files transferred to a floppy for security.

You are now ready to start the survey program. Type the following:

```
C:\SURVEY>DDES
```

After a few seconds you will get a main menu that tells what options are available.

**DIRECT DATA ENTRY SYSTEM 2.4
(DDES)**

- ▶ 1 Conduct Survey
- 2 Area Configuration
- 3 Project Configuration
- 4 File Maintenance
- 5 Exit

U.S. Army Engineer Waterways Experiment Station

A warning message will appear if the program is unable to locate the project configuration (DDCONFIG.DAT) file. The project survey coordinator will provide the necessary file to the surveyor with file structures designed to house the survey data.

File Maintenance

Procedure

The "File Maintenance" program can be entered by selecting option 4 on the main menu. Highlight "File Maintenance" then strike the enter key or type the number 4.

The program will prompt for the drive to be read. Enter the letter designation of the drive and hit enter. Once in the file maintenance program the following screen will appear:

Function

The purpose of this component of the program is to allow the surveyor to maintain and transfer files used during the survey process. The program allows for files to be copied to and from the hard disk and floppy. A help line can be found at the bottom of the screen in this part of the program to guide the user.

Use the arrow keys to move around in the program. A file selected on the left side of the screen will be copied to the target disk shown on the right side of the screen. If you need to transfer files in the other direction, simply use the left and right arrow keys to switch origin and destination drives. If you copy the wrong file, you can remove it by highlighting the wrong file then pressing the delete key to remove the file.

You cannot use the "File Maintenance" menu to copy the DDES.exe file to another disk. This copy procedure must be done outside of the program. When copying or deleting area files, simply highlight the *.DAY file. The program will search for and execute the command for both the *.DAY and *.END files.

Items within the help line include:

- [F2] - to update the screen when you change disks.
- [F3] - to change the target drive.
- [Del] - to remove highlighted file.
- [F10] - to exit maintenance program and return to the main menu.
- [-->] - toggles to the right hand screen changing the screen on the right to the origin.
- [<--] - toggles to the left hand screen changing the screen on the left to the origin.

Training Configuration

In order to practice or test the DDES program project and area configurations must be completed. The training video (U.S. Army Corps of Engineers Nontraditional Training and Planning Division 1992) and associated documentation does not describe these processes. Providing only the VERS Coordinator with this procedure was done as a safeguard to avoid confusion.

Care must be taken to keep any testing or training files separate from the actual project files. To accomplish this follow the directions to setup project and area configurations using a real project example; however, use a unique name such as 2TEST, 3TRAIN, or 2PLAY during the area configuration. The purpose

of using a distinctive name is to insure that the user does not become confused with the actual project files and uses the wrong file inadvertently.

Once the training configurations are complete proceed with the DDES directions to run the program. It is imperative that only the practice files are used for training and are kept separate from the actual field collected data. In order to run the DDES for actual surveying, setup the project and area configurations. Confirm file structures in all cases.

Project Configuration

Procedure

From the main menu, the arrow keys are used to highlight the "Project Configuration" selection, option "3." The program will ask the user to supply the password for this portion of the program. The password for this portion of the program should be given only to the project survey coordinator or the person responsible for setting up the survey program at each of the individual projects. This will ensure that the project specific data are not tampered with while in the field.

**Password: _____

8:50:39 a.m.

Project Configuration Screen

Project Name: GOOD TIME LAKE
Project NRMS# 39180

Activities for: Summer

<p style="text-align: center;">Available</p> Cross country skiing Hiking Hunting Ice fishing ORV riding Other overnight Snowmobiling Swimming Visit marina	⇒	<p style="text-align: center;">Selected</p> Hiking Other overnight Swimming Waterskiing	<p style="text-align: center;">User Options</p> AT VISITOR CENTER JOGGING PLAYED VOLLEYBALL
--	---	--	---

↑↓ Cursor → Delete mode ← Add F2- Change Season F3- Print F10- Done

Function

After the proper password has been given, the project configuration screen will appear. If the wrong password is given, the program will exit back to the main menu. During project configuration, these data will be entered:

- a. Project name.
- b. Project NRMS number.
- c. Established activities for each season.
- d. Optional activities for each season.

This part of the program deals with project level information that remains constant throughout all surveying. The project name and project NRMS number are entered for reference purposes. The project survey coordinator can select from a list of ten activities for each of the four survey seasons, in addition to a special set up for holiday periods. The project survey coordinator is responsible for entering the seasonal activity selections because they form the basis of the survey. The list of activities selected is a subset of all activities that may be seasonal in nature (e.g., cross country skiing during the winter only). Seasonal questions can be tailored for a given project for each of the 5 available survey seasons.

Other data that are entered during this portion of the program include optional activities for each of the five seasonal categories. This allows the project survey coordinator to collect data for activities that may be of particular importance to a specific project. Up to three optional activities can be entered for each season at the project.

The Project Configuration information is to be collected and entered only once for each project. The configuration file is stored and used for all other portions of the DDES program and should be revised only when there has been a change in the project. For this reason, this section of the DDES program has been password protected and is prepared by the project survey coordinator.

The following is a description of how to input the required data.

- a. *Project name.* If you are entering the project configuration component for the first time, the program will prompt you to supply the project name for this survey. If reentering the file, the program will provide the name given and allow changes. After the project name has been entered, strike the <enter> key to confirm the entry.
- b. *Project NRMS number.* When the project name has been provided, the program will prompt the user to supply the project NRMS number. This is a five digit number used to identify the project in the NRMS national database. Once again, the user must strike the <enter> key to confirm that the data is correct.
- c. *Established activities for each season.* After the NRMS number has been provided, the program will allow the user to select from an established list of activities for each season. To toggle between seasons make sure that the activity column is highlighted, then strike the [F2] key to access

the season menu. Use the up and down arrow keys and the <enter> key to select the appropriate season. Complete steps 4 and 5 for each season. Return to this step, repeating steps 4 and 5 for each season selected.

- d. Select any variation of activities from the list for each of the five seasons. The program has been designed so that the user cannot select the same activity more than once for any season; but it will allow the same activity to be chosen for all seasons. If you accidentally select an activity for a season in which that activity cannot take place, you can delete it from the seasonal database prior to its being stored. This is done by using the right arrow key to toggle to the center screen. This screen displays those activities which you selected from the activity list. Use the arrow keys to highlight any erroneous activity and then strike the <delete> key. This will remove that activity from the selection set prior to saving.

Camping, Picnicking, Fishing from Shore, Fishing from Boat, Boating, Other Watercraft Use, Sightseeing and "Other Activity" are a part of the standard survey instrument and are not available for selection or deletion.

The list of activities available for selection include:

- Cross country skiing.
 - Hiking.
 - Hunting.
 - Ice fishing.
 - ORV riding.
 - Other overnight.
 - Snowmobiling.
 - Swimming.
 - Visit marina.
 - Waterskiing.
- e. Optional activities for each season. This component of the program is similar to the previous one in that it will allow the user to enter up to three additional activities for each season. The difference is that these activities can be anything not covered in the established list of activities and that needs to be accounted for by the project or any area within that project. Note: This information is not specific to an area - it will be asked at all areas for the project in that season. Questions will be in the form: "How many people were...?" The reporting of these optional activities will be included under "other" in reports for the NRMS. Typical activities relate to project specific activities or facilities such as a visitor center, golf course, baseball fields, and campground program attendance. To enter data for this portion of the program, the right arrow key is used to move into the optional activities area of the screen. Once in this portion of the screen, any alphanumeric character string up to 20 characters can be entered. These character fields will later be used in the survey program to prompt the interviewer to ask questions about the

selected activities. To exit this portion of the program strike the <enter> key until the cursor has toggled back to the center portion of the screen. When the cursor is in the center portion of the screen, the user can strike the [F10] key to exit the project configuration component of the program or [F2] to continue to the next season.

After the [F10] key has been entered, you will be asked to confirm that the data provided are correct. To confirm, strike the "Y" key and then <enter>. If the data are incorrect, need editing or need to be completed for another season, strike the "N" key and enter. This will bring you back to the beginning of the project configuration component.

Once a project configuration component is completed, a hard copy print-out may be made of the seasonal activities selected. Use [F3] to transfer the data from the screen to a printer. A sample output is provided. The printout generated should become a part of the project survey plan.

The project survey coordinator will distribute the survey program and project configuration file to the interviewer. Load a blank disk in drive A (or suitable drive), use the DOS copy command, type the following, and verify that the directory of the disk contains the files identified.

Description	Command
Copy the files from the survey directory	Copy DD*.* A:
Transfer files	DDES.EXE DDCONFIG.DAT
Confirm transfer	Dir A:
Remove the disk	

Label the disk with project name, current date, DDES Disk, original configuration. If using the VERS for file transfer, go to the File Maintenance menu and select "Make DDES disk" option.

Create and complete this file (DDCONFIG.DAT) before creating any area configuration files.

DIRECT DATA ENTRY SYSTEM
DDCONFIG.DAT 03/07/93 11:20:15 a.m.
(Seasonal Activities)

DDES Project Configuration Report

Project Name: Goodtime Lake Project NRMS# 39180

Spring Activities

Hiking
Hunting
Other overnight

User Options

At Visitor Center
Jogging
Played Volleyball

Summer Activities

Hiking
Other overnight
Swimming
Waterskiing

User Options

At Visitor Center
Jogging
Played Volleyball

Fall Activities

Hiking
Hunting
Other overnight

User Options

At Visitor Center
Jogging

Winter Activities

Cross country skiing
Hiking
Hunting
Ice fishing
Other overnight
Snowmobiling

User Options

At Visitor Center
Jogging

Holiday Activities

User Options

Area Configuration

Procedure

From the main menu, use the arrow keys to highlight the "Area Configuration" selection, option "2," and strike the <enter> key. The program will ask the user to supply the password for this portion of the program. The password for this portion of the program should be given only to the project survey coordinator or the person responsible for setting up the data files at each of the individual areas/ survey sites. This will ensure that the area specific data has not been tampered with while in the field.

**Password: _____

8:52:57 a.m.

Area Configuration Screen

File Name: 2PAWDY1A

Survey Site Name: PANTHER PAW DAY USE METER

Number of NRMS Areas behind this meter: 1

Area name	Num
PANTHER PAW	006

Season: Summer

Meter Type: Magnetic loop

Direction of Traffic: One way

Monday date: 09/16/96

Is this correct? Y/N

Function

After the proper password has been given, the area configuration screen will appear. If the wrong password is given the program will exit back to the main menu. During area configuration, the following data will be entered:

- a. Season of survey.
- b. Area file name.
- c. Survey site name.
- d. NRMS area name(s) and number(s).
- e. Meter type.
- f. Traffic direction crossing meter.
- g. Monday date of survey.

This component of the program allows you to enter the survey season, area names, and NRMS numbers, as well as other important data on each survey site. Verify that the project configuration file has been completed for the season being selected prior to creating area file structures.

This information is to be collected and entered for each meter/survey site location at the project, for each season scheduled for survey. The Area Configuration file is stored and used with the project configuration file during other portions of the DDES program and should be revised only when there has been a change at a specific area or meter location. For this reason, this section of the DDES program has been password protected and should be conducted by the project survey coordinator.

File naming

The first step in the area configuration, is understanding how to properly name and monitor data files. To assist in file naming the following protocol is provided; a data file name will:

- Be 8 characters in length.
- The first character will represent the survey season.
- Contain no spaces or special characters, e.g., *.@ # % \$.
- Be unique to the survey site location and season.
- Have extended characters automatically placed by the program.

These filenames should be entered on the appropriate survey schedule page of the project survey plan.

In our example, Panther Paw Creek has three meter/survey site locations. They are: Panther Paw Marina, Panther Paw Campground and Panther Paw Day Use. Surveys will be done for all four seasons. In order to keep meter names, seasons and file names organized the following is recommended:

Panther Paw Campground: 1 P P A W C M P
 1 2 3 4 5 6 7 8 : 8 characters

The number 1 in character position 1 represents the spring survey season. At the end of the year there will be four sets of files

1PPAWCMP.* - Spring

2PPAWCMP.* - Summer

3PPAWCMP.* - Fall

4PPAWCMP.* - Winter

Here are the names for the other meter locations:

Panther Paw Marina: 1 P P A W M R A

Panther Paw Day Use: 1 P P A W D A Y

If there are two survey sites at a single location, the file name must be unique for each survey site. Use character field 8 (e.g., A, B, C) to distinguish each survey site location or interviewer. If the area has only one meter location, and the location requires only one survey site, then the three names are interchangeable, however; if there is more than one week of surveying within a season

reserve character 7 to distinguish weeks. Use a numeric character to identify the first, second, or third week or surveys. Names would be further abbreviated to describe file contents, for example:

1PAWMR1A.*

1PAWMR1B.*

1PAWMR2A.*

1PAWMR2B.*

The above 4 sets of file names describe 2 weeks of surveying (1 and 2 in position 7) and two interviewers at the survey site location (A and B in position 8). 1PAWMR1A would represent Spring surveys at Panther Paw Marina; week one, interviewer A.

The following is a discussion of how to input the required data.

- a. *Season of survey.* The first field needed is the season in which the survey is to be conducted. This is done automatically and cannot be bypassed. Use the arrow keys to highlight the appropriate season and strike the <enter> key (1 = Spring, 2 = Summer, 3 = Fall, 4 = Winter, 5 = Holiday). This will automatically enter the first character into the area file name, as described in the above discussion on file naming.
- b. *Area file name.* After the survey season has been selected, the program will allow you to enter the remaining seven characters in the area file name, no spaces or special characters are permitted. This procedure will create two files, *.DAY and *.END data files. These files are different only in their file extension characters, distinguishing weekday and weekend data. All data from the survey will be stored in these data files, so file naming should follow the convention described. These files are to be created for each meter/survey site location for each survey week. Strike the <enter> key to confirm your entry.

To see a listing of files created, select the appropriate season, press the <enter> key twice instead of entering a new file name. You will see a menu of area files to choose from. Use the arrow keys to scroll to the desired file and press the <enter> key. This will load an existing area file and allow an edit.

- c. *Survey site name.* Once the area file name has been established, the program will prompt the entry of the survey site. The survey site name is also referred to as the meter location. This can be any character string up to 25 characters. Spaces are permitted. Press <enter> to move to the next section. Multiple interviewers at the same survey site must use identical survey site names; only the file names should differ.

- d. *NRMS area name(s) and number(s).* Enter the name of each NRMS reporting area that is behind a meter location. To enter the names in this part of the program, press the F2 key. This will open a block that allows you to type in an area name. After you have entered the area name, press the <enter> key. This will move you to the section asking for the NRMS number that corresponds with that name. You must press the F2 key for every area name and number you wish to enter. When all the area names and numbers are entered, press the <tab> key to move on to the next field. Only one name will be entered if there is only one NRMS area located behind the traffic meter. Multiple entries are required only if the survey site location must determine which NRMS reporting area is used by the visitor.
- e. *Meter type.* Enter the type of meter that is used at this location. The choices are pneumatic hose or magnetic loop. Again use the arrow to highlight your choice and <enter> to select.
- f. *Traffic direction.* Enter the direction which traffic crosses the meter. The choices are either one way or two way. Again use the arrow keys to highlight and <enter> key to select the traffic direction.
- g. *Monday date.* This variable is split into three fields: month, day, and year. The structure for input will be: MM/DD/YY. When entering the numeric fields, you must press <enter> after each of the three fields. The survey plan will contain this information. Once all this information is entered, the program will prompt you to print and continue or exit. A sample printout is provided.

The area configuration step creates the physical files that will store the survey data. The filename created will identify the season and meter location to be sampled. The survey coordinator should distribute these *.DAY and *.END files along with the project configuration and program files. Copy these files and distribute to the interviewer as appropriate.

```

DIRECT DATA ENTRY SYSTEM

DDES Area Configuration Report  07/08/96  11:39:14 a.m.
File Name: 1TEST
Survey Site Name: Panter Paw Day Use Area
Season: Spring
Meter Type: Magnetic loop
Direction of Traffic: Two way
Monday date: 3/17/1997
Number of NRMS Areas behind this meter: 1

Area name          Num
-----
Panter Paw         006

```

Each interviewer should have: (1) DDES.EXE, (2) DDCONFIG.DAT, (3) *.DAY and *.END files for the survey sites they are to survey. It is recommended that data files *.DAY and *.END files be distributed by survey season.

Conducting the Survey

Procedure

From the main menu, use the arrow keys to highlight the "Conduct Survey" selection, option "1." No password is required; however, it is necessary for the interviewer to know which file names and survey sites are linked.

DIRECT DATA ENTRY SYSTEM 2.4
(DDES)

- ▶ 1 Conduct Survey
- 2 Area Configuration
- 3 Project Configuration
- 4 File Maintenance
- 5 Exit

U.S. Army Engineer Waterways Experiment Station

Function

This program segment is the essence of the DDES. It contains the internal logic and range checking required in data collection. Before interviews can begin the Project and Area configuration segments must be completed. The interviewer must have the DDES.EXE, DDCONFIG.DAT and survey site/meter files before surveying can begin.

The files created in the area configuration will contain all of the necessary defaults identified in the project configuration. The main components of the interview are:

- a. Interviewer name.
- b. Vehicle classification.
- c. Length of stay.
- d. Project and area activities.

The following is a discussion of items that are different from data entry on the ENG Form 4835. A comparative listing of variables for the two systems is provided. This information supplements the survey procedures described in the exportable training manual, "Visitor Surveys For Developed Recreation Areas" and the accompanying video tape.

- a. *Interviewer name.* Enter your complete name, first name then last name. If an interviewer is relieved during a survey period, exit the interview and have the new surveyor enter their name. This information was not previously stored to disk.
- b. *Vehicle class.* Passed vehicles are of two types - refusal and traffic. It is no longer necessary to enter a remark for passed vehicles; remarks are automatic. Refusals are coded with a 0 in the number of axles. Traffic entries are a double key entry <ALT> <F8>. Hold the <ALT> key while striking the <F8>. When the appropriate code is entered the remarks are automatically recorded.
- c. *Length of stay.* Day use and overnight use categories are unchanged. An addition to DDES, is the other overnight use. This includes such overnight uses as houseboat and cabin rental. For reporting purposes, this category is considered project camping. The interviewer must be trained to interpret overnight use that is included in this category. The project survey coordinator must define "other overnight use" acceptable for this project.

The DDES also collects information on the number of day users that will spend any nights away from home in a commercial accommodation. These data can be tied to economic impact data collection.

- d. *Project and area activities.* Below are changes included in the DDES data entry.
 - (1) A number of activities have been made optional. The determination of the activities to be used each season is made in the project configuration file by the project survey coordinator.
 - (2) All activities selected for each season are available at both the project and area levels; e.g., area hunting can now be obtained. All activities are now able to accept group sizes greater than nine.
 - (3) A lead question on watercraft-use has been added to streamline boating participation questions. If no one participated in watercraft activities, all boating activities will be bypassed, including boat ramp use. The total number of boaters is a separate item from other watercraft users.

DDES STRUCTURE AS COMPARED WITH ENG FORM 4835

PROJECT CONFIGURATION OF DDES VARIABLE	ENG Form 4835 HEADER	DDES Treatment
Project name	26-45	Same ¹
Project NRMS number	1-5	Same
Activity questions	DATA LINE	Same
ID of survey entry	11-13	Same
No. of axles	14	Same
NRV/RV	15	Same
Return to Project	16	Same
Return to Area	17	Same
No. of Persons	18-19	Same
Camping at Project	20	Same
Camping at Area	21	Same
Other overnight use		DDES ² Optional ³
No. Nights Camping in area	22-23	Same
Day Use Hours	24-25	Same
PROJECT QUESTIONS		
No Pinicking	26-27	Same
Used Picknicking Facilities	28	Same
Used Launching Ramp	29	Same
Visit Dock or Marina	30	Optional
No. Boating (Watercraft)	32-32	Same
No. Waterskiing	33-34	Optional
No. Fishing from Boat	35	(expanded field) ⁴
No. Other watercraft		DDES
No. Fishing from Shore	36	(expanded field)
No. Swimming	37-38	Optional
No. Off Road Vehicling	39	Optional (expanded field)
No. Hiking	40	Optional (expanded field)
No. Hunting	42	Optional (expanded field)
No. Ice Fishing	43	Optional (expanded field)
No. Snowmobiling	44	Optional (expanded field)
No. Cross Country Skiing	45	Optional (expanded field)
No. in Other Activity	47-48	Same
No. Sightseeing	49-50	Same
No. Other Optional Activity 1		DDES, Optional
No. Other Optional Activity 2		DDES, Optional
No. Other Optional Activity 3		DDES, Optional

(Continued)

¹ Variable unchanged in the DDES.

² Variable unique to DDES, no comparable ENG Form 4835 component.

³ As part of Project Configuration, activity or facility variable is included at the descresion of project survey coordinator by season.

⁴ Variable width is expanded to two columns.

DDES STRUCTURE AS COMPARED WITH ENG FORM 4835 (Concluded)

PROJECT CONFIGURATION OF DDES	ENG Form 4835	DDES Treatment
Origin - ZIPCode	51-55	Same
Only Area Visited	56	Same
Primary Destination		DDES
No. Day Users in Commercial Accomodations		DDES
AREA QUESTIONS	ENG FORM	DDES Treatment
No. Picknicking	57-58	Same
Used Picknicking Facilities	59	Same
Used Launching Ramp	60	Same
Visit Dock or Marina	61	Optional
No. Boating (Watercraft)	62-63	Same
No. Waterskiing	64-65	Optional
No. Fishing from Boat	66	(expanded field)
No. Other watercraft		DDES
No. Fishing from Shore	67	(expanded field)
No. Swimming	68-69	Optional
No. Off Road Vehicling	70	Optional (expanded field)
No. Hiking	71	Optional (expanded field)
No. Hunting		DDES Optional (expanded field)
No. Ice Fishing		DDES Optional (expanded field)
No. Snowmobiling		DDES Optional (expanded field)
No. Cross Country Skiing		DDES Optional (expanded field)
No. in Other Activity	72-73	Same
No. Sightseeing	74-75	Same
No. Other Optional Activity 1		DDES Optional
No. Other Optional Activity 2		DDES Optional
No. Other Optional Activity 3		DDES Optional
AREA CONFIGURATION OF DDES	ENG Form 4835	DDES Treatment
Survey site name	46-70	Same
Area NRMS number	6-8	Same
Weekday/Weekend	9	Same
Survey Season	10	Same
Monday of survey week	11-16	Same
Percent of weekday traffic	17-18	Omitted
Meter Type	19	Same
Direction of Traffic	20	Same
Other	21-25	Omitted

(4) A new variable added to the DDES is primary destination. This will determine if the visitor came to the project as a final destination or as a stopping point on a larger trip. This question is asked at the project level only.

e. *Data entry.* There are two main types of entries to be made - Yes or No and number of participants. Depending on the response to a question, comment fields will pop-up requesting further information. All entries require a hard return to complete.

Beginning the interview

The following instructions explain how to conduct a survey after the project and area configuration files have been created and loaded to the hard disk. In this example, the file that was created in the configuration sections will be used.

Description	Command
Change to the survey directory	cd/survey
Engage the program	DDES
Select the "conduct survey" option	1
Identify the day type	1 for weekday 2 for weekend

You will be provided a screen similar to the one below identifying the files available. Note that only the *.DAY or *.END files will be displayed based on the answer to the weekday or weekend question asked.

8:57:19 a.m.

Is this a 1) weekday or 2) weekend survey (1/2)? 1
 (Esc to go back to menu)
 Data files in C:\SURVEY

F1 Help	←J Select	Space Toggle
C:\SURVEY*.DAY		
Matching files: 6		Total bytes: 221536
2PAWDY1A.DAY	644 Sep 06,1996	8:52a A
2SEVE_A1.DAY	135240 Sep 06,1996	8:54a A
2SEVE_B1.DAY	17368 Sep 06,1996	8:55a A
2VISTA.DAY	16100 Sep 06,1996	8:55a A
2VISTA.DAY	16100 Sep 06,1996	8:56a A
2VISTA2.DAY	36064 Sep 06,1996	8:56a A

Note: The file size of an empty structure is 644 bytes.

Highlight the desired file and hit enter to load. A screen will display the file setup. This will give you the chance to review the screen, and load another file if the incorrect file was retrieved.

8:57:59 a.m.

HEADER DATA	
PROJECT NAME: GOOD TIME LAKE	PROJECT NRMS NO.: 39180
AREA NAME: PANTHER PAW	AREA NRMS NO.: 006
WEEKDAY SURVEY	SITE NAME:PANTHER PAW DAY USE METER
MONDAY DATE: 9/16/1996	SEASON: Summer
METER TYPE: Magnetic loop	TRAFFIC: One way
SEASONAL QUESTIONS ASKED: Waterskiing, Swimming, Hiking	
OTHER ACTIVITIES: AT VISITOR CENTER, JOGGING, PLAYED VOLLEYBALL	
ASK OTHER OVERNIGHT: YES	# OF AREAS BEHIND METER: 1

Is this the correct file? Y/N
Enter 'Y' to begin survey, 'N' to select another file

It is critical that the correct file has been selected. Verify site name, season, and day type (weekday or weekend) before proceedings. If the proper file has been retrieved, confirm with a Y for yes. You will be asked to enter your name.

You will then be asked to enter the correct date and time. The computer's current date and time will be displayed. If the computer clock is correct, then press the return key to accept. If the computer clock is not correct, you must enter the date and time that the survey is being conducted. Note the form displayed for entry of the date and time. Entries must be in this same format. This information should match the survey schedule precisely.

8:59:52 a.m.

Enter interviewer's name:
Enter date 9/16/96
Enter time 8:59

When all pre-interview data have been entered you are ready to begin the interviews. The following screen is the introduction to be read to the visitor:

Hello. My name is _____.
I am with the Corps of Engineers. We are surveying
visitors here at GOOD TIME LAKE so that we can better
serve your needs. May I take a few minutes of your time
to ask you some questions?

Total number of axles:
Enter 0 for refused.
Press <ESC> to quit program.

Refusal and acceptance

Record the number of axles on the vehicle after the party has agreed to be surveyed. Valid entries for the number of axles are 2 through 10. If a number greater than 4 is entered, an explanation must be given to describe the vehicle. If the visitor has refused to be interviewed, then enter a "0." This will enter one record with "refused" on it. A confirmation screen will appear to verify the entry.

Traffic backup

A traffic entry can be made only if five vehicles are waiting. Finish your current interview, then let four vehicles pass and interview the fifth. If you need to make a traffic entry, it is entered by pressing the alternate <Alt> key and the function 8 <F8> key at the same time. Do not try to hit the two keys simultaneously. Hold down the alternate key first then select the F8 key. This is symbolized by "<Alt><F8>." The combination of two keys helps to eliminate an accidental entry. The program complies with these rules. All four traffic entries are made with a one-time entry of <ALT><F8>. A traffic entry cannot be made until an entry has been made. Two traffic entries in a row are not allowed. When you make this entry, a screen will appear (or flash) telling you to please wait while the entries are being processed.

Exiting the program

At this point you are given the chance to exit from the program. To do this, press the escape <Esc> key. A confirm message will then appear to give you a chance to reconsider the choice. There are certain situations when you need to exit the program, such as ending a survey period or when being relieved by another interviewer at the same location.

Warning

Do not turn the computer off or "reboot" the computer before exiting the program. This could result in the loss of data.

Variables Unique to DDES

Other overnight use

Many projects permit overnight use that is not limited to campgrounds. This use includes overnight use outside developed campsites, on islands, houseboats, cabins, and in some cases hotels on CE property. This "other overnight" use is captured only if the optional question is set up by the project survey coordinator in the project configuration of the DDES.

The visitor must respond yes to the question of staying overnight on the project. The next question of "Did you camp?" would be answered with a NO. The screen will provide the question: "Where did you stay?" and a comment box would be provided. Enter a brief description of where the visitor stayed. Examples would be "houseboat," "fished all night," and "rental cabin." The next two questions will be directed to the interviewer and are not to be read to the visitor.

Do not read this to the visitor.

* The following questions are for the interviewer *

Does this qualify for overnight use at the project? (Y/N)

Does this qualify for overnight use at this recreation area? (Y/N)

These questions require that the interviewer be familiar with the types of other overnight use that are permitted on the project and at each recreation area. If "No" is entered to either of the questions then the interviewer will be prompted to ask for the number of day use hours the visitor was recreating. If the answer was yes to both questions, then the number of nights the visitor stayed at the project will be asked.

The detailed survey reports will provide the summary of the percentage of other overnight use at the area. This use will be rolled into the total project camping number for upward reporting.

Periodic check

The program has built in points of review. The interviewer will be prompted periodically with the question:

Are the last entries correct? (Y/N)

A yes response to this question will allow the program to continue. A no response will require the interviewer to return to the last point where this question appeared:

Project verses area questions

Depending on the visitors response to the "return to project" question, the program will branch to either the Project or Area questions. The interviewer will be prompted by a screen that describes the type of questions to be asked. If the visitor was returning to the project, then project level questions will be bypassed and only the area questions will be asked. If so, then the following screen will appear:

9:44:19 a.m.
The following questions relate to the people in this vehicle and their use of the Panther Paw area during this visit.
Press <Enter> to continue...

If the visitor is not returning to the project, but going home for the last time, then the following screen will appear:

9:35:57 a.m.
The following questions relate to the people in this vehicle and their use of Goodtime Lake during this visit.
Press <Enter> to continue...

While activity questions are being asked, the top of the screen will display either the project name or the area name, depending on the program branching requirements. Refer to this heading to verify if area or project level questions are being asked.

Project questions are typically asked first since the project is more encompassing and the area is a subset of the project. For those visitors that only go to one recreation area their project use and area use are identical and the survey ends after the determination that it was the "only area visited." For those instances where visitors go to more than one recreation area, project questions are asked first to determine all activities of participation. This is followed by area questions that will be a subset of the project questions they responded to

positively. Since the area is a subset of the project, the total list of activity questions will not have to be asked twice at the area then project. A screen is provided to explain to the visitor that a subset of the project use will be determined for the area use. The interviewer should note that this is not a repeat of the all activity questions but a winnowing of the activities that the party has already identified as having participate in at the project.

9:36:43 a.m.
For those activities you participated in at Goodtime Lake, how many people participated in those activities or used those facilities at the Panther Paw area?
Press <Enter> to continue...

Activity questions

The standard activity questions that will appear in the program are: Camping, Picnicking, Fishing from Shore, Fishing from Boat, Boating, Other Watercraft Use, Sightseeing and "Other." The optional questions that may have been selected by the survey coordinator include: Cross-country skiing, hiking, hunting, ice fishing, ORV riding, other overnight, snowmobiling, swimming, visit to marina, and waterskiing.

The definitions of these terms are discussed in Appendix C and remain unchanged in the DDES. The activities that have been added to the DDES include the use of the word watercraft and the other watercraft category. A lead question, "Did you participate in watercraft activities while at this project?" will determine if the boating questions will be asked. The boating questions that are included within watercraft use are waterskiing, fishing from boat, other watercraft use, total watercraft use, and boat ramp usage.

If anyone in the party participated in "other watercraft" activities a list of activities are presented to choose from:

Please select which watercraft activity:

- Pleasure boat/other.
- Jet skiing.
- Sailing.
- Wind surfings/sailboarding.
- Rafting/canoeing/kayaking.

The total number of persons participating in watercraft activities at the bottom of the screen represents the total number of people participating in any of the boating activities. The total number of persons boating must be at least as high as the highest of the other three questions (waterskiing, fishing from boat and other) and can not be greater than the sum of the three or the number in the car. The program will verify that the total number in watercraft activities meets these requirements, if it does not, the program will return to the first watercraft question and remain in this logic loop until the problem is corrected.

Optional questions

The project survey coordinator may have entered up to three other optional activities or facility questions. The questions are standardized which may often result in awkward wording. The questions relate to the number in the car and determine the number of participants in an activity or used a facility. From our sample project configuration file the summer seasonal optional questions would appear?

How many people were?

- Toured visitor center.
- Went on ranger tour.
- Jogging.

The project survey coordinator should provide any clarification of abbreviated terms (e.g., Center) and proper wording at the interviewer training. These questions are asked at all areas on the project and are not area specific.

Sightseeing

The program will keep determine if all vehicle occupants have been accounted for in some activity. If no single activity has accounted for all vehicle occupants than, the following question will appear:

Number of people sightseeing:

This means that it is possible that some visitor has not participated in any activity during this visit (review definition in Appendix C). This question will not appear in project questions if the party was camping at the project or area questions if area camping. If none of the people in the vehicle were participating in any activity, then all will automatically be put in sightseeing. The sightseeing question will appear only to describe what has been done.

Multiple areas behind the counter

If the project configuration file indicates that multiple NRMS areas are being surveyed at this one survey location, the program will prompt for a determination of which area was used primarily. The project survey coordinator should provide instructions on how the areas differ and allocation procedures.

Primary destination

One of the final questions asked of visitors is if this was their primary destination. Primary destination is designed to determine if the visitor is on a larger trip or was the trip to the lake the focus of the excursion. A rephrasing of this question could include: Was this lake a stopping point on a larger trip or was it your sole destination when you left home?

Comments

After completing the survey the program provides a comment field. Interviewer comments:

COMMENTS:

Hit return for no comments.

This gives you the chance to enter any comments the visitor might have. The information contained in the comment fields can be obtained under the VERS text file output.

Review

The program provides a review of the survey, allowing the interviewer to see that data are being recorded. It also provides a reminder to thank the visitor for their time. It also provides a prompt that permits the deletion of the record. If you respond that the interview is not correct, the entire interview will be deleted and you can start over. Use this only as a last resort because we don't want to make a visitor wait too long during the interview.

Thank you — Review #241	9:37:02 a.m.
Recreation Vehicle: Yes Return to Project: No People in Vehicle: 4 Overnight Use at Project: No Day Use Hours: 3 # of people overnight on this trip: 4 Only Area Visited: No Project Primary Destination: Yes	
Is this interview information correct? Y/N	

Rewording Questions

There are reasons for questions ordering and wording. In some instances it will be necessary to repeat or rephrase questions to visitors. It is important to understand subtle differences in wording that can change the meaning of the question. Compare the responses to the following questions:

Question	Response	Question	Response
1. How many people are in your vehicle now?	5	2. How many are with you?	4
3. Will you be returning to this area today?	NO	4. Will you be returning to this area?	YES
5. For the people in this vehicle, how many went swimming at this area?	3	6. Did you go swimming?	NO

The odd numbered questions are similar to the ones that will be asked during the DDES survey. Notice how similar the questions appear and yet the responses are quite different. If question 2 is used, visitation will be underestimated one visitor at a time. The average party size per vehicle will be reduced.

In questions 3 and 4, how different the questions become with the omission of the word "today." This is not a satisfaction question, but a question to determine if the trip is over. If question 4 is asked, and the response is YES, the interview is ended and the true information required is lost.

For the final set of questions (5 and 6) note that the respondent was not one of the three people that went swimming. Questions relate to all vehicle occupants not just the key respondent.

Training helps to ensure that the interviewer understands the need for asking questions in a systematic fashion.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE September 1997	3. REPORT TYPE AND DATES COVERED Report 1 of a series	
4. TITLE AND SUBTITLE Recreation Use Estimation; Report 1, Procedures for Developed Recreation Areas		5. FUNDING NUMBERS	
6. AUTHOR(S) M. Kathleen Perales, R. Scott Jackson		8. PERFORMING ORGANIZATION REPORT NUMBER Technical Report R-93-	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Engineer Waterways Experiment Station Environmental Laboratory 3909 Halls Ferry Road, Vicksburg, MS 39180-6199		10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Corps of Engineers Washington, DC 20314-1000		11. SUPPLEMENTARY NOTES Available from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.	
12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.		12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) This report categorizes the resource settings at Corps of Engineers water resource projects where visitation occurs. It describes recreation reporting units of measure and the advantages and disadvantages of various survey techniques. It provides a structure for evaluating visitation and determining appropriate techniques for data collection. Standardized procedures for use measurement at CE developed recreation areas with limited vehicular access are explained. Traffic-stop surveys in association with traffic counters as a means of estimating recreation use are explored. Appropriate meter placement, survey site location, survey plan development, interviewer training, and survey procedures using ENG Form 4835 and the Direct Data Entry System (DDES) are described.			
14. SUBJECT TERMS Attendance reporting Direct Data Entry System Measurement Recreation Traffic-stop surveys Use measurement Visitation Visitor surveys			15. NUMBER OF PAGES
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED			16. PRICE CODE
18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED		19. SECURITY CLASSIFICATION OF ABSTRACT	
20. LIMITATION OF ABSTRACT			