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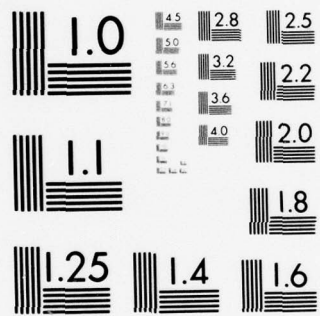
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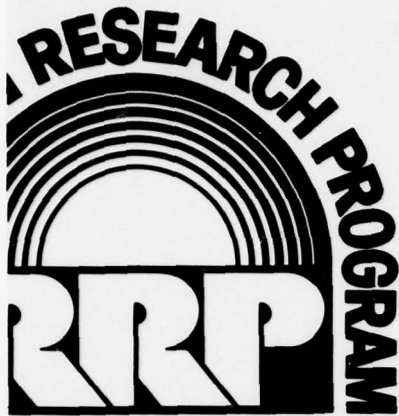
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DEVELOPMENT OF IMPROVED DECISION-ORIENTED RECREATION USER INFORMATION SYSTEM

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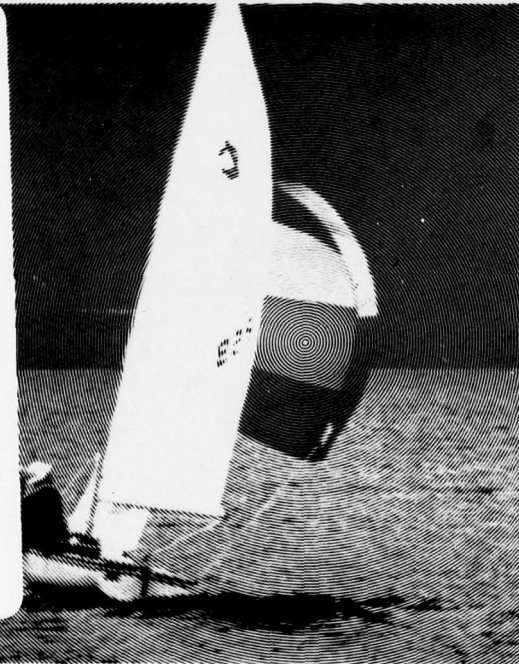
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In 1977, 424 million recreation days were reported at 440 Corps lakes and other project areas. As a result of the growing number of visitors entertained at Corps projects annually, planners and managers need information about the recreation activities, facilities, and preferences of these users. To provide for these needs, MRI undertook a research project to improve the visitation input data to the RRMS and evaluate the need for an overall recreation information system.		

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20. ABSTRACT (Continued).

Improvement of Visitation Data - In a separate Handbook, MRI proposed implementation of a standardized survey and visitation estimation procedure. In addition to describing the methodology, MRI evaluated the manpower, training, equipment and quality control measures needed to support a standardized procedure.

Supplemental Recreation Information System - An important information need Corps-wide is to forecast the impact of national and regional trends in terms of recreation participation growth, sale of various types of recreation equipment and other such factors that affect use of park areas. To accomplish this task, MRI proposed developing a supplemental recreation information system. Utilizing and interfacing with the existing RRMS and SIRAP, a supplemental system would provide planners and managers with better tools to handle basic functions such as project feasibility, site planning, management, etc.

CONT

There are five major tasks involved in implementing MRI's recommendations regarding improvement of visitation data and development of an overall information system:

- a. Research and analysis;
- b. Collection and storage of data;
- c. Computer requirements;
- d. Training and quality control, and
- e. Reporting.

The final report describes these functions and examines the advantages and disadvantages associated with four administrative decision scenarios. The resulting conclusion is that WES should expand its role to include improvement of the visitation data and undertake development of a supplemental information system.

A final part of the report identifies and discusses major administrative aspects associated with this conclusion: organizational structure for implementation, manpower requirements, staff capabilities needed, potential contracting needs, training and standardization, implementation schedule, apportionment of cost among various Corps functions and other legislative and administrative constraints.

PREFACE

This report presents Midwest Research Institute's (MRI's) findings and recommendation for improving the accuracy of visitation data reported by the Corps of Engineers at its water resource development projects, and for developing a supplemental recreation information system to support recreation planning, management and research functions. A Handbook is being prepared to specify the methodology for the visitor survey and the visitation estimation technique. This report discusses this technique and in concept describes the supplemental recreation information system. The overall system utilizes the data from the Corps' existing Recreation Resource Management System (RRMS) and other information and greatly expands available data and analytical techniques for Corps planners and managers. The study was conducted under contract with the U.S. Army Engineer Waterways Experiment Station (WES), Vicksburg, Mississippi, and the U.S. Army Engineer Institute for Water Resources (IWR), Ft. Belvoir, Virginia (Contract No. DACW39-77C-0082).

Mr. Raymond M. Mischon, Manager of Leisure Programs at MRI, was project leader on this study. Dr. Chris Wyatt, Senior Systems Analyst, had major responsibility for development of the visitor survey and visitation estimation technique. Ms. Margaret Thomas, Resource Planning Specialist, was involved in developing the site planning portion of the supplemental system.

Mr. William J. Hansen, WES, and Mr. Richard T. Reppert, IWR, were project monitors. Dr. Adolph Anderson, WES, is program manager of the Environmental Laboratory (EL) Recreation Research Program. The study was under the supervision of Dr. Conrad J. Kirby, Chief, Environmental Resources Division, EL, and under the general supervision of Dr. John Harrison, Chief, EL.

Director of WES during the conduct of this study and preparation of the report was COL J. L. Cannon, CE. Technical Director was Mr. F. R. Brown. Mr. A. J. Fredrich was Director of IWR.

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CONVERSION FACTORS, U.S. CUSTOMARY TO METRIC (SI)
UNITS OF MEASUREMENT

U.S. customary units of measurement used in this report can be converted to metric (SI) units as follows:

<u>Multiply</u>	<u>By</u>	<u>To Obtain</u>
Acres	4046.856	square metres
Acre-feet	1233.482	cubic metres
Miles (U.S. statute)	1.609344	kilometres

DEVELOPMENT OF AN IMPROVED DECISION-ORIENTED
RECREATION USE INFORMATION SYSTEM

PART I: INTRODUCTION

1. During the past 30 years, outdoor recreation use on Corps of Engineers projects has grown from an incidental amenity to a major program that accommodates the needs of millions of people. In 1977, 424 million recreation days were reported at the 440 Corps lakes and other project areas. A total of 12.5 million acres* of land and water and nearly 3,100 recreation areas are managed at these projects. Individual areas are managed by quasi-public, local, state, and other Federal agencies as well as by the Corps of Engineers.

2. As a result of the growing number of visitors using Corps projects each year, planners and managers have found themselves in need of information about the recreation use of projects, the types of facilities that visitors need and want, and preferences regarding the various types of activities that are to be provided for on Corps properties. Although a great deal of research has been conducted since the Outdoor Recreation Resources Review Commission published its report in the early 1960's, most professionals acknowledge there is still a great lack of information regarding the various elements of outdoor recreation use.

3. To get at some of these key areas of information, the Corps of Engineers has developed its own information system called Recreation Resource Management System (RRMS). It provides substantial storage, retrieval, and report processing capabilities with regard to quantitative recreation visitation and other data for Corps projects. The system, however, has been criticized because of the poor statistical quality of

* A table of factors for converting U.S. customary units of measurement to metric (SI) units is presented on page 3.

its visitation data and its failure to emphasize information of direct relevance to Corps planning, engineering and design, and research functions even though this was not the intent of the original design of the system. Although Corps publications and research provide broad guidelines for onsite data collection, there appears to be a lack of uniformity at District and project levels.

4. However, measuring recreation visitation onsite is only a part of the overall informational problem. Perhaps the most important consideration is the type of data being collected and the distribution of these data to personnel who need the information to make key planning and management decisions. The RRMS and SIRAP (System of Information Retrieval and Analysis for Planners) systems are two informational systems that have been developed for the Corps of Engineers; they serve at least a part of the overall informational needs.^{1,2} These systems, however, are of limited use in certain functional areas of the Corps' Water Resource Program because of their limited scope and the questionable statistical validity of the visitation data.

5. As a result of these problems, some of the Corps Districts, as well as the Office of Chief of Engineers (OCE), have developed other data collection procedures that supplement and sometimes interface with existing systems. Although these efforts have been fragmented and insufficient consideration has been given to quality control, they nevertheless provide the basis for an improved Corps-wide data system. After all, the Divisions and Districts are the focal point of Corps decisionmaking. In many cases, Corps field personnel have recognized the need for different types of data and have initiated programs on their own that can provide a key to improving the entire Corps data system.

6. The U.S. Army Engineer Waterways Experiment Station (WES) is in the process of planning and conducting for OCE a comprehensive, nationwide recreation research program. The overall objective of the research program is to improve the efficiency and effectiveness of

recreation functions at all levels within the Corps by expanding planning and management alternatives available and by providing a better understanding of their potential effects. Midwest Research Institute's (MRI's) study examines one aspect of the overall effort and provides recommendations that will improve the quality of visitation data and provide more usable recreation information to Divisions, Districts, and projects Corps-wide.

Objectives, Scope of Work and Methodology

Objectives

7. The overall objective of MRI's study for WES was to investigate and recommend visitation data collection techniques and supplemental data systems that might significantly improve available information. The thrust of the research was on evaluating existing data collection systems and identifying the principal types of research and planning information required to improve the Corps' overall recreation program.

In order to accomplish this objective, MRI identified and evaluated the:

- a. Methods and frequency of visitation data collection presently used at Corps projects and by Corps Districts.
- b. Types of data analyses used by Corps offices on a routine basis.
- c. Kinds of information and data pertaining to recreation visitation necessary to support planning, design, management, and research functions.
- d. Methods of storage, retrieval, and dissemination of data and information.

8. The MRI study was not aimed toward collecting data as such but instead was directed toward the technique and methodology involved in improving the overall information available to Corps planners and managers; specific recommendations are expected to be implemented at a later date.

As requested by WES, MRI considered the administrative aspects of alternative recreation information systems, assuming various program levels and degrees of sophistication at the Division, District, and project levels. Specifically, MRI considered the manpower requirements, cost of collecting and storing data, organizational considerations pertaining to field data collection and central data management functions, funding requirements and apportionment of costs among programs, as well as various legislative and administrative constraints.

Scope of work

9. Early in the research program, MRI, working closely with WES, identified two areas on which the research would focus:

- a. Improved Corps visitation data. The RRMS has a number of the visitation elements needed to accomplish much of the recreation planning and management functions. The weakness in the system is not in the type of information elements but in the quality of the data. This is particularly true with regard to visitation. Thus, MRI's research program concentrated on developing a framework and methodology to improve the visitation input to the RRMS. Implementation of this methodology is essential if the "similar project" concept continues to be the primary technique to predict visitation at proposed Corps projects.³
- b. Supplemental information system. The RRMS contains only a part of the total recreation information required by Corps planners and managers. A number of other factors are needed to keep pace with the changing recreation preferences of the American public (e.g., production of new recreation equipment by private industry, changing travel patterns, and the effect of various supply characteristics, site utilization patterns, and use of different types of Corps facilities). This type of information can only come from a supplemental information system. Thus, MRI focused on identifying information elements, sources of data, information collection techniques, and the storage/retrieval/accessing necessary to develop a supplemental information system. Implementation scenarios were also examined for comparative purposes.

10. To provide WES with the essential information to improve visitation data in the RRMS and develop a supplemental data system, three major research outputs have been provided by the MRI study:

- a. Standardized procedure to estimate project visitation. This procedure is being developed in handbook format under separate cover.
- b. Conceptual design of the supplemental information system. The major components of the system are discussed in this report under the headings:
 - (1) Type of information and intended use.
 - (2) Sources of information.
 - (3) Essential information elements.
 - (4) Collection of information.
 - (5) Storage/retrieval of information.
 - (6) Accessing, reporting, and dissemination of information.
- c. Implementation Plan. A suggested framework for implementing the recommendations of the study are contained in a later section of this report. A comparison is also made between the recommended alternative and several conceptual implementation scenarios.

Methodology

11. MRI project personnel initially visited with personnel from WES, OCE and IWR. In addition, a number of trips to different projects, Districts, and Divisions were made to discuss data collection and processing with planners and managers making day-to-day decisions. It was felt that these offices could provide key input to the development of a comprehensive recreation information system.

12. Prior to contacting personnel at the Corps of Engineers Divisions, Districts, and projects, the MRI staff prepared a list of questions about present data collection techniques, the interest regarding types of recreation information, and the analytical techniques presently being utilized to accomplish planning and management functions. Although these questions were not asked at every field office, they served as a guide to lead the discussion groups. (The questionnaire is contained as Appendix A and the field offices visited are listed in Appendix B).

13. Corps contacts at each office were asked to organize a meeting that would include individuals involved in day-to-day planning, manage-

ment, and research decisions. Staff members who were familiar with the RRMS and those involved in master planning and project feasibility analysis were suggested for the meetings. If the field offices were involved to any great extent with automatic data processing (ADP), they were asked to have their analyst attend the meeting.

14. The size of the meetings ranged from only 2 individuals in a single office to up to 12 to 15 individuals with all of the functions described above. Candid comments were encouraged, and in some cases project people were interviewed apart from the Divisions and Districts. All field offices were extremely interested in the area of outdoor recreation; they felt such a study would be helpful to them in the long run.

15. In addition to discussions with field personnel, MRI utilized two on-line, computerized information services available for public use to locate similar types of projects and information systems which could have an impact on an improved recreation information system.⁴ The MRI staff also coordinated with other state and Federal organizations developing recreation information systems (see Appendix B).

PART II: FINDINGS AND RECOMMENDATIONS

16. Although the Corps of Engineers traces its origin to 1775, its responsibility in the area of outdoor recreation is relatively new. The initial role of the Corps was primarily military in nature. Through the years, however, the organization has become more heavily involved in water resource development. In 1932 the authority of the Corps of Engineers was extended to provide for consideration of recreation boating as well as commercial navigation interests in planning improvements along waterways. The 1944 Flood Control Act expanded on this responsibility and authorized the Corps of Engineers to construct, maintain, and operate public parks and recreation facilities at reservoir areas as a part of multipurpose water projects. Finally, in 1965, PL 89-72 (Federal Water Projects Recreation Act) provided for Federal participation in projects in which recreation and fish and wildlife are project purposes to the extent of financing 50 percent of the construction costs assigned to recreation and fish and wildlife purposes for facilities. Several additional acts and numerous OCE directives, engineering regulations, and guidelines also direct planning and management of recreation facilities.

Corps Responsibilities in Planning and Managing Recreation Resources

Planning responsibilities

17. Although it is not possible to summarize all regulations and directives related to recreation planning, it is useful to summarize some of the basic responsibilities involved in the design of recreation sites, areas, and facilities provided at water resource projects. Perhaps the basic philosophy underlining recreation development is best summarized as follows:

a. Planning. The objectives and basic policies governing planning, development, and management of outdoor recreational resources, and enhancement of fish and wildlife at Corps of Engineers water resources projects are contained in ER 1165-2-400, "Recreational Planning, Development and Management Policies" and ER 1165-2-500, "Environmental Guidelines for the Civil Works Program of the Corps of Engineers" which establish four environmental objectives: (1) to preserve unique and important ecological, aesthetic, and cultural values of our national heritage; (2) to conserve and use wisely the natural resources of our Nation for the benefit of present and future generations; (3) to enhance, maintain, and restore the natural and man-made environment in terms of its productivity, variety, spaciousness, beauty, and other measure of quality; and (4) to create new opportunities for₅ the American people to use and enjoy their environment.

b. Design. Recreation developments and facilities should be of the highest quality, should be safe and should promote the health, welfare and aesthetic enjoyment of the public. The design of each development and of each facility in a site is the result of compromise between conservation of the natural environment and providing for public use. The designer should be aware of how the proposed development will affect the environment. Certain design principles are important in providing for the public use of project resources with enhancement of, or with the least damage to, the overall environment of a site or area. These principles are applicable to single use area developments, e.g., boat launching, as well as to complex site developments₆ with two or more uses, e.g., state park development.

18. In order to accomplish this Herculean goal, the Corps of Engineers has the responsibility for evaluating overall recreation needs, determining if a project is economically feasible, and then planning facilities and development which best accommodate public needs. Each project goes through a preauthorization phase of study to evaluate the project; the plan of study usually includes both prefeasibility and feasibility analyses. After authorization, the project undergoes the first phase of planning with a General Design Memorandum (GDM) prepared for development of the project. The Phase II GDM provides master plans for development and feature GDM's, including preparation of specifications for construction plans.

19. The general planning function has a number of separate steps during which planners must analyze and make decisions using a variety of data and information. Some of the important individual tasks are summarized below:

- a. Assessment of recreation needs.
- b. Demand forecasting.
- c. Determination of project feasibility (including benefit/cost analyses and concession feasibility).
- d. Site resource capability analyses.
- e. Site design and layout.
- f. Specifications for construction of buildings and facilities.

20. It is, of course, evident that to some degree, each of these tasks is followed for a project in both the preauthorization and authorization phases. Of course during the development phase there is a great deal more emphasis on demand forecasting, site analysis and design, etc.; and obviously the assessment of recreation needs must be a continuing function of recreation planners. Planning is probably best thought of as the research necessary to assure the highest level of quality and use are being planned for in the design and development of recreation facilities.

Management of recreation resources

21. Of course management goes hand in hand with the planning of facilities. The difference, however, is that management begins with the operations phase of a project. In other words, management is the function or responsibility necessary to make sure the resources are utilized in a proper manner. Since recreation is a highly dynamic activity, however, quite often a project manager finds himself working closely with planners, adapting facilities and resources to evolving recreation uses.

22. As with planning, managers find themselves involved in a variety of different tasks; and although it is not the purpose of this report to summarize each individual activity, some of the more important are summarized from ER 1130-2-400 below:⁷

- a. Design of recreation sites, areas and facilities.
- b. Recreation-resource planning.
- c. Preservation and enhancement of fish and wildlife resources.
- d. Responsibility for Federal participation and recreation development.
- e. Pest control program for Civil Works projects.
- f. Authority for regulating certain private floating recreation facilities on Civil Works projects.
- g. Consideration of aesthetic values in water resource development.
- h. Pollution control.
- i. Real estate outgrants.
- j. Disposal of timber, crops and minerals.
- k. General safety requirements.
- l. Agreements for cost sharing of recreation and/or fish and wildlife developments.

23. These tasks are oriented to maintaining and improving facilities and regulating visitor use in order to provide the highest quality of recreation visits. Of course the resource management staff also have the responsibility of collecting visitation and other data for Corps use.

24. Finally, the managers are responsible for the coordination of all resource management activities on multiple-use projects to insure the local image of the organization is enhanced. In other words, managers serve as a bridge between the Corps of Engineers, recreation visitors, and the local citizenry impacted by Federal projects.

Current Approach to Planning and Managing Recreation Functions

25. Although the Corps of Engineers regulations and guidelines are voluminous and appear to cover every possible situation, there are many planning and management functions not specifically mentioned. In fact, instead of finding a highly consistent approach with a great many similarities across the Division, District and project levels, the MRI research team noted a great many dissimilarities and differences in the way Corps field offices perform planning and management functions.

Use of surveys

26. Surveys are commonly used to develop measures of visitation and recreation use (load factors) to be applied to traffic counts. Although several Districts and Divisions have established guidelines for conducting recreation surveys, most generally follow the suggested format in a study by the Sacramento District.⁸ Where surveys are used, typically cars are stopped at entry points and occupants are asked a number of questions: what they intend to do at the recreation area, where they came from, how often they use the area, etc. From these surveys, load factors (number of people per car, actual number of recreation vehicles, recreation activity participation rates, etc.) are developed and used in conjunction with traffic counts to estimate project visitation. While there are a few problems with the survey procedure itself, there are several more fundamental issues that minimize the effectiveness and accuracy of survey based data:

- a. Survey administration. There are no Corps regulations requiring surveys to be conducted at the project level. As a result, surveys are not generally scheduled on a regular basis, and the questionnaire differs from District to District. In some cases surveys have never been conducted and Districts have no intention of employing them to estimate visitation. In these cases, they either "ball park" load factors or use a factor developed by another District.

- b. Selection of sites. The visitor surveys are generally conducted at heavily used, public recreation areas. Because of this, they provide little information about "walk-in" users (e.g., visitors from adjacent subdivisions) or other special user groups (fishermen launching boats in remote areas, waterfowl hunters in headwater areas, etc.).
- c. Personnel constraints. Surveys are often conducted by Corps personnel involved in many other management activities. In addition to quite often having little training in survey methodology, other priorities affect the scheduling and implementation of the survey.
- d. Visitor preference information. Managers are quite often more interested in visitor preferences and utilize techniques other than visitor surveys (informal contact, campfire discussions, suggestion box, etc.). In these cases they fail to realize that a visitor survey, combined with a few questions concerning preferences, can produce far more detailed information for planning and management functions.
- e. Questionnaire clearance. While clearance through the Office of Management and Budget (OMB) is required for any type of survey that involves the use of human subjects (this includes virtually all of the surveys that the Corps undertakes), it was found that most of the project personnel and many of the District personnel were not aware of OMB approval requirements for human subjects research. In the case where personnel were aware of the OMB requirement, they simply ignored it because it is too difficult to go through the mechanisms and procedure to get the clearance.

Estimating recreation visitation

27. As early as 1953, OCE began collecting useful resource management data on a systematic basis. By 1972, the RRMS had been developed to provide standard data for OCE to make management decisions. One of the important elements in the system is the visitation data element. The RRMS regulation presently requires an estimate be made at each project of the recreation days of use for each month and also the total for the entire year. The ER specifies that:

"The visitation will not include those people passing over, through, or along the project, or stopping momentarily to view a project area or structure."¹

This requirement implies that only recreation users (those who use facilities) be included in the visitation count, not those passing over a dam enroute to work, home, etc.

28. The RRMS regulation further specifies that:

"If the total recreational days of use during the year decreased more than 5 percent compared to the previous calendar year, enter a Y in this column (43). If the total remained the same, increased, or decreased by less than 5 percent, enter an N (same column). When entering a Y in the column, the reason for the decline must be discussed in the narrative."1

This requirement should provide an incentive for managers to keep a close watch on their visitation so that consistent counts are made on a yearly basis.

29. Development of the RRMS has provided a great deal of information needed for planning and management of recreation areas. However, with regard to the visitation data input, several basic concerns were identified during MRI's field visits:

- a. Lack of a standard definition for a recreation visit. Although the RRMS provides a clear definition of a recreation visit, there is considerable flexibility in how this definition is interpreted in the field. For example, in one case a project manager had a major highway crossing the dam of his project. Although the District had on several occasions suggested the location of counters should be at the entrance to recreation sites, or that a survey be conducted on the highway to determine how many of the cars actually contained recreation visitors, the project manager continued to monitor traffic across the dam. When queried by the MRI staff, he stated that he felt that if people passing over the dam viewed his project and somehow had a better outlook on the day, then in his opinion they were a recreation visitor. This view is in contrast to other interpretations that a visitor is a visitor only if he uses recreation facilities and areas. In those cases, people who pull into a parking lot, look around and immediately leave are not even counted as visitors.

Even with the RRMS recreation definition, project managers are still in disagreement as to which visitors to count. The MRI team noted on another occasion (in a District that supposedly had little recreation use) that visitation was estimated primarily as a "ball park" figure in the District office. This District also had a project that was almost 100 percent recreation oriented, but it was not in the RRMS. In this case, the District operates about 30 locks and dams along a river. The river is no longer used as a commercial navigation waterway and is thus almost 100 percent recreation boats. Even though this situation exists, the project is presently not recorded in the RRMS. One can only wonder how many other such projects would add to total recreation visitation throughout the United States.

- b. Lack of standardized use of load factors. There appeared to be a lack of understanding and use of survey data in developing and applying load factors to traffic counts. Some personnel did not seem to recognize the problem of multiple reentry, maintenance, or nonrecreation vehicles. They simply divided traffic counts by two (two axles per vehicle) and multiplied the quotient by the average number of people in cars (survey data). Others, often using a more sophisticated technique to apply load factors, assumed a single load factor applied to all areas on a project or all projects in a District. In this case, they failed to recognize that facilities and activities often affect load factors.

In addition to often using old load factors, MRI field personnel also noted that the position or location of the personnel applying load factors differed by District. In some cases they were applied by project personnel utilizing hand calculators. In other cases, computer techniques were employed by District personnel.

It is evident that the understanding, attitude and general priority relating to load factors and visitation varies by District. Some Districts conduct surveys and update load factors every third year on some projects. Other Districts conducted them when the original Sacramento study was done, over 10 years ago. Other Districts have never done them and have no plans to utilize surveys in conjunction with traffic counts.

- c. Incentives to inflate visitation estimates. Another issue cited at both the District and Division levels was the fact that the ranger grades are in part affected by the level of visitation at projects. Opinions about the effect of this factor on overall visitation estimates varied sharply. Some Division and District personnel were of the opinion the project managers were totally fabricating visitation, so that

they would be well over the magic number of 1 million visitors annually. Others indicated that grade levels did not alter the accuracy of the visitation that much. One District indicated that rangers were indoctrinated from the beginning of their employment about the need for accuracy of the visitation. They felt this encouragement alone provided esprit de corps and pride in maintaining good visitation estimates.

An even more important factor perhaps, is that funds are often allocated to projects based on the level of visitation, even though administrators may not place that much reliability on the accuracy of the counts. Because project managers daily face the public and have to answer questions as to why their facilities are not comparable to other Corps facilities only 20 or 30 miles away, they may be led to inflate visitation so they will receive stronger consideration for O&M funds.

- d. Visitation to outgrant areas. Visitation to these areas is no doubt an important component of the overall visitation to Corps projects. It was also noted that there is no consistent way that this visitation is presently being estimated. For example, some Corps project people actually maintain their own counters, use survey techniques, and keep a close check on visitation entering and utilizing outgrant agency areas. In one case, a District gives the outgrant agency a copy of the Sacramento study and tells them to follow these instructions. In another case, a District asks the outgrant agency to keep track of overall visitation without any specific direction as to how the data are to be collected.
- e. Specific measurement problems. Finally, there are a number of specific measurement problems making the entire recreation visitation estimating procedure difficult. In most cases these specifics can be researched and solved. For example, it was noted there was little agreement between Districts as to the most effective type of traffic counter. Although the Southwestern Division (SWD) is probably leading in the installation of magnetic counters, the MRI team interviewed District personnel who said they had attempted to use them but found problems with them far worse than those encountered with the pneumatic counters. Even in SWD, although Division and District personnel feel the magnetic counters are accurate enough to measure the number of independent vehicles (cars, campers and boat trailers), project people said at best, they can count individual units

(cars + trailer = 1). And, even in some cases, during rush hours or during peak periods, cars were so close together that counters had difficulty separating them and providing an individual count of units.

Of course there is the problem of counting users at non-gated sentry points (fishermen and hunters, and recreation users from subdivision). However, quite often these users are associated with peak use periods such as duck hunting season, fishing season, etc. Quite often unobtrusive observation and an occasional aerial survey is being used to improve visitation counts significantly. The subdivision problem is perhaps slightly more complicated, since use can take place any time of the day, month or year. However, the Louisville District has pioneered in the development of surveys associating an average day use of participation per individual housing unit from surrounding subdivisions. Thus, approximately every 3 to 5 years an aerial survey combined with a ground survey provides a good overall estimation of the recreation visitation coming from subdivisions surrounding lake projects.

Another problem is the multi-gated use areas where perhaps three different entry points to a single recreation area prevent use of traffic counters without good surveys in support of the counts; combined with periodic surveys and unobtrusive observation, even this problem is being handled by some Districts.

Finally, there is the problem of reentry at various points by a single recreation visitor. MRI previously conducted a joint study for a Corps of Engineers District and a multi-county tourism organization. This area contained a combination of recreation areas managed by three separate Federal agencies, two state agencies and numerous private developments. We summed total visitation for all agencies and found it was estimated that over 10 million visitors were coming to the area annually. Using MRI's COMPATRAX recreation demand model and the highest quality rating for recreation resources in the area, the maximum annual visitation the model would forecast was 2 million. One of the outputs from the model is the number of overnight visitors. Using average occupancy rates for all private and state resorts plus cabin units and an average occupancy rate applied to the campground sites, it was noted that MRI's COMPATRAX overnight visitor forecast was within about 10 percent of the derived number. Assuming only a small portion of the 10 million visitors were staying overnight, all resorts and camping spaces would have been occupied 100 percent of the time, with a considerable surplus having to leave the area.

This potential double counting problem has also been noted by some of the Districts. For example, one District, quite well versed in survey techniques and visitation estimation, conducted surveys several years ago on some of their projects to update load factors. The study was apparently well done, with excellent statistical design. District personnel indicated if they had used the revised load factors, visitation to District projects would have been 30 percent under the previous year's estimate. Because they did not want to attempt to explain the reductions in visitation, they chose to ignore these surveys and thus continue to use previously established load factors.

30. Many of the problems and issues outlined above are statistical in nature and therefore can be solved with good quality control and knowledge of statistical techniques. No doubt visitation estimates are being done very well at individual projects, but with the present situation there is no way for a planner in a particular District to know which visitation estimates are believable and which are inaccurate. Since demand forecasting using the "similar projects" technique assumes visitation counts are accurate, it is essential that a program to improve these counts be initiated. In all probability, projects are being both over and under estimated, with some recreation visitation attributable to Corps of Engineers facilities not even being included in the RRMS. There is no way to estimate what the overall recreation visitation at the national level is, but it is possible that overall Corps visitation would neither increase nor decrease significantly if a program to standardize efforts was pursued.

31. At the present time few Corps planners and managers have faith in the numbers that are being collected. As a result, they either ignore them or place little reliance on forecast techniques in the planning of additional facilities. The Corps of Engineers should not be embarrassed by these findings. Our experience indicates that other Federal agencies are experiencing the same problems. The only place where MRI

has found accurate visitation estimates is where a turnstyle, usually supported by the sale of tickets, is used to measure the number of visitors. Only in these cases have visitation estimates been found to be within a percent or two of the actual count.

Use of analytical methodologies
and information systems

32. Another part of the MRI study involved evaluating how Districts and Divisions are utilizing recreation visitation and other data to accomplish planning and management functions. To gain a perspective of the various analytical techniques and methodologies utilized, a portion of the field discussion was directed toward this subject. Although each Corps office generally has its own set of analytical techniques, some of the more general methodologies are summarized below.

- a. Project feasibility. General guidelines for preauthorization studies and reports are contained in the Corps of Engineers EM 1120-2-101 and ER 1120-2-404.^{9,10} These guidelines suggest how to evaluate the various aspects of each project including recreation, fish and wildlife, ecological, archeological, historical, and other environmental aspects. Preauthorization planning involving recreation resources should consider such things as the magnitude of human needs, the application of sound resource management, economic principles, the utilization of accepted standards for space and facility requirements, establishing a quality experience for the visiting public, and maintaining or improving the quality of the environment.

The general guidelines for postauthorization planning and preparation of a general design memorandum (GDM) are contained in ER 1110-2-1150.¹¹ Postauthorization planning is very similar to preauthorization planning except that more emphasis is placed on forecasting facility and site needs, whereas preauthorization planning emphasizes economic benefits and costs associated with recreation development. The main set of guidelines utilized for estimating recreation benefits is the old Senate Document 97 and the new Principles and Standards.¹² There is, of course, a major congressional act that governs all existing and proposed Corps projects, the National Environmental Policy Act of 1969. This Act provides further requirements for each existing and proposed project.

b. Forecasting recreation visitation. By far the most common technique for forecasting recreation visitation is the methodology outlined in Technical Report No. 2, developed by the Sacramento District (Estimating Initial Reservoir Recreation Use).³ This technique is based on the concept of the most similar project (i.e., an existing reservoir most comparable in size, operation and anticipated recreation-use characteristics). Thus, recreation visitation at an existing reservoir provides the basis for estimating use at a planned project.

In general, the MRI research staff found that most Districts involved in planning reservoirs are utilizing this technique. However, nearly all offices contacted pointed out three basic problems with the technique. First, the report is limited to data on 52 existing Corps reservoirs, located primarily in the South and Southwest. Second, the recreation visitation in this report is now over 10 years old. Third, the technique is oriented toward estimating initial reservoir use and offers little for planners attempting to update master planning at existing reservoirs.

The St. Paul District offered one innovation with regard to the use of Technical Report No. 2. This District has computerized data in the report and is able to evaluate the effect various factors have on total visitation at a project (i.e., raising the water level, changing the shore line miles, etc.).

Another exception is in the Los Angeles District, where dry reservoirs in the Los Angeles Metropolitan Area are being developed for parks. In these areas, the technique used is straightforward and fairly simple. Basically, State recreation participation rates are multiplied by forecast population to determine total activity days generated in a region. These days are allocated to the existing supply of resources. The surplus of recreation days is the amount that is expected to be expended at the proposed project. Using facility and space standards, the number of days are converted into the number of facilities required to accommodate these needs.

In addition, WES is presently testing a nonreservoir recreation demand model for use in project planning. The model was initially developed by the Sacramento District from area of origin visitation data collected at parks along the American River in California.¹³ It is interesting to note that although the publication describing this study

is over a year old, there is little knowledge of this technique or its possible uses for proposed projects outside of the Sacramento District.

- c. Demand analysis for harbor developments. Corps manual EM 1120-2-113 describes criteria for evaluating the benefits from small boat harbor projects.¹⁴ Paragraph 9 summarizes these criteria. Although several of the Districts MRI contacted are involved in this type of feasibility work, we were unable to obtain a copy of the small harbor study, or to talk with those preparing reports. No doubt research needs for this type of study should be considered in developing an information system.
- d. Concession needs analysis. The need for commercial concession analyses is described in ER 1120-2-400.⁵ This regulation specifies that the need of the public for water-oriented accommodations and services will be considered with the same degree of planning as those determinants made for other public use and access requirements. The ER specifies that an adequate market study and analysis will be accomplished. The MRI research team is aware of several Districts involved in this type of analysis. In general, most of the more sophisticated analyses reviewed center around using population, boat registration, and competition from other concessions on the lake as well as other lakes to determine the need for additional services and facilities.
- e. Urban needs analysis. A number of Districts are becoming more and more involved in evaluating urban needs. For example, the Kansas City District, has two developing lakes on the edge of a major metropolitan area. The Fort Worth District already has several existing reservoirs in the Dallas/Fort Worth area, and of course the Los Angeles District projects are primarily centered in the Greater Los Angeles area. These and other Districts indicate the growing need of a framework for analyzing urban demands.

A few years ago, WES sponsored a study to evaluate methods and models applicable to urban studies.¹⁵ This report is intended to provide a source book for planners and others involved in studying urban areas. A number of different types of planning models were described. Even with this pioneering effort, Districts acknowledge one of the main problems of urban recreation needs analyses is that planning guidelines are written in terms of eight water-oriented recreation activities commonly found at reservoir projects.

Even the types of facilities that the Corps may cost-share on are more oriented to these activities than some of the more urban types of facilities such as tennis courts. The Los Angeles District planners were of the opinion that the technique to evaluate quantitative demand for urban needs was not as important as identifying the various types of needs. In general, this District has departed from the traditional activities normally planned at lake projects, and has become involved in equestrian activities and facilities for rodeos, bicycling, outdoor game areas, etc. They emphasized the demand for these activities far exceeds the existing supply. The important thing to them was being able to identify the general needs so that facilities could be planned and built.

Areas of concern expressed by Corps field personnel

33. In addition to the problems and issues outlined above, a number of other important considerations affecting visitation data and recreation information systems surfaced during the field discussions. One of the major problem areas in planning and managing of recreation resources relates to the organizational structure of the Corps of Engineers. Functioning basically as a national engineering and construction organization, the Corps of Engineers only recently has begun to address the question of managing developed resources. Up until the last few years, the major thrust of the organization was oriented to designing and building large multipurpose water projects, dredging rivers, construction of locks and dams, and other such major construction activities. Now the organization is beginning to acknowledge the volume of resources located throughout the country requiring continual planning and management.

34. Since the Corps of Engineers is presently in a mode of shifting views from being construction-oriented to more of a management philosophy, it follows that there may be under-commitment for some of the basic management functions. Since it is natural for any organization to attempt to maintain a status quo, it is likely there may be insufficient funding for operations and maintenance (O&M), particularly with

regard to outdoor recreation. During field visits, Corps staff members constantly pointed out this basic problem to the MRI research staff. Any time suggestions were made for improving the information system or collecting additional data, Corps personnel immediately emphasized there was insufficient staffing to perform present planning and management activities not to mention assigning additional responsibilities.

35. Corps staffs also said present funding policies are highly restrictive with regard to developing facilities for outdoor recreation. Other than in the Los Angeles District, it appears these programs are restricting development in areas where facilities are sometimes needed. One District official pointed out that the state park agency in a particular state had already absorbed as many Corps properties within its system as it was financially possible to include; and other than the state, no other local agency was interested.

36. Related to the organizational problem is the limited research and planning capabilities at the District level, particularly with regard to an automatic data processing (ADP) function. Field offices quite often indicated the ADP section was oriented to design and accounting responsibilities. Planning was far down the list of priorities for developing and managing data programs. As a result, data are quite often handled on a manual basis rather than waiting for programmers and analysis to assist in developing any kind of software program. Only where Districts have evolved to a more sophisticated management mode have the Districts developed any major ADP capabilities.

37. A second major problem area affecting the way Corps personnel plan and manage recreation resources is the varied role Corps resources play throughout the country in satisfying outdoor recreation needs. In some sections of the country large multipurpose lake projects provide the dominant recreation resource base. Around these lakes state and other

Federal organizations have developed areas and facilities for recreation use. Two state park systems (Kentucky and Oklahoma) rely heavily on the availability of Corps properties as sites for the development of major resort lodges.

38. In other areas of the country, national parks, forests, and other public and private resources dominate; but even here Corps waterways often serve a major recreation need. For example, a recent study by MRI for the St. Paul District, revealed that river recreation travel is an important project use on the Mississippi River north of St. Louis.¹⁶ In some sections of the country (New England Division and Los Angeles District) dry storage reservoirs furnish important resources for the development of state and municipal parks.

39. The variety of natural resources, project uses, and recreation facilities and uses go together to make a difficult situation for developing planning guidelines and data systems to serve the total Corps need. One District in the Midwest which is responsible for planning several multipurpose water projects on the edge of a large metropolitan area emphasized that Corps policies and guidelines are oriented to rural lake operations. They said the guidelines are not suitable for the situation for which they are planning. Coastal offices emphasized the unique climatic characteristics requiring specific planning needs. An often heard comment went something like, "Not enough attention is given to regional recreation differences in engineering regulations or planning and management guidelines." Although MRI visits to projects were not extensive, it was noted during field trips, as well as from prior experience, that projects vary significantly in terms of resources, site layouts, management philosophies, etc. These factors will have to be considered in the design of an information system that will be used for making basic planning and management decisions.

40. The Corps of Engineers water projects are also being affected by external forces. During the past 20 years there have been major innovations in outdoor recreation. Not only has industry been vying for a share of the market by developing new types of equipment and devising new forms of recreation use, the American public is undergoing a philosophical change that emphasizes use of leisure time for recreation purposes. As a result, all public agencies have continued to show increases in visitation--even during periods of recession and restrictions on the availability of fuel. Not only are the numbers of visitors increasing, there are new demands for different types of activities and facilities for which little information is available. These new uses often conflict with other established uses and existing policy standards.

41. A common opinion voiced by Corps field offices was that present policies and guidelines limit the changing of site developments so that new use patterns are not easily accommodated. Throughout the Midwest, for example, Corps lakes have been developed to include rather large picnic areas for single family use. Project people indicate these areas are no longer being used in this manner. Quite often day use groups, composed of a number of different types of vehicles, move into an area and dominate a whole section of a park. Not only are the areas not designed for this type of use, present management guidelines generally prohibit it. Another comment heard was that facility and use standards are out of date and should not be used to plan for today's participation patterns. A few of the field personnel even went so far as to say that standards were changing so rapidly that by the time the budgeting process (usually lagging 3 to 5 years behind master planning) caught up with development, the constructed area would be out-of-date.

42. Obviously, some of these problems may be minimized in the future. For example, as the Corps of Engineers evolves into a management mode, more attention will be directed to the basic organizational structure and staffing necessary to fulfill planning and management functions.

Nevertheless, these issues presently confront Corps field offices, and to a great extent impact and thus determine the various approaches to planning and management. The MRI research staff noted, for example, in some Districts that planning took an extremely simplistic approach; whereas in other Districts it was quite sophisticated and certainly keeping pace with the state of the art. The level of planning activity, the approach, and the methodology greatly depend on the size of the staff and the difficulty of the planning problem. Corps offices are generally doing an outstanding job tailoring their use of existing methodologies and data systems to fit the problem and the availability of staffing and budget.

MRI Study Recommendations

Future recreation scenarios

43. During the past 25 years, some major innovations have taken place not only in leisure markets but in the entire American way of life. Prior to the great depression and even during postwar years, monitoring trends was the primary technique used to forecast uses, participation, and human behavior. Those involved in "futures work" today seem to agree that the key to forecasting tomorrow's behavior lies in understanding a number of possibilities. With regard to outdoor recreation use and the demands that will be placed on facilities in the future, several concepts are currently receiving wide attention in recreation literature. A few of these concepts are discussed briefly below:

- a. Volunteer simplicity. The 1960's and 1970's were the age of recreation expansion with a wide range of sophisticated recreation equipment, including boats, RVs, ski mobiles, all-terrain vehicles, etc. Partly because of recent environmental legislation and the awareness that people are developing about the destructive capacity of these and other recreation uses, some feel that tomorrow will be an age of conspicuous conservation.

- b. Participation flexibility. Because of the availability of many types of recreations areas, heavy commitment by public agencies to outdoor recreation, and the wide variety of equipment and activity choices made possible by the private sector, the American public is the most sophisticated leisure consumer in the world. Almost everyone has the opportunity to acquire skills and participate in the activity of his choice. Even courses are taught at the high school level today that allow children to experiment with new recreation activities. As a result, planning in the future will have to be highly flexible to meet the activity demands made by the American public.
- c. Passive versus active recreation pursuits. Earlier participation surveys showed many age groups, income categories, and cultural classes to be passive in their recreation pursuits. Recent studies indicate a trend for tomorrow that may well be towards active involvement in recreation pursuits by all groups. Already, even some advertisers are concerned by TV ratings and trends away from other more passive recreation activities.
- d. Women in the labor force. Partly as a result of inflation and the need for more money, a trend began a few years ago that of more women joining the labor force. Recent studies show that a declining number of women are leaving the labor force even during pregnancy; instead they are remaining a part of the force throughout their entire careers. This factor has had conflicting results with regard to the use of leisure time. More money is available for leisure pursuits, but there is less time for family activity. This could mean more separate vacations for husbands and wives, or shorter vacations taken by air travel and other commercial carriers.
- e. Increase in singles. Population statistics show that young people are marrying at a slower rate than they were a generation ago. With an increasing number of singles, planners may have to rethink their provision of facilities and services for this new clientele.
- f. Retired market. People are living longer than they did a generation ago. In addition, they tend to be more active and in a better state of health. Until recently, early retirements meant that more older families would be traveling after 50 to 55 years of age, thus placing a greater burden on recreation facilities during the spring, fall, and winter seasons. With the passage of the new Social Security

package and abolishment of forced retirement clauses, a great deal is left in doubt as to whether this market for recreation will be increasing or decreasing during the next 25 years.

Recommendations for Corps action

44. All of the above concepts may become major trends and must be monitored during the next few years. No one has answers as to how these trends will affect recreation developments, particularly with regard to outdoor areas such as those managed by the Corps of Engineers. To provide planners and managers with the information that is necessary to accommodate the American public, the Corps of Engineers must have a system that can evaluate these and other major changes in the American way of life. Already the Corps has responded by not only developing a large number of areas and facilities around the country, but also by acknowledging recreation as a viable project purpose. In addition, the development and implementation of the RRMS has shown a strong commitment to accommodating recreation needs.

45. In this report, MRI is recommending improvements in the Corps of Engineers recreation information system. Procedures for collecting and analyzing the information as well as individual data elements are discussed. However, prior to describing some of these more specific program issues, MRI has classified the overall recommendations into four general areas. All information program and data improvements are tied directly to these four recommendations:

- a. Acknowledge the importance of recreation information. Based on our discussions with field personnel, MRI recommends that the Corps of Engineers acknowledge the importance of a recreation information system to Division, District and project personnel. No doubt engineering regulations, circulars and other formalized documents have some impact. But unless the program is supported with earmarked funds and additional personnel with designated assignments for collecting and analyzing information, field personnel will

not have sufficient resources to do the job. It is absolutely essential that the program be adequately financed. Rather than giving the program limited support, and developing an information system based on weak data, MRI recommends that the Corps concentrate its resources on other recreation problems.

- b. Establish organizational support. In order for the recreation information system to function efficiently, the Corps of Engineers must designate a central office to coordinate the overall program. This office must be supported in requests to obtain data from field offices as well as require and enforce changes in data collection techniques. Although OCE (the Recreation Resource Management Branch) is presently responsible for the RRMS, because of its focus on congressional and national direction it does not appear to be the proper element to fulfill this function. However, a number of Corps research labs could also qualify as the central office. WES is in the process of developing demonstration projects throughout the country and needs authority to direct data collection. In addition, they have already developed an agency recreation information exchange bulletin and are in the process of becoming known as a focal point for recreation research within the Corps of Engineers. Therefore, MRI recommends that WES be designated as the central office to develop and implement the recreation information system.
- c. Improve recreation visitation data. We recommend that the Corps take immediate steps to implement standardized survey and visitation estimation procedures at the project level. Although new visitation estimates may be in direct contrast to previous figures, sound data are absolutely essential for recreation planning and management. These improved data will enable Corps planners and managers to compare projects on a regional basis with a strong degree of accuracy. Implementation of this recommendation will include development of an engineering regulation (utilizing the MRI survey and visitation estimation handbook) with quality control and enforcement of handbook procedures furnished by the central authority (see b. above).
- d. Design and implement a total recreation information system. We recommend development and implementation of a total recreation system as described in this report. It would be supplemental to information already available from RRMS and include the following major thrusts:

- (1) Monitoring trends. Continual input of annual information into the system with a high degree of segmentation regarding use patterns will enable Corps personnel to spot the effects of changing leisure patterns and to forecast the impact of these trends.
- (2) Planning/management framework. The system should constantly focus on field needs. The RRMS, a necessary management tool, was designed for use primarily by OCE. Future systems, however, must focus on the needs of field personnel and their requirements for fulfilling planning and management responsibilities.
- (3) Flexibility. The information system as proposed in this report is based on the needs of today. Leisure trends, equipment development, and various external factors will determine and control tomorrow's demands. The system, therefore, must be responsive to the continually changing information needs of the field staff.

46. An overall information system will be expensive and require a great deal of staff time to implement and maintain. Because of the constant threat of inflation, it is essential that the Corps of Engineers begin implementing at least parts of the system as soon as possible. The needed data for the recommended information system essentially comes from implementing standardized survey techniques on Corps projects, tracking trends in external factors affecting recreation use, analyzing already existing RRMS data, and collecting additional information at selected sites. The latter element could come in conjunction with the Recreation Research and Demonstration System (RRDS) concept proposed by WES. Figure 1 provides an overall view of the major system components and the general process for developing the recreation information.

47. The remainder of this report describes the standardized survey, visitation estimation technique and recommended supplemental recreation information system. Part III of the report deals with visitor surveys and visitation estimation. Implementation of a standardized survey and estimation technique are essential to improving the visitation information. Thus the survey and visitation technique should be utilized

FIGURE 1
RECREATION INFORMATION SYSTEM COMPONENTS

DEVELOPMENT OF RECREATION INFORMATION					
SYSTEM COMPONENTS	Training and Quality Control	Collection of Data	Analysis Processing of Information	Storage of Information	Reporting/Use
<u>Visitation Information</u>	WES to train projects and Districts every 3 years.	All projects to conduct visitor survey every 3 years, or as needed	Project survey data analyzed and processed by Districts (load factors, activity participation, etc.)	Specific visitor elements stored in central data bank by WES (interactive system)	WES to produce reports as desirable. Information used by projects, Districts, Divisions
<u>Visitor Surveys</u>	Same as visitor surveys. Annual monitoring of projects by Districts	All projects to collect traffic data monthly (traffic counters checked weekly for operation)	Districts to develop monthly, seasonal and yearly visitation estimates for projects (application of load factors, etc. to traffic data)	Visitation and supporting information input to RRMS annually (interactive system)	RRMB (OCE) to produce annual visitation reports. Information to be of broad interest (national and local)
<u>Visitation Estimation</u>	WES to coordinate overall research program and provide consulting expertise to projects, Districts and Divisions	Selected projects to conduct preference studies and other special studies of interest to projects and Districts (selection based on project, District, Division or WES needs)	Districts to assist projects in selecting primary data. Specific studies and analyzing data elements to be stored in supplemental system by WES (interactive system)	Districts to retain all primary data. Specific data elements to be stored in supplemental system by WES (interactive system)	Same as visitor surveys
<u>Preference and Other Special Studies</u>	WES to design and develop a supplemental recreation information system (interactive) and train Districts and Divisions in use of the system. Districts to assist projects and use system to solve planning and management problems. WES to serve as a consultant to projects, Districts and Divisions concerning recreation information needs	WES to monitor and compile data from annual reports, statistical analyses and other secondary sources	WES to identify (with input from projects, Districts and Divisions) data sources and information elements for the supplemental information system. WES to conduct needed analyses.	WES to store information in central data bank (some elements manual, others in interactive system)	Same as visitor surveys. Information published in RECNOTES and annual report
<u>Trend and Cross Tabulations</u>	Projects to collect specific data elements from visitor, preference and other special studies	Projects to collect specific data elements from visitor, preference and other special studies	WES to specify data to analyze data sources as required for projects	Specific data elements to be stored in the supplemental information system by WES (system interactive)	Same as visitor surveys. Districts to use system in developing visitation projections for projects
<u>Demand/Benefit Forecasts</u>	Projects to collect specific data from RRMB's and other special study areas	WES to specify data elements, Districts to monitor and assist projects and analyze data as required for projects	Same as Demand/Benefit Forecasts	Same as Demand/Benefit Forecasts	Same as visitor surveys. WES to use information in support of other research studies
<u>Site Planning Information</u>					

at all Corps projects. The need for preference and other special studies, on the other hand, may come from the project, District, Division or WES. To provide a standardized methodology and enable broad analytical capability, WES should consult with the other Corps units and select specific data elements for storage in the overall information system.

48. The total information system (sometimes referred to as supplemental because it utilizes existing data along with supplemental elements) is described in Part IV. It contains three information subcomponents: trend and cross tabulation analysis, demand/benefit forecasts and site planning information. The system should be designed by WES, with information collected at all Corps levels. Although some analysis will be required of Districts, the bulk of the analysis will probably be accomplished by WES. The system should be maintained by WES, with interactive system capabilities at the District level. WES will probably produce periodic reports, and projects, Districts and Divisions will have the capability of utilizing the system to satisfy their own planning and management research needs.

49. The remainder of MRI's final report discusses alternative implementation scenarios (Part V) and the administrative aspects of implementing the study findings (Part VI).

PART III: IMPROVEMENT OF VISITATION DATA

50. Since 1962 when recreation was accepted as an economic output for the Corps, it has become increasingly important that adequate visitation data be gathered. Procedures for gathering public use visitation data were developed at that time and were subsequently revised and modified until in 1969 a set of procedures was adopted as guidelines. The procedures were designed to elicit data that were necessary for effective Corps project operation and management and planning and to fulfill the reporting and budget requirements of OCE.

51. While the guidelines for gathering the data are good, there is no requirement that they be gathered in a uniform manner. As a rule three inputs are used to collect public use participation data: (1) roadside surveys; (2) traffic counter readings; and, (3) estimates of low-density or miscellaneous use areas. In actuality, there is variation among projects regarding how each of these three elements are accomplished. The lack of a uniform methodology for surveying and the placement of traffic-counters make it difficult to make comparisons among projects. With the development of a set of regulations and a central agency which would be responsible for quality control, the major problems concerning visitation data can be overcome.

52. The purpose of this section is not to be critical of current data collection techniques and data systems, but to highlight some of the problems inherent in the procedures and the system and to make recommendations for dealing with the problems so that the reliability of the data can be improved.

Current Methodology

General findings of field visits

53. The MRI survey team found that a variety of surveys are being used by project managers to gather data ranging from public use patterns to user preference. The surveys themselves ranged from the formal roadside surveys recommended by the Corps to informal user preference surveys conducted at project areas.

54. The importance of accurate public use data is recognized by almost all project managers. Throughout the Corps, data have been gathered following certain general guidelines, but by methods interpreted by individual projects. These different interpretations have resulted in wide variations in submittal of both Recreation Survey Use Information and Monthly Visitation Reports.¹⁷ A number of Districts have developed survey guidelines to clarify and standardize the gathering of Recreation Use Survey Information, submittal of Monthly Visitation Reports and Traffic Counter Operations. Only one Division has developed a set of regulations concerning how and when visitation surveys should be accomplished.¹⁸

- a. Recreation use survey. The Division regulations concerning visitor surveys are similar to those of the Districts that have attempted to standardize data collection.¹⁹ These regulations specify that surveys will be conducted at least three times a year to sample recreation activity--during spring, summer and fall. The spring period includes the months of March through May; the summer period includes June through August; and the fall period includes October through November. The surveys are expected to be accomplished during each of the 3-month periods in the month that best typifies the recreation activity for that period. The surveys taken for consecutive seasons are not taken within 1 month of each other. Also surveys for the winter quarter, the months of December through February, are optional surveys. If the surveys are not taken during the winter quarter, then the fall survey is used to estimate December visitation, and the spring survey is used to estimate the January and February visitation. The survey is conducted on one mid-week day and on one weekend day of the same week.

The regulations suggest that survey days reflect normal conditions and no holiday surveys are conducted. Weather should be average for the season, and the water level should be adequate for recreation purposes. In addition, there should not be any special events such as boat races, fishing season openings, rodeos, or fishing tournaments that might tend to draw abnormally large crowds or bias the normal activity. The surveys are conducted for a minimum of 12 hours per day.

A number of Districts and Divisions have modified the Sacramento study questionnaire to obtain additional information or devised special surveys to obtain visitation information in situations where the Sacramento procedures are inappropriate. The Division having the most comprehensive regulations concerning surveying provides special surveys for obtaining data such as: the number of hunters, visitors using trailers or other special facilities, visitors using houseboats for overnight use, and visitors from adjacent subdivisions where monitoring of visitation is at best difficult.

- b. Other surveys. Some projects were found to be using other types of surveys to gather information that might be helpful in managing and planning recreation facilities. These surveys include user preference surveys designed to identify the kinds of facilities and activities campers and other users of recreation facilities most frequently want. Many of these user preference surveys are done by persons not employed by the Corps. It was found that some managers use graduate students or university personnel to conduct user preference surveys. Probably some of the studies are of excellent quality and aid the project manager to get a handle on user preference for a project.

The methodology employed in these surveys varies from project to project. In the case of university personnel or graduate students who are conducting surveys for particular projects on user preference, the survey is designed to fit the immediate project area. Sometimes these surveys are conducted with other intentions in mind, such as a graduate thesis or dissertation. In other cases, Districts have contracted with universities to develop data for planning and managing of recreation activities at particular projects. In these instances the survey design is usually good, and the data elements are generally well thought out and attached to a body of theory that makes the methodology feasible and the data usable.

Another type of survey is the informal interview. Project personnel engage in informal surveys to determine the types of activities in which project participants are engaged and the types of facilities that are most wanted by individuals. In these cases Corps personnel move freely among the visitors at a project area and simply ask questions such as: What do you like best about the project? What do you like least?, etc. In this way they get an idea of what could be done to improve the project from the visitor's point of view, what other activities should be included in the project, and what would make a more pleasant recreation experience for the user. The sampling technique and methodology employed in this kind of survey is arbitrary. There is generally no effort to randomize the sample, nor is there any effort to conduct uniform surveys, develop a uniform series of questions, or construct an interview schedule for each individual respondent. As a result, the project personnel get an idea what would be best at their particular projects but do not get any accurate data to allow them to make planning and management decisions.

Another methodology used by managers to solicit opinions and expressions from project visitors is the use of campfire discussions. In some instances, this procedure involves only informal group discussions around a campfire. In other instances participants in a campfire discussion fill out a questionnaire based on what activities they enjoyed most, those they enjoyed least, and their preferences in recreation. The latter form of survey could be effective and productive if the methodology were standardized and if it could be determined that the sample was not biased.

The final survey technique used at many surveyed projects is a suggestion card-box technique. This is a completely voluntary activity. Recreation users are given the opportunity to make suggestions on a printed card about how to improve the particular project or project areas. The card is readily available, usually at exits. There is a suggestion box nearby so that the cards can be easily deposited. Recreation users simply fill out the cards anonymously and leave them in the suggestion box with ideas for improving activities. This allows project personnel to find out what individuals would like in the way of facilities and activities. However, it does not provide information dealing with other important variables for project management and planning, such as the distance the visitor traveled, the amount of time spent at the project, the attitude toward recreation in general, and the frequency with which the visitors use the project area.

c. Traffic counters. Correct traffic counts are necessary to provide accurate visitation information. In order to get meaningful results the counters must be placed properly and maintained in good working order.

Several types of traffic counters and different placement arrangements are used on Corps projects. One is a pneumatic counter with a hose that stretches across both lanes of traffic. It registers the exact number of axles which pass over it. The same type counter might also be utilized on a one-way entrance/exit. The total traffic reading is either divided by four (two-way road) or two (one-way road) to estimate the actual vehicle count. A second is a pneumatic hose that has a counter that only counts each second axle so that the numerical reading is only divided by two for two-way traffic (no division required on one-way roads). A third type of counter is a vehicle sensing loop that is embedded in the roadbed of a traffic lane (lanes). The loop sensor is generally calibrated to count vehicles. If it is installed in just one lane so that it only records traffic entering or exiting, no adjustment is required. If the loop sensor covers both entry and exit lanes (two-way traffic), the count must be divided by two.

Each type of counter has advantages and disadvantages. There seems to be little consensus among project personnel concerning which type is best. Each has also been found to be unsatisfactory at one time or another.

Traffic counters are used to get the total annual attendance at projects throughout the Corps. The gross vehicle count in each area is to be adjusted to compensate for boat and camp trailers, nonrecreation vehicles and for vehicles entering an area more than once (return recreation vehicles). The basis for determining the adjustment factor is recreation-use surveys or other checks and observations.

Traffic counters should not be placed on a road or highway leading through a project but not leading to a public use area. This does not rule out placing them on roads or throughways which are also access to recreation areas as long as

proper adjustments are made in the readings to account for NRV's (nonrecreation vehicles).

Accurate traffic counts depend on proper placement, maintenance, and accurate regular reading. Proper processing of the data is also essential. The major problems that the MRI team found with regard to the use of traffic counters are easily rectified. As a rule they were related to improper placement and inadequate maintenance. At some projects the MRI team found that traffic counters were located too close to residential areas which tended to distort visitation statistics because of trips to and from school, work, and shopping and delivery and service vehicles. Compounding the problem, trips from these residential areas to recreation sites may go unrecorded. For example, people who live near a lake may walk to the beach or there may be no traffic counter which would record their movement. The traffic counters, then, register the unwanted traffic while the recreation traffic goes unreported. Locating traffic counters too close to residential areas also makes vehicular adjustment difficult because bicycles, minibikes, and simple jumping up-and-down will register on the counter. It is difficult to adjust for this superfluous counting because it varies with the age and number of children, the vehicles routinely operated by persons living in the area, the toy or toys, and game or games that are popular at the time, etc.¹⁹

The maintenance and regular reading of traffic counters is critical to obtaining accurate data. Counters need to be checked regularly to ensure that they are in proper working order. Ideally they should be checked once a week for vandalism or mechanical failure. In reality, the O&M demands on project personnel are sometimes so heavy that this is not done on most projects. The counters are checked only about once a month.

- d. Visitation estimates. Data from on-site surveys and traffic counters are to be supplemented by information obtained from other reliable sources such as observation. There are no formal procedures for making estimates and incorporating them into the information system. As a result there is variation from project to project. Some projects merely sum the traffic counts and add a flat percentage to account for miscellaneous areas. Other projects simply add a percentage related to survey areas to get an estimate of use for low density and remote areas.

Major problems

55. The most apparent problems with visitation surveys have to do with frequency and timing, the assumptions underlying the technique and the use or nonuse of results. These are interrelated problems that can be alleviated with some minor changes. As the surveys are currently conducted and used, total project visitation, load factors and activity participation are based on only 1 year's seasonal survey. This approach enhances the chances of magnification of sampling error. By simply accumulating and averaging survey results the magnitude of the error could be reduced. A 3-year average would result in data that would be approximately 1.7 times more likely to be representative of the whole population of visitors than the survey from any 1 year alone. By including two more years of surveys, sample reliability would increase by 2.2 times over the reliability of a single day's observation.

56. Perhaps the greatest error in collecting survey data involves the RRV's (return recreation vehicles). As presently conducted, most surveys fail to account for any upward bias attributable to the mobility of recreation visitors. For example, if a single visitor is already in a survey area at the beginning of a day, leaves, returns and is surveyed, and then leaves for the day, there would be no downward adjustment for his two exits. The effect would be an estimate of 1-1/2 visitors. If a single visitor drives from a survey area to a nonsurvey area, the effect would be an estimate of two visitors.

57. The problem with the RRV also causes inaccuracies in the estimation of recreation activity participation when survey responses for an entire visit are associated with an individual area. The RRV party may visit more than one area on the project during their trip, participating in different activities at different areas. Association of activity participation for the entire trip with an individual area thus distorts the recreation participation that actually occurs at the surveyed area. This

sometimes results in participation being reported at areas where opportunities (resources and facilities) to participate are not available.

58. Every recreation party will obviously make an initial arrival or final departure exactly one time per visit. Visitors, therefore, need to be interviewed only when they first arrive at a project or as they exit, concluding their visit. Each recreation visitor could then be sampled with equal probability. By defining all other transiting visitors as reentries would enable the recreation day estimates, which account for visitor mobility and activity estimates, not to be unduly influenced by more mobile visitors.

59. There are also some problems with regard to basic assumptions involving the interpretation of survey and counter data. Three implicit assumptions underline the current use of survey and counter data: (1) boat and camp trailers have one axle each; (2) RRV's and NRV's (non-recreation vehicles) have only two axles each; and (3) recreation activities reported by respondents for their entire visit are associated with the immediate survey area. The effect of the third assumption has already been discussed above. It basically distorts the validity of activity participation.

60. The first two assumptions can have the effect of actually inflating visitation. For example, boat and camp trailers are not always limited to one axle. In addition, both RRV's and NRV's may have three or more axles. Unless the surveys are designed to account for these types of variations, accurate load factors cannot be established. Currently, visitation is inflated because the system is designed to only take account of the minimum number of axles for boat and camp trailers, and RRV's and NRV's. The adjustment factors are generally lower than they should be which can result in a sizable error in visitation at some projects.

61. Another sampling error has to do with the application of load factors to sites where a survey has not been conducted. Generally, it has been suggested by past studies (regulations, experience, etc.) that

sites be stratified as to potential uses, facilities, or resources, with a representative site or group of sites surveyed to estimate visitation, activity participation, and/or load factors. However, sites are not always stratified according to any specific guidelines. The selection of the survey sites may depend on the ease of obtaining data (number of potential contacts with visitors), distribution of personnel (surveys conducted at campground toll stations), and other such nonstatistical factors. In addition, it was noted in the field discussions that average load factors for an entire project are sometimes applied to estimated (noncountered) traffic at nonsurveyed sites. This procedure may give the wrong weight to the nonsurveyed sites and distort the visitation estimate for the project.

62. In addition to the survey and statistical application problems described above, another, and perhaps more important problem is the attitude of the project managers toward the validity of the reported data. Almost all project managers surveyed acknowledged the importance of accurate visitation information. However, a number indicated that lack of a standardized methodology provides an environment for overestimating visitation in order to promote the importance of individual projects. As a result, many managers do not consider the visitation data component of RRMS valid for comparison of their projects with projects of similar size and resource characteristics. As long as this attitude exists, the usefulness of the data within a broader recreation information system is questionable.

63. Closely associated with the manager's attitude is the availability of manpower for conducting the surveys, let alone training survey crews. Manpower and resources at most projects are scarce. As a result, surveys tend to be done cursorily and are based largely on estimates. Most projects are understaffed and have difficulty allocating manpower and resources; thus, surveys are of only secondary importance.

64. At present, when it is time to conduct a survey, a project staff person is picked at random, or persons are hired on a part-time contract basis. Even though there are guidelines, and in some instances regulations relating to the conduct of the surveys, these persons are seldom trained to collect data in an accurate, systematic fashion. An integral part of any survey is the ability to meet the respondents, explain what is being done, and elicit information. In order to make the survey more effective, every person who is involved should participate in a training session. They should be trained in what questions to ask, what observations to make, and what kinds of questions they can use as probes when individuals are reluctant or unable to supply the necessary information.

65. A major consideration is the cost of conducting the surveys. A training period costs additional money, which is difficult to obtain when budgets are already strained. This results in very little attention being paid to doing surveys adequately.

66. An example of the costs for conducting a visitation survey are:

Weekday - 1 Area - 1 Person	\$98.36	
Weekday - 3 Areas - 3 Persons	\$270.92	(Earning different wages)
Weekend - Saturday - 1 Area - 1 Person	\$106.44	
Weekend Saturday - 3 Areas - 3 Persons	\$293.16	(Earning different wages)
Total for Traffic Survey for 1 Area, Wednesday and Saturday	\$204.80	
Total for Traffic Survey for 3 Areas, Wednesday and Saturday	\$564.08	

67. While these costs are not excessive and should be budgeted routinely, there is a tendency to use survey money to accomplish other needed tasks such as repair of facilities or upgrading sites.

68. Because of the current use of the RRMS, the system is perceived by most project managers as useful only to OCE for developing total budget programs to present to Congress and to fulfill required reporting needs to HCRS. Much of the information is perceived as not helpful to project managers and planners who are concerned with facilities and public services at particular projects. The system does not provide information on user preference or the types of facilities that users need or want. Such a situation makes it difficult for project managers to justify allocating scarce manpower and resources to train individuals to conduct surveys when the surveys are viewed as having little impact on day-to-day operations.

Major needed improvements

69. If operations and planning are to be able to make decisions concerning recreation needs at Corps projects, it is necessary to have accurate, reliable information. In order to improve the accuracy and reliability of recreation data, attention should be focused on standardizing the methodology for visitor surveys; developing better visitation estimation procedures; developing better procedures for estimating recreation visitation and activity for remote use, specialized use, and outgrant agency use; expanding the survey of recreation activities to include those that are other than lake-oriented; counting visitors not currently included in RRMS, such as at areas with fewer than 5,000 recreation days annually, and to various rivers, harbors, channels and other Corps project areas; and establishing a system of quality control.

- a. Standardization of survey methodology. There are three basic aspects of the current methodology that are currently causing the most problems: when to survey, where to survey, and how to survey. At a minimum a standardized methodology will establish regulations concerning each of the above areas in order to eliminate ambiguities in conducting surveys. In addition, there should be a standard set of definitions of the data elements included in the survey.
- b. Visitation estimation procedures. Visitation estimation is dependent on reliable survey data. However, there are

other factors that need special attention in order to ensure that estimates are made correctly. There should be a set of regulations that provide guidance in the placement, reading and maintenance of traffic counters. Reliable load factors can then be generated and applied by type of site across projects to enhance the visitation estimates.

- c. Better estimation procedures for remote use, specialized use, and outgrant agency use. At present, a major problem in gathering accurate information for recreation management and planning is that there has been no systematic attempt Corps-wide to collect data on remote use, specialized use, and outgrant agency use. Most projects attempt to gather such information, but there is no standard way across projects to gather and utilize it. As a result, some visitation figures are inflated, and some may be undercounted. Other public agencies have used observation as a means of developing visitation estimates. There should be a set of regulations established with specific guidelines for estimating visitation to remote use and specialized use areas. These should include at a minimum regulations concerning the frequency of observations, the forms to be used by observers, instructions for observing and completing the forms, and procedures for processing the observation data.

It is also difficult to get adequate information concerning outgrant agency use. At a minimum the Corps should require that compatible data be gathered at outgrant agency use areas so that they can be made comparable to Corps data.

- d. Expansion of surveyed recreation facilities to include those other than lakes and reservoirs. The Corps currently collects detailed recreation data at lakes and reservoirs, dry lakes, and some waterways. Attention should be given to expanding the surveys to include rivers, harbors, channels and other types of Corps projects. This is difficult because there are not project personnel at many of these areas. In addition, many do not have central access areas which complicates data gathering still further. The methods by which these problems should be addressed are best left to another study.
- e. Counting visitors currently not included in the RRMS. It would be useful to have data concerning recreation use at projects with fewer than 5,000 recreation days annually. The same problems exist in obtaining information in these areas as those for nonreservoir projects. Another study should address the peculiar problems of collecting accurate recreation visitation data at these areas.

f. Establishment of a system of quality control. In order to ensure that the data gathering is done accurately and adequately, a system of quality control must be established. Such a system should include detailed training sessions for persons who are engaged in recreation surveys, as well as for those who are charged with the responsibility of estimating remote use, specialized use, and outgrant agency use. Training seminars should be held by WES with particular Districts and projects participating every third year on a rotating basis. At these seminars unusual problems encountered in the surveys could be discussed, changes in techniques and regulations clarified, and training conducted in interview techniques. In addition, instruction and aid would be provided in doing visitation estimation and conducting special surveys when needed.

To ensure that surveys are done correctly and estimations are made accurately, a system of checks should be employed in the system. That is, from time to time persons should check to see that interviews are conducted properly and that estimations are made realistically. This can be done in one or both of two ways. The first is to assign a person from the District or Division office or from WES with the responsibility for training these individuals and observing them as they take their surveys or make their estimates of visitor use. The second is to have someone be a respondent during a regular survey period. In this way, it can be determined how accurately the survey is being conducted. It will also be possible to make comments and criticism to enhance the system.

Recommended Survey Methodology

70. Improvement of the survey methodology is essential for gathering recreation data that are uniformly reliable and accurate. No survey is simple, but a relatively uncomplicated methodology that will aid managers and planners to make decisions regarding recreation is possible. The survey methodology presented under separate cover is simple enough, that with training, any Corps staff member will be able to use it.

The survey methodology

71. The survey methodology that MRI has proposed is basically the same as that which exists currently. While there are some technical problems with the current survey, it is believed that these are relatively easy to address. The survey methodology addresses the problems discussed earlier and answers the questions of where to do the survey, when to do it, and how to do it. The manual provides detailed guidelines to eliminate many of the technical problems of the surveys. In addition, it provides step by step instructions for conducting the survey. However, to ensure that the survey methodology is successful, there must be sufficient training of personnel to do the survey, monitoring of the process itself, and adequate administrative support from the Corps.

72. One of the major problems of the current data gathering technique is insufficient consideration of visitor mobility. It is generally assumed that visitation at individual sites will sum to total project attendance. This is only true if each visitor uses only one recreation area. Visitor mobility must, therefore, be addressed in the survey methodology. It is suggested that at the point of survey the question be included: Will you be returning to this particular area today?

73. The above approach dictates that an exit survey be used. Ideally, it would be best to have both an entrance and an exit survey. This would allow analysis to determine significant differences between intended and actual behavioral patterns. Unfortunately, this is just not feasible at most projects. The Survey Manual will discuss the strengths and weaknesses of each type of survey with guidelines for deciding which is best at particular projects.

74. The Survey Manual will also include a set of definitions that will help reduce sampling bias and also reduce some other technical problems that presently occur. In addition, data elements are refined so that the analysis of the surveys can be accomplished more quickly with the results reaching project personnel sooner.

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Requirements to implement the methodology

75. In order to implement the methodology, attention must be focused on manpower, training, equipment, and costs.

- a. Manpower. It can be assumed that most of the surveying will be done by field personnel (e.g., field rangers, or temporary hires). Ideally, there should be two persons at each survey site in order to expedite the survey and to improve accuracy by reducing the pressure on a single person. Also, each project should have at least one person who has gone through the Corps-wide training program and who is qualified to train those persons at the project who will be doing the study. Any temporary hires used should be thoroughly familiar with the project and have spent a minimum of 2 or 3 days in training.
- b. The training program. The training program is absolutely essential for the survey methodology. All too frequently, persons attempt to conduct surveys without any background in survey research or in interviewing. To ensure that the survey is conducted properly, a 1-week training program should be conducted each year for persons involved in surveying visitors to the Corps projects. The personnel should be required to attend every 3 years in order to take advantage of improved techniques and to refresh and upgrade their skills.
- c. Equipment. The equipment needed to conduct the survey is minimal. However, it would be necessary to develop, on the basis of a preliminary survey, realistic and adequate locations for placing traffic counters at projects and at areas within projects.
- d. Costs. The costs for implementing the survey methodology are not excessive. Based on the figures reported above the costs would average approximately \$2,000 a year for three persons to survey three sites three times a year. The costs would increase by about \$200 per site per time if additional sites are included. Using one additional person at each survey site would double the costs. This would mean approximately \$4,000 per year for six persons to survey three sites. The costs would be increased by about \$400 per site, per time if additional sites are included.
- e. Schedule for Implementation. It is believed that the survey methodology could be implemented in a relatively short time after the complete design. It would have to

be field-tested first in order to eliminate any bugs in the system, but following the field testing, it could be scheduled within 1 month of design of the manual and at the end of the initial training period. It should begin simultaneously at each District within each Division and run on a rotating basis within each project within each District. Since all projects are not surveyed simultaneously, whatever difficulties are encountered can be communicated to other projects in the District, and those limitations can be overcome. The survey should be conducted for three consecutive years in order to ensure that total comparability is achieved based on the survey instrument and the methodologies involved in the survey process. Following the end of the 3-year period, it would be possible to conduct the surveys on an every other year or every third year basis depending on a constant review of national trends and recreation use, which would become an integral part of any system.

Recommended Techniques for Estimating Visitation

76. There is no systematic way to survey all of the areas at Corps projects, thus standardized techniques must be used to develop visitation estimates. There are two essential elements for making visitation estimates: visitation surveys and traffic counts. An accurate survey will provide recreation information, but in order to get reliable estimates of visitor use at a project, it is imperative that there be good numbers from traffic counters.

77. The Survey Manual establishes a set of guidelines covering the placement, reading and maintenance of traffic counters. MRI also recommends that only one type of counter be used at each project. This simplifies the reading of the counters and recording and processing the numbers.

78. In addition to providing guidelines for placement of traffic counters, the handbook will provide procedures for standardizing the collection of traffic counter data. It will discuss the development of load

factors and give specific examples of how these factors should be applied to counter data to estimate total visitation and recreation participation at projects.

Responsibility and authority

79. In order to ensure comparability in visitation estimates there should be an administrative structure established to provide training and monitoring of the development of visitation estimates. Project and District personnel should be involved in training every 3 years. The training will deal with the major issues such as placement, reading and maintenance of traffic counters and the processing of the data. The responsibility for making the visitation estimates lies with the projects. However, the Districts will monitor the projects annually to be certain that regulations are being followed.

Interface of survey with traffic count data

80. Based on the systematic surveys that are conducted over a 3-year period, it will be possible to determine up-to-date load factors for counters at various Corps projects. These load factors will be applied systematically to counter data and will take into account factors such as the number of axles on camp and boat trailers and other vehicles towed into projects. The mechanism for doing this would be based on survey data on the percentage of boats, camper trailers, and other vehicles being pulled by another vehicle as they enter the park. In addition, traffic count numbers will be adjusted to account for NRV's such as delivery vehicles, maintenance vehicles, and other extraneous factors that might bias the count such as bicycles near residential areas.

Estimation techniques for remote areas, etc.

81. Observation is the basic technique for estimating visitation at remote or specialized use areas. The Survey Manual provides guidelines for accomplishing the observations. It also deals with site selection and frequency and provides a form and instructions for recording the data.

82. Alternative techniques such as aerial surveys and a computer simulation model are also discussed. They have some particular validity for remote areas where observation may at best be difficult because there is no definition of area. Because these techniques are relatively new, guidelines for use will not be presented in the Handbook. Most of these techniques will require a considerable amount of research before they can be practically used on projects.

PART IV: DEVELOPMENT OF A SUPPLEMENT RECREATION INFORMATION SYSTEM

83. One of the important information needs Corps-wide is to be able to forecast the impact of national and regional trends on projects. This includes tracking national and regional trends in terms of recreation participation growth, sale of various items and recreation equipment, and other such factors that affect recreation development. Obviously, tracking trends is not the whole answer, but being able to interpret trends and other factors so that planners and managers are in a better position to handle their responsibilities is part of the answer. Already the Corps has an important information source (the RRMS) which will probably continue to improve by adopting changes which enhance its use. Outlined below is a supplemental information system which will provide for the immediate and longer range needs of recreation planners and managers.

Trend and Cross-Tabulation Information

84. General trend information is required in performing many of the planning and management functions at the Division, District, and project levels. For example, project managers are interested in camping trends and how a management program should be adjusted to meet new trends. At the District and Division levels, planners are interested in trends in order to make adjustments in their master plans for projects regionwide. Managers at this level are also interested in coordinating among projects in the field to verify trends and to alert project managers of possible impacts.

85. Trend data, in general, have almost a limitless number of data elements, and the importance of particular data elements change periodically with each new trend. There is also an almost unlimited number of

industry and public data sources that undergo periodic revision and changes in the way they catalogue data. One example is found in the changes that have been made in the participation surveys at the national level and the resultant difficulty in establishing trends from the different surveys. Some of the essential areas that are required for recreation planning and management are outlined below. General sources are identified with some of the information elements listed. Collection, storage, retrieval, and accessing of the information are also discussed. The RRMS is an important information source, and several analytical uses are recommended for further research to enhance its usefulness.

Type of information and intended use

86. Three types of trend information are required to serve Corps planners and managers:

- a. Recreation demand trends. To understand use patterns and potential trends for Corps projects, planners and managers should have available national and regional trends regarding recreation demand. Some of the more important categories of information would include recreation participation rates, visitation and use patterns at established public and private areas, sale of recreation equipment, and the trend in recreation expenditures by visitors. This information provides a key to what might be expected at Corps projects throughout the United States.
- b. Recreation supply trends. Probably no other type of public service is more affected by supply than outdoor recreation. Numerous examples show that opening particular resources results in establishing new activities and patterns of use; these activities and patterns sometimes impact throughout large regions. In order to understand the potential impact that a supply of resources may have, Corps planners and managers must have available to them trends in both the public and private supply of recreation resources. Several of the more important information elements include the areas, facilities, and services provided, as well as agency budgets and commitments to particular types of recreation developments. This information is part of the key to understanding how Corps facilities can accommodate use by the general public.

c. Corps RRMS trends and cross-tabulations. The RRMS already provides a body of data that can undergo research and analysis to establish trends and cross tabulations for different types of projects. For example, no doubt there are visitation and supply characteristics unique to urban projects in contrast to rural projects. Part of the information system developed for Corps-wide use should include a thorough research program involving the RRMS because this system includes much information which could be useful to planners and managers.

Sources of information

87. The general sources of information for the three types of trends are as follows:

a. Recreation demand trends. The sources of data to evaluate recreation demand in general are numerous. A program should be undertaken to research and utilize those sources that will allow long-range trend analysis. Table 1 identifies the general type of recreation demand information, some of the specific information elements, and sources of information to monitor trends. Briefly, these sources are as follows:

- (1) Heritage Conservation and Recreation Service (formerly BOR). The HCRS has been conducting national surveys of recreation participation since 1965. One of the major problems in utilizing the data has been the changing of the questions, the method of sampling, and other survey-related problems. MRI has spent some time converting these data to annual per capita rates and has found that this information is of use in tracking long-term trends. The Corps of Engineers should conduct a research effort that would make this important source of information a useful tool in forecasting long-range visitation.
- (2) Federal or State agencies. Most Federal and State agencies have the same types of problems in terms of accuracy in visitation data as have been encountered by the Corps of Engineers. Nevertheless, this information does provide a basis for analyzing regional trends, and it should be monitored on a long-term basis. This information is available for specific areas, states, regions, or for the agency on a national basis.

- (3) Trade association data. A number of trade associations track the sale and shipment of recreation goods on a long-term basis. Even in the private sector definitions have undergone change during the years; trade associations have also experienced organizational changes which have affected the data bases. This information, however, provides long-term trends in recreation equipment sales; it also allows planners to focus on yearly changes that might affect project use. Some of the trade associations include the National Association of Engine and Boat Manufacturers, Recreation Vehicle Institute, etc.

The U.S. Travel Data Center is a quasi-private organization that monitors travel. Periodically, they conduct a National Travel Survey which provides valuable statistics on the number of persons in travel parties, the length and duration of the trip, and other essential elements that are of interest to planners. A private company that annually monitors the lodging industry occupancy rates is Laventhol and Horwath.

- (4) Public data sources. Several agencies provide statistics on recreation expenditures, number of employees, licenses, etc., including the U.S. Department of Commerce, U.S. Bureau of Labor Statistics, and U.S. Coast Guard.
- (5) The SIRAP System. The System of Information Retrieval and Analysis for Planners (SIRAP) was developed by OCE to provide planners with information necessary to accomplish their job. The SIRAP System is presently accessed on the Lawrence Berkeley Laboratory computer in Berkeley, California. A manual has been developed so noncomputer-oriented users are able to utilize the system in the course of their work.² The system presently uses census and other readily accessible information on population, income and employment, demographics, city-county data, economics and navigation. Other data elements are presently being considered for inclusion in the system.

- b. Recreation supply trends. The bulk of the information regarding recreation facilities, areas, and financial commitments, etc., must come from the public sector. Table 2 shows some of the essential elements and data sources for recreation supply information. Other recreation systems

such as the U.S. Forest Service Recreation Information Management (RIM) system provide valuable information on levels of use, number of sites, acreages, etc. An organization such as Kampgrounds of America can provide the total number of franchises, and private directories such as the Rand-McNally "Campground and Trailering Guide," will provide information on the number of private campsites available by area, region of the country, or nationally. Agency budget and financial commitments must come from contacts with particular agencies. This will essentially involve collecting new information requiring a format, definitions, and particular categories of information, etc.

- c. Corps RRMS trends and cross-tabulations. The RRMS is a source of data that is already available, and within the next year or so many Districts will have an interactive capability to input and process recreation information. The system has a number of data elements specifying general project characteristics, visitation, resources and facilities, and management information that make it of use to a wide variety of users. Although the District and project personnel did not readily indicate a need for the RRMS data, a part of their attitude is attributable to the present difficulty in obtaining data and the fact they do not have the capability of looking at their projects in comparison to others. Since the system will continue to be utilized by OCE as a data source at the national level, consideration should be given to conducting research studies to classify and cross-tabulate data to evaluate various recreation trends.

The specific elements already existing in the RRMS are identified in Table 3. Some of these various elements could be subjected to cross-tabulation or various types of correlation analyses to establish trends on a year-to-year basis. Other elements (i.e., when impoundment began, name and address of manager, etc.) are more supporting in nature to the overall analysis. There are many combinations of projects that would be of interest to planners and managers Corps-wide. A few of the many possible combinations are listed in Table 4. Planners, for example, might be interested in the difference in recreation activity use and per capita use rates for urban lakes in contrast to rural lakes. Use patterns might also be of interest at a high-density project as compared to a more rural, low-density use project. This information could be available from the

RRMS if the projects were further classified into the types of groupings of interest to a wide variety of managers and planners. Of course this will require the development of a supplemental information system and software packages to access and analyze the data.

Essential information elements

88. Some of the specific units of information for supply and demand trends have already been identified in Tables 1 and 2. Table 3 shows the RRMS information elements that could be cross-tabulated according to various project classifications. This information, on an annual basis, would then be available as another information source for use by planners and managers. Additional research must then be devoted to determining which of the specific elements will be most useful on a long-term basis. Another area requiring more research is in the types of cross-tabulations that might be of interest to the widest group of Corps planners and managers. Conceivably these information elements, together with the general categories describing the projects, could be developed into software packages that could be easily applied at the District level. Of course, the existing RRMS does not specify which lakes are rural, urban, or deep mountain lakes, etc. This specification would require additional research and the establishment of a supplemental system to make RRMS data usable for such an analysis.

89. One difficulty noted during field visits was the inability of Corps planning and management personnel to articulate the specific information needs required for day-to-day operation. Part of this problem is probably because planning and management fields have evolved from a wide variety of activities. Thus, no standard body of knowledge, procedures, techniques, etc., has been developed. A continuing research need will be the identification of the specific information elements required to fulfill various Corps policy and planning functions.

Collection of information

90. To obtain information and to track trends on an annual basis, an extensive research effort must be undertaken. The initial work will involve developing a small library of secondary sources. Historical data will be gathered, and the research staff will have themselves placed on the mailing lists of various trade associations and public agencies publishing data annually. Each year the latest information will be acquired, which will be a reminder to renew those subscriptions, contacts, or other sources of information that are most helpful to the development of a total system.

91. With RRMS data, the initial effort will be considerably more difficult. The various cross-tabulations will have to be identified, and a system of information will have to be developed so that projects may be grouped according to classifications of interest. This process will require identifying and defining project characteristics and specifying the particular classifications from the different alternatives. It will also require developing software packages to utilize the RRMS data for analysis by the various cross-tabulations. This package will interface RRMS with the supplemental system to classify projects into the various groupings of interest. Each year software packages can be utilized to track specific changes in trends. The initial research effort is ambitious, but its potential value should justify the expenditure. Also, the annual maintenance cost will be minimal.

Storage/retrieval of information

92. The bulk of the trend information for recreation demand and supply can probably be stored manually. Depending on the degree of sub-classification (recreation demand or supply statistics for particular areas, etc.), a manual approach should be adequate. However, as information elements are subdivided for projects, regions of the country, types of equipment, etc., a computerized system may become necessary.

Any use of the RRMS data will no doubt have to be on a computerized basis. The information is already available on a computer system; thus, it requires software accessing packages for analysis.

93. Retrieval of manual data will not pose any major problems, but development and maintenance of software packages can be difficult, particularly when data bases are accessed from two or more sources. Part of the annual maintenance function will have to be devoted to storage and retrieval problems. At some point, data bases will also have to be converted from a manual to a computerized system. Each year, the information must be summarized for the various reports that might be produced.

Accessing, reporting, and dissemination of information

94. Three types of information system accessing and reporting are recommended. These are: a quarterly information bulletin, an information service, and annual workshops and conferences. These types of services could be utilized to access and report general trends to Corps planners and managers. Already WES has initiated an information exchange bulletin (RECNOTES). Certainly some of the information produced in the supplemental system could be reported in this bulletin. The information service, on the other hand, could provide specific items of information to District and project personnel on a contact basis prior to publication. This would enable the staff responsible for developing and maintaining the supplemental system to be aware of any problem requiring additional recreation trend information, which would, of course, enhance Corps recreation planning and management.

95. Conceivably, the manual data base and some parts of the RRMS trend data should be published in an annual catalogue to allow Corps personnel to track trends of interest. The format for this report should be thoroughly researched prior to producing the catalog; this format should then be retained so that overall trends can be monitored on a long-term basis.

96. Finally, workshops and conferences can be utilized as vehicles to further elaborate recreation trends and possibly train personnel in the use of the supplemental cross-tabulation program. Since computer software and two separate systems are involved, it will be essential that a handbook and a procedure be developed; this will undoubtedly involve training of District planners. The program should be developed and coordinated with the interactive RRMS capabilities in such a way that District planners and managers can try out various analyses apart from the standard packages. The workshops would also enable the Districts to comment on some of the procedures they have attempted and possibly expand on the type of capabilities that the system as a whole should include.

Demand and Benefit Forecasts

97. Although each District has to some extent developed its own technique for predicting visitation in planning for new projects, virtually all of these techniques follow the guidelines provided in Brown et. al. (Estimating Initial Reservoir Recreation Use).³ This framework utilizes the "most similar project" concept (i.e., an existing project is most comparable in size, operation, and anticipated recreation use characteristics to a planned project).

98. Although a number of studies have described techniques for computing project benefits, there has been no generally agreed upon or universally accepted method of estimating the recreation contribution to national economic development. In light of recent proposals to the Water Resources Council and previous research conducted by the Corps of Engineers, it appears that it is only a matter of time before the "willingness of users to pay" concept will be used as the primary methodology for estimating the overall benefits produced by projects.²⁰

99. The Corps of Engineers is involved in planning for a variety of projects in addition to lakes, including the development of harbors, multipurpose parks along waterways, and even a few large nonlake natural resource parks (Meramec Park, St. Louis District and Big South Fork National River and Recreation Area, Nashville District). Other than harbors, these types of attractions and park areas are relatively new to Corps of Engineers planners and managers. As a result, there is a complete absence of an approved technique to estimate use or benefits. However, during the last several years, a technique has been studied for estimating use to urban-oriented nonreservoir recreation areas. Although only in the testing stage, this technique may hold the key to solving use forecasting problems, particularly for urban strip developments along waterways. Currently WES is involved in a study to evaluate the accuracy and effectiveness of this technique.

100. In the section below, each of the above methodologies is examined in terms of data needs, sources of information available, possible supplemental data collection required, and storage/retrieval and dissemination of the information to appropriate Corps personnel.

Lake use/benefits

101. By far the most common technique for forecasting recreation use at lake projects is the methodology outlined in Brown et al.³ As discussed above, the underlying assumption of this methodology is that recreation visitation at an existing reservoir provides the basis for estimating use at a planned project. Assuming that visitation data improve for all projects throughout the United States, the "similar project" methodology should continue to be a valid technique for estimating use. There are three basic problems in applying the similar project technique, however. First, the information contained in Brown et al. (June 1974)³ is limited to 52 lakes located primarily in the South and Southwest. Second, the recreation visitation in this report and the accompanying per capita use curves are now over 10 years old. Third, the tech-

nique was originally intended for estimating initial reservoir use, and little thought was given to the updating of use estimates for continued master planning at lake projects. If this technique continues to be used, consideration should be given to improving the quality and availability of data so that its use can be expanded. The concept of an "expanded similar project" technique is explained below:

- a. Type of information and intended use. The overall concept proposed is to expand the use of the similar project methodology to the number of Corps projects that are currently in the RRMS. In that way, rather than being limited to 52 regional projects, a District planner will have information available for some 440 projects. Since the bulk of the information required to utilize the methodology is already available in the RRMS, only a few additional factors would need to be considered in the supplemental system. These factors generally include: capacity estimates for day-use areas, competing water-oriented recreation areas, and per capita use rates. Of course the purpose of acquiring such information in a supplemental system would be to enable the Corps' planners to utilize the methodology more effectively in estimating use and benefits.
- b. Sources of information. The bulk of the information required to expand the similar projects concept is already available in the RRMS system. The fact that the RRMS will very soon be interactive with remote terminals available at the District level enhances the application of this concept. Table 5 summarizes the factors required to use the similar project concept. The table shows the type of data already available in the RRMS as well as information presently available from other sources including: State Comprehensive Outdoor Recreation Plans (SCCRP), State traffic maps, project brochures, etc. Of course, much of the information under the column "Data Available from Other Sources" can be obtained from the District responsible for managing the project. Often a telephone call to the project manager will reveal key planning information, particularly concerning competing water-oriented recreation areas.
- c. Essential information elements. A fundamental element of the expanded similar project concept should be the rapid accessing of information. This could either involve accessing the projects in a catalogue or by computer techniques.

In any event, several specific data elements should be available for immediate analysis. These include:

- (1) Maximum pool (acre-feet).
- (2) Attendance (recreation days), at least the previous 5 years; updated annually.
- (3) Access:
 - (a) Amount of paved road.
 - (b) Amount of limited access.
- (4) Overnight lodging nearby (number of camping as well as motel/hotel units).
- (5) Competing water-oriented recreation areas (in a form similar to that already developed in Brown et al.³).
- (6) Per capita use curves.

If the above information elements were combined with the other information already available in the RRMS, a planner could very quickly select from among some 440 projects those that were similar to the one under study. The planner would then have up-to-date information and a wider variety of projects that should enable him to make more realistic recreation use estimates. Of course, the underlying assumption is that the visitation estimates and the development of on-site surveys are closely coordinated so that the data collected are compatible across projects, Districts, and regions.

d. Collection of the information. Assuming the needed information for the expanded similar project method is assembled apart from the RRMS, there are three essential components to completing the system:

- (1) Description of the projects. Out of the wealth of data available on each project, there should be a brief description emphasizing the qualitative aspects of the project (e.g., nearby attractions, seasonal variation in recreation participation patterns, etc.). Since this type of description will require a great deal of in-depth information about the resources and the patterns of use, it is suggested that project managers, with the assistance of District personnel, collect this important information component. To provide some element of compatibility, it is further suggested

that an overall framework be developed to assist the project managers in completing the narrative.

- (2) Supplemental data elements. Nearly all of the essential information elements (see c above) are available at the District level. It is suggested, therefore, that a framework be developed and that these essential data elements be collected at the District level.
 - (3) Survey data (collection and analysis). The most difficult item of information to obtain will be per capita use rates for existing projects. First, unless an origin/destination survey is being conducted at the project level, the information will not be available. Therefore, it is essential that O/D information be a part of the overall survey required for each project. Second, these data must be interfaced with the population from the various distance zones. This process would involve analysis in addition to the data collection itself. Essentially, for each project in the RRMS, the population within the various use zones must be computed. Since this computation is crucial in establishing per capita use rates, it appears that one central office should be given the responsibility. Using a consistent method, population zones could be established for each project, and these could be updated with each new census. Using these population figures together with the O/D data, per capita use rates could be developed.
- e. Storage/retrieval of information. The information elements (described in c above) are essentially apart from the existing RRMS. It seems appropriate, therefore, to set up a supplemental data system for the storage of each of these components. The use of the system and the similar project technique as a whole will probably continue to be at the District planning level. Since the RRMS is expected to become interactive during the next year or so, it seems appropriate to store this supplemental information in some type of computerized system, which will require the development of a format to input the data and software packages to retrieve the data. Unlike the RRMS, it appears that the number of essential data elements will be fairly limited. Therefore, the actual coding and inputting of the data into a supplemental system could be accomplished by a centralized staff, provided the information is sent to them by the projects and Districts along some strict format lines. A number of elements and essential information items

could probably be stored in a small-sized computer system available from any one of several commercial sources in metropolitan areas.

f. Accessing, reporting, and dissemination of information. One of the most important parts of the expanded similar project technique would be the development of a manual describing the program. If a supplemental system with key elements is developed by a central office, the most efficient and effective systems technique would be to interface the needed information from the RRMS with the key elements from a supplemental system. Conceivably a software package could be developed so that a District planner could select key criteria describing his particular project. In simplified form, he could then request the system to identify similar projects and produce key data elements.

To accommodate this type of approach, simplified software packages would need to be developed to fit the terminals that will be installed at each of the Districts. Of course, this will require that supplemental data elements be on the same system and in the same general format. Since each of the 440 Corps projects includes a narrative describing qualitative elements, a user's manual could conceivably be developed that would contain both these descriptions and the necessary software language procedures necessary to utilize the system. No doubt, the manual would have to be supplemented with training sessions and the availability of a Corps analyst to assist Districts utilize the system.

The approach described above would expand the Brown et. al.³ concept to include a wider variety of projects as well as improve the quality and timeliness of the data. Obviously a supplemental data system could contain additional elements as described in other parts of this report.

Nonreservoir use/benefits

102. Until recently little research had been devoted to the factors affecting recreation use at nonreservoir recreation projects. However, during the last several years a methodology has been tested on the American River in California by the Sacramento District.¹³ The model relates recreation visitation from zip code origins (the dependent variable) to three categories of independent variables (characteristics of

the origin, potential of the destination to attract recreation use, and linkages or relationships between the origin and destination). In many respects the model is similar to another technique proposed by the Sacramento District.²¹

103. The model is essentially a gravity approach and relates origin characteristics, resource characteristics, and road mileage to recreation use patterns. By applying the coefficients developed in the model to statistically significant factors, an estimate of use at a project or a site can be computed. The technique is currently undergoing testing by WES under contract to a private consultant. If subsequent testing shows the model to be consistent and efficient, it may supplement the most similar projects technique. One of the problems with the technique is that different factors may very well be correlated to recreation use for different types of projects. However, these dependent variables cannot be identified prior to establishing the correlation, which means the technique must be replicated under a variety of conditions and resources to establish which independent variables are associated with use for different types of projects.

104. Closely associated with nonreservoir recreation use is the concern among some of the Districts about the level of recreation use at locks and dams and the competition between recreation traffic and commercial traffic. This type of recreation use will probably require close monitoring during the next 5 to 10 years. MRI was recently involved in a study for the St. Paul District to develop a model to forecast recreation lockage on the Upper Mississippi River.⁶ The study identified four factors accounting for 73 percent of the variation in lockage at 28 locks and dams between the Twin Cities in Minnesota and St. Louis, Missouri. These factors included a surrogate of boating activity on the pool (commercial marina and private slips), a factor indicating long distance recreation traffic flow through the pool (an empirically derived factor

from 1977 survey data), the distance to the next lock above and below (in miles), and a factor to account for the quality of the resources in each pool.

105. Three of these factors are generally available from master plans, District information, etc. One factor (long distance flow through the pool) needs to be closely monitored to determine the effectiveness of the model as well as to determine trends in the use of the locks and dams by recreation traffic. This essential data element could also be a part of the survey program to obtain the necessary information for testing and implementing the nonreservoir recreation prediction technique.

106. The two examples above, although differing in their application to specific projects, require similar types of information (origin/destination information, and travel characteristics). These particular elements are required for almost any type of demand modeling. If a comprehensive program is undertaken to obtain such information, it is anticipated that the information would not only be of value to the above two models--the information as a whole might be applicable to many other types of demand models. The sections below outline some of the essential considerations regarding development of an information base to support nonreservoir use/benefit prediction techniques:

- a. Type of information and intended use. Two types of information are required to develop most types of nonreservoir use/benefit models: origin/destination of recreation users and the general trip characteristics. The purpose of collecting such information is to develop and test various predictive models and improve the techniques being utilized to estimate use/benefits at Corps nonreservoir projects.
- b. Sources of information. This type of information can only come from surveys administered at recreation sites. If a generalized model for an entire project is being developed, the site could be the project itself, but in most cases, site will be a specific location (a recreation area, e.g., picnic area, boat launch, recreation lock, etc.). At the present time this type of information is being collected

only sporadically by projects or Districts, with little long-range use in mind. Quite often the major thrust behind such data collection has been to quantify use from various zones in order to make long-range forecasts of use for specific projects. No overall coordinated program has been conducted beyond the project level.

c. Essential information elements. There are two essential information elements:

- (1) Origin/destination information. The destination is the site where the survey is conducted. The origin is the place where the trip originated (the recreationist's home). If the survey is being conducted at a lock and dam, the elements could be as described above, but the destination is where the boat was either launched or moored on the river. A second destination is then required, the place where the recreationist is going by boat. In other words, a river trip involves two segments of the trip, one by car to the point of departure on the river, and then a boat trip to a second destination.

The origin in some cases may require only the name of a town. This is particularly true with a small community or town. However, if a boat is being launched from a ramp in a metropolitan area, the name of the metropolitan area is not sufficient. In this case, a specific address is required so that zip code zones and distances to the point of departure may be computed.

- (2) Miscellaneous information elements. Although the second essential information element might be classified simply as nice to know, it does enhance the development of models and analysis of demand data. Since the survey is required to get O/D information, the second item can often be obtained without even asking the question (observation). The essential elements include the type of equipment that the recreationist is using (boat, camping trailer, etc.), the number of people in the party, and the type of boat (runabout, cruiser, houseboat, etc.). In the case of a lockage study, two other elements are essential for use in a predictive model. These elements include the number of locks used on an entire trip and whether the craft was either launched or moored at a private or commercial marina. Although this information generally requires responding to a question, MRI learned during the 1977 survey that the answers are easy to obtain and relate to map locations.

d. Collection of information. The information required to develop and test nonreservoir recreation prediction models can only come from surveys administered at field sites. It has been proposed in another part of the report that surveys be undertaken to establish boating factors and to improve visitation data currently required in the RRMS. The origin/destination information is already required in part for these surveys. Distance to residence and county of origin has been recommended for inclusion by previous Corps studies. It is recommended that the zip code be used instead to pinpoint specific location within a county. This would also provide interface with existing computer packages for the analysis of the data.

Surveys at locks and dams, however, are not required to provide input to the RRMS. With the increasing use of the locks by recreation traffic, it appears that surveys should be considered to improve the information about recreation lockage. Such a survey was recommended by MRI in a recent study for the St. Paul District.¹⁶ MRI recommended that lock operators administer a mailback survey, utilizing a simple postcard questionnaire at all locks on the Upper Mississippi. This information could be mailed to a single District using summer students to analyze the data and monitor the changes in long distance lockage. Every 5 years a major personal interview survey could be administered at the locks to check the accuracy of the mailback information. Although this recommendation was specifically directed to the 28 locks and dams on the Upper Mississippi River, it could be expanded for all locks and dams in the United States for which the Corps of Engineers is responsible, particularly those where recreation traffic is important. This would allow development of a lockage model that would fit the entire system, and the cost of obtaining additional information should be at a minimum, other than the periodic major personal interview survey.

e. Storage/retrieval of information. The recreation surveys currently being conducted not only are not standardized, but much of the information is lost for analytical purposes. Even where Districts are obtaining origin/destination information and other important elements that would be of use in developing nonreservoir use/benefit models, the information is not analyzed beyond development of load factors and periods of peak use (months, seasons). If the recommendation of standardizing the survey is implemented and the essential elements are added (origin/destination), a great

deal of information will be collected for Corps projects. To be of use in developing and applying models for recreation use/benefits, an attempt must be made to store these data and set up some type of retrieval so that the data may be further analyzed by a research staff member. Appropriate storage and coding procedures should be set up so that the information can go into a data bank. The research staff should develop coding and storage procedures, with most of the coding being completed at the District level. The information could then go directly into a data bank, referenced by a project, year, and other essential identifying information.

It is beyond the scope of this project to propose how this information will be used in developing and applying recreation use/benefit models, but it is anticipated that it will follow the lines already established by work in the Sacramento District. In time, with sufficient analysis of the data and expansion of the data bank to include a variety of projects, it is assumed that a District planner with sufficient documentation could retrieve this information, establishing per capita use rates and developing demand models (with suggested coefficients). Other information could be extracted from the data bank for use in establishing demand and benefits for a particular nonreservoir project.

- f. Accessing, reporting, and disseminating information. As recommended for the lake use/benefit prediction technique above, the data should be accessed to users through a computerized system. This will require development of a user's manual, however, and certainly some of the elements of the data base can be described in catalogue form. It is anticipated that annual analysis of the origin/destination and other information will reveal trends and other items of information of interest to Corps planners. This information should be articulated in the form of either some type of annual report, information bulletin, seminar, or perhaps a combination of all three. An underlying assumption is that there will be a concerted effort on a continuing basis to modify and develop recreation demand/benefit models by the group that is responsible for supervising and maintaining the supplemental information system.

Site Planning Information

107. Little attention has been given in recreation information systems to developing any body of knowledge regarding site planning factors. In the past, standards have quite often been developed based on opinion and perception without follow-up research to verify standards. Even today, textbooks often devote a section to development of standards with the extremes in the ranges presented for the reader's knowledge. The result has been that planners and site managers are often confused and attempt to establish their own standards based on limited observation.

108. Presently, WES is undertaking research to establish a Recreation Research and Demonstration System (RRDS) of typical projects across the country. This program provides an excellent opportunity to set up a system of information for site planning factors. With a system for classifying, storing, and analyzing these data, not only can standards be established and tested, but *geographic factors, types of use, and other considerations* can be analyzed with regard to site development. This section presents a preliminary site planning information program which might be adopted within the overall RRDS concept. Although several years of data have to be collected, stored, and analyzed before planners and managers can benefit, the program is nevertheless an important part of a total recreation information system.

Types of information and intended use

109. As recreation use of Corps projects grows, the need increases for an information system which can provide recreation personnel with evaluative data for site planning. There are two primary reasons for such information: first, as user preferences for activities and facilities change with time, resource managers need access to an evaluation system of site planning information. User preferences for the aesthetic experience as well as for the actual activities and facilities available

in a recreation setting are constantly shifting; resource managers need to be cognizant of these changes in order to plan effectively. Second, evaluative information that considers the carrying capacity of the natural resource base is greatly needed. This is the other half of the user preference equation and includes the ongoing refinement of planning guidelines to achieve the optimal balance between meeting recreation demands of the public and preserving the natural resource area. Managers of existing recreation projects are potentially among the best qualified to evaluate and modify site planning and management guidelines used in the past, and many of the observations on carrying capacity are made daily by resource personnel in the field. However, these observations are presently not systematically recorded or analyzed so as to become input for future planning considerations. Without an information system to store and disseminate these evaluations and recommendations, future projects cannot be tailored to take advantage of the insights gained from the past. Thus, the trial and error education gained is largely wasted, and each manager learns anew the constraints to site planning that others may have already recognized.

110. Two categories of site planning information which this section of the report considers are user preference trends and carrying capacity. The intended use of both of these information categories is to improve and expand upon planning frameworks currently utilized by resource managers.

Sources of information

111. The Corps of Engineers already has a major information source for site planning factors. Table 6 shows the various types of recreation area and site information available from the RRMS. These information categories include acreage, expenditures, number of recreation days, and various types of facilities at major Corps areas in the RRMS. Although a number of weaknesses in this system have been mentioned, a number of corrective actions are proposed by this study. The major weakness for

site planning analysis is the accuracy of the visitation data. Assuming the recommendations of the study are implemented, accurate visitation data should allow analytical comparison of the various types of sites, their facilities, and their patterns of uses. It is possible that when these data are improved, an analytical program similar to the previously described RRMS cross-tabulation program would provide a great deal of information about geographical and other differences.

112. The second major information source that could be developed into the supplemental information system is the already mentioned RRDS program. Although many details of the system are yet to be worked out, it is not too early to begin planning systematic programs for storing the information gained from the RRDS projects. Below are several major proposed categories of information that should provide much needed data to site planners and managers.

Essential Information Elements

- a. User preference trends. A systematic method of assessing changing preferences in the recreation experience in Corps areas would include consideration of aesthetics, facilities, and activities. The public's present satisfaction with the overall "feel" of the area, as well as specific attitudes on the supply/availability of activities and facilities, should be gathered through preference surveys. Such surveys have already been recommended in Corps planning manuals (ER 1120-2-400) and in another section of this report.⁵ Unfortunately, these data are seldom collected. In general, harmonious architecture for structures, quality construction, and appearance standards are essential for user satisfaction. A sample listing of specific information elements for defining user preference for the aesthetic environment could include perceived awareness of and problems from:

- . Overall parkscape: vistas, views, setting, mood, variety, scale, natural quality, cleanliness, satisfaction, interest, etc.
- . General appearance of facilities, including roads, beaches, and campgrounds.
- . Presence of unauthorized structures and encroachments on land and water.
- . Objectionable debris.
- . Mud flats and associated vegetation.
- . Upstream delta deposits.
- . Visual pollution from adjacent private development.
- . Water pollution from adjacent private development.
- . Eroded banks.
- . Sediment deposition on ramps, beaches, and shores.

In conjunction with problem identification and ranking the perceived importance of objectionable conditions from an aesthetic viewpoint, the information system should include the manager's recommended mitigation measures to alleviate adverse conditions. Creative and experimental approaches to any of the above 10 problem areas could be tracked over time. The results of such projects would be extremely useful to other managers.

User preference for facilities is based on the type of recreation experience desired. In fact, the overall presence or absence of facilities is a valid starting point in the information system since many users prefer to minimize man-made additions to a recreation area insofar as possible. For a given activity, different types of facilities may also be indicated: for example, a number of types of overnight sites can be provided, varying from primitive, walk-in camp sites to modern, full-service lodge facilities. Users expect their changing preferences for alternative forms of recreation activity to be recognized and provided for. A sample listing of the information elements for defining user preferences for facilities is shown below:

User preference for facilities

Alternative site planning elements

Overnight use

- . Primitive walk-in sites; few or no amenities.
- . Walk-in sites; water and sanitary facilities provided.
- . Trailside shelters, limited water and sanitary facilities.
- . Typical family campground, limited water and sanitary facilities.
- . Typical family campground with flush toilets, showers, and laundry tubs.
- . Typical family campground with complete utility hookups at each camp site (trailer court).
- . Housekeeping cabins.
- . Lodges, with complete service including restaurant or cafeteria.

Picnicking

- . Tables and scattered trees.
- . Low, coniferous canopy.
- . Near parking.
- . Grass.
- . Near play fields.
- . Near swimming or hiking areas.
- . With view.
- . Under shelters.

Swimming

- . Beach.
- . Natural area.
- . Food facilities.
- . Proximity to other areas of activity.

Boating and Marinas

- . Rentals and sales.
- . Types of launching.
- . Special use zones.
- . Docks and mooring space.

User preference for facilities

Alternative site planning elements

Boating and Marinas (continued)

- . Motor versus sail facilities.
- . Storage facilities.
- . Sanitary dump stations.
- . Motels and boatels.
- . Deicing equipment.
- . Water and electricity.
- . Night lights.
- . Boat washing area.
- . Fish cleaning facility.

Winter use

- . Access and parking.
- . Slopes for sports.
- . Buildings (warming, food, rentals, sanitary facilities, instruction, lodging, etc.)

Fishing

- . Shoreline access and piers.
- . Boat (moving, stall) zones.
- . Wading.
- . Ice.
- . Special access areas (e.g., early morning/late evening uses).

User preferences for activities as a function of site planning is basically a process whereby the requirements and potential impacts of the activities desired are matched, where possible, with locational factors and site characteristics of an area to produce a recreation plan for development and management of the resources. The development and management must seek to optimize both the quality of the recreation experience enjoyed and the preservation of the natural resource base being utilized. As resource managers develop better information on recreation demand and user preferences for aesthetics and facilities as well as for activities, it will become even more important to suitably match the natural environment of a project area with sound planning, design, and layout for a given activity.

The standard natural resource data categories for matching activities and facilities to the resource area are climate, geology, topography, soils, water, vegetation, and wildlife. The social and economic data categories for selecting recreation activity development for a region are: land use (agriculture, recreation, open space, urban, residential); utilities; transportation; historical and cultural resources; aesthetics; population; and demographic characteristics.

A sample selection of critical information elements for site planning by recreation activity is matched with the above data categories in Figure 2. This figure is primarily concerned with site planning information as it exists for a given activity. The relationship between the activity and its site and the project area as a whole, as well as the location of the site relative to others in the region, are other important factors the resource planner needs to consider.

- b. Carrying capacity. A critical site planning factor which the Corps supplemental information system should address is the carrying capacity of recreation areas and the site limitations on activities and facilities which should be recognized. Public demand for recreation should not be allowed to take precedence over preservation of the resource or the recreation experience. Corps projects should offer "places where people go for a special kind of experience, rather than merely places to get away from everyday activities."⁶ Further understanding of natural resource constraints would do much to avoid repetition of past planning decisions which have led to a deterioration of the very resource which people are coming to enjoy. While the concept of carrying capacity is a familiar one to resource managers, the development of a substantive data base from which to establish actual carrying capacity guidelines has not been accomplished. At least two categories of information elements should be addressed: carrying capacity for natural resource conservation, and carrying capacity for quality of the recreation experience.

Collection of information

113. Site information in the RRMS is already being collected in a systematic way. Forms have been developed and training sessions are provided for those responsible for input data. Implementation of the

Figure 2

Sample: Site Planning Information by Primary Activity

	Camping	Swimming	Picnicking	Fishing	Hiking	Hunting	Boating	Driving	Winter Use	Nature Study	Outdoor Games
<u>Natural Resources</u>											
<u>Climate</u>											
Temperature extremes	-	-	-	-	-	-	-	-	+	-	-
High rainfall	-	-	-	-	-	-	-	-	-	-	-
<u>Geology</u>											
Presence of unique formations					+			+		+	
Shallow depth to bedrock											
<u>Topography</u>											
High relief variation	+				+	-	+	+			-
Presence of unique features	+		+		+			+		+	
<u>Soils</u>											
High erodibility	-		-								-
Low productivity	-		-								-
<u>Water</u>											
High quality	-	+	-	+			+				
High fluctuation	-	-	-	-			-		-		
<u>Vegetation</u>											
High degree of forestation	+		+		+	+		+		+	-
Presence of many natural associations					+	+		+		+	
<u>Wildlife</u>											
High quantity	+		+		+	+				+	
Presence of prime habitat	-				+	+		-		+	-
<u>Social/Economic Resources</u>											
<u>Land Use</u>											
High degree of urbanization	-	+	+	+	-	-	+	+	+		+
<u>Utilities</u>											
Accessible to site (costs)	-										
<u>Transportation</u>											
Presence of scenic highways	+							+			
High accessibility		+	+	+			+	+	+		+
<u>Historical and Cultural Site</u>											
Visual Character	+	+	+		+		+	+			
Population Projections		+				+	+				+
Demographic Characteristics	+	+	+	+	+	+	+	+	+	+	+

- Potential constraint element.

+ Potential advantage.

+ May be constraint or advantage depending on activity and facilities to be developed.

recommendations of this report will improve the visitation component and thus provide a body of information useful for analyzing planning and management concepts. The RRDS program is just now getting under way. The exact details of who collects the information, when it is to be collected, and in what form and format have not yet been worked out. As with any other data system, several principles should be followed:

- a. There should be a standard format for collecting the data,
- b. The data collection should be by well-trained people using the same techniques and forms, and
- c. The information should then be carefully checked, key-punched, and input into the system for further analysis and use. Some of the information elements that should go into the system were discussed in the previous section.

As the RRDS proceeds, a systematic collection technique should be designed so that the data will be meaningful and accurate.

Storage/retrieval of information

114. The RRDS data will only be available from a limited number of sites. On these areas, a great deal of information will be assembled apart from the RRMS data. No doubt a number of useful comparative techniques might be utilized to analyze the RRDS/RRMS data. However, since the RRDS data are from a limited number of sites, some type of classification/comparison analysis could be developed to enable Corps planners to forecast possible use patterns, preferences, and site impacts. For example, interfacing the RRDS data with the RRMS data could result in locating similar patterns. If this is the case, hypotheses can be set for other RRMS sites not in the RRDS program enabling planners and managers to propose proper programs of facilities and services. In other words, by utilizing the data from both systems, a planner/manager for a newly developed site could anticipate problems and impacts prior to the fact.

115. It is not possible at this time to anticipate the types of storage and retrieval programs that might be developed from the two systems of information. To provide the widest possible use, the information should be fully available to planners and managers utilizing computer software at the District and project level.

Accessing, reporting, and disseminating information

116. The site planning information component of the supplemental information system probably has the widest impact of the three components recommended in the system. The information from this component obviously has meaning and use all the way down to the project level. Because the concept is new and the RRDS program is not fully developed, it is not possible to recommend the specifics of accessing and disseminating site planning information. Nevertheless, several general considerations should be followed. First, the actual analysis and use of any kind of comparative technique will probably be at the District level. Use of some type of computer software will require the development of handbooks and training sessions for District planners. On the other hand, implementation and application of the results to the site are of interest to site managers. Most of these personnel will have neither the knowledge nor the computer equipment available to use the system. Thus, some type of general information publication should be considered.

117. As with some of the components discussed above, a yearly publication as well as some mention in quarterly information bulletins would be of great assistance to project managers. In addition, District personnel will no doubt be utilizing the system on specific projects and providing this information to project managers. Periodically, WES researchers will have available information which should be published in referred journals, which should do much to further the state of the art of recreation planning and management.

PART V: IMPLEMENTATION OF STUDY FINDINGS

118. The types of actions necessary to improve the visitor survey data as well as to develop a supplemental recreation information system to serve planning and management needs were identified in the previous two parts. Obviously the findings and recommendations call for a greatly expanded recreation information program. A foundation for an expanded program has already been laid with the development and implementation of the RRMS. In addition, establishment of a center for recreation research at WES enhances the overall program. There is already great interest in recreation at the District and project levels, and additional effort, assuming adequate financing and staffing, should be received openly. The purpose of this part is to examine the recommendations for implementing MRI's study findings. Some conceptual alternatives to the recommendations are also presented for comparative purposes as well as the rationale supporting MRI's recommendations.

Recreation Information Program Tasks

119. There are five major tasks involved in implementing MRI's recommendations. These tasks are described in Figure 3.

Research and analysis

120. The first part of the program will be research and analysis of the various system components. It will include continually identifying information elements and sources of data. The task will also include analysis of the RRMS cross-tabulations, the nonreservoir recreation survey data, and the RRDS data. These three sources alone will greatly enhance the recreation information that can be provided to planners and managers, but much work must be done in identifying the various information elements, collection procedures, and analytical techniques. Of

Figure 3

Major Tasks in Developing and Maintaining a Supplemental
Recreation Information System

Research and Analysis

Identification of information elements
Development and maintenance of data sources
Analysis of RRMS cross-tabs
Analysis of nonreservoir survey data
Analysis of RRDS data
Annual analysis of trends

Collection and Storage of Data

Continual collection and storage of data for expanded similar project
concept
Storage of data for RRMS cross-tab analysis
Collection of historical data
Annual/periodic collection of RRDS data
Continual collection and storage of nonreservoir recreation survey
data

Computer Software Requirements

Storage programs for historical trend data
Storage and analysis programs for RRDS data
Programs for RRMS cross-tab analysis
Programs for expanded similar project analysis
Storage and analysis programs for nonreservoir recreation survey data
and model
Maintenance of the supplemental recreation system

Training and System Quality Control

Training, expanded similar project methodology
Training, RRMS cross-tab analysis
Training, nonreservoir recreation model
Training and implementation of improved visitor surveys
Annual quality control monitoring of visitor surveys

Reporting

Annual report of historical trends (printouts and narrative)
Handbook for expanded similar project methodology
Handbook for RRMS cross-tab analysis
Handbook for nonreservoir recreation model

course, the research task also includes developing and tracking historical trends.

Collection and storage of data

121. Collection and storage of data will be another major task to support the overall information program. In addition to maintaining information so trends can be monitored annually, information will also have to be collected and stored for the RRDS and the nonreservoir recreation surveys. To implement the expanded similar project methodology and the RRMS cross-tabulation analysis, additional data will have to be collected and stored in a supplemental system so that it may be interfaced with the RRMS data. These latter two components will require a great deal of initial effort, but after the first year only a minimal amount of maintenance should be necessary.

Computer requirements

122. The computer requirements to support the supplemental data system will also require a great deal of initial effort. After the basic programs have been developed, periodic updating because of equipment changes to take advantage of new developments and programming to accommodate new information elements will be required. The initial thrust of the computer task will be to develop programs to store and analyze the RRDS data, facilitate the RRMS cross-tabulation analysis, and implement the expanded similar project methodology. Depending on the implementation of the nonreservoir recreation survey information, effort will have to be expended to prepare storage and analytical programs. As far as historical trend data are concerned, probably most of the initial effort can be accomplished with the simple development of tables, etc. In time, however, as the program becomes more sophisticated, software packages will no doubt have to be developed.

Training and quality control

123. Such an undertaking and change in programming effort will of course require training and quality control programs to maintain the data base. Although probably coming during the second or third year of implementation, training is an essential component. Before the improved visitor surveys can be implemented, District and project personnel must be trained in the use of the Handbook. An implementation schedule will have to be set up and closely followed before any appreciable change can be made in the visitation input to the RRMS. As the improved surveys are implemented, quality control checks will also have to be made periodically to make sure that Districts and projects are following the manual. No doubt some adjustment will have to be made in procedures, but the important contribution of training and monitoring will be consistent and standardized surveys. The quality control aspect will be continuing so that standardization is maintained.

124. Additional training programs will also have to be undertaken to implement the expanded similar project methodology, the RRMS cross-tabulation analysis, and use of the nonreservoir recreation model. Since these data will not be available before the second or third year of implementation, however, training can also be delayed.

Reporting the results

125. Finally, an important task will be reporting the results of the program. Several recommendations have already been made in this report regarding the types of communication programs that might be utilized to report essential information to planners and managers. An annual report should be provided and circulated to all Districts and projects. It should trace historical trends and point out regional differences. This type of information will greatly aid project managers and District personnel.

126. The MRI Handbook for implementing the improved visitors survey will be an essential tool for improving the visitation input to the RRMS. Three additional Handbooks will also be required. These include: The expanded similar project methodology, the RRMS cross-tabulation analysis, and the nonreservoir recreation model. These manuals should contain a narrative described in lay terms so that the overall concept of the methodology will be thoroughly communicated. A section should also contain the essential elements for automatic data processing personnel. Additional reports and communication materials will also probably be identified as the program is implemented.

127. The information program described in this report could be developed in several different ways than the one recommended by MRI. In addition, the Corps could choose to do nothing to improve visitor information. For comparative purposes, two conceptual alternatives for implementation, as well as the do nothing option are presented below:

Implementation Alternatives

Recommended plan

128. The recommended MRI plan involves a two-pronged effort. First, the Corps should undertake a program to improve the input data in the RRMS. As a part of MRI's study, a Handbook is being developed to standardize the visitor surveys and estimation of total visitation using both survey information and traffic count data. A program must be undertaken to implement use of this Handbook. The initial step is development of an engineering regulation. Next, a program to implement use of the Handbook must be started. A crew of highly trained personnel will have to start with a few Districts and each year expand their effort to include additional Districts and projects. Finally, after several years, the visitor survey and use of the techniques recommended in the Handbook will be consistent Corps-wide. Then, only a minimal quality control and

maintenance effort will be necessary to ensure that the visitor information in the RRMS is accurate.

129. The RRMS visitation input is only a part of the total information problem existing for planners and managers, however. The other part of the problem is obtaining information, as discussed in Part IV of this report. To obtain this information, the Corps must undertake a program to develop a supplemental data system and provide information elements not currently contained in the RRMS. Taking this approach will eliminate any tampering with the RRMS. That system can continue on its own with the improvement of the visitation element. Development of a supplemental system will require the tasks described above including research, collection, and storage of data; development of software computer programs; training; and reporting. The supplemental recreation information system and the RRMS might be interfaced with appropriate computer software packages for the types of analyses described in Part IV. This will greatly expand the availability of the data as well as the use of more sophisticated analytical techniques.

130. The advantages of this plan would be that the RRMS and SIRAP can continue to exist separately for use by OCE as well as Districts while a new system is being developed. In fact, it is recommended that the RRMS not undergo any changes other than minor refinement of individual data elements. This approach will enable the Corps to focus on major problems such as the accuracy of the visitation data and development of a new system. That way a program is not fragmented into many different competing components. In addition, on-line data for analysis and use would probably be available in a much shorter period of time than if any attempt was made to modify the existing RRMS.

131. The recommended plan also seems to fit well with the research function of WES that has already proposed the establishment of a RRDS. This concept fits well with the development of a supplemental data system.

During the next several years WES will be identifying particular demonstration areas, data elements, data collection techniques, storage methods, and other components necessary to support the RRDS concept. Organizationally, the alternative would enable WES to undertake both the improvement of the visitation information in RRMS as well as development of a supplemental information system.

132. A major problem in implementing this plan is that WES presently has no line function over Districts and projects. The organizational chain of command instead follows through OCE down to the Divisions, Districts, and projects. To implement this plan, WES will have to be supported by first adopting an engineering regulation around the recommendations proposed for the visitor survey handbook. Next, WES will have to be given the responsibility to train, supervise, and maintain quality control of the survey and visitation data.

Option No. 1

133. The Corps of Engineers could ignore all of the previous work that has been done as well as the systems that have been developed to support recreation and other types of planning. They could proceed by starting all over and developing a recreation information system that would include all essential elements in RRMS and the SIRAP program.² In addition, all of the previous research that had been devoted to recreation could essentially be ignored, and new techniques could be developed. This would mean already existing techniques such as the similar project methodology, the nonreservoir recreation use model, and other such methodologies would no longer apply.

134. Based on all experience up to this point, Corps planners and managers could develop a system that would be relatively perfect compared to using an existing system and superimposing over it new methodologies, data collection, and analysis techniques, etc. The HCRS has on several previous occasions given consideration to this

alternative with regard to the national recreation survey. Even with the possible advantages of starting from scratch, HCRS has generally continued developing a data base using existing techniques and standards and improving on them where possible.

135. The insurmountable disadvantage of implementing Option No. 1 is that all data in the RRMS and information that has been catalogued up to this point would be lost for further analysis. The cost of implementing Option No. 1, as shown in Part VI, is also considerably larger than the other options. Because of the lost data and down time, it would take a considerable amount of time and investment to get usable data on line to assist recreation planners and managers.

Option No. 2

136. A second option would be to expand the RRMS and add data elements to make the system more comprehensive. Since OCE already has direct lines of authority to Divisions, Districts, and projects, they could also undertake implementation of the improved visitor survey. With this alternative, the Recreation Resource Management Branch at the national level could undertake the total program of implementing and providing information to Districts and projects regarding recreation planning and management.

137. The major advantage to this approach would be that the development of an interactive system should be simpler and easier to accomplish with one system rather than interfacing two. Another advantage is that organizationally the alternative seems more sound. Divisions, Districts, and projects are already accustomed to reporting directly to OCE.

138. A major disadvantage will be that the RRMS, a system that essentially is debugged and ready for on-line use, may be further complicated, and interactive use of the system may be delayed. Also, the OCE staff will have to redirect their efforts to include all of the research

and development functions described in this report. This could delay and fragment some of their current efforts and programs.

139. The alternative could in part be combined with the recommended alternative. For example, with minor changes in the RRMS, the WES staff could make the system more comprehensive for planning and management needs. Two of the methodologies already mentioned (the expanded similar project methodology and the RRMS cross-tabulation analysis) could be implemented within the existing RRMS system. The advantage, of course, would be that all of the information and analytical procedures relating to the RRMS would be contained within the system, thus minimizing the need for interfacing programs. The disadvantage would be that the RRMS may not be interactive for several more years. A supplemental data system could still be developed to contain the information elements described in the previous part of the report as well as data and analysis from the RRDS's.

Do nothing option

140. Of course the Corps could choose to do nothing to improve visitor information or develop a supplemental recreation information system. As the Corps completes more and more lake and nonreservoir projects, they will find themselves more in a management and operation mode than in construction. This will mean that managers and planners will have to have up-to-date information regarding visitation, user preferences, demands, attitudes regarding Corps facilities, etc., if they are to successfully fulfill their mission of serving the public.

141. The Corps of Engineers has a number of dedicated personnel who are already doing an outstanding job of accommodating the public. A great many other problems were acknowledged during MRI's field visits. Almost every manager said he did not have enough annual maintenance and operation funds to do the job adequately.

142. An information system will no doubt require a great deal of funding and commitment in terms of personnel. The potential results that can be produced by such an undertaking must be balanced against the competing needs throughout the Corps of Engineers. From both a theoretical as well as an operational standpoint it appears improvement of visitor information and development of a supplemental system to serve planning and management is essential.

143. Other agencies are also acknowledging the need and are undertaking the development of information systems to support their recreation planning and management capabilities. During the last year, the Tennessee Valley Authority and the Bureau of Reclamation have both undertaken studies to develop such a system. Even the U.S. Forest Service, with probably the oldest existing recreation system (RIM), is considering additional research to make their system more usable. The State of California is also currently funding a research study at a level of \$740,000 to improve their information system.

144. The Canadian government, Parks Canada, has undertaken a major program to provide leadership and consultation in the area of outdoor recreation and park use research. The new Socioeconomic Research Division (SERD) has been given the mandate to monitor and evaluate "the people impact" of Parks Canada's ongoing and planned activities. Staffed with a variety of research skills (statistics, economics, sociology, geography, recreation, survey methods and econometrics) the division's activities are divided into six sections: survey assistance and monitoring, research information, analysis and research needs, projections and statistical design, social science support, technical and clerical support.

145. All of these agencies have recognized the need for more sophisticated planning and management information and are taking steps to make sure that they keep pace with the state of the art.

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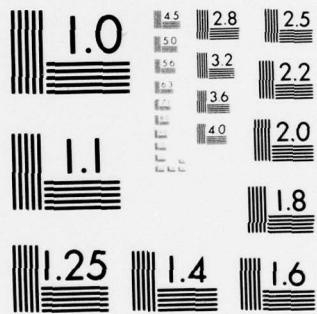
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PART VI: ADMINISTRATIVE ASPECTS OF IMPLEMENTING STUDY FINDINGS

146. In the previous chapter, a recommended plan for implementing the findings of this study was described and conceptual alternatives were identified. These alternatives ranged from an extreme of scrapping all previous research and analytical experience to doing nothing. The fact that the Corps of Engineers contracted for this study shows that there is a desire to improve available information and perhaps supplement existing systems with more meaningful data.

147. A number of administrative concerns must be considered in implementing the findings. These concerns include organizational structure, manpower requirements, staff capabilities, use of contractors to supplement in-house capabilities, training and standardized management techniques, implementation schedules, apportionment of cost among major Corps programs, and legislative and administrative constraints. Each of these concerns is discussed in the sections that follow. Some of the concerns would be the same for each of the conceptual alternatives as well as for the recommended plan. Where special considerations must be given to a particular alternative, these are so noted.

Organizational Structure for Implementation

148. The recommendations have assumed that all responsible elements within the Corps would be devoted to improving the visitation data in the RRMS and developing a supplemental recreation system for planners and managers. In part, this assumption has already been fulfilled in two separate offices. At OCE, for example, the Recreation Resource Management Branch is responsible for maintaining the RRMS and coordinating with the higher levels of management for funding of Corps projects. At WES, on the other hand, focus has been on the recreation

research needs required to support planners and managers Corps-wide. Both of these groups play a very important part of the overall program conceived in this report.

149. Implementation of all of the recommended plan assumes a degree of administrative authority over Divisions, Districts, and projects. For example, implementation of a standardized survey will not be possible unless Districts and projects give their full cooperation to the program, and this will not be possible short of developing an engineering regulation based on the Handbook that MRI develops. In addition, the Districts and projects will have to be checked periodically to ensure that a degree of quality control is being maintained with regard to this regulation.

150. Development and maintenance of the supplemental information system is also complicated by the fact that it includes major functions of all general responsibilities within the Corps of Engineers. A part of the program will involve research, another part management, and another part planning. These functions have been traditionally separated within the Corps to provide a framework for administrative control. These functions will essentially have to be drawn together in order to implement the information program.

151. If the Corps of Engineers chooses to place the responsibility for the information system within OCE, the Recreation Resource Management Branch appears to be the logical location. This group is already maintaining the RRMS. Its familiarity with the program would no doubt be important in developing a comprehensive information base. On the other hand, another program within this branch would tend to fragment its present efforts. Therefore, a separate section would probably have to be set up and devoted to implementing the findings of this study. This would mean the Recreation Resource Management Branch would be involved in both planning and research, which may not be appropriate.

152. On the other hand, WES is primarily involved in research and the recreation information system would involve both planning and management to some degree. If the Corps decides to locate the recreation information program at Vicksburg, Mississippi, it could be handled as a technical information element with direct input from the recreation research group. As can be noted from the suggested program, almost all of the initial work will involve a heavy emphasis on research. After the basic information system is set up, it will be maintained by the annual acquisition of information. Research will still be involved in tracking and analyzing trends and suggesting new information elements that should be included in the total system. The one major disadvantage to locating the program at WES is the fact that it does not have direct authority over Divisions, Districts, and projects. Presently, WES must rely on cooperation to achieve any results. Thus, attention will have to be given to establishing organizational support if the program is to be located at WES.

Manpower Requirements

153. The manpower requirements for implementing the recommended plan as well as the conceptual alternatives are presented in Table 7. These estimates have been prepared under the assumption that all primary data collection will be accomplished by Districts and projects. The cost and manpower requirements for the standardized survey and methodology for estimating visitation have been discussed in another part of the report. It is further assumed that data collection from the RRDS's will be initially based on cooperation between WES and the Districts and projects. The manpower requirements shown in Table 7 include only what would be required to do the basic analytical data storage, quality control, and reporting by the national level office.

154. The recommended plan assumes that the information system would involve a two-pronged effort. The visitation data in the RRMS would be improved, and a supplemental system would utilize both RRMS and other information within a total system. This would be slightly more expensive, in terms of manpower, than broadening the RRMS to include all data elements required in the system. There would be some savings in personnel in taking this latter approach (Option No. 2), but these do not appear significant, in light of the added costs to debug an already on-line system. It also would complicate and delay making the system interactive.

155. It may be noted that to implement Option No. 1 (development of a completely new information system) would require roughly twice the manpower as the other two alternatives. There would also probably be a corresponding increase in manpower and other costs at the District and project levels, since Corps personnel would have to learn how to use the new data collection techniques.

156. Based on the overall staffing requirements, it appears between six and eight people would be required initially to start the recommended system. After the initial years of program development and implementation, a staff of four or five should be able to handle the program adequately.

157. The proposed recreation information system would also involve other costs such as automatic data processing, travel, and publication costs. These would be roughly similar for implementation of the alternatives as well. An estimate of these costs is provided in Table 8. The initial cost of implementation would be roughly between \$120,000 and slightly under a quarter of a million dollars. After the recreation information system is tested and fully implemented, the annual costs would range from near the \$100,000 level to over \$150,000.

158. It should be obvious that these costs are rough estimates and are subject to change as the program is implemented. The computer costs are similar to those already being incurred in the use of both the SIRAP

and the RRMS; the publication costs should not be overly excessive. A major variation in costs could result from travel during training and in the implementation of the recreation survey and in the conducting of workshops for District personnel using the supplemental information system techniques.

Required Staff Capabilities

159. In general, the individuals implementing the program should be oriented to research and planning but have an appreciation for management of Corps facilities. For this reason, it is recommended that former District or project staff be utilized in some of the positions. Since the Corps of Engineers already has a training program and many District and project staff are working on advanced degrees, suitable personnel can probably come directly from within the Corps of Engineers. In addition to this general staff capability, several specialties will be required to implement the recommended plan.

Research design and survey specialist

160. An essential part of the recreation information system will be in designing and coordinating the various components of the total system. This will require a specialty in overall research design as well as survey administration. The specialties could be separated, or a single individual could coordinate both aspects. Since five positions are recommended for the recreation information program, at least two positions should probably be devoted to implementing and administering the visitor surveys.

Information Specialist

161. A major focus of the recreation information program will be on developing and presenting information that will be useful to Corps field personnel. An information specialist, trained in both graphic and

narrative communications, would provide the link between field and research/planning personnel. This skill would be especially needed to publish the information bulletin, set up and conduct workshops and respond to field requests for information.

Automatic data processing specialist

162. Since the program will include developing software packages for the supplemental information system, as well as interfacing programs between the supplemental system and the RRMS, a computer analyst will be required. Although knowledge of programming and computer languages is essential, this position does not necessarily have to be filled by an individual who will be doing all of the programming. At least a part of this function could be contracted to an outside firm. Nevertheless, the specialty should be filled by an individual who has this capability. At a minimum it may require debugging, updating, and checking software packages.

Planning specialist

163. Part of the information system will require knowledge in various social sciences including economics, sociology, and urban and regional planning. This responsibility might be filled by an individual with a marketing degree or a Master's in Business Administration. The individual filling this position will be responsible for developing and modifying the various information elements related to his field, analyzing trends, and providing planners in the field with the types of information needed to fulfill their responsibilities.

Resource specialist

164. Much of the information that will be developed and analyzed utilizing the RRDS's will be natural resource information. This will require an individual trained in one of the resource management specialties such as forestry, biology, or fish and wildlife management. Probably his primary responsibility will be in the general area of resource carrying capacity.

Information System Contracting Requirements

165. During the development and maintenance of the recreation information system, there will be times when specialties are required in addition to those cited above. For example, a general resource specialist trained in forestry may need assistance in either fisheries or wildlife management. Therefore, there will be the occasional need to contract with an outside agency, firms or university for specific program elements. Although the general types of studies are difficult to anticipate at this time, three areas seem to be appropriate for outside contracts.

Data collection

166. Survey firms, students, a university, or a private research company might be able to conduct the on-site surveys and fill other data collection requirements. Although this type of contract would normally be let at the District or project level, it could be at the national level. A major advantage is that a private company or other potential contractor can generally function on a quick turnaround basis at a reasonable cost. Thus, the Corps does not have to add additional personnel for a single project element and incur exorbitant training and administrative costs.

Computer programming

167. As the recreation information system is implemented, there will be a need to develop software packages for storage of data as well as other software packages to analyze and interface the supplemental system with the RRMS. These are very specific computer requirements and will require highly trained analysts capable of dealing with complex computer problems. Although the ADP specialist will have a general capability, this would also be an appropriate area for contract. The ADP specialist, of course, would be coordinating with the developer of the programs to ensure that the programs were compatible with Corps needs.

Storage of data

168. The supplemental recreation information system will have to be stored in a facility that is available to a wide number of users (Divisions, Districts, and projects). The system could either be installed on a university computer or a commercial vendor. Again, a contract will be required to place the system on an interactive basis. University facilities offer the advantage of generally having the most up-to-date, sophisticated equipment and are inexpensive. Commercial vendors, while slightly more expensive, are generally more accessible to users.

169. During the initial implementation of the recreation system, a larger staff will be required. Thus, some of the initial work might be accomplished by university professors working on Sabbaticals or temporary duty Corps personnel from Divisions, Districts, or projects. In addition, some of the initial work elements might also be accomplished on a contract basis.

Training and Standardization

170. In other parts of this report, recommendations have been made regarding training and standardization of recreation information. Workshops will no doubt have to be conducted to implement the survey procedure. Additionally, workshops and training sessions will be required to teach personnel how to use the various system components, such as the RRMS cross-tabulation analysis or the expanded similar projects technique. A workshop would also be useful for discussing more general problems, particularly with regard to project management. During the early years, such a workshop would be beneficial in obtaining input from the field and in gaining support from planners and managers Corps-wide.

171. Handbooks, guidelines, and user manuals will be required to describe and implement the various recreation information system components at later stages of development.

Schedule for Implementation

172. To be successful, an organized and efficient program of implementation must be undertaken to ensure that the visitor survey and methodology for estimating visitation be implemented at the Division, District, and project level Corps-wide. This study has recommended the recreation information system utilize the survey and visitation Handbook as a guide to implementing surveys at the project level.

173. To be sure that procedures are properly carried out, training sessions will have to be held. In addition, quality control checks of actual surveys will have to be made periodically. It seems appropriate that District personnel be trained at Division sessions, and they, in turn, should train the project people in their respective Districts. The information program can provide personnel to administer workshops at the Division level for training District people. In addition, a few of the managers from large projects might also attend these Division sessions. Initially these training sessions might require 2 to 3 days. During later stages of implementation a 1-day refresher course should be adequate.

174. With this type of time commitment, it would seem possible to develop and conduct a training session with three Divisions (approximately 12 Districts) annually. The program staff should also attend some of the District training sessions and make periodic checks throughout the recreation season to ensure that the visitor survey is being conducted correctly. If approximately three Divisions (12 Districts) are trained annually, a 3-year cycle would be required to completely implement the visitor survey and use estimation techniques.

Since it appears that the visitor surveys should be conducted every third year, the training sessions can be repeated both at the Division and District levels prior to conducting each of the major surveys.

175. If development of an entirely new recreation information system is undertaken (Option No. 1), the 3-year cycle will probably not be adequate. Many of the Districts, for example, are already somewhat familiar with visitor surveys and use estimation techniques. Adopting an entirely new format for surveys and other data collection techniques will no doubt require more time to comprehend and implement. A 5-year cycle, therefore, may be more appropriate for implementing Option No. 1.

Apportionment of Cost Among Major Corps Functions

176. The Corps is funded under a very elaborate system of budgeting. For example, research and planning generally come out of general funding, and construction and operation are budgeted under a separate category. There are also additional special funds to cover some programs. The overall funding of the recreation information system obviously cuts across budgetary lines because the program includes elements of research planning and operations. The surveys, for example, are generally administered by operations staff or financed under private contract out of Operation and Maintenance (O&M) funds. The information system itself is designed primarily as a planning tool but no doubt will furnish managers with a great deal of useful information. Research will be required throughout the development and implementation of the program. Therefore some consideration must be given to funding the overall program to include all of these Federal water-related programs. This could obviously be a major budgetary problem; but as with the organizational structure, it is a consideration that must be faced early in the development of the program.

Other Legislative and Administrative Constraints

177. In addition to the various administrative aspects of implementing the recommended plan, two additional considerations should be recognized.

Comparability of recreation system to HCRS requirements

178. The HCRS annually publishes a report to the Congress.¹⁹ This report describes recreation use at Federal areas in terms of 12-hr visitor days. The recreation information system, including the visitor survey data, should be developed in a manner that will be compatible with this definition of visitation. This does not mean that the Corps should change its present approach and collect all visitation data in terms of visitor days. Instead, the necessary elements that would provide conversion factors should be added to the survey and perhaps even to the RRMS. This would make the information more readily accessible to OCE for analysis and use.

OMB questionnaire approval

179. Federal regulations require the Office of Management and Budget (OMB) to approve all questionnaires gathering information from more than 10 people that will be utilized by an agency for planning, operations, or evaluation of its program. Since the improvement of the visitation data and the RRMS requires that visitor surveys be implemented at all projects, OMB clearance is required. This is a continuing concern, not only to the Corps, but to all Federal agencies. Because the questionnaires will be essentially the same, the needs of the recreation information system should be discussed at length with OMB clearing authorities. Gaining broader support and OMB approval for the questionnaire are a must. Since all Federal agencies with a responsibility in recreation are faced with the same constraint, perhaps the Corps could provide leadership and explore various alternatives to developing a Federal agency-wide questionnaire that would qualify for OMB approval.

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Table 1

Trends in Selected Recreation Demand (Or Use) Information

<u>Selected Information</u> <u>Category</u>	<u>Units of Information</u>	<u>Sources</u>
Recreation/Participation/Visitation/Use	* Per Capita Recreation Participation (National or State)	Heritage Conservation and Recreation Service or Appropriate SCORP
	* Visits to Parks, Recreation Areas, and States (aggregate as well as specific areas)	Federal or State Agency
	* Travel Characteristics (length of stay, size of party, how far traveled, etc.)	U.S. Travel Data Center
Recreation Equipment	* Sale of Recreation Goods (RVs, boats, snowmobiles, other outdoor equipment items)	Trade Associations, U.S. Department of Commerce
	* Use of Recreation Equipment (licensing, use characteristics, user preference)	Trade Association, Individual companies, U.S. Department of Commerce, U.S. Coast Guard, and Special Studies
Recreation Expenditures	* Equipment Costs (cost of item, change in preference, expenditure habits)	Trade Associations, U.S. Bureau of Labor
	* Travel Costs (cost breakdown, level of expenditures, habits)	U.S. Travel Data Center, State and Federal Agencies

Table 2

Trends in Selected Recreation Supply Information

<u>Selected Information Category</u>	<u>Units of Information</u>	<u>Sources</u>
Areas and Facilities	<ul style="list-style-type: none"> * Acreages and Locations * Number of Sites/Facilities, etc. * Level and Quality of Development/Management of Recreation Areas, Business, etc. * New Concepts in Recreation 	Trade Associations, Private Directories, and Information Systems
Agency Budgets/Commitments	<ul style="list-style-type: none"> * New Developments, Programs, Areas of Emphasis * Staffing * Annual Management Budgets 	Agency Records and Information Systems

Table 3

Specific Elements Already Existing in the RRMS

General

Project purpose
When impoundment (operation) began
Shoreline miles (fee)
Pool elevation (minimum, average recreation, flood)
Encroachments
Project area data (total, flowage easement, fee and recreation acreage)
Number of public areas and visitation
Proximity to Standard Metropolitan Statistical Areas (SMSAs) (name, road miles, population)

Visitation

Annual visitation (recreation days)
Recreation days/month
Percent of activity in eight recreation activities
Average attendance weekday during peak month (family day use and camping)

Project Resources and Facilities

Number of off road vehicle (ORV) areas
Picnicking facilities (number of sites, number of units average weekend)
Camping facilities (same as above)
Boat launching (number of lanes, number of launches average weekend)
Private facilities (use permits, number of boats in community docks, other floating facilities, and number of nontransient trailers)
Areas in recreation (intensive, low density use), natural, wildlife management, and forested areas

Management Information

Number of personnel in various management positions
Law enforcement information
Golden age passport information
Name, address, telephone number, etc., of manager and project office

Table 4

Possible Classifications for Cross-Tabulating RRMS Data

Contrasting Examples

* Deep Mountain Lakes	* Shallow Prairie Lakes
* Urban Lakes (or projects)	* Rural Lakes (or projects)
* Cold Climate Lakes (or projects)	* Warm Climate Lakes (or projects)
* Large Multipurpose Projects	* Small Limited Purpose Projects
* Lakes (no outlets)	* Waterways (locks and dams)
* Old Established Projects	* Relatively New Projects
* Type of Project Attraction	* Depends On Attraction Breakdown
Major Resort	
Day Use	
Intermediate	
* Lakes With High Drawdown	* Lakes With Low Drawdown
* Projects With Many Competing Resources	* Projects With Few Competing Resources
* Lakes With Many Vacation Homes on Shoreline	* Lakes With Few Vacation Homes on Shoreline
* Lakes With Permanent Pools	* Lakes With No Permanent Pools
* Projects With High Water Quality	* Projects With Low Water Quality
* Projects Where Public Ownership Is Predominant	* Projects Where Private Ownership Is Predominant
* Projects With Many Land-Use Controls	* Projects With Few Land-Use Controls
* Lakes and Projects With Good Access	* Lakes and Projects With Poor Access
* Main Project Purpose	* Depends on Purpose Breakdown
Flood Control	
Navigation	
Power	
Other	
* High Density Use Projects	* Low Density Use Projects
* Type of Lake or Project by Acreage Class	* Depends on Acreage Breakdown

Table 5

Factors Utilized In Estimating Initial Reservoir Recreation Use

<u>Planning Factors</u>	<u>Data Available In RRMS</u>	<u>Data Available From Other Sources</u>	<u>Data Must Be Compiled and Analyzed</u>
Location (State)	X		
Maximum pool:			
Acre-feet		X	
Surface acres	X		
Average recreation pool:			
Surface acres	X		
Shoreline miles	X		
Year impoundment began	X		
Number of access areas	X		
Recreation facilities:			
Tent and trailer spaces	X		
Day-use areas (capacity in recreation days)	X		X
Boat launch lanes	X		
Attendance (recreation days):	X	X	
1977)			
1976)			
1975) (previous 5 years)			
1974)			
1973)			
Recreation season	X		
Project purpose (FC = flood control, R = recreation, C = conservation, P = power, WS = water supply, and I = irrigation)	X		
Timber cover	X		
Reservoir terrain		X	
In National Forest	X	X	
Access:			
Paved road		X	
Limited access		X	
Overnight lodging nearby		X	
Competing water-oriented recreation areas:			
0-25 miles - lake (acres)		X	X
- river (miles)		X	X
25-50 miles - lake (acres)		X	X
Per capita use curves	X	X	X

Table 6

Recreation Area and Site Data Available From the RRMS

General Information	- location, acreage (developed in recreation), expenditures, managing agency, performance of managing agency
Visitation	- recreation days
Sanitary Requirements	- total Federal cost of eliminating the existing sanitary and public health deficiencies at the area or site (upgrading or replacement, not expansion)
Recreation Facilities	- number of sites, launching lanes, trails, other
Concession Information	- facilities and services, occupancy, improvements, performance
Fee Area Information	- number of sites, visitation, revenues, proposed fee program for next year

Table 7

Manpower Requirements to Implement the Alternatives,

Man Years

<u>Program Task</u>	<u>Recommended Alternative</u>	<u>Initial</u>		<u>Recommended Alternative</u>	<u>Annual</u>	
		<u>Option 1</u>	<u>Option 2</u>		<u>Option 1</u>	<u>Option 2</u>
Research and Analysis	2	4	2	1/2	1	1/2
Collection and Storage of Data	2-1/2	5	2	1	2	1
Computer Software Requirements	1	2	1/2	1/2	1/2	1/4
Training and System Quality Control	2	4	2	2	3	2
Reporting	-	-	-	1/2	1/2	1/4
Totals:	7-1/2	15	6-1/2*	4-1/2	7	4*

* In addition to existing Recreation Resource Management Branch staff.

Table 8

Other Recreation Information Costs

	<u>Initial</u>	<u>Annual</u>
Computer Costs	\$100,000 to \$200,000	\$75,000 to \$125,000
Travel Costs	17,000 to 28,000*	11,000 to 22,000**
Publication Costs	<u>1,000 to 5,000</u>	<u>5,000 to 10,000</u>
Total:	\$118,000 to \$233,000	\$91,000 to \$157,000

* Based on 150 to 250 days in the field at \$45 per diem, 3-day trips, and \$200 average transportation costs.

** Based on 100 to 200 days in the field at \$45 per diem, 3-day trips, and \$200 average transportation costs.

APPENDIX A:

QUESTIONNAIRE FOR DEVELOPMENT OF AN IMPROVED DECISION-
ORIENTED RECREATION USER INFORMATION SYSTEM

QUESTIONNAIRE FOR DEVELOPMENT OF AN IMPROVED DECISION-ORIENTED
RECREATION USER INFORMATION SYSTEM

1. What type (types) of data have you found to be most useful for your own recreation managing? Planning? Research?
2. Collecting the data for any system can be a problem. How do you currently collect data needed for recreation management? Planning? Research?
3. How often do you collect data and update your data files?
4. What kinds of research do you do for your own recreation management, planning, and research needs?
5. Do you have a system of checks to insure that your data are accurate? That is do you double check your figures by using more than one technique?
6. What are the techniques currently employed? That is, do you use counters, surveys of persons entering the area, exiting the area, utilizing particular sites, etc.

FOR PROJECT LEVEL ONLY

7. What do you need to know in order to manage the project better in terms of recreation?
8. In addition, what types of information do you need from the district, division and OCE.

(User Preference)

9. Do you currently collect data on user preference?
10. Do you collect data on how people feel about the facilities in order to make resource allocation decisions. That is do you check on what people prefer in terms of the way resources should be employed and utilized (should weeds be cut or left growing, more boat launch sites or less, etc.)
11. If so, what is the technique that you use? (Interview at entering, exiting or on site, a questionnaire to be mailed back upon leaving, informal discussion, observation, etc.)
12. What type of information on user preference do you consider to be important?
13. What do you do with that data in terms of both storage and use?
14. What impact does the data have for recreation management? Planning? Research?

(Data Analysis)

15. How do you analyze the data that you collect? (models, programs, etc.)
16. What kind of data analysis (that you are not now doing because of data or analytical problems) do you need on a routine basis to support recreation management? Planning? Research?
17. What type of format would be most useful for the data after it has been analyzed? Graphic depiction? Tabular Form? Photogrammetric Presentation? Map.

18. How familiar are you with the RRMS?

FOR PROJECTS ONLY

19. How do you gather the data that goes into the RRMS?
20. What criteria have you used for placement of counters?
21. Do you sample to determine if they should be placed on more than one road and the spot on each road where they should be placed?
22. How often do you read the counters and adjust them?
23. How do you convert the traffic counts into visitation estimates?
24. Do you use a survey in conjunction with your traffic counters?
25. How often do you do the survey and what guidelines do you employ for it?
26. Who conducts the survey for you (part-time help, contract, full-time corp personnel, etc., and what training do they have?
27. What kinds of procedures do you think should be developed in order to standardize survey techniques and data collection?

FOR ALL LEVELS

28. Does the RRMS supply you with the necessary information to manage recreation activities? Plan for Recreation activities? Do research for recreation activities?
29. Have you made any local adaptations of the RRMS that makes it more useful to you? What is the nature of these adaptations? (Probe for specifics, documentation, etc.)
30. If not, what are the major gaps (or weaknesses) in the RRMS for managing? Planning? Research?
31. What are the problems in supplying input data to the RRMS?
32. Are there any special problems supplying input data to the RRMS?
33. What are the resource requirements in order to supply the data for the present reporting system? (money, manpower) How much does it cost to do the survey?
34. What kinds of information (data) not now supplied by the RRMS are needed to support recreation management? Planning? Research? Facility design?
35. Are you able to arrive at this information by using another system?
36. If so, what is the other system to get the data needed for recreation managing? Planning? Research?
37. Would you describe the system (or systems)?
 - a. Does the system (do the systems) interface with RRMS?
 - b. Does it (do they) interface with other systems of which you are aware?
38. What kinds of data are provided that give you a better handle for recreation managing? Planning? Research?
39. Are you familiar with SIRAP (System of Information Retrieval and Analysis for Planners)? Do you use it? Why or why not?

APPENDIX B:

CORPS OFFICES AND OTHER AGENCIES CONTACTED BY MRI STAFF

Corps of Engineers

Waterways Experiment Station	Vicksburg, Mississippi
Office, Chief of Engineers	Washington, D.C.
Institute of Water Resources	Ft. Belvoir, Virginia
Corps of Engineer Divisions	
Southwestern	Dallas, Texas
Ohio River	Cincinnati, Ohio
North Central	Chicago, Illinois
New England	Waltham, Massachusetts
South Pacific	San Francisco, California
Corps of Engineer Districts	
	Kansas City, Missouri
	Ft. Worth, Texas
	Tulsa, Oklahoma
	Little Rock, Arkansas
	Louisville, Kentucky
	Nashville, Tennessee
	Rock Island, Illinois
	Chicago, Illinois
	St. Paul, Minnesota
	St. Louis, Missouri
	Los Angeles, California
	San Francisco, California
	Sacramento, California

Other Agencies

Heritage Conservation and Recreation Service (formerly BOR)
U.S. Forest Service
National Park Service
U.S. Fish and Wildlife Service
Bureau of Reclamation
Bureau of Land Management
Tennessee Valley Authority

State of Illinois (Department of Conservation)
State of California (Department of Parks and Recreation)

In accordance with letter from DAEN-RDC. DAEN-ASI dated 22 July 1977, Subject: Facsimile Catalog Cards for Laboratory Technical Publications, a facsimile catalog card in Library of Congress MARC format is reproduced below.

Mischon, Raymond M

Development of improved decision-oriented recreation user information system / by Raymond M. Mischon, R. Chris Wyatt, Midwest Research Institute, Kansas City, Mo. Vicksburg, Miss. : U. S. Waterways Experiment Station ; Springfield, Va. : available from National Technical Information Service, 1978.

113, 3, 2 p. : ill. ; 27 cm. (Technical report - U. S. Army Engineer Waterways Experiment Station; R-78-2)

Prepared for Office, Chief of Engineers, U. S. Army, Washington, D. C., under Contract No. DACW 39-77C-0082; monitored by U. S. Army Engineer Waterways Experiment Station and U. S. Army Institute for Water Resources, Ft. Belvoir, Va.

References: p. 104-105.

(Continued on next card)

Mischon, Raymond M

Development of improved decision-oriented recreation user information system...1978. (Card 2)

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TA7.W34 no.R-78-2