

# Cooperative National Park Resources Studies Unit

## ARIZONA

SPECIAL REPORT NO. 3  
GRAND CANYON NATIONAL PARK  
SOCIAL SCIENCES RESEARCH PROGRAM

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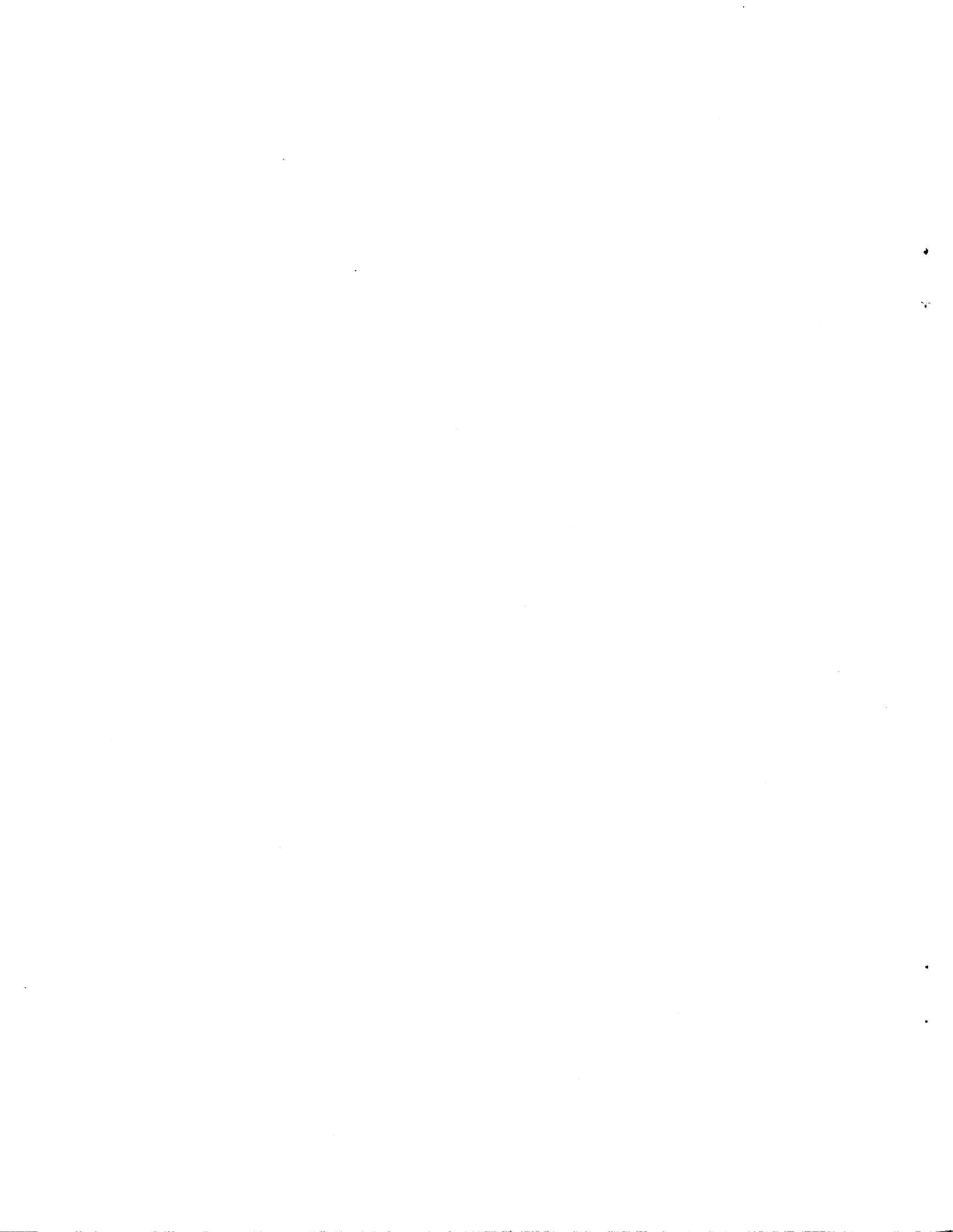
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SOCIAL SCIENCES RESEARCH PROGRAM

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## **GRAND CANYON NATIONAL PARK SOCIAL SCIENCES**

### **RESEARCH PROGRAM**

In the 1916 legislation that created the National Park Service (NPS) the agency was charged with the dual and somewhat contradictory tasks of preserving superlative natural and historic resources and at the same time providing for the use and enjoyment of these resources by future generations. The extent of public interest in National Parks is reflected by the fact that in 1981 close to 239 million recreationists visited the National Parks System. These parks are more than geological, biological, or historical specimens. They are important social institutions. Effective management of National Parks must integrate the biological and physical sciences needed to monitor and protect these resources with an understanding of the social processes which have resulted in the creation, support, and human use of these parks.

This document addresses the social science information needs and research potentials for Grand Canyon National Park (GCNP) and indirectly many units of the National Park System. Far more information is available to the park's managers concerning the physical and biological resources of the park than exists concerning human uses of the park. With the exception of detailed studies involving the relatively small numbers of people who take float trips on the Colorado River, data concerning visitors are limited to very basic information involving total numbers of visitors, information derived from backcountry use permits, and a few specific studies such as the study of foreign visitation by Machlis (1982). Considering the international significance of this park and the large numbers of people who visit it, managers would be in a far better position to evaluate alternative policies if more complete information were available concerning the characteristics, behaviors, and perceptions of visitors. This report presents an agenda for social science research that has the potential of assisting National Park Service personnel in managing this park. It is the collective effort of a panel of researchers representing a diverse range of social science and resource management expertise (see Appendix A).

### **AN AGENDA FOR SOCIAL SCIENCE RESEARCH IN GRAND CANYON NATIONAL PARK**

There exists a broad range of methodologies and potential study topics involving the human phenomena associated with the use of a National Park. However, in developing the following agenda, the panel has focused on research that is most likely to have direct utility to managers of National Parks and on research that can realistically be conducted in a National Park situation given cost constraints as well as the need to minimize obtrusion into the experiences of park visitors. We have identified three basic phases for social science research (Figure 1): basic use monitoring, specific problem areas, and evaluative studies.

## **Basic Visitor Use Monitoring System**

An initial phase in the preparation of this report involved discussions of potential study topics with National Park Service personnel. This led to a list of specific issues which warrant research and preliminary objectives and methodologies were developed to address each of these issues. It readily became apparent to the panel that certain basic types of information are needed for almost any social science research endeavor. Furthermore, these same basic types of visitor data are probably the most important types of information for park managers. For these reasons, we believe that the top priority for social science research at GCNP should be to develop an ongoing system for monitoring the most basic variables describing human uses of the park. These basic variables are presented in Figure 1.

Fortunately, with current survey and data processing methodologies, this type of a monitoring system would be relatively simple and inexpensive. Furthermore, with the exception of the need for outside advice in designing the data collection and analysis system, a monitoring methodology could be implemented using existing NPS personnel. The system developed for Grand Canyon National Park could be easily adapted to other National Park situations.

In the development of the monitoring system, the following points should be considered:

- a. **Simplicity and brevity.** It should address only the most basic and relevant characteristics of visitor use.
- b. **Automation.** Modern techniques involving machine read survey instruments or electronic data entry pads make it feasible to produce almost instantaneous data summaries. Ideally, park managers should have a summary of the previous month's use patterns available at the beginning of each month.
- c. **Minimization of obtrusion upon visitors.** The kinds of information to be monitored on a continuous basis could be obtained by short interview forms completed as people depart from the park. These forms would require less than five minutes to complete.
- d. **Sampling strategy.** In order to obtain reliable basic trend data, it would only be necessary to interview a small percentage of the visitors to the park, provided an appropriate sampling strategy is designed and followed.
- e. **Language barriers.** Because of the simplicity and brevity of the survey instrument, it would be easy to have instruments available in several languages.

The visitor use monitoring system described above would provide managers with current use and trend data that would assist them in daily decisions and help them to identify areas that warrant more detailed research. We cannot stress too strongly that once a sampling system is

### Phase 1

An ongoing system for monitoring use patterns and trends.

#### Variables

No. of people in party

Party type

Areas/facilities visited

Activities

Duration of stay

Origin/permanent residence

Age categories

Sex

User satisfactions

Mode of Transportation

Other variables identified by NPS as crucial to management

### Phase 2

Current Issues

Assessment and Problem Identification of GCNP use by foreign visitors.

Assessment of perceptions, expectations and evaluations of the GC experience for different user groups.

Evaluation of communications between NPS management and visitors to GCNP.

Evaluation of alternative transportation systems for the south rim of GCNP.

Estimation of economic impacts of GCNP on local, state, and regional economics.

Estimation of costs of services provided by NPS in GCNP.

Estimation of benefits provided by GCNP.

Other social science issues as they become apparent to management and researchers.

### Phase 3

Studies to evaluate the effects of changes in management and policies.

Effectiveness of foreign visitor targeted programs and services.

Visitor satisfaction with and utilization of new interpretive programs and facilities.

Evaluation of other policy changes implemented to deal with human issues in GCNP.

- data gathered and analyzed by NPS personnel
- automated analysis, monthly summaries
- representative sample of all visitors
- short, simple instrument

- studies conducted by university or other outside contractors
- detailed studies focusing on specific problem areas
- conducted over a limited time period
- new problem areas to be addressed as they arise

may involve replication of earlier studies to assess effects of changes in policy.

Figure 1. A social science research agenda for Grand Canyon National Park.

designed and adopted, it must be followed precisely. Data collected by management personnel has often been unuseable, because they do not recognize the importance of following the sampling design and are diverted to put out management "brush fires". Someone must be responsible for the integrity of the data collected.

### **Current Problem Areas**

In addition to basic information concerning visitor characteristics and activities, there are a number of current issues in which more detailed social science research could provide park managers with useful information. Some of these topics are listed in Figure 1 and the last section of this report presents a brief description of their significance and potential methodologies for their study. Unlike the monitoring system, these studies would be completed within a specific time period and it is anticipated that this list would change as new management problems became apparent.

We wish to stress that there are a number of methodologies for studying human phenomena. Surveys (personal interviews, telephone, or self-report) are commonly used techniques. In addition however, there are many unobtrusive methods such as aerial censusing, participant observation, visitor observation, assessment of physical indicators of human activities (trail erosion, etc.), and analysis of various existing sources of data (hotel or airline records, etc.). All of these techniques can provide park managers with useful information concerning human uses of an area. As with the use monitoring system, the utility of these types of information is dependent upon careful research design and data collection. Even basic data from a photoelectric trail counter is of little value if the equipment is not regularly serviced and data systematically gathered.

### **Evaluative Studies**

In many cases, a management problem is identified, studied, and then changes are made in management policies. One additional logical step in this process is to evaluate the effects of management changes. Often this involves replication of prior research rather than development of new methodologies. Thus, for example, one could measure levels of satisfaction before and after management changes. If the basic monitoring system is properly designed it should reflect such management changes. Similarly, studies of foreign visitation might lead to new programs of signing, interpretation, or other services designed and implemented by park managers. Subsequently, an evaluating survey and/or other systematic observation system might be used to determine whether management action was effective in meeting needs of foreign visitors.

### **Research Expenses**

The research proposed in this document could be implemented in a variety of ways depending upon the availability of funds and the extent

to which the GCNP could commit existing personnel to the tasks involved. Furthermore, there is considerable overlap in specific parts of several projects that, if coordinated, would reduce costs considerably.

An approach that would minimize the burden on Park Service personnel would be to issue contracts to researchers in private organizations or universities. However, this would also be the most expensive approach. As research priorities are further refined, a variety of funding and staffing arrangements should be explored. Below are some examples:

NPS contracts to universities or consulting firms.

Coordination of research through the Cooperative National Park Resources Studies Unit at the University of Arizona to utilize existing personnel and inexpensive student assistance.

Solicitation of support from local and state governments which benefit from GCNP tourism.

Solicitation of support from private businesses (concessionaires, travel industry, or other businesses interested in contributing to worthwhile public projects.

Funding by the Grand Canyon Natural History Association.

Utilization of NPS personnel in conjunction with the NPS Resources Studies Unit or university personnel.

Utilization of volunteers.

Utilization of university students with seasonal appointments.

Cooperative Education Agreements with universities.

## **Project Areas**

The following sections provide background, objectives, and general methodologies for studying several social science issues that were identified as important by the panel in consultation with NPS Personnel. (Budget information will be added in the final version of this report).

**Project Title: ASSESSMENT AND PROBLEM IDENTIFICATION OF GRAND CANYON USE BY FOREIGN VISITORS**

## **Background**

Tourism increased tremendously in the 1970s to become a major industry throughout the world. The world-wide increase in numbers of tourists was shared by the GCNP, a major tourist destination in North

America, and is reflected in the increasing numbers of foreign tourists arriving at the Canyon. A preliminary estimate, based on the numbers arriving by car and bus at the South Rim, indicates that more than a third of the tourists there are foreigners. This involves at least a few people from almost every nation on earth and rather large contingents from such nations as Germany, France, Great Britain, Canada, Japan, Australia and Italy.

Park officials and concessionaires at the Grand Canyon are not well-prepared to deal with this influx of foreigners. The lack of signs and limited availability of information in foreign languages may lead to bewilderment among the visitors who do not understand English. The behavior of the visitors and their demands made in strange languages baffle those who must deal with them. Eventually the sheer numbers may lead to exasperation and rudeness on both sides due to a lack of clear communication and understanding of the expectations of each.

A better understanding of who these visitors are and what are their expectations could alleviate this situation. There are identifiable numbers and patterns of behavior among the various groups who arrive at the Grand Canyon. Some, like the Japanese, come largely in group tours to specified places for limited periods of time, others like many young Europeans, arrive in shared Winnebagos, or by hitchhiking. Some wish to camp, some to explore, some to sit in the lodge. Their mode of travel, needs, types of expectations, and preferred activities are based on the cultures from which they come.

By means of careful social science research the numbers of visitors and their expectations could easily be identified and policies developed which could vastly improve the preparation of park officials and concessionaires for types of tourist which are likely to become even more common in the future. The following list presents a number of objectives for research which we believe can provide park managers with important information for improving the quality of experience of foreign visitors.

### **Objectives**

1. To understand the magnitude of foreign visitation including the distribution of foreign visitors within the park and specifically to identify countries with sufficient numbers to warrant special foreign language programs and additional studies of foreign visitor needs and support services.
2. To identify and describe varying concepts of national parks and outdoor recreation in various countries and cultures so as to provide staff and concessionaires with understanding of the diversity of foreign visitors' previous experiences.
3. To gain understanding of visitation objectives and expectations of foreign visitors for use in the development of appropriate interpretive and information programs.

4. To assess National Park Service staff and concessionaires employee images of foreign visitors for development of training programs to enhance understanding and responsiveness to foreign visitor needs and expectations.
5. To identify Park Service and Grand Canyon National Park communications objectives with foreign visitors and alternative modes of implementation to enhance communications.

#### **Methods**

1. Data for objective 1 will be obtained on a regular and continuing basis from the monitoring program previously recommended as a priority need.
2. Objectives 2 involves library study of secondary sources to develop categories of parks and recreation patterns related to various cultures. These concepts and categories will be incorporated into a mail survey of knowledgeable individuals for verification (IUCN, WWF, NPS, UNEP, FAO, etc.).
3. For objective 3, tape recorded interviews will be conducted in the native language of foreign visitors upon arrival and departure. Visitors travelling by car will be interviewed at park entrance upon arrival and departure and bus travellers will be interviewed while en route to and from park. Separate samples will be interviewed upon departure to assess experiences and satisfaction. National samples will be based on the magnitude of visitors from various countries (objective 1).
4. Open ended interviews of staff and concessionaires employees will be used to elicit information about personal experiences and the national images (stereotypes) they hold of foreign visitors.
5. Given information from objectives 1 and 2, interviews with key on-site administrators and a mail survey to off-site administrators will be used for objective 5 to determine the primary communication objectives and perceived range of possibilities for implementation.

**Project Title: ASSESSMENT OF PERCEPTIONS, EXPECTATIONS, AND EVALUATIONS OF THE GRAND CANYON EXPERIENCE FOR DIFFERENT CANYON USER GROUPS**

#### **Background**

It is the individual's expectations and perceptions of an experience that give rise to their evaluations of the experience. Since expectations and perceptions can be modified or changed so that evaluations reflect a positive or valued experience, it is important to

understand what individuals of different GCNP user groups expect of their experience beforehand and during the experience, how they perceive the experience as they engage in it and afterwards, and their evaluation of the experience as they go through it and afterwards. These different use groups are distinguishable by their age; the season of use; their nationality and language read; their handicap, if any; their previous use of the Canyon or some other National Park; what part of the park they experience (i.e. rim, day hike, corridor overnight, back country overnight, river, north rim) and many other meaningful characteristics.

Without the above information being collected and analyzed in a systematic way both before and after some program or policy change is made, park managers are unable to know with certainty whether the change had the desired or intended effect. Such changes might include:

1. Types and distribution of printed material.
2. Interpretative programs.
3. Wayfinding and self-guided tour.
4. Drag out rates subsequent to new information or signing policies.

### **Objectives**

1. To assess the different user groups' expectations of their Canyon visit prior to their visit.
2. To assess the different user groups' perceptions of their visit during and toward the close of their visit.
3. To determine the different user groups' evaluations of their experience during and toward the close of their visit as well as a few days after the visit.
4. To determine a variety of characteristics of the user in order to place in perspective the findings of the first three objectives (i.e. previous trips to Canyon for specific activities, or other similar previous experiences).

### **Methods**

1. A pilot study will provide the necessary preliminary descriptive data that can be used as a basis for knowing what subgroups to study. The following study plan is proposed: 500 interviews will be taken with a random sample of individuals as they enter the park, 500 different individuals as they engage in their park experiences, 500 different people as they leave the park and 500 more that have agreed to fill out a questionnaire a month after leaving the park.

2. Depending on which (1) objective or (2) user group is involved, different sampling techniques will be required in order to represent the subpopulation in question. Advice of a sampling statistician should be sought after objectives and subgroups are decided upon. The survey instrument should be designed to elicit reliable responses to single-stimulus questions. The instrument should be designed to minimize respondent burden and, where appropriate, interviewer burden. Respondents should be questioned in sufficient detail to determine whether or not they have a well-formed opinion about the topic in question.

**Project Title: EVALUATION OF COMMUNICATIONS BETWEEN NPS MANAGEMENT AND VISITORS TO GRAND CANYON NATIONAL PARK**

**Background**

Communication is an important tool in the management of National Parks for two basic reasons. It can be an inexpensive and effective means for accomplishing practical management objectives like communicating rules and regulations or redistributing visitors among park facilities. In addition, effective interpretation can provide important social benefits by enhancing the enjoyment and educational aspects of visitors' experiences. Both of these issues are important considerations for managers of GCNP concerned with providing opportunities for people to experience this superlative environment while at the same time protecting this resource from the potential impacts of large numbers of users.

There are several important issues involving communication and interpretation at GCNP:

- A large number of visitors come from foreign countries with limited abilities to understand English.
- Because of the extremes in physical terrain and temperatures within the canyon, visitors must be warned about the very real hazards to physical well-being associated with hiking in the canyon.
- Because of its isolated location and international significance, it would be useful to improve communications to potential users outside the park as a means of better distributing use throughout the park and throughout the year.
- The large demand for backcountry activities requires special considerations concerning how and what types of information can be communicated without detracting from the wilderness experience sought by backcountry users.
- The canyon is a resource of international significance and the potential for enhancing the experiences of visitors by providing interpretative information are great.

- Existing interpretative facilities and programs have evolved over time with little evaluation of which approaches are most effective.

For all of these reasons, better information is needed concerning the effectiveness of communication/interpretation programs at GCNP and concerning the potential for increasing this effectiveness. To meet these information needs, research is proposed to address the following objectives.

### **Objectives**

1. To determine what segments of the visiting public are being reached by the various types of media and information provided at GCNP.
2. To assess the potential demand for additional interpretative facilities and programs.
3. To assess the extent to which visitors to GCNP are aware of important management information involving park regulations and public safety.
4. To assess the effectiveness of existing information programs in reaching special user groups including foreign speaking visitors and backcountry hikers and campers.
5. To develop proposals for improving communication and interpretation functions at GCNP.

### **Methods**

The objectives of this project will be accomplished using two basic methods.

1. **Inventory of existing programs and review of relevant literature.** In addition to reviewing research literature and cataloging existing programs and facilities, this phase of research should involve meetings with NPS personnel to determine their perceptions concerning what types of communications are most important (public safety, interpretation, etc.).
2. **User Surveys.** Several useful types of information can be obtained by interviewing representative samples of visitors to the park such as:
  - What types of facilities and programs are reaching various segments of the public?
  - What types of information is being retained by visitors?
  - What types of programs, facilities, or information would visitors like increased?

Samples of visitors should be selected for interviews representative of the following populations:

- General visitors to the park
- Users who visit South Rim only
- Hikers and backpackers who travel into the canyon
- Other populations designated by park managers as having special communication problems (foreign visitors, etc.).

The findings of this research will be organized into a format that will readily assist park managers in development of communications facilities and programs.

**Project Title: EVALUATION OF ALTERNATIVE TRANSPORTATION SYSTEMS FOR THE SOUTH RIM OF GRAND CANYON NATIONAL PARK**

### **Background**

Grand Canyon National Park (GCNP) is among the most popular and most frequently visited parks in the nation. Its unique scenic qualities annually attract large numbers of both foreign and domestic tourists. Due to its popularity, however, the park experiences certain intractable problems having to do with transporting an estimated 40,000 visitors per day to and through the park. Obviously such numbers of people, concentrated in a limited geographic area, pose profound management problems for GCNP administrators.

The transportation system *in situ* at GCNP is best described as an amalgam: Over time, different elements of the network have developed more-or-less independently of the others. The result is that several different transportation modes are currently in use at GCNP; yet there exists no comprehensive transportation systems management plan (TSM) whereby the various elements of the network are logically and rationally integrated.

Because current Congressional authorization for one of the elements of the network is soon to expire--i.e., the authorization for the intrapark shuttle system operated by a concessionaire--it would appear that it is now an ideal time to study the present situation and to look at feasible alternatives.

### **Objectives**

Research and study into alternative transportation systems would include the following objectives:

1. Data-gathering on the transportation network currently in place is a necessary first step. Estimates of arrival to the park by

air, bus, automobile and RV are needed in order to adequately describe and assess the current situation. Knowledge of where visitors travel in the park, by what means, and whether they would prefer alternative modes, is a prerequisite to future planning.

2. The development of alternative TSMs. There exists a broad range of alternatives to the current transportation network, ranging from continued heavy reliance on private means of transportation to various public transportation systems run by concessionaires or NPS. Ideally, the development of three or four alternatives should be accomplished by including in park planning outside groups and individuals such as the following: Other governmental units, including federal, state, and local entities; concessionaires interested in operating transportation systems; academics, members of interest groups, and other interested individuals. The point is that transportation planning offers an excellent means whereby intergovernmental cooperation efforts become an integral aspect of broad-ranged park management and planning.
3. Selection of a transportation systems management plan for GCNP. Once information on present use, visitor preferences for alternatives, and cost-benefit assessments of different transportation modes are accomplished and compiled, park management will be in a position to decide on an alternative (or alternatives) to the present network. The alternative selected may be only marginally different from what is currently being used, or it may differ substantially. This objective cannot be determined with any precision, however, until the basic research outline of above is accomplished.

#### **Methods**

Survey research techniques will be utilized to collect the necessary data. First, a brief demographic survey of users will yield valuable knowledge of who uses the park, the modes whereby the park is reached, and preferences for alternative modes. Second, other governmental agencies, private and/or commercial interests, and other groups and individuals concerned with GCNP need to be contacted to solicit their opinions on a park TSM. To gather this information a loosely-structured interview schedule is suggested. Third, and finally, the information generated by the techniques mentioned above needs to be compiled and interpreted. All three stages/techniques are standard research tools in the social sciences.

**Project Title: ESTIMATION OF ECONOMIC IMPACTS OF GCNP ON LOCAL, STATE, REGIONAL ECONOMIES**

#### **Background**

As a national and international attraction, GCNP would be expected to be a significant factor in the local, state, and regional economies.

Estimation of that significance in terms of employment, income, and output in local, state, and regional economies would be useful in inducing greater cooperation across levels of government and between the public and private sectors. The models that can provide such information can be used also to predict the impacts of management actions on employment, income, and output by sector of the economy. Such information is useful because it indicates where gains and losses may occur as a result of changes in policy management.

### **Objectives**

Estimate the employment, income, and output effects of GCNP on local, state, and regional economies.

### **Methods**

Input/output models are used to display the economic interrelationships among sectors of an economy. They make it possible to estimate the direct, indirect, and induced effects of changes in final consumer demand on various sectors of an economy as well as the total impacts on employment, income, and output.

The construction of an input/output model from the ground up can be expensive. However, the Forest Service has developed a model based on existing economic data that greatly reduces the expenses of data collection. That model, IMPLAN, is available for use, requires a minimum amount of data, and is disaggregated to the county level.

The data that would be needed are GCNP expenditures and park visitor expenditures by sector in the economies of interest. GCNP sectoral expenditures should be available from park records. A survey would be necessary to obtain the expenditure patterns of park visitors.

**Project Title: ESTIMATION OF COSTS OF SERVICES PROVIDED BY NPS IN GCNP.**

### **Background**

In choosing among alternatives for accomplishing a given objective, it is obvious that the least cost alternative should be selected. Being able to demonstrate that management is cost effective would be useful in supporting budget requests.

Knowledge of the additional costs imposed by provision of a specific service can be used, in conjunction with demand information, to establish a differential fee. The degree to which various services are subsidized can also be determined from cost studies.

## **Objective**

To estimate the costs of various services provided by the NPS within GCNP.

## **Methods**

Prospective budgets will not support cost studies of each service provided in GCNP. Hence, park personnel should select for study two or three services or programs for which cost information would be especially useful to them.

Presumably, park records will provide most of the basic data. However, because of differences between accounting and economic definitions of costs, some translation will probably be necessary. While cost estimation may appear to be fairly simple, there are important decisions that must be made regarding what constitutes a cost, handling of recovery of capital costs, and inclusion of opportunity costs. Within the next year an article providing guidelines for estimating recreation costs will appear in the Journal of Leisure Research. It should be consulted before engaging in any cost studies.

**Project Title: ESTIMATION OF BENEFITS PROVIDED BY GCNP**

## **Background**

Estimates of the benefits provided by the park to visitors could be used in a number of ways. Such estimates would be useful in developing park budgets. Benefit-cost analysis is a useful tool in decision-making and, of course, benefit estimates are necessary for it. Finally, benefit estimates can be used with cost estimates to determine optimal carrying capacities.

Benefit estimates and estimates of demand functions go hand-in-hand. Demand functions indicate how use will vary with varying fees. Hence, they can be used to determine the fee that would ration use to some desired level. Demand functions along with cost information, can be used to determine the fee which would result in optimal use of a service, i.e. that level of use which would maximize net public benefit.

## **Objective**

Estimate the demand for and value of services provided by NPS in GCNP.

## **Methods**

While it would be possible to estimate a demand function for and the value of the "Park", it would be much more useful to estimate demand

functions for the various kinds of uses made of the park, e.g. estimates for overnight hiking, day hiking, overnight use on the South and the North Rims, day use at the two Rims, etc. Such an approach recognizes the multiple-use nature of the park and results in more valid estimates. It is not reasonable, however, to suggest that estimates be made for each kind of use. Those uses for which such information would be most useful and critical should be selected by GCNP personnel for study.

The travel cost method of demand estimation is recommended. The data from an ongoing use monitoring system could be used to estimate the demand functions. Improved estimates of demand functions, hence more defensible benefit estimates, would be possible if the monitoring system also gathered data on visitor incomes and whether or not the park was the main destination of the trip.

## **APPENDIX A**

### **Panel**

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Richard Marks - Superintendent, Grand Canyon National Park  
and park staff as appropriate