MOTORS AND OARS IN THE GRAND CANYON
Bo Shelby and Joyce M. Nielsen
Colorado River Research Program Final Report

Technical Report No. 2

Colorado River Research Program

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The Colorado River Research Program was initiated by the National Park Service in 1974 to secure scientific data to provide a factual basis for the development and the implementation of a plan for appropriate visitor-use of the Colorado River from Lee's Ferry to Grand Wash Cliffs and for the effective management of the natural and cultural resources within the Inner Canyons. The intensified research program consists of a series of interdisciplinary investigations that deal with the resources of the riparian and the aquatic zones and with the visitor-uses including river-running, camping, hiking, and sight-seeing of these resources, as well as the impact of use and upstream development upon canyon resources and visitor enjoyment.

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Technical Report No. 2

Grand Canyon National Park
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Contribution Number 31

MOTORS AND OARS
IN THE GRAND CANYON

RIVER CONTACT STUDY
FINAL REPORT

PART II

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PREFACE TO PART II

The River Contact Study was contracted in April, 1974, to assess the sociological effects of different management alternatives on the nature and quality of the river experience in the Grand Canyon. Initially, the project was focused on the effects of motorized travel and different use levels. In the spring of 1975, concern over the differences in private and commercial use prompted the Park Service to include this issue within the scope of the study.

The final report is organized into four major sections. The first is a description of the study design and implementation, including measurement techniques, sampling, and data collection. Parts II, III, and IV consider in turn the motor-oar, use levels, and private-commercial issues. The sections are bound separately to make them more easily available to those with specific interests.

ABSTRACT

The effects of motor and oar trips in the Grand Canyon are discussed. Discussion begins with a brief history of the controversy over motorized river travel. Data on motor-oar differences come from two sources: standard commercial trips (where people generally had only one kind of experience) and motor-oar combination trips (which created a group with both experiences). Combination trip passengers reported a clear preference for the oar trip. Reasons for this preference are based on perceived differences in the character of the motor and oar experiences. Passengers indicated that the oar trip was preferred because of the slower, more relaxed pace; the quiet, more sensitive (to the river or Canyon) trip environment, and the smaller, more comfortable social groupings. A discussion of the different characteristics of standard trips (length, size, etc.) indicates that these are likely to determine passenger perceptions. Implications for management are that 1) oar travel appears more compatible with the wilderness experience, and 2) a major increase in the proportion of oar travel would cause a number of changes in the river running scene.

ACKNOWLEDGEMENTS

Our ability to conduct the River Contact Study was based primarily on the cooperation of the people who run the Colorado River. Outfitters accommodated the project by allowing observers to accompany trips, boatmen were helpful on a day-to-day basis on the river, and passengers filled out questionnaires with only minor grumbling. Special thanks are due to Bob and Jessica Elliott of ARTA Southwest, who made possible the motor-oar combination trips. Private river runners were especially gracious in allowing observers to become a part of their trips.

Our observers turned in reliable trip reports under sometimes trying circumstances. Mary Strand, Mike Delaney, Susan Shoulders, and Randy Fout did the bulk of the data collecting, while Bill Fowkes, Dan Spray, David Schoen, Dick Skeene, Barb Farhar, David Lillie, Bev Shafer, Peter Marshall, Sig Krane, and Kim Rea rounded out the trip schedule, sometimes on short notice.

The staff of Grand Canyon National Park made many contributions to the project. Bob Yearout and his people in the Inner Canyon Office provided invaluable information from their files. Roy Johnson's commitment to the integrity of the project was crucial at several points, and he proved to be a resourceful research strategist as well as an able liason with the Park Service.

The members of our research advisory board, Drs. William Catton, John Krutilla, George Stankey, and Karl Taeuber, provided professional advice, suggestions, and criticism. Tom Heberlein at the University of Wisconsin contributed his expertise and enthusiasm on an informal basis. Thanks also go to Jeff Ingram, who provided assistance on historical aspects of the motor-oar controversy.

First rate support was provided by Charlotte Purvis and Susan Leavy, who without extensive complaining turned semi-legible scrawl into finished manuscripts. They created a competent and congenial office atmosphere on which the project relied heavily. Barbara Douglas provided editorial assistance, and we made extensive use of her ability to insure that written material actually conveyed what we meant to say.

Finally, some sociological issues seem to be of interest to almost everyone. When it was discovered that we were doing research in the Canyon, many people had ideas and opinions which they shared with us. Some of these thoughts were clever and insightful and others weren't, but they were fun to talk about and the project benefitted from our exposure to all of them.

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FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Finding: River travel in the Grand Canyon was essentially unregulated until the early 1970's. Unchecked growth in use created a number of problems, the motor-oar issue among them. It was clear that the quality of the river experience was threatened by uncontrolled use; and, while no one contested the need for regulation, the content of particular regulations sparked much controversy. The current Park Service position is that studies will provide a base for river management decisions. pp. 5-10

Finding: Passengers on combination trips, who had experience with both motor and oar travel in the Canyon, preferred the oar trip. In response to four different items, 79 to 91% chose oar, while 4 to 6% chose motor. pp. 13-14

Finding: Reasons for preferences were based on the different character of the motor and oar experiences. Combination trip passengers preferred the oar trip because of the slower, more relaxed pace; the quiet, more sensitive (to the river or Canyon) trip environment; and the smaller, more comfortable, social groupings. pp. 14-22

Finding: The motor and oar trips were perceived as equally safe by combination trip passengers. Twenty-five percent considered the oar trip safer, 25% the motor, and 46% felt there was no difference. p. 25

Finding: There are a number of structural differences between the usual motor and oar trips. Motor trips are larger, have more people per boat, have more contact with other parties each day, spend less time in the Canyon, make fewer and shorter side stops, and make more adjustments for crowding. pp. 25-27

Finding: Commercial river travelers in the Canyon are a select group; they have high incomes and educational levels. Average age is 33, half are women, and the majority live in or around large cities. pp. 28-30

Finding: Motor and oar passengers are remarkably similar in terms of background characteristics, indicating that the same social-demographic selection factors operate for both kinds of trips. p. 28-30

Finding: Combination trip passengers were reasonably representative of river runners in general. p. 30 App. 2, pp. 1-3

Finding: There are differences between motor and oar trip passengers in their opinions, preferences, and perceptions. Those on oar trips found motors and their accompanying noise less appropriate in the Canyon, preferred to have less contact with other groups, and were more sensitive to crowding and human impact. pp. 29-35

Finding: Most river travelers define their trip and the Canyon in terms of wilderness. p. 37

Conclusion: Eliminating either motor or oar trips would not appear to exclude any specific group described by measured demographic variables. pp. 28-30

Conclusion: Oar travel appears to be more compatible with the "wilderness experience." p. 38

Conclusion: A major increase in the proportion of oar travel in the Canyon could cause significant changes in the river running scene, including party structure, encounters with other groups, and numbers of people running the river. pp. 38-41

Recommendation: If an increase in the proportion of oar travel in the Canyon is desired, care should be taken to develop ways of minimizing undesirable impacts. Changes should be monitored through further research to insure that management policies have the desired effect. p. 41

INTRODUCTION

The maintenance of wild, backcountry areas has become an important issue in the past twenty years. A central question is the desirability of the use of motors in such areas. With the development and increasing prevalence of all sorts of motorized vehicles, conflicts have grown between groups such as trail bike riders and hikers, snowmobilers and cross-county skiers, and motorized and self-propelled boaters. At a managerial level, this creates problems of competing uses and judicious allocation of resources. At the social and psychological levels, it raises questions about the nature and quality of the different kinds of experiences associated with mechanized versus non-mechanized uses.

The specific issues explored here arose at the managerial level. The Grand Canyon section of the Colorado River is a popular whitewater experience, and commercial outfitters offer trips of between 5 and 18 days through the Canyon. The shorter trips are made possible by the use of outboard motors on large pontoon rafts. Conflict developed over the use of motors in what was otherwise a non-mechanized "wilderness," and a management problem was created.

This report will begin with an historical review of the situation which developed at Grand Canyon. Other relevant research will then be reviewed and the issues suggested by the background information and the research literature will be specified. The study design and results will then be presented. An attempt will be made to delineate the relevant management alternatives and explore the ramifications of each.

BACKGROUND*

The Grand Canyon is an unparalleled natural area. The Colorado River flows through the Canyon for 280 miles from Lee's Ferry to the Grand Wash Cliffs and provides an incomparable outdoor-white-water experience. River trips through the Grand Canyon begin at Lee's Ferry, Arizona. The first point at which passengers can debark is Phantom Ranch, 88 miles downstream, but most go on to either Diamond Creek (mile 225, the first point where boats can be taken out) or Pierce's Ferry (mile 280). Motorized trips float the river on large (30-40 foot) pontoon rafts, and take between 5 and 11 days to traverse the Canyon. Oar powered craft are generally smaller (15-25 feet) and take a longer time (12-18 days) to make the trip.

At night, trips camp on natural beaches along the river. During the day, they travel on the river and make stops at "visitor attraction sites." These are places of scientific, historical, or aesthetic interest. They include side Canyons, tributary streams, waterfalls, swimming holes, etc. The number and length of these stops varies from one trip to another.

The motor-oar controversy arose within the context of a situation involving a number of other factors, rather than as a single separate issue. The Park Service at Grand Canyon initially allowed commercial outfitters to run the river essentially unregulated. The unchecked growth in use which developed created a number of problems, one of which was the motor-oar issue. It would be difficult and misleading to separate this issue from the others which surrounded it; thus, the following describes the development of the overall situation.

---

*This section begins with a brief description of Grand Canyon river trips, which is repeated at the beginning of Parts II, III, and IV. It then discusses in detail the development of the motor-oar and use level controversies. Those not interested in this history should skip to the next section, "Motor and Oar Trips in the Canyon."

Although first run in 1869 by the Powell Expedition, the Grand Canyon had seen less than 100 river runners by 1950, and by 1959 there were still less than 100 people making the trip each year. During the sixties and early seventies, however, use grew at an average rate of 59% a year. In 1965, only 547 people ran the river; by 1972, the number had grown to 16,428 (see Nash, 1973:271 for further documentation).

The condition of river beaches deteriorated as a result of increasing use. Trash and human waste were a serious problem and the need for regulation became apparent (Cowgill, 1971). In 1970, the park stopped issuing additional commercial permits and began measuring use in user-days. In 1971, commercial operations were more carefully controlled, and overall use was restricted for the first time. Regulations for the 1972 season allowed an increase in user-days, but other aspects of use were further regulated with the institution of monthly quotas, maximum trip sizes, and minimum trip lengths.[1]

Use regulations have implicit in them decisions about how a given resource ought to be used, and the philosophical nature of the problems facing the Park Service at Grand Canyon became increasingly apparent. The January, 1971 draft Master Plan had touched on several aspects of river management, including sanitation, congestion, noise pollution, and the overall quality of trips.

> Reduction of the river trips to a fast, thrill-type experience must be prevented: such thrill-type trips are inappropriate in a national park and pose a threat to the maintenance of a wilderness quality within the Canyon. The most desirable river experience is felt by some persons to be the slow 10- to 15-day float trip, in small parties, without power -- a true wilderness experience.[2]

A petition submitted in 1972 by a group of boatmen and outfitters put it this way:

> On these [Colorado River] trips a person can experience the beautiful, quiet, and sublime wonders of the Grand Canyon. Let them ... stand under the great waterfall at Deer Creek alone and feel its power, without 115 people pushing in taking pictures, bathing, washing clothes, [and] filling water jugs. The Canyon and the trip should provide a contrast, not a parallel, to the city with its problems of overpopulation, smog, and pollution.[3]

There was, then, an increasing concern with the quality of the "Grand Canyon experience." It was clear that quality was threatened by uncontrolled use. The River Use Plan issued in December of 1972 was an attempt to address the issues.

For 1973, the plan indicated that overall commercial use would be held to the 89,000 user-days actually used during 1972. Daily limits were added to the monthly restrictions already in effect, maximum trip sizes were decreased, and minimum trip lengths were increased. Guidelines were also developed for sanitation, safety, interpretation, and employee training and certification. Company profiles and financial statements would be required of outfitters, and it was indicated that further limitations might be in the offing.

There were two "bombshells" in the Use Plan which were to become central issues in the "quality of experience" argument. The first concerned use levels. Outfitters had been allotted 105,000 user-days for 1972, but had used only 89,000; they would be held for the next few seasons to this 16% reduction. In addition, however, the Use Plan stated that "the goal of the National Park Service will be to achieve an annual . . . use level [commercial and private] of 55,000 by the 1977 season." A concommitant reduction in the number of outfitters would be called for.

The second issue involved the use of motors. Citing the 1971 draft Master Plan, the River Use Plan went on to say that

> The 15-day oar-powered trip ... may well be the optimum for most visitors. On the other hand, a 10-day motorized trip ... can also be very rewarding, affording the visitor opportunities for extensive off-river hiking and time for leisurely drifting. This assumes a 'quiet' motor and small parties.

The plan acknowledged the philosophical nature of the issue and pointed out that "the [Park] Service must determine how mechanical a river party should be." Although an "intimate relationship" with the river was seen as "somewhat subjective," it was concluded that "the attempt is made to run the river on its own terms, and should be." The plan went on to compare trip prices, indicate that many river passengers are unaware of the alternative types of trips, and imply that the Park Service has a responsibility to see that the visitors' experience is "the best that can be provided."

The conclusion was that, "based on some preliminary sociological study results, the above discussion, and individual value judgements, we believe that motorized craft should be phased-out of use in the Grand Canyon." A mandatory three year phase-out plan was outlined, and it was indicated that immediate "wilderness reserve status" would be proposed for the Colorado River, with wilderness management to be achieved by 1977.

Controversy raged over the use level and phase-out issues during the next year and a half. The basis for the decisions was unclear, and they appeared final even though the Use Plan indicated the need for a "coordinated research program." In March of 1973, with the River Use Plan only three months old, Assistant Secretary Reed of the Department of the Interior, issued a defensive statement which began by stating that "The decision which has been made regarding limitations on public use and motors on the Colorado River . . .was not made hastily and without taking into account all relevant factors."[4] Regarding use levels, the document indicated that further information was needed and several years would be required to collect it. The proposed use levels were seen as an interim effort to protect the Canyon's "environmental and social values" while studies were conducted. The reduction of use and number of outfitters announced in the Use Plan was thus put on a conditional basis pending the outcome of research. This may be the reason why the use level issue was a less important part of the controversy which continued in later months.

In regard to the motor-oar issue, however, the Interior document restated (with elaboration) the apparently inflexible position presented in the River Use Plan. The Canyon is a unique resource, it stated, and "the only acceptable standard for river use . . . is the highest standard obtainable. Basically motors are antithetical to the quality of a wilderness experience that is, and should be, obtainable in the Grand Canyon."

The assistant secretary's statement went on to evaluate the advantages of each kind of trip. The lack of air, water, and noise pollution was seen as an advantage of oar trips, although it was admitted that the "extent of the environmental or sociological impact of such pollution" was not yet known. Pollution was not, however, the only issue. The Canyon was described as a "refuge from the pressure of modern life," a unique place in which one could "escape civilization." Oar travel was in keeping with the nature of the river-canyon sanctuary.

The arguments which had been made in favor of motors fell into two categories, safety and convenience. Proponents of motor travel said that the greater size and power of their craft made for less danger in rapids. The document dismissed this point, saying, "we find very little indication that motors are indispensable to a safe passage down river."

Convenience arguments stated that motor travel was easier, faster, and cheaper. The river was thus made more available to the aged and infirm, people who had less time, and those with budgetary constraints. Given a user-day quota, faster trips also enabled a grester number of people to make the trip.

Reed's statement pointed out that convenience, in "the context of wilderness travel, is not a compelling consideration. In fact, . . . ease in the Canyon trip can impair its full flavor and character." It was noted that partial trips using Phantom Ranch as an interchange were shorter, cheaper, and less demanding. Future arguments on the motor-oar issue generally formed along the lines described in the preceding paragraphs.

The Interior document made one final but important point. Other regulations, such as those affecting trip departures, camping areas, camping practices, and disposition of wastes, were favorably received by most river runners. The point was that no one seemed to contest the need for regulation in general; only the content of particular regulations was in question.

Two months later, in May of 1973, a group of outfitters organized as the "Professional River Outfitters" brought suit against the Park Service in U.S. District Court. They contested the 16% reduction in their use allotments and the motor phase-out on the grounds that the Park Service decisions were "arbitrary and capricious" since they were based on incomplete information. The court determined that no constitutional rights had been violated, and the issue was therefore an administrative one. The Park Service, it said, was entrusted with administration of the Grand Canyon, and the court had no jurisdiction. The outfitters had lost, but planned an appeal.

In 1973 river running season passed, and the Park Service began announcing guidelines for 1974. A September 12 letter to outfitters indicated that use allotments would remain the same. The phase-out schedule was altered to make motor reduction voluntary for the first year (1974), but reduction would be mandatory thereafter.[5]

The next nine months (October 1973 - June 1974) were marked by confusion. The outfitters, having lost in the judicial process, increased their efforts at political and public pressure. The response of Park Service personnel was marked by hasty, inconsistent decision-making, and neither they nor the outfitters functioned at their best. Controversy centered on the motor phase-out issue.

An October 31, 1973 news release from regional director Howard Chapman further altered the phase-out, saying it had been "deferred pending further study."[6] Here it appeared clear that research would affect both the motor-oar and use level issues. However, a December 10, 1973 letter to Senator Goldwater from acting Secretary of the Interior Whitaker indicated that studies would "in no way alter" the goal of wilderness classification for the river.[7] This was supported by an April 2, 1974 letter from NPS Director Walker to Senator Steiger, which stated that "the motors decision has already been made."[8] However, several changes of the phase-out schedule ensued.

The outfitters continued to apply political pressure, maintaining their position that studies should form the basis for the motor-oar decision and that no change should be made until such information was available.[9] This pressure finally had an effect, and on June 3 Director Walker reversed his earlier position. He stated in a letter to Senator Jackson that studies would "provide a base" for river management decisions and that "existing river uses would . . . not be changed" until study was completed.[10] The issue was settled for the time being, and the outfitters withdrew their suit.

Previous research on the issue of motorized versus self-propelled travel is limited to a study done in the Boundary Waters Canoe Area of northern Minnesota. Lucas (1964a, 1964b) cites several differences between paddling canoeists and motorboaters. Subjects were asked to indicate what parts of the BWCA they considered "wilderness," and paddlers saw a much smaller area as such. They were more likely to exclude areas from wilderness classification if they contained roads or buildings, were heavily used, or if motor boats used them. Canoeists also disliked meeting motor boats, while motor boaters weren't bothered by contact with other groups of either kind.

MOTOR AND OAR TRIPS IN THE CANYON

The overall aim of this study is to find out how different management alternatives affect the river experience. The general model for understanding this phenomenon contains four elements:

management alternatives	→	character of the experience	→	perceived differences in character of experience	→	evaluation of the experience

With respect to the motor-oar issue, the general categories can be further specified:

motor or oar travel	→	length, speed, size, etc. of trip	→	perception of trip as hurried, crowded, etc.	→	preference for mode of travel

There are three major research questions suggested by this discussion. First, which travel mode is preferred? Second, what are the reasons for different preferences? Third, are the reasons for different preferences based on observable trip characteristics? In other words, what perceptions of the experience cause people to prefer one travel mode over another? Are these perceptions a result of the experience itself, or are they due to some pre-existing ideological position?

COLLECTING DATA ON MOTOR-OAR DIFFERENCES

The general sample for the River Contact Study included both motor and oar trips, but people who have been on only one kind of trip do not provide a good evaluation of the two travel modes. It is, of course, obvious that they have only one kind of experience, with little direct knowledge of the other. In addition, however, people tend to develop beliefs and attitudes which are consistent with their experience and behavior (Bem, 1970). People who have been on a given trip, then, would tend to endorse that kind of trip; it is thus important to find a group with both experiences.

Very few (10%) of our respondents had been through the Canyon before, and even fewer had experience with both travel modes. It was thus difficult to find a group which could make an informed comparison of motor and oar travel. Since such a group was not easily accessible, an attempt was made to create one. To this end, a motor-oar combination trip was designed in which people traveled part of the Canyon by motor and part by oar.

Information on motor-oar differences, then, comes from two sources: combination trips (where people had both experiences) and standard trips (where people generally had only one). Information about perceptions and preferences is generally drawn from the former group, where people were better able to make comparisons. The latter group (standard trips) provides a larger sample from which generalizations about overall trip characteristics (such as length, size, etc.) can be made.

In this part of the report, the term "standard trips" refers to commercial trips only. The experience of actually being on a motor trip relates primarily to this group, since most private parties travel by oar power. The "character of the experience" issues discussed here also relate primarily to commercial trips, since private users usually have more experience upon which to base their choice of travel mode.

The method of data collection for standard trips is described in Part I of the report. The motor-oar combination trips are described below.

The Motor-Oar Experiment

Ideally, a researcher would like to assign people randomly to the motor-oar "treatments," assess the "effects" of the different experiences, and then compare the two. However, there are obvious logistical problems with assigning people to trips ranging in length from 5 to 18 days and in cost from $300 to $800. In addition, subjects could still relate only the nature of the one experience they had had; they would be unable to compare the two experiences. The motor-oar "experiment," then, was conceived as a compromise.[11] "Subjects" were people who chose a combination trip, during which they experienced both modes of travel. They were given both "treatments," and asked to describe and evaluate each one. This procedure does not fulfill formal experimental requirements for controlling sources of invalidity. However, this is a situation where some information is better than none, and the quasi-experiment described here makes more sense than sole reliance on the survey method on which the standard trip sample is based (Campbell and Stanley, 1963).

Outfitters were notified on the nature of the research problem. The combination trip was designed in cooperation with American River Touring Association (ARTA), one of the commercial outfitters that offers both motor and oar trips (and the only one to express interest in the project).[12] Two trips, one motor and one oar, were scheduled to leave Lee's Ferry so that they would meet halfway through the Canyon (at Shinumo Creek, mile 110). At this point, the passengers would leave one set of boats and boatmen and switch to the other. The trip would then continue to the debarkation point, Diamond Creek (mile 225). The trip (for passengers) would take nine days, 5½ by oar power, 3½ by motor.

The trip was listed in the ARTA brochure, along with other ARTA river trips. The sequence described above was offered twice, once in July and once in August. With a capacity of 64 passengers for all four trips, 56 people signed up for the combination experience.

The ability to generalize from this study is limited by two factors. First, respondents were self-selected rather than randomly assigned. As a result, the represenativeness of the group who chose combination trips can only be estimated after the fact rather than assured. (Potential bias in the combination trip sample will be discussed later.) Second, the motor and oar trips experience by subjects can only be considered representative of ARTA motor and oar trips. While this may provide insight into the nature of such trips in general, there is no assurance that results would be the same with other outfitters.

Respondents were administered two questionnaires.[13] The first was given on the evening before the switch. It consisted of those items from the standard questionnaire which, based on analysis of pilot study data, one would expect to be answered differently by those on motor and oar trips. The second questionnaire was given the night before the trip ended. It contained the items in the first questionnaire, the rest of the items from the standard questionnaire, and a set of items designed specifically to compare and evaluate the two different experiences.

PREFERENCES

People on standard trips were asked, "With which type of trip would you rather run the river?" One might expect people to

endorse the kind of trip they had actually been on. Table 1 indicates that this is true for those on oar trips, 98% of whom indicated they preferred oar power. Of those on motor trips, however, only 61% endorsed motor power. Fifteen percent said they would rather run the river with an oar trip, and 25% said it makes no difference.

It is difficult to interpret the preferences of standard trip passengers, most of whom had little basis for comparison. Data from two other groups, boatmen and combination trip passengers, provide further information.

Boatmen were asked the same preference question as passengers. Again, one would expect boatmen to prefer the kind of trips they were running. This was true of oarsmen, all (100%) of whom preferred oar power (see Table 2). However, only 36% of motor boatmen preferred motors; 23% preferred oars, and 41% had no preference.

The questionnaire responses of combination trip passengers, who had both experiences fresh in their minds, allowed further exploration of motor-oar preferences. Combination passengers were asked four different questions to determine which type of trip they preferred. The first was, "If you were planning a trip on another river, which type of trip would you choose?" As Table 3 shows, 87% said they would choose an oar trip, 4% a motor trip, and 9% said it made no difference. In recommending a Grand Canyon trip to a friend, 79% indicated they would endorse an oar trip, 6% a motor trip, and 14% would not specify one or the other. When asked which type of trip better enable them to "experience" the Canyon, 91% chose the oar option while only 5% chose motor. Finally, respondents were asked, "Overall, which type of trip did you like better?" Here, 82% preferred the oar trip, 5% the motor trip, and 13% said it made no difference.

Among people with both kinds of experience, then, there is a clear preference for oar trips. In response to the four different items, 79 to 91% chose oar, 4 to 6% chose motor and 4 to 14% said it makes no difference.

REASONS FOR PREFERENCES: THE CHARACTER OF THE EXPERIENCE

The preference for oar travel among combination trip passengers is clear. However, it is important to know why oar trips are chosen. People were asked to give the reasons for their choice. Their answers give insight into the different character of the motor and oar experiences.

TABLE 1

MOTOR-OAR PREFERENCE BY OWN TRIP TYPE
(STANDARD TRIP PASSENGERS)

		Own Trip Type		
		commercial		
		motor	oar	total
Preference	motor	61 (426)	1 (1)	52 (427)
	oar	15 (103)	98 (124)	27 (227)
	makes no difference	25 (173)	2 (2)	21 (175)
		100 (702)	100 (127)	100 (829)

Chi square = 544, $p < .001$
Number of missing observations = 63

TABLE 2

MOTOR-OAR PREFERENCE BY OWN TRIP TYPE
(BOATMEN)

		Own Trip Type		
		motor	oar	total
Preference	motor	36 (33)	0 (0)	26 (33)
	oar	23 (21)	100 (36)	45 (57)
	makes no difference	41 (37)	0 (0)	29 (37)
		100 (91)	100 (36)	100 (127)

Chi square = 61.7, $p < .001$
Number of missing observations = 5

TABLE 3

MOTOR-OAR PREFERENCES
COMBINATION TRIPS

	Oar	Motor	Makes no Difference	Total	Missing observations
If you were planning a trip on another river, which type of trip would you choose?	87 (46)	4 (2)	9 (5)	100 (53)	(3)
Which would you recommend to a friend planning a Grand Canyon trip?	79 (42)	6 (3)	14 (8)	100 (53)	(3)
Which type of trip better enabled you to "experience" the Grand Canyon?	91 (50)	5 (3)	4 (2)	100 (55)	(1)
Overall, which type of trip did you like better?	82 (45)	5 (3)	13 (7)	100 (55)	(1)
Which do you think was safer?	26 (14)	26 (14)	48 (26)	100 (54)	(2)

Overall

Combination trip passengers were asked why they liked the trip they picked in the overall preference question. A blank area was provided for responses, and people could list as many reasons as they wanted (responses are given in Table 4). As reasons for liking motor trips, two people mentioned more hiking time; earlier camping, a more thrilling ride, and better food were cited once each.

Reasons listed for oar preference can be divided into three categories. First, the pace of the trip was felt to be slower and more relaxed. Second, what might be called the "environment" of the trip itself was different. People liked oar travel because it was quiet and there was no engine noise or exhaust. They also said oar travel was more natural; they were better able to feel the water or experience the Canyon. Finally, the social nature of the trip was different. People said they liked the smaller groups on oar boats and the resulting ability to converse. Boatmen were also more accessible, either generally or for specific information.

Description of Trips

Respondents were next asked what single words they would use to describe each kind of trip. Ten blank spaces were provided for responses to each kind of trip, and no words or categories were suggested (response are listed in Table 5).

The pace of a motor trip was described as "fast," "speedy," "hurried," and "rushed." People characterized the trip environment as "noisy," "loud," "crowded," "big," and "wet." In addition, however, the trip was seen as "fun" and"exciting."

By contrast, words like "leisurely," "slow," and "lazy" were used to describe the pace of the oar trip. The trip environment was seen as "relaxing," "peaceful," "quiet," "silent," and "natural." Socially, people felt the oar trip was "friendly," "individualized," and "intimate." In addition, the oar trip, like the motor trip, was described as "fun" and "exciting."

Perceived Advantages of Trips

As a final comparison, subjects were asked to list the advantages of each kind of trip (Table 6). The advantages most often listed for the motor trip can be seen as aspects of convenience: speed, and the ability to carry more. In addition, more hiking time and a better ride (hitting harder) in rapids were cited. Safety was also listed, but this issue will be more thoroughly dealt with later in this report.

Advantages of the oar trip can be divided into the categories discussed earlier. The slower, more relaxed pace of the trip, with more stops or hikes, was seen as an advantage. A relaxing, quiet trip environment allowing one to see or hear more was also a positive factor, as was the ability to better "feel" the river. The different social nature of the oar trip accounted for another set of benefits. People cited the smaller, more intimate groups and resulting ease in conversing with and getting to know others as pluses, along with the greater accessibility of the boatmen. Finally, being able to participate (row the boat) was seen as an advantage.

The raw data from which Tables 4 - 6 were derived are presented in Table A1 (found in Appendix 1). Two more interesting comparisons can be made from this information. First, the negative words used to describe an oar trip include "hot," "taxing," and "dependent," giving some insight into the reasons why a few people preferred the motor trip. By contrast, the motor trip was negatively described as "uncomfortable," "smelly," "impersonal," "intermittent," "truck-like," "touristy," and "tiring," in addition to the words "hurried," "noisy," and "crowded" discussed earlier.

The total numbers of responses given by passengers can also be compared. In preferring one trip or the other, the 56 respondents listed 104 reasons why they liked the oar trip and only 5 for why they liked the motor trip. The words used to describe the two experiences can be reasonably classified as positive or negative. Here, passengers came up with 98 positive and 76 negative words to describe the motor trip while they thought of 171 positive and only 7 negative phrases in describing the oar trip. Finally, people listed 144 advantages of an oar trip, and 108 for a motor experience.

TABLE 4

REASONS FOR MOTOR-OAR PREFERENCES

Overall, which type of trip did you like better? Why?

Reason	Number of times mentioned[1]
Motor[2]	
more hiking time	2
earlier camp	1
more thrilling ride	1
better food	1
Oar[3]	
Pace of Trip	
slower, more leisurely, less hurried	11
more relaxed	7
Trip Environment	
quiet	16
no engine noise or fumes	5
experience or feel river or water better	10
experience Canyon better	7
more natural	7

Table 4 Continued:

Reason	Number of times mentioned[1]
Social Aspects	
smaller groups	6
better ability to converse, better conversation	6
boatment more accessible	11

[1]There were 56 respondents, all of whom returned completed questionnaires. Figures presented here indicate the number of passengers listing a given response.

[2]all responses

[3]presents only those responses listed five or more times

TABLE 5

DESCRIPTIONS OF MOTOR AND OAR TRIPS

What single words would you use to describe a motor trip?[1]

Word	Number of times mentioned
Pace of Trip	
fast, speedy	32
hurried, rushed	6
Trip Environment	
noisy, loud	27
crowded	11
big	6
wet	7
Other	
fun	11
exciting	5

What single words would you use to describe an oar trip?[1]

Word	Number of times mentioned
Pace of Trip	
leisurely, slow, lazy	19
Trip Environment	
relaxing	20
peaceful	10
quiet, silent	20

[1]presents only those words listed five or more times

Table 5 Continued:

Word	Number of times mentioned
natural	6
Social Aspects	
friendly, individualized, intimate	11
Other	
fun	15
exciting	14

TABLE 6

ADVANTAGES OF MOTOR AND OAR TRIPS

What are the advantages of a motor trip?[1]

Advantages	Number of times mentioned
Convenience	
speed (quicker, faster, save time, cover more area)	37
can carry more (people, food, conveniences)	22
Other	
more hiking time	9
better ride in rapids (hit harder)	5
safer	8

What are the advantages of an oar trip?[1]

Advantages	Number of times mentioned
Pace of Trip	
slower, more relaxed pace	14
(more stops or hikes)	4
Trip Environment	
relaxing	8
quiet	20
can see and/or hear more	7
can feel or experience the river or water better	17

[1] presents only those advantages listed five or more times

Table 6 Continued:

Advantages	Number of times mentioned
Social Aspects	
smaller, more intimate groups	8
easier to meet or get to know people	6
better able to converse	5
boatmen more accessible	7
Participation	
participation, can row	7

Perceived Safety

A brief report on the safety issue is of interest here. It will be recalled that one argument made by outfitters running motor trips was that their boats provided a safer trip. However, a Park Service analysis of accidents requiring helicopter evacuation indicated that rates for boat-related accidents were identical for motor and oar trips.[14] In view of continuing discussions of the issue, combination trip passengers were asked their subjective opinion of the relative safety of each kind of trip. As Table 3 shows, the verdict was an even split; 26% considered the oar trip safer, 26% the motor, and 48% felt there was no difference.

WHY TRIPS ARE PERCEIVED DIFFERENTLY

Preferences for different travel modes have been discussed, along with the reasons for those preferences. Passengers' descriptions indicate that they perceive the character of the experience quite differently for motor and oar trips. Why is this the case? Are there observable differences in the structure of trips which explain the differences in passengers' perceptions? Or are people on motor and oar trips just "different" to start with?

The above questions suggest two different explanations for passengers' characterizations of the two travel modes. One focuses on structural characteristics of trips, the other on background characteristics of passengers.

Structural Characteristics of Trips

On the river, there are a number of observable differences between motor and oar trips which would affect passengers' perceptions. Average values for these characteristics are listed in Table 7.

The total number of people (passengers and crew) in the party is greater for motor trips (30) than oar trips (24). Since motorized boats are larger, the number of boats is lower for motor trips (an average of 2 as compared to 5 for oar trips). The result is that the total number of people in each boat is about five on oar trips and about 15 on motor trips. People on motor trips, then, get used to having a larger number of people around them, both in their party and on their boat.

The number of river contacts each day is also higher for motor trips (3.8) than for oar trips (2.2). This is true even though the total number of contacts for the trip tends to be higher on oar trips (37 as compared to 23). Presumably because they travel faster and further each day, then, motor trips encounter more other groups on a daily basis. As a result, those on motor trips see almost twice as many boats and people, other than those on their own trip, each day.

Because of their higher contact level, motor trips spend slightly more time in sight of other parties each day, averaging 41 minutes versus 28 minutes for oar trips. However, dividing these figures by their corresponding levels of contact per day indicates that the average length of each contact is longer for oar trips (14 minutes) than for motor trips (10 minutes). One of the advantages of a motor is the greater range of speed possible; the amount of time spent in the presence of another party on the river can be controlled to a greater degree. By contrast, an oar-powered trip generally drifts with the current, and may spend hours in sight of another oar trip. If one looked only at contacts between oar trips (rather than those between oar trips and all others), the average length of time in sight would surely be longer than that given above.

The length of a trip is also different for motor and oar groups. Oar trips average about 14 days, with most taking 12 days. Motor trips averaged 7 days. Those on oar trips, then, spend almost twice as much time in the Canyon. While in the Canyon, oar trips make more stops at visitor attraction sites. They averaged 17 stops, while motor trips made about 12. In addition, oar trips stay about four times longer at each stop, averaging 6 hours compared to an hour and a half for motor trips. This means an average oar trip spends about 100 hours at side stops, compared to about 16 hours for motor trips.

Finally, adjustments for crowding are different for motor and oar trips. These adjustments occurred when boatmen passed up a planned stop or went to a different campsite because of the presence of another group(s). Motor boatmen averaged .43 adjustments each day, while oar boatmen averaged .23. This is another advantage of a motor; adjustments for crowding are easier with the motor's greater range of speed.

In summary, then, those on motor trips become accustomed to larger numbers of people, both in their party and on their boat. They also have more contact with other parties on the river. They are in the Canyon for fewer days, visit fewer attraction sites, and spend less time at each one.

TABLE 7

COMPARISON OF CHARACTERISTICS OF MOTOR AND OAR TRIPS
(COMMERCIAL TRIPS ONLY)

	Mean (average) value		t value
	oar	motor	
Number in party	24.1	29.8	1.7*
Number of boats	5.1	2.0	5.5
Number of people per boat	4.8	15.2	15.7
Number of river contacts per day	2.2	3.8	2.9
Number of river contacts (total per trip	36.5	23.4	2.8
Number of people seen per day (on river)	44.3	80.9	2.8
Number of boats seen per day (on river)	5.4	9.7	2.6
Minutes (per day) in sight of other parties	28.3	41.0	1.3*
Average length of contacts (minutes)	14.1	10.2	2.0
Length of trip (days)	14.4	7.3	6.0
Total number of attraction sites visited	17.0	12.1	2.3
Average length of stops at sites (hours)	6.0	1.3	2.4
Number of adjustment per day for crowding	.23	.43	1.6*

*$p < .10$. For all other differences, $p < .05$

Background Characteristics of Passengers

Structural characteristics of motor and oar trips appear to explain much of the difference in passengers' perceptions of the two travel modes. It may be, however, that motor and oar passengers are "different" before the trip starts, and these differences might affect or "bias" their perceptions. This argument raises two questions: 1) Do motor and oar passengers differ on background characteristics? 2) Were combination trip passengers representative of river runners in the Canyon?

Standard motor and oar trip passengers. Passengers on standard trips gave information on a number of standard background variables, which are listed in Table 8. Mean values indicate that commercial river travelers in general are a fairly select group. Income level is high, with half of the people reporting family incomes over $24,000. Educational level is also high, with 78% having at least some college and 53% possessing a bachelor's or more advanced degree. Average age of river runners is 33, 43% are married, and half are women. The majority (64%) currently live in large cities or suburban areas. Only 22% belong to an outdoor club or conservation organization, and for a sizeable proportion (31%) this is their first wilderness-type trip.

Data from other studies give some perspective to these demographic figures. Hendee (1968) reports that 60% of users of eight different backcountry areas had at least some college. In the three Washington-Oregon areas he surveyed, 75% of respondents were married, 30% belonged to outdoor or conservation organizations, and average age was about 36. Comparisons with our data would indicate that Grand Canyon river runners tend to be younger, better educated, and are less likely to be married. Boster's (1972) study of Colorado River runners, done on a 1967-1970 sample with a 65% response rate, indicates that for those years half of the people reported incomes over $20,000, average age was 40, and only one-third of river runners were women. Assuming his sample was representative, comparison with present data would indicate that the river running population now includes more young people and women.

The left-hand column in Table 8 gives the correlations of demographic variables with trip type. It can be seen that those on motor and oar trips do not differ significantly in terms of age, sex, income, marital status, or number of children. The proportion of passengers living in cities, both presently and during childhood, is also equal. The only demographic variables showing a significant ($p < .001$) relationship are education ($r = -.14$) and occupation ($r = -.12$), with those on motor trips having slightly lower levels. However, the strongest of these accounts for only 2% of the variance, which is not enough to be of much importance.

Passengers also provided information on variables more closely related to outdoor experience and attitudes. There is no difference between motor and oar travelers in their amount of river running experience (r = -.02) or how long ago they went on their first wilderness trip (r = -.06). However, those on motor trips are somewhat less likely to participate in other outdoor activities (backpacking, camping, etc., r = -.10) and to belong to an outdoor or conservation organization (r = -.20). Personal attitude toward human developments in wild areas (artifactualism) was also measured. Those on motor trips were slightly more likely to favor such developments (r = .16).

In summary, river passengers as a whole are a fairly select group demographically. However, there is surprisingly little difference between motor and oar passengers on pre-trip background variables. Those on motor trips have on the average slightly less education and lower occupational status. They are a bit less likely to participate in outdoor clubs or activities, and more likely to favor developments in wild areas. With the possible exception of club membership, none of these differences is large. In other words, the social-demographic factors which act to "select" river travelers in general are the same for both motor and oar passengers.

Combination trip passengers. The primary threat to the validity of the combination trip data is the self-selected nature of the sample; it might be that people were biased in favor of one kind of trip before they signed up. If this were true, results might reflect the earlier biases rather than an open-minded evaluation of the two trips based on the actual experience. Random assignment would have been the only way to assure that the sample was representative of river runners as a whole. Short of that, the possibility exists that self-selection biased the sample, but there is good reason to believe that the combination trip group was both representative and open-minded. A more detailed discussion is presented in Appendix 2.

Other Percpetions Related to Travel Mode

The structural differences discussed earlier are determined by the type of trip chosen. They suggest why combination trip passengers would describe a motor trip as crowded, noisy, and hurried. Passengers on standard motor and oar trips also showed differences in their opinions, preferences and perceptions related to the different trip characteristics.

TABLE 8

BACKGROUND CHARACTERISTICS OF
PASSENGERS ON STANDARD AND COMBINATION TRIPS

variable	correlation[1] with trip type	mean value[2] standard trips	mean value[2] combination trips	t value
Demographic Characteristics				
Age	-.05	32.8	30.9	1.0
Sex	.01	1.48	1.54	.6
Education	-.14*	13.2	13.9	1.1
Occupational Status	-.12*	5.3	5.5	.7
Income	.09	7.4	7.7	.6
Marital Status	.01	2.4	2.2	1.7
Number of Children	.08	1.1	1.0	.2
Present Residence (rural-urban)	.03	3.7	3.6	.9
Past Residence	.00	3.4	3.3	.8
Outdoor Experience and Attitudes				
Membership in Outdoor Club or Org.[4]	-.20*	1.2	1.2	.3
Time of first wilderness experience	-.06	3.3	3.5	.8
Experience on other Rivers	-.02	1.6	1.9	2.4
Participation in Outdoor Activities	-.10*	11.5	11.3	.5
Artifactualism	.16*	12.4	9.4	5.2*

[1] standard (commercial) trips only; coded 1 = oar, 2 = motor

[2] all means except those for age and number of children are based on coding categories and are by themselves meaningful only for comparison purposes.

[3] coded 1 = male, 2 = female

[4] coded 1 = no, 2 = yes

* $p < .001$

Opinions about motors. Respondents on standard trips were asked their preferences for meeting other trips. Those who were on motor trips were more likely ($p < .01$) to prefer meeting motor trips ($r = .50$) and larger trips ($r = .19$). In addition, perceptions differed on two other motor-related issues.

First, respondents were asked, "Does outboard motor noise bother you?" Of those on oar trips, 94% (115) said yes; among the people on motor trips, only 18% (127) said yes. Second, people responded to the statement "The Canyon would be more of a wilderness if motor travel were banned." On oar trips 80% (103) agreed, while on motor trips only 35% (259) agreed. People who are not on motor trips, then, find motors and their accompanying noise less appropirate in the Canyon.

Contact with other parties. Trip type is related to preference for contact with other groups. Almost all (92%) of those on oar trips preferred to meet other oar trips on the river (see Table 9). Among those on motor trips, 18% preferred to meet oar trips and 9% motor trips, while most (73%) said it makes no difference.

There were also motor-oar differences in preferred numbers of contacts. Those on oar trips preferred less contacts on the river, with over half (54%) wanting to see no other parties, and only 19% preferring three or more cntacts each day (see Table 10). In the motor group, only 38% preferred no contacts, and 34% would have liked to see three or more parties each day.

Camp contact preference is also related to trip type. The vast majority of river runners (91%) preferred to camp alone. However, a slightly larger percentage of those on oar trips (98%) than of those on motor trips (89%) indicated this preference (see Table 11). Those on oar trips, then, prefer seeing fewer other trips, both on the river and at camping spots.

Perceptions of use. The question which needs to be asked is, "Does all this make any difference?" We have found that, on the average, if a person goes on a motor trip, there will be more people in his party and on his boat, he will see more other people each day, and will be in the Canyon a shorter time. He will find the presence of both motors and other people less bothersome. Are these structural factors and specific perceptions important for river runners' more general perceptions of the Canyon? To the extent that these things affect their Grand Canyon experience, those on motor trips should perceive the Canyon as less crowded and less affected by the presence of man, since in their experience people are more a "part of the scene."

TABLE 9

PREFERRED KIND OF ENCOUNTER (ON RIVER) AND OWN TRIP TYPE

		Own Trip Type		
		motor	oar	total
Preference	motor	9 (72)	1 (2)	8 (74)
	oar	18 (146)	92 (162)	61 (308)
	makes no difference	73 (572)	7 (12)	32 (584)
		100 (790)	100 (176)	100 (966)

Chi square = 358, $p < .001$
Number of missing observations = 64

TABLE 10

PREFERRED NUMBER OF ENCOUNTERS
(ON RIVER) AND OWN TRIP TYPE

		Own Trip Type		
		motor	oar	total
Preference (parties per day)	none	38 (287)	54 (69)	40 (356)
	1 or 2	28 (212)	27 (35)	28 (247)
	3 or more	34 (259)	19 (25)	32 (284)
		100 (758)	100 (129)	100 (887)

Chi square = 14.26, $p < .001$
Number of missing observations = 3

TABLE 11

CAMPING PREFERENCE AND OWN TRIP TYPE

		Own Trip Type		
		motor	oar	total
Camping Preference	Near other parties	11 (74)	2 (3)	9 (77)
	Alone	89 (614)	98 (124)	91 (738)
		100 (688)	100 (127)	100 (815)

Chi square = 7.87, $p < .01$
Number of missing observations = 75

This is, in fact, the case. Those on motor trips were less likely ($p < .01$) to say that they had met too many people during the trip ($r = -.20$), and they perceived the Canyon as less affected by over-use and the presence of man ($r = -.31$). The character of the oar trip, then, appears to make people more sensitive to crowding and human impact.

Summary

Combination trip data indicate that passengers perceive clear differences in the character of the motor and oar experiences. Two possible explanations for these differences are 1) the structural characteristics of trips and 2) background characteristics of passengers. Data presented here indicate that the characteristics of trips (length, size, etc.) are more likely to determine passenger perceptions.

IMPLICATIONS FOR MANAGEMENT

OARS, MOTORS, AND WILDERNESS

The background material presented at the outset indicated that clear differences would be found in comparing motorized and non-motorized travel, and that these differences would affect the way people perceive the experience. It was further suggested that, in evaluating the nature of the two experiences, differences would emerge along the lines of aesthetics and convenience.

These suppositions are borne out by the analysis presented here. Data from special combination trips indicate that people preferred the oar trip for aesthetic reasons; the slower, more relaxed pace, the quiet, more sensitive (to the river or Canyon) trip environment, and the smaller, more comfortable social groupings were the most frequent explanations. The advantages more often cited for motor travel fit under the heading of "convenience" rather than quality of experience. Finally, data from standard trips suggest that these perceptions are linked to the different characteristics (length, size, etc.) of motor and oar trips.

How does all this relate to wilderness? "Wilderness" is a deceptive term. Nash (1973) traces its meanings in history, concluding that wilderness is land in a wild state, where the control and order of civilization are absent. The Wilderness Act of 1964 defines it as land "retaining its primeval character," with little development (such as roads or buildings) and low numbers of people. A wilderness experience then, is one which provides the opportunity for close contact between an individual and this kind of natural, undeveloped environment. Increasingly, emphasis has been placed on the aesthetic and "re-creative" benefits which can be derived from an intimate relationship with wild country. Such an environment seems to provide a necessary contrast to the more "civilized" urban mode of existence.

Colin Fletcher, a much celebrated backpacker, illustrates this point with his feelings about traveling on foot in wild country. "Sometimes, when I have been straining too hard to impose order on an urgent press of ideas, it seems as if my mind has slowly relaxed; and then, all at once, there is room for the ideas to fall into place in a meaningful pattern" (Fletcher, 1971:4). He further compares the "complex" and "simple" worlds of cities and country, saying that

each "makes more sense, takes on surer meaning when viewed against the other" (Fletcher, 1971:7-9).

Fletcher's account of his journey on foot through the Grand Canyon illustrates the aesthetic and re-creative nature of the wilderness experience. At the beginning of the two month trek, he was faced with a schedule imposed by weather conditions, and "the need to hurry kept trying to brush aside [the] softer moments" of sensory experience (Fletcher, 1967:78). After several weeks' time, however, he saw things "in a way that would have been impossible when [he] was living, day after day, surrounded and cushioned and segregated by the accoutrements of the man-ruled world . . ." (p. 107). Before climbing out to the North Rim, Fletcher was struck by the finality of his last few days in the Canyon. "I know it is over. . . . The things I wanted to do are done. The time has passed for contemplation. I must get out and do. For doing is what counts. The contemplation is only for that" (p. 219).

Two important points emerge from this account. First, although Fletcher's experience was more intense than many may desire, his most rewarding moments in the Canyon were clearly of an aesthetic nature. To a large extent, the quality of this "wilderness" experience depended on the absence of the more obtrusive artifacts of civilization. Second, Fletcher's feeling about ending the trip reinforces the contention that both the civilized and wilderness experiences are important; each lends greater meaning and significance to the other.

Most river travelers define their trip and the Canyon in terms of wilderness. The vast majority (91%) consider the area a "wilderness," most (65%) prefer two or less river contacts per day, and 90% prefer to camp away from others. Small travel groups are considered most appropriate, with 57% preferring groups of 20 or less and another 29% favoring groups of 20-30 persons (these findings are presented more thoroughly in Part III, "Use Levels and Crowding in the Grand Canyon).

People generally view the Canyon as a place where developments and conveniences are out of place. Only 10% felt there should be more developments like Phantom Ranch, and only 7% favored building a tram into the Canyon. A similarly small number favored more conveniences (9%) and better facilities (12%) on river trips.

Finally, most river runners perceive the Canyon as relatively uncrowded and unaffected by the presence of man. About 70% said they did not think they met too many people during their trip, and 75% felt the Canyon was not being damaged by over-use. In other words, people think that the Canyon is and should be "wilderness."

Data presented in this report clearly suggest that oar trips are more appropriate for the kind of wilderness experience described earlier. Passengers' reactions indicate that the entire "feeling" of the trip is different on an oar boat. The pace slows, the atmosphere is more peaceful, and personal interactions seem easier and more comfortable. As a result, the Canyon and the river are closer more easily perceived.

But that isn't the last word on the motor-oar issue. The important question is, "What is to be provided by river trips in the Canyon?" If the answer is "An opportunity for a wilderness experience," then oar trips appear better able to accomplish this. There are, however, other answers to the question, and the decision about what is the best thing to do with the Grand Canyon falls outside the realm of research and within the realm of policy and management. Research can specify the consequences of management alternatives; policy-makers (including the public, politicians, and managers) must decide the desirability of the different options.

IMPLICATIONS OF POLICY CHANGE

Research can contribute to assessing the implications of different management alternatives. For the sake of discussion, let us assume that there are two options regarding motors and oars in the Canyon: 1) continue with current policy (about three quarters of all trips are motorized), or 2) eliminate motors, either for certain periods or entirely. The "status quo" option is well described by data from this study and needs no further elaboration. The possibility of an "oars only" policy, however, goes beyond our data, and involves some speculation about its effects on river travel in the Canyon.

A review of the different characteristics of motor and oar trips (Table 8) provides some indication of the changes which might result from an increase in oar travel. It should be kept in mind that discussing the effects of an oars only policy on a specific variable assumes that 1) current trends continue and 2) all other variables remain constant.

Party Structure

The structure of river parties would probably change with an oars only policy. Overall group size would decrease somewhat, but the number of boats in each party would more than double. Each party would, as a result, occupy a larger amount of space on the river; but, with fewer people on each boat, the density of people in a given "party-space" would be lower.

Encounters with Other Groups

Rowing parties currently have fewer contacts with other parties each day. However, the increased "party-space" required for oar trips might put parties in closer proximity, thus increasing contacts. In addition, each contact is already longer for oar trips; contact length among oar trips only would surely increase.

There is currently less variation in the length of oar trips than there is for motor trips. While a larger proportion of motor trips range from 5 to 8 days (with 8 being 60% longer than 5), most oar trips range only from 12 to 14 days (a 17% difference). This means that with oars only trips would travel at more uniform speeds, with more similar schedules. Once they came in contact with one another, they would have more difficulty disengaging.

By the same token, oar trips which started far enough apart might never see each other. The idea, of course, is to space the departure of trips so that the likelihood of downstream contact is minimized. But deciding how far apart is "far enough" is confounded by at least two factors. The first is the different travel patterns of trips. A two or three hour "head start" could be eliminated if the lead party stopped for lunch, a hike, or an early camp while the one behind continued to travel. The second confounding factor is the water level, which depends on releases from Glen Canyon Dam. The water at Lee's Ferry starts coming up about mid-morning, and continues to rise until evening. Since the lower volume of water moves more slowly, trips leaving later in the day tend to "catch up" with those which left earlier.

There are at least two ways to moderate the effects of these problems. First, boatmen who know the implications of the more uniform speeds of oar travel can maximize the benefits of this situation. When two trips begin to get in each other's way, all that may be required is an agreement that one will stop for a few hourse while the other goes on. Second, if spacing of departure becomes desirable, it should be done with consideration of water speeds. For example, trips might be spaced by waiting for the trip ahead to get to Badger Rapid. This might be three or four hours in the morning, and only an hour and a half in the afternoon. It might also help to schedule the first night's camp.

Oar trips enjoy the luxury of fewer adjustments for crowding. This probably occurs because motor trips 1) are more able to adjust (with their greater variability in speed); 2) are more willing to adjust (because of their ability to do so or since they are on a faster schedule anyway); or, 3) have higher contact rates, and are compelled to do more adjusting. The point is that, if motors were

eliminated, oar boatmen might well be confronted with a greater need to make adjustments for crowding and their somewhat limited (by their more uniform speed) ability to do so.

The point of this discussion is that a change to oars only would certainly create some new contact and crowding problems. They would not necessarily be more difficult to solve than current ones, but the solutions might require some experimentation and innovation. Scheduling would be an effective management tool, but this would require careful consideration to be both effective and non-oppressive. These contact and scheduling issues will be discussed more thoroughly in Part III of the report, the section devoted to use levels and crowding.

Stops at Attraction Sites

Oar trips make more stops at attraction sites and stay at each one longer, so a change to "oars only" would affect the amount of use in side canyons. If total trip volume were unchanged and oar trips continued to stop at half again as many places for four times as long, the total use of side canyons (all taken together) would increase six to seven fold. This could affect both encounters and ecological impacts at attraction sites, depending greatly on the distribution of use from one site to another.

Distribution is really the key here. When use at a site exceeds the physical capacity of trails and open areas, people begin to make new inroads on natural vegetation and geographic structures as they attempt to give each other enough space. What this means is that several hundred people using a site simultaneously may get on each other's nerves and cause ecological damage as well. However, the same number distributed in small groups throughout a day might have little impact, social or ecological. This issue will be further discussed in Part III, "Use Levels and Crowding in the Grand Canyon."

Trip Length

The smaller variation in oar trip length would produce the contact and scheduling problems discussed earlier. But the greater length of oar trips could significantly alter the number of people making the Grand Canyon trip. Use in the Canyon is currently regulated in terms of user-days. If an oar trip is twice as long, it takes twice as many user-days to get one person through the Canyon; with the current use limit, only half as many people could run the river.

There are, of course, ways to mitigate this effect. Use of the interchange at Phantom Ranch could increase the absolute numbers making the trip. Increasing use during the off-season would have a similar effect, although it would require a re-evaluation or restructuring of the user-day concept. Finally, lower absolute numbers may simply be a negative trade-off associated with an oars-only policy. If oars are more appropriate for the kind of experience the Park Service wants to provide for Canyon visitors, then perhaps fewer people will be able to have that experience.

Further Research

There would be a number of changes in the river running scene if motors were removed. As the foregoing discussion suggests, the effects of such changes would be pervasive and complex. There are many specific variations possible in implementing on oars-only policy, and we cannot foresee how all the variables would interest and change. As a result, the effects of such a policy are quite difficult to predict. If an oars-only policy seems desirable, an early trial period would be valuable, making it possible to monitor changes and work out ways of minimizing undesirable impacts. This topic will be discussed more extensively in Part III of this report.

FOOTNOTES

1. Summarized in National Park Service, "River Use Plan -- Grand Canyon National Park Complex," December, 1972, mimeo.

2. National Park Service, Grand Canyon National Park, A Master Plan for Grand Canyon National Park, Arizona -- A Preliminary Draft, U.S. Department of the Interior, National Park Service, January, 1971.

3. Petition to National Park Service, Grand Canyon National Park, by "Boatmen and Outfitters," undated mimeo.

4. U.S. Department of the Interior, National Park Service, "Colorado River - Grand Canyon" [from the office of Assistant Secretary Nat Reed], March, 1973, mimeo.

5. Merle E. Stitt, Superintendent, Grand Canyon National Park, letter to river outfitters, September 12, 1973.

6. Howard Chapman, Regional Director, Western Region, National Park Service, "Mandatory Phaseout of Motor Rafts on Colorado River Trips Deferred," October 31, 1973, mimeo.

7. John C. Whitaker, Acting Secretary of the Interior, letter to Senator Barry Goldwater, December 10, 1973.

8. Ronald H. Walker, Director, National Park Service, letter to Representative Sam Steiger, April 2, 1974.

9. Richard G. Brown, Attorney at Law, letter to Sanderson River Expeditions, February 13, 1974, Gaylord L. Stavely, Canyoneers, Inc., letter to Henry M. Jackson, April 26, 1974. Gaylord L. Stavely, Canyoneers, Inc., letter to editor, Arizona Republic, June 1, 1974. Fred Burke, Arizona River Runners, Inc., letter to Ronald Walker, Director, National Park Service, May 28, 1974.

10. Ronald H. Walker, Director, National Park Service, letter to Senator Henry M. Jackson, June 3, 1974.

11. Dr. Roy Johnson of the National Park Service was instrumental in the original conception of the combination trip.

12. Bob and Jessica Elliott of ARTA Southwest were insightful and cooperative in setting up these trips.

13. The quesionnaires are documented in Part I of the final report.

14. Grand Canyon National Park, Grand Canyon, Arizona, "Injuries: Commercial River Trips; Resulting in Helicopter Evacuation," November 27, 1973, mimeo.

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APPENDIX 1

TABLES NOT PRESENTED IN TEXT

TABLE A1

MOTOR-OAR COMPARISON ITEMS - RAW DATA

Overall, which type of trip did you like better? Why?

Motor	
more hiking time	2
earlier camp	1
more thrilling ride	1
better food	1
TOTAL	5
Oar	
quiet	16
experience sounds	2
no engine noise or fumes	5
slower, more leisurely, less hurried	11
more hikes (or time for them)	3
more relaxed	7
experience or feel river or water better	10
experience Canyon better	7
more natural	7
less intrusive	1
study Canyon better	1
boat rides better	2
boatmen more accessible (can talk to them)	6
boatmen less rushed	1
more boatmen	3
more individualized	1

Table A1 Continued:

smaller groups	6
better ability to converse, better conversation	6
more casual and friendly	3
just better	2
can row	1
more exciting	1
water fights	1
on it longer	1
TOTAL	104

What single words would you use to describe a motor trip?

positive		negative	
fast (speedy)	32	hurried, rushed	6
fun	11	noisy, loud	27
exciting	5	crowded	11
big	6	wet	7
safe (safer)	4	uncomfortable	4
beautiful	3	smelly	4
scenic	1	dull	1
wonderful	1	impersonal	2
great	2	anticlimactic	1
exhilarating	2	truck-like	1
controllable	1	touristy	2
smooth	2	tiring	1
comfortable	2	awful	1
dynamic	1	undesirable	1
powerful	3	bland	1
soft	1	cold	2
interesting	3	intermittent	1
leisurely	2	superfluous	1
relaxing	1	thrill-less	1
steady	1	food and boatment not as good	1
easy	2	TOTAL	76
enlightening	1		
different	1		

Table A1 Continued:

positive	
informative	1
nice	1
alright	1
adequate	2
efficient	2
on time	1
together	2
TOTAL	98

What single words would you use to describe an oar trip?

positive		negative	
relaxing	20	hot	3
peaceful	10	taxing	1
reflective	1	work	1
serene	2	wet	1
restful	1	dependent	1
easy	2	TOTAL	7
smooth	3		
renewing	1		
fulfilling	1		
easy going	2		
calm	1		
contemplative	1		
leisurely (slow, lazy)	19		
quiet (silent)	20		
exciting	14		
adventurous	1		
fun	15		
natural	6		
ecological	1		
social			
friendly	4		
individualized, personal	3		
intimate	2		
jovial, congenial	2		
extraordinary	1		
great	2		
wild	1		
fantastic	1		
beautiful	3		

Table A1 Continued:

positive	
nice	2
more enjoyable	4
varied	1
entertaining	1
scenic	2
informative	4
challenging	1
stable	1
interesting	3
superb	1
small	2
terrific	1
climactic	1
dry	1
thrilling	1
more enlightening	1
bouncy	1
sensing	1
pleasant	1
better	1
TOTAL	171

What are the advantages of a motor trip?

speed (save time, quicker, faster, cover more area)	37
more hiking time	9
more time in camp	3
better schedule	2
more organized	2
can carry more people (larger groups)	4
more fresh food	2
better food	5
more comforts	3
more storage space	5
more room	3
clear water	1
comfortable ride	1

Table A1 Continued:

can be with everyone	2
get to know people quicker or better	3
safer	8
more power	3
more control	1
can go upstream	1
drier	2
wetter	1
can run motor	2
better ride in rapids (hit harder)	5
less boats	1
better pictures	1
boatmen are nice	1
TOTAL	108

<u>What are the advantages of an oar trip?</u>

quiet	20
can feel/experience the river/water	17
nature study	2
learn more	4
more natural	2
feel a part of nature	1
can see and/or hear more	7
less intrusive	1
experience Canyon	1
go slow	4
slower, more relaxed pace	10
more stops or hikes	4
relaxing	8
peaceful	3
less regimented	1

Table A1 Continued:

easier to meet or get to know people	6
smaller groups	4
able to converse	5
intimate, personal	4
less crowded	4
get away from people	2
get to know boatmen	2
boatmen more accessible	4
boatmen nice	1
choice of boat and crew	1
participation	2
can row	5
boats themselves	
safe	1
more room	2
no fumes	1
more exciting	1
drier	1
stability	1
good ride	1
easier	1
water fights	1
challenging	1
scenic	1
good food	1
sense time and distance	1
just liked it	5
TOTAL	144

TABLE A2

REASONS FOR CHOOSING COMBINATION TRIP[1]

Wanted to experience both modes of travel	55% (31)
Trip fit time constraints	39% (22)
Would have liked to try oar trip	20% (11)
Did not want to be fully committed to oar trip	11% (6)
Couldn't get reservation on oar trip	7% (4)

[1] Percentages do not sum to 100 since respondents could give more than one reason. Number of respondents = 56; number of responses = 74.

APPENDIX 2

REPRESENTATIVENESS OF THE COMBINATION TRIP SAMPLE

The primary threat to the validity of the combination trip data is the self-selected nature of the sample; it might be that people were biased in favor of one kind of trip before they signed up. If this were true, results might reflect the earlier biases rather than an open-minded evaluation of the two trips based on the actual experience. Since it was impossible to randomly assign people to the combination trips, one can only assess after the fact the representativeness of the group. The problem suggests three major questions: How were the trips presented to the public? Why did people decide to go on a combination trip? How did the people compare to other Colorado River runners?

The combination trips were arranged with ARTA in October of 1974. They were announced in ARTA's regular 1975 brochure, which came out in February. The combination option was listed between the "oar power Grand" and "streamline (motor) Grand" trips as the "combination Grand: oar-motor special." ARTA's standard rowing trip required 12 days to Pierce's Ferry and cost $490, while the motor option took eight days and cost $435. The combination trip took nine days to Diamond Creek, and was billed as "the best of two worlds. Run river part-way on large motor raft and part-way on smaller oar-power raft." Cost was $460.

In terms of advertising, then, the appeal was neutral, emphasizing that the trip provided an opportunity to experience both motor and oar travel. The price also struck a medium. The length of the combination trip, however, was more likely to appeal to a potential motor customer, since it took only one more day than a motor trip but three less than the oar option.

Further information about the reason for trip selection was obtained through informal interviews which took place during the trip. In the course of normal conversations, passengers were asked in a general way why they chose the combination trip. Their responses were categorized and recorded at a later time. Responses were obtained from all passengers. When a group (such as a family, couple, or group of friends) cam together, often one person had done most of the planning and decision-making. When this occurred, all members of the group had essentially the same reason for selection and were categorized accordingly. Responses are presented in Table A2. Categories were not mutually exclusive, since people often gave several responses.

The majority (55%) indicated that the combination trip was chosen in order to experience both modes of travel. Thirty-nine percent indicated that the trip fit their time constraints. A minority (20%) said they would have liked to try an oar trip, but either didn't have enough time, did not want to be fully committed to the oar experience (11%), or couldn't get a reservation on an oar trip (7%). The important question here is which of these people might have been closed-minded about the experience. It is most likely that only the 7% who couldn't get on an oar trip are the most likely to have had a clear preference beforehand; those without the time or commitment might well have accepted a motor trip if combination trip had not been available.

Standard trip data presented earlier also shed light on this issue. We know (from Table 1) that 98% of people on oar trips prefer to run the river with that type of trip. Those on motor trips are less loyal to the motor experience, with a sizeable minority (40%) either preferring the oar alternative or not caring. The point implied here is that those on oar trips want nothing to do with motor travel. If this is a pre-trip bias, then very few of these people would be "open-minded" enough to select a combination trip which was partly motorized. If, on the other hand, it is a post-trip choice, then it is based on the experiental "treatment" and is the effect in which we are interested.

Combination trip passengers can also be compared to other river runners in terms of their background characteristics. The two center columns of Table 8 compare mean values on background variables for people on standard and combination trips. The sample for the combination trip is remarkably similar to the standard trip group. There are no statistically significant differences on any demographic variables. Of the variables related to outdoor experience and attitudes, the combination group is different only with respect to artifactualism (they were less likely than commercial passengers to favor developments in wild areas). In this one respect, then, they are more like oar passengers than motor passengers.

This could be a biasing factor if this attitude affected evaluation of the motor and oar parts of the combination trip. However, a look at the correlation of artifactualism with the items evaluating trip differences show that this is not generally the case. Artifactualism is unrelated to any of the preference items. Of the items describing the character of the experience, only two are related to artifactualism. Those who favored development were more likely to describe the oar trip as peaceful ($r = .27$, $p > .05$) and less likely to list the accessability of boatmen as an advantage of oar travel ($r = -.25$, $p > .05$).

The possibility of bias introduced by boatmen or observers deserves brief discussion. It is generally asserted that boatmen can "make or break" a trip, and their opinions frequently seem to carry an inordinate amount of weight with people who are normally independent of mind. Reports of observers on the combination trips indicate that boatmen did express their opinions when asked about the motor-oar issue. However, there is no reason to believe that oar boatmen had greater persuasive power than motor boatmen, particularly when passengers were exposed to both sets of boatmen and had personal experience upon which to base their judgments.

Observers provide another potential source of bias. They were instructed to avoid discussing their personal opinions on the motor-oar issue and to simply note the nature of conversations which occurred among passengers. Only two observers participated in the combination trips, and which observer collected that data had no significant effect on the motor-oar choice for planning another trip, recommendation to a friend, overall preference, or perceived safety. There was a slight observer difference on one item, with passengers in one group slightly less likely to say the oar trip better enabled them to "experience" the Canyon and passengers in the other slightly more likely to do so ($r = .22$, $p = .053$).

In conclusion, self-selection was the most potent threat to the validity of the combination trip data. Random assignment would have been the only way to assure that the sample was representative of river runners as a whole. Short of that, the possibility exists that self-selection biased the sample. However, the foregoing discussion indicates that there is good reason to believe that the combination trip group was both representative and open-minded.