COLORADO RIVER MANAGEMENT PLAN

DRAFT

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Grand Canyon National Park

National Park Service

United States Department of the Interior

COLORADO RIVER MANAGEMENT PLAN

I. INTRODUCTION

The Colorado River in the Grand Canyon provides a thoroughly unique combination of thrilling whitewater adventure and magnificent vistas of a remarkable geologic landscape, one deeply incised by remote and intimate side canyons. The river's flow is regulated by Glen Canyon Dam, just upstream from the Grand Canyon, and the combination of erratic snowfall patterns and summer monsoons make the river corridor an extremely dynamic environment. The floor of the Grand Canyon is a narrow channel of Sonoran Desert life, snaking along a mile beneath the rim's coniferous forests. The flora and desert creatures that inhabit the inner Canyon are beautifully adapted to the rigors of their harsh, variable environment. For these reasons a Grand Canyon river trip is perhaps the most sought-after back-country experience in the country, and nearly 17,000 visitors share that experience annually.

In order to fulfill its mission of preserving and protecting the Colorado River corridor for future generations, the National Park Service (NPS) periodically updates it Colorado River Management Plan (CRMP). Revision of the CRMP has involved public comment at several stages, of which the draft plan before you is the last and most important. The Draft CRMP is available for public review and comment for a 30 day period commencing November 10, 1988 and concluding December 9, 1988. Please take the time to read this draft plan carefully and comment in writing no later than December 9, to the Colorado River Management Plan Team, P.O. Box 129, Grand Canyon, AZ 86023.

Sincerely,

Richard W. Marks
Superintendent

UNITED STATES DEPARTMENT OF THE INTERIOR/NATIONAL PARK SERVICE

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A. INTRODUCTION AND HISTORICAL PERSPECTIVE

The Colorado River drains nearly one-twelfth of the continental United States as it cuts west at the southern edge of the Colorado Plateau and traverses the Grand Canyon area. For the next 277 miles, the Colorado River courses through some of the most spectacular scenery in North America. The Colorado River through Grand Canyon National Park, the longest stretch of recreational white water in the world, offers one of the most sought after river trips in the United States.

The desire of the American public to experience this unique area has dramatically increased. In 1967, 2,100 people traveled the river through Grand Canyon National Park. The number of recreational river users dramatically increased to 16,500 in 1972. This sudden rise in use was noticeably impacting the vulnerable inner canyon ecosystem. Trash, charcoal, and human waste were accumulating, multiple trails were developing to points of interest, and the numerous prehistoric and historic sites near the river were being damaged.

Recreational use along the Colorado River and the Grand Canyon is concentrated within the riparian zone and on beaches. The time and location of visitor use in the river corridor is uneven, causing high density levels at certain locations throughout the river corridor. Crowding and congestion at attraction sites have not only impacted resources, but also the river trip experience for many visitors. Popular sites include geologic features, side canyons, archaeological and historical sites, caves, waterfalls, and unusual vegetation. The attraction sites are marred by multiple trails, trampled vegetation, and compacted soils.

The above problems were a direct result of the increase in the recreational use of the area. In 1973, twenty one commercial boating companies and noncommercial river runners carried more than 15,000 people down the river, an increase of almost 700 percent in 6 years. Colorado river use for 1972 alone exceeded the 100-year period from 1870 through 1969.

Until the completion of the first dam on the Colorado River, the river remained fundamentally unchanged. Then, in 1935, Lake Mead, behind Hoover Dam, flooded the lower sections of the Grand Canyon. The upper reaches of the canyon remained in a natural state until Glen Canyon Dam was completed in 1963.

Both Hoover Dam and Glen Canyon Dam have had profound impacts on river running through the Grand Canyon. Lake Mead extended into the lower section of the canyon, producing slack water that marked the end of the free-flowing Colorado. Formerly, river runners had been able to float the entire length of the river to Pearce's

Ferry. With the advent of Lake Mead, trips had to take out 55 miles upriver at Diamond Creek, or use motors to traverse the slack water of the lake to Pearce's Ferry.

Glen Canyon Dam's effects have been more dynamic and dramatic. The amount of sediment and driftwood carried naturally along the river's course through the canyon has been significantly reduced. Water releases from Glen Canyon Dam have created more predictable seasonal water levels, but have resulted in extreme daily fluctuations. As a result, canyon beaches, which provide campsites for river runners, no longer receive sufficient replacement sediments and are being eroded by the erratic daily flows. During periods of low water release from the dam, passage at certain rapids has become difficult, creating hazards and delays. Heavy spring runoff no longer scours the river's banks, and this has allowed a new ecosystem to develop in the pre-dam flood zone.

Prior to the influx of river runners and the advent of dams, the river required very little active management by the National Park Service (NPS). However, by the early 1970s it was apparent that a comprehensive river management plan was needed.

In 1973 the NPS initiated a research program and planning process leading to the development of the Colorado River Management Plan (CRMP) in 1979. At this time the user day allocation concept was formulated and implemented. Any portion of a day a river user spends on a river trip is defined as a user day. The 1979 Colorado River Management Plan and its associated Environmental Impact Statement (EIS) were finalized and approved, through the process mandated by the National Environmental Policy Act of 1973 (NEPA), by the National Park Service (NPS). The plan eliminated use of motorized craft on the river.

Congressional response to components of this plan was negative when, in 1980, the Hatch Amendment was passed as an element of the Fiscal Year 1981 Department of the Interior Appropriations Bill. The amendment prohibited a reduction of summer season user days or passenger launches for commercial motorized craft below 1978 levels.

Based on passage of this amendment, the NPS modified the Colorado River Management Plan to allow a diversity of river running experiences in Grand Canyon National Park. While some reevaluation of management goals has taken place, the preservation of the Grand Canyon and the Colorado River for future generations has remained a primary objective of the plan. Scientific research, public input, historic considerations, and legislative mandates have placed the current levels of commercial and noncommercial user days at an aggregate total of 169,950. The NPS

reserves the right to add or subtract, allocate or reallocate user days based on review of all relevant factors. Current allocations are as follows:

Commercial Sector -	Primary Season -	106,156 user days
Commercial Sector -	Secondary Season -	9344 user days
Commercial Sector -	Total -	115,500 user days
Noncommercial Sector -	Primary Season	-43,920 user days
Noncommercial Sector -	Secondary Season	-10,530 user days
Noncommercial Sector -	Total	-54,450 user days

Therefore, the purpose of the Colorado River Management Plan is to address and resolve the major issues surrounding the management of river resources and river running activities. Additionally, it serves to update and revise the 1981 Colorado River Management Plan.

B. LEGISLATIVE AND PLANNING INFLUENCES

Grand Canyon National Park was officially established as a "public park for the benefit and enjoyment of the people" on February 26, 1919. In 1975, the park was enlarged "in order to further protect and interpret the outstanding scenic, natural, and scientific values".

As a scientific resource, Grand Canyon is a mecca for geologists, geographers, and biologists throughout the world. It is also a place of tremendous natural and historic interest; a place of beauty, peace, quiet, or exciting adventure.

Best known for its geologic significance, the Grand Canyon offers a record covering the first three eras of geological time, nearly 2 billion years. It is one of the most complete continuous records of geological history anywhere in the world. Other important resources include scenic vistas, unique wildlife and vegetation, and historic and archaeological remains.

In all, approximately 20 pieces of legislation contribute to the establishment of Grand Canyon National Park and to the protection of wildlife, objects of unusual scientific interest, geologic and paleontological features and objects, and other scientific and natural values.

Management of recreational boating on the Colorado River in Grand Canyon National Park is influenced directly by legislative mandates. The most significant is the National Park Service Act of 1916 which established the mission of the agency:

> "...The service thus established shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations, hereinafter specified, by such means and measures as conform to the fundamental purpose of said parks, monuments, and reservations, which purpose is to conserve the scenery and natural and historic objects and wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired."

The act of Congress which established Grand Canyon National Park in 1919 included only a portion of the canyon and river corridor. This was modified by the Grand Canyon Enlargement Act of 1975. This act added Marble Canyon National Monument, Grand Canyon National Monument, and portions of Lake Mead National Recreation Area to Grand Canyon National Park. All of the Colorado River corridor within Grand Canyon, except adjacent Indian tribal lands on the Navajo, Havasupai, and Hualapai Reservations, is now within the park boundary.

The Grand Canyon National Park Master Plan also contains statements which directly influence management of the Colorado River, for example:

> "...preservation of the Grand Canyon natural environment is the fundamental requirement for its continued use and enjoyment as an unimpaired natural area. Park management therefore looks first to the preservation and management of the natural resources of the park. The management concept is the preservation of total environments, as contrasted with the protection of only a single feature or species."

Additional legislation and executive orders which influence river management in the park include: the National Historic Preservation Act of 1966 as amended, the National Environmental Policy Act of 1969 (NEPA), the Water Pollution Control Act Amendments of 1972, the Endangered Species Act of 1973 as amended, the Clean Air Act Amendments of 1977, the American Indian Religious Freedom Act of 1978, the Archaeological Resources Protection Act of 1979, the Hatch Amendment No. 1754 to the FY81 Department of the Interior Appropriations Bill, Public Law 100-91 of 1987 (regarding aircraft management), 1978 Public Law 95-250, and Executive Orders 11593 and Executive Order 11987.

The Amendment to the Act to establish Redwood National Park in 1978 amended the Act of August 18, 1970 to reaffirm that all areas of the NPS were to be regulated consistently with the Organic Act. This law directed the Secretary of the Interior to afford the highest standard of protection and care to the resources of the National Park System. It stated that no decisions could be made

in derogation of park values and purposes except as Congress may have specifically provided.

The Wilderness Act of 1964 required all federal land management agencies to reexamine their resources for possible wilderness classification. In 1976, the National Park Service prepared a draft environmental statement (ES) and preliminary wilderness proposal which was reviewed by the public. A recommendation was forwarded to the Department of the Interior in 1980 which proposed 980,088 acres, or approximately 80% of the park, for immediate wilderness designation. Further, 131,814 acres, or approximately 11% of the park, were proposed as potential wilderness additions. Action on this recommendation is still pending.

Encompassing a total of 1,215,734.64 acres, the park is bounded on the north by national forest and public domain lands, on the east by the Navajo Indian Reservation, on the south by national forest and Hualapai and Havasupai Indian Reservation lands, and on the west by the upper reaches of Lake Mead National Recreation Area. The park is located within Coconino and Mohave Counties. These adjacent land management entities also affect the management of the Colorado River through Grand Canyon National Park.

C. PLAN REVIEW AND UPDATE

The 1988 Colorado River Management Plan will be in effect for a ten year period. A comprehensive plan review, directed by the Superintendent through the Division of Visitor and Resources Protection and the Division of Resources Management and Planning, will occur before the end of this period.

This comprehensive review process will incorporate public meetings and comments, data from monitoring/research projects, visitor use statistics, NPS policies, federal rules and regulations, and legislated mandates. The purpose of the review will be to fully examine evolving public concerns, develop far-reaching programs needed to protect natural and cultural resources and environmental processes, thereby enhancing the opportunity for park visitors to have a quality experience.

The 1988 Colorado River Management Plan will also be responsive, on an annual basis, to results of research, monitoring programs, and public and constituent group input. This will insure a planning document that will be responsive to the dynamics of river management within the unique environment and circumstances of the Grand Canyon.

Interested persons are encouraged to submit comments to the Superintendent for consideration at any time for use in the annual reviews.

II. THE GOALS OF THE COLORADO RIVER MANAGEMENT PLAN

The basic goals of Grand Canyon National Park in the management of the Colorado River reflect those of the NPS as expressed in the National Park Service Act of 1916 and the Redwoods Act of 1978. These legislative mandates serve as the driving force behind management decisions in NPS areas across the nation. The goals of the Colorado River Management Plan are thus predicated on, and the result of, these legislative mandates and management objectives. These goals are as follows:

1) To preserve the natural resources and environmental processes of the Colorado River corridor and the associated riparian and river environments.

2) To protect and preserve the historic and prehistoric cultural resources in the river corridor and associated environments subject to impact by visitor use.

3) To provide Colorado River users the opportunity to participate in and appreciate a variety of the unique experiences offered by Grand Canyon National Park as a whole and by the riverine environment in particular.

4) To provide a quality Colorado River experience through Grand Canyon National Park.

    A) By determining the impact of crowding and use levels on visitor experience (considering, trip size, number of contacts per day, visitor expectations, and time of year) through social science research.

    B) By then establishing a human use capacity and a limitation on use based on the results of the above research and related management considerations.

    C) By managing visitor use to provide opportunities and settings for certain experiences and critical attributes as defined in the limits of acceptable change guidelines found in this document (Appendix B).

5) To ameliorate conflicts between backcountry and river users (especially in the upper Marble Canyon area).

6) To protect and preserve the river corridor environment within the National Park Service's ability to do so considering the effects of Glen Canyon Dam.

7) To provide opportunities for people of most ages, abilities and physical handicaps to participate in river trips.

III. MANAGEMENT OBJECTIVES OF THE COLORADO RIVER MANAGEMENT PLAN

The management objectives of the Colorado River Management Plan acknowledge the natural, cultural, and experiential components which constitute the unique quality of a Grand Canyon river experience, including; solitude and natural quiet, hiking opportunities, the white water adventure, unique scenery and geologic features, wildlife and vegetation ecosystems in a natural condition, archaeological and historic features, and social and group interactions while on the river trip. These management objectives are governed by the preeminent NPS mandate of preserving the natural and cultural resources of the Colorado River within Grand Canyon National Park.

The following objectives (not in priority order) are designed to provide general guidance to park managers both conceptually and in the practical context of making decisions. Where applicable, certain management objectives are further defined and quantified in the Limits of Acceptable Change section, Appendix B, of this plan.

1) Monitoring Program--Establish, design, and implement an integrated, long-term monitoring program to assess changes in the status of natural, cultural, and experiential resources.

a) This long-term monitoring program will require an integrated and standardized data base, statistical analyses, and management decision-making process.
b) This program will require definition of present resource status and these data will serve as the baseline against which changes will be measured.
c) Results from the monitoring program will be reviewed each year to assist in evaluating the effectiveness of management policies.

2) Social Science Research--Initiate social science research to develop visitor profiles and user expectations for the Colorado River white water experience.

3) Glen Canyon Dam Operations--Advocate and support operational objectives for the Glen Canyon Dam which are most compatible with protection of the intrinsic resources of the Colorado River within Grand Canyon National Park. Further, promote seasonal water releases which are consistent with the requirements of a safe, high quality, white water rafting experience.

4) Off-river Activities--Allow for visitation to attraction sites, hiking side canyons, and for general off-river time verses on-river time.

5) Natural Experience--Provide the opportunity to experience solitude, quiet and the unique and natural environment of the canyon.

6) Safety--Maximize river safety by determining and enforcing regulations regarding boat operations and equipment standards. These regulations must be adequate to mimimize injuries and accidents due to equipment failure or craft design.

7) Fishing--Allow fishing as a recreational activity only if it does not adversely impact or jeopardize threatened/endangered species inhabiting or using the river. Such species include humpback chub, peregrine falcon, and bald eagles.

8) Research--All scientific research will be in compliance with the research guidelines for the National Park Service and Grand Canyon National Park. To insure compliance, researchers using the Colorado River will be required to make research available to the National Park Service in a timely manner.

9) Pre-trip Information--Provide trip information to confirmed clients of park concessioners which accurately describes trip size, trip length, and boat capacity. Concessioners will be required to provide this information to all passengers, thus aiding the planning process by comparing visitor trip expectations to their actual experiences.

10) Crowding and Congestion--If desired, parties will have the opportunity to avoid crowded areas and/or attraction sites, regardless of season, and find other places they do not have to share with any other group. Within existing user day allocations and seasonal distribution patterns, river users must expect to share high use areas with at least one other group during the primary season. If deemed necessary and functionally effective, a computerized launch model may reduce the frequency of trip contact to levels consistent with the park's general objectives of reducing crowding at attraction sites and of reducing competition for overnight camps.

11) Health, Sanitation, and Water Quality Guidelines--Implement and enforce all state and local public health and sanitation standards for all trips on the river. Maintain, to the extent possible, water quality in side streams and river to comply with state, county, and national health standards.

12) Commercial Guide Education--Continue to encourage concessioner support and guide participation in a yearly, park-sponsored Guide's Educational Seminar, in order to enhance knowledge of park regulations and Annual Commercial Operating Requirements, as well as enhance their knowledge of the natural and cultural history of the park and the river corridor.

13) Spectrum of Opportunities--Maintain the opportunity for visitors to select commercial or noncommercial river trips by a variety of water craft.

SUMMARY OF MANAGEMENT CHANGES SINCE IMPLEMENTATION OF THE 1981 COLORADO RIVER MANAGEMENT PLAN (CRMP)

Following is a brief summary of policy, regulatory, and administrative changes that have been or will be instituted as part of the Colorado River Management Plan revision.

Subject/Change: Guide Certification

Implementation Date: 1988 Primary Commercial Season

Duration: Permanent

Policy Description: All commercial guides carrying passengers for hire on the Colorado River through Grand Canyon National Park will be required to pass a written exam based on the Annual Commercial Operating Requirements.

Subject/Change: Limit on Commercial Trip Size

Implementation Date: 1987 Primary Commercial Season

Duration: Temporary

Policy Description: The 1981 Colorado River Management Plan established an upper limit of 36 commercial passengers traveling and camping together on one commercial river trip. During the 1987 and 1988 primary commercial river seasons that limit was raised to 40 passengers on a temporary basis. Based upon evaluation of all input related to crowding and congestion problems in the river corridor during the primary season, the limit is restored to 36.

Subject/Change: Administrative Charges for Noncommercial Users

Implementation Date: Proposed for 1990 Noncommercial season

Duration: Permanent

Policy Description: Applicants to the noncommercial waiting list will be required to pay $25 in order to be placed on the list. All trip leaders will be required to pay $50 upon return of their noncommercial river trip permit application to the River Permits Office. Both charges will be non-refundable.

Subject/Change: Scheduling of Noncommercial Launch Dates

Implementation Date: Proposed for 1990 Noncommercial season

Duration: Permanent

Policy Description: Noncommercial launch dates will be scheduled two years in advance. Each year a sufficient number of waiting list applicants will be contacted in order to fill available launch dates for two years (Primary and Secondary seasons).

Subject/Change: Noncommercial Double Launches and Resultant Effects on Commercial Launch Calendar

Implementation Date: 1988 Noncommercial Primary Season

Duration: Permanent

Policy Description: In order to more fully utilize the noncommercial allocation in the primary season, 40 additional noncommercial launches have been added. Beginning in the 1989 Noncommercial Primary Season, one double launch will be scheduled per week. On the double launch day, the commercial launch limit will be held to 134 passengers. During the secondary season, 12 additional launches will be scheduled.

Subject/Change: Noncommercial Continuing Interest and Participant Rules

Implementation Date: Proposed for 1990 Noncommercial Season

Duration: Permanent

Policy Description: All applicants to the noncommercial waiting list will be allowed to miss one continuing interest deadline and may participate in one noncommercial river trip other than their own for the duration of the time they are on the list.

Subject/Change: Call-in System/Filling of Open Noncommercial Launch Dates

Implementation Date: Proposed for 1990 Noncommercial Season

Duration: Permanent

Policy Description: Any noncommercial date in the two year scheduling period which is not filled by the initial launch system, or which opens due to cancellation, will be filled by the River Subdistrict Office. The office will contact applicants at

the top of the list by phone and/or in writing. If a date is not filled by either of these methods, the date may be claimed by anyone on the waiting list under the Call-in System Guidelines, as defined in Appendix D of this document.

Subject/Change: Commercial Deadhead Trips

Implementation Date: 1990 Commercial Season

Duration: Permanent

Policy Description: Commercial trips traveling downriver with empty boats for the purpose of picking up passengers at Phantom Ranch or Whitmore Wash will be required to expedite travel to those destinations. These boats will not be allowed to stop at attraction sites, and will be required to use smaller, less popular camps. On days that deadhead trips depart Lees Ferry, the number of passengers being picked up downriver will be counted against that day's commercial passenger launch limit.

Subject/Change: River Trips Conducted for Research Purposes

Implementation Date: December 1989

Duration: Permanent

Policy Description: Research trips conducted on the Colorado River will be required to submit research proposals prior to launch and justifications for each trip member's participation. Following completion of each trip, a journal of trip activities and research must be submitted to Grand Canyon National Park in a timely manner.

Subject/Change: Commercial Secondary Season Use

Implementation Date: Proposed for 1989 Commercial Secondary Season

Duration: Permanent

Policy Description: The secondary season commercial allocation will be divided among the 20 commercial outfitters so that each company will have sufficient user days to operate two trips during the secondary season of the size and duration historically established by each company. Remaining user days will be administered as a pool by the NPS. Companies with the highest historic use will have priority access to the pool until all user days are distributed.

Subject/Change: Noncommercial User Day Pool

Implementation Date: Proposed for 1989 Noncommercial Primary Season

Duration: Permanent

Policy Description: Noncommercial user days which become available due to trips with fewer than the maximum allowed participants or river days will become available through an NPS administered pool. As sufficient days become available, additional noncommercial launches will be scheduled as double launches throughout the primary and secondary seasons.

Subject/Change: Lower Gorge Management

Implementation Date: 1989-1991 Primary Noncommercial and Commercial Season

Duration: Temporary pending development of Colorado River Lower Gorge Management Plan.

Policy Description: Use in the lower gorge below Diamond Creek will be monitored and regulated to determine future management needs. Interim guidelines have been designed to regulate use coming upriver from Lake Mead during development of a comprehensive Colorado River Lower Gorge Management Plan. These Guidelines are contained in Appendix F of this document.

Subject/Change: Noncommercial Deferral Policy

Implementation Date: Proposed for 1990 Noncommercial Season

Duration: Permanent

Policy Description: Noncommercial waiting list applicants will not have the option of deferring their launch date by one year.

SUMMARY OF 1987/1988 COLORADO RIVER MANAGEMENT PLAN REVIEW

Included in this section is a brief summary of the review process and public involvement plan that has been implemented during the last 18 months, since the initiation of the revision of the Colorado River Management Plan.

1987

June - CRMP review process commences with notification of over 4000 individuals, including interest groups, congressional delegations, and cooperating agencies.

June through July - Planning Guides mailed to over 1000 interested individuals to participate in identification of major issues.

July - Scoping session with advisory group comprised of river managers, recreation and social researchers and NPS river managers. Session designed to target primary issues and potential changes to 1981 plan.

September - Due to the magnitude of interest and volume of comments (115 letters up to that date), the decision to expand and extend the revision process was announced.

September - Meetings with Grand Canyon commercial river guides in Flagstaff and Marble Canyon, Arizona to discuss guide certification program, resource management programs, and boat capacities. Approximately 50 were in attendance.announced. December, 1988 was established as the target completion date.

October - First meeting with park's Concessioner Steering Committee at Marble Canyon, Arizona. Contact and discussion with elected representatives of Colorado River Outfitters, including representatives from small, large, old, new, motor, and oar companies.

October - River Rendezvous, Telluride, Colorado. Approximately 200 people contacted, comprised primarily of noncommercial boating interests.

October - Annual Colorado River Concessioner's Meeting, Grand Canyon National Park. Issues discussed with the park's twenty commercial outfitters and company representatives.

1988

January - The mailing exceeded 1000 names of individuals and organizations interested in being involved in the review process. 150 written comments had been received, and the targeting of issues of greatest concern was begun. 30 additional noncommercial launches ("double launches") were added to the 1988 calendar on a trial basis.

January - Guide Certification Program instituted as an amendment to the Annual Commercial Operating Requirements.

February - Western River Guides Association Meeting, Denver, Colorado.

March - CRMP Issue Workbook developed from public comment and input and mailed to those on waiting list who requested one (approximately 400).

April - First public meeting in Flagstaff, Arizona. Approximately 34 people took advantage of workshop and formal comment opportunities.

May - Public meetings in Denver, Colorado and Reno, Nevada with about 50 people participating.
June - Over 50 completed workbooks returned by review/comment deadline.

July - Meeting with Concessioners Steering Committee to discuss draft Preferred Alternatives.

August - Meeting with Constituent Advisory Committee to discuss Draft Preferred Alternatives

August - Draft Preferred Alternatives mailed for public review.

October - Attend River Rendezvous in Telluride, Colorado. Approximately 30 people contacted.

COLORADO RIVER MANAGEMENT PLAN

APPENDIX A

RESOURCE MONITORING PROGRAM

Introduction

- The Need for An Integrated Approach to Resource Management
- Contents and Schedules of Reports
- Management Actions

Resource Monitoring Issues

- 1- Listed, Endemic, and Alien Species
- 2- Camp and Attraction Site Quality
- 3- Visitor Experience in the River Corridor
- 4- Water Quality in the River Corridor
- 5- Cultural Resources

References

Addendum A - Bald Eagle Research Program

COLORADO RIVER MANAGEMENT PLAN

APPENDIX A

RESOURCE MONITORING PROGRAM

Introduction:

To fulfill its Congressional mandate to protect all resources, the National Park Service (NPS) must keep pace with dramatic changes in the dynamic system of the Colorado River. Effective, efficient management of the many resources in the Colorado River corridor must be based on consistent, long-term monitoring data which have been carefully collected, appropriately analyzed and thoroughly considered. The dynamic nature of the river corridor and recent advances in technology require this monitoring program to be periodically evaluated, updated and integrated using modern data management practices. This portion of the CRMP summarizes the on-going and proposed monitoring activity, on which the next revision of the CRMP will be based.

The Need for an Integrated Approach to Resource Management

The management objectives of the CRMP require identification and protection of specific river corridor resources. Effective and rigorous resource management must be based on an integrated, long-term monitoring and research program. Monitoring methods and management options will be subject to external review, and a standardized data management system will be used. In the future, several tasks will be accomplished: 1) resource assessment of the monitoring issues identified here will be initiated or continued; 2) baseline resource conditions will be assessed and relevant literature compiled for each major resource issue; 3) a standardized, coordinated, computerized data management system will be developed to store and analyze all river resource data, and will be used to identify significant departures from baseline resource conditions; and 4) an integrated, long-term monitoring plan will be developed and externally reviewed to integrate baseline data, assess resource changes, and direct management decisions. The monitoring program presented here is also supplemented by the Limits of Acceptable Change (LAC) monitoring approach.

The NPS will consult with a professional data base manager to develop the data base system, and this data management system will be on line before January 1, 1990. Analyses, graphics and other statistical products will contribute substantially to interpretation of monitoring data and will be used in annual and summary monitoring reports.

External and in-house review of monitoring methodology and management options will improve the scientific integrity of management approaches and actions. Recognized experts in the fields of water quality, public health, wildlife and habitat management, archeology, recreation sociology, and systems analysis

will be contacted as needed to review the monitoring methodology for each monitoring issue, the long-term monitoring program, as well as to examine management options.

Contents and Schedule of Reports

Resources requiring identification and protection include natural, cultural and experiential river corridor resources. A separate monitoring statement has been developed for each major management issue and each statement will be reviewed by qualified scientific experts in that field. A baseline status report will be prepared for each resource issue by January 1, 1990. This baseline report will include a comprehensive literature survey and history of action on each resource, as well as any data pertaining to evaluation of resource quality.

Monitoring of river corridor resources will take place at regular intervals, with an annual NPS monitoring river trip in late fall/winter of each year. In some cases, pre-season versus post-season evaluations of visitor impacts may be necessary. The annual monitoring report will be written by February of each year, reviewed externally, and the findings made available to the public upon request. The annual monitoring report will serve to update managers on the status of resources, introduce any changes in the monitoring program, and identify new issues which require management attention.

A summary monitoring report will be prepared for any major revision of the CRMP, which summarizes the information contained in the annual reports. These reports will be prepared by the Division of Resources Management and Planning.

In addition, within two years of implementation of the 1988 CRMP, a long-term monitoring and research plan will be designed to integrate management concerns and perspectives on all river corridor monitoring efforts, data compilation and statistical analyses, and will suggest appropriate methodologies for development of management alternatives. This long-term plan will be reviewed externally and within the NPS. This long-term plan will confer a broad scientific perspective on the CRMP monitoring program and will strengthen the integrity and defensibility of future management decisions made by the NPS at Grand Canyon National Park.

Management actions

The long term monitoring and research plan will address the implementation of management decisions which are triggered when a change in resource status reaches unacceptable levels. The scientific community can assist the NPS regarding the need for and range of management options. Within the constraints of statistical decision-making, the standard value used for judging the significance of a deviation from a given baseline is $p = 0.05$, and a change of 0% to 5% (depending on the resource) from the baseline

value is considered an unacceptable level of change. Increased variance will also be used to evaluate changing status of resources. These statistical indicators will be used to evaluate change in resource status away from baseline conditions throughout the monitoring program. The annual and summary monitoring reports will document trends (nonsignificant changes or changes of less than the pre-established percentage) to allow NPS managers to distinguish incremental changes above $p < 0.05$ (e.g. the $p < 0.10$ level), and these increments will serve as indicators of potential or developing problems.

When management action is merited through monitoring data and has been verified by on-site inspection, a range of management options will be considered by NPS resource management and administrative staff. Consequences of each management option will be evaluated as well. The management problem, management options and consequences of each option will be summarized and evaluated by internal and external review and, where necessary, through the process mandated by the National Environmental Policy Act (NEPA). Where possible, management options will be developed to maintain resource availability to the public by considering alternatives to visitor access reduction, however, the goals of the CRMP are maintenance of resource quality, and degradation of resources may require reduction of public access to facilitate a resource recovery program.

When indicated, management action will be taken following completion of the review process. The success of management action will be evaluated through continued monitoring of the affected resource, using the methodological protocol previously described.

RESOURCE MONITORING ISSUE 1: LISTED, ENDEMIC AND ALIEN SPECIES

The population status of listed, endemic and alien species is of primary importance to the park. Information on these species will be compiled and updated in the annual and summary monitoring reports. In several cases, data can be gathered from on-going studies sponsored by other agencies, however, some species will require examination in the field by staff or other qualified researchers.

Listed Species

Humpback Chub and Peregrine Falcon: Populations of these endangered species are currently under study in the park. Literature and data on population dynamics, habitat requirements, and distribution in and near the park will be gathered from on-going studies and summarized in annual CRMP reports on the status of important listed, endemic and alien species. Consultation with the U.S. Fish and Wildlife Service (USFWS) will be initiated immediately, when applicable to comply with Section 7 of the Endangered Species Act of 1973.

Wintering Bald Eagle: The Southern Bald Eagle (Haliaeetus leucocephalus) is federally listed as a rare and endangered subspecies. Wintering bald eagles have been observed in Marble Canyon since 1984 and the population has increased dramatically since 1986. In March, 1987 more than 18 individual bald eagles were observed in a single observation at the mouth of Nankoweap Creek. The period of eagle occupation corresponds roughly with the trout spawning period. From observations made at Nankoweap Creek in January, 1988, wintering bald eagles are extremely sensitive to the presence of humans, and fly from foraging areas when humans are within 0.3 miles.

More information is needed on the presence of wintering bald eagle in Grand Canyon National Park, and a research program is currently being developed by the NPS (see Addendum A). In addition, an informal consultation with the USFWS will be initiated to comply with Section 7 for bald eagle and other rare and endangered species in the park, following the 1988/1989 winter observation period.

Threatened Species

The status of all threatened species will be documented in the annual CRMP monitoring report. For example, the current status of the Colorado River otter (Lutra canadensis sonora) is unknown in the park. A recent study by B. Spicer of the Arizona Game and Fish Department found no evidence of this species in the park, however, several observations and scat have been located in the river corridor during the last decade. Ranger patrols and other river users will be informed of the need for data on this species. A literature survey and any recent information on this species will be included in the summary CRMP monitoring report.

Similar attention should be devoted to the small population of the Gila monster (Heloderma suspectum) which inhabits the lower Grand Canyon below Colorado River Mile 208, and to the populations of Traill's Flycatcher and Bell's Vireo.

Endemic Species

The Colorado River corridor in the Grand Canyon hosts several endemic plant species, such as Flaveria macdougallii, as well as the Grand Canyon rattlesnake, (Crotalus viridis abyssus) which are not federally listed. The taxonomic status of the collared lizard (Crotaphytus spp.) and in the Grand Canyon is also unknown and is worthy of further investigation. Research on these and other potential endemic species will be encouraged by the NPS. Data on these and other endemic species will be compiled and presented in the baseline, annual and summary monitoring reports.

Alien Species

Numerous alien species occupy the river corridor and, for the most part, their population dynamics are unknown. Alien species of primary importance include salt cedar, camel-thorn, several Bromus grasses, Russian olive, Chinese elm, white and yellow sweet clover, alfalfa, and other plant species; river "shrimp" (Gammaris lacustris), rainbow and other trout, striped bass, carp, and other fish species; house sparrows, and other vertebrates. The park will determine the rate of population change for alien species. Such a determination will be based on data from on-going studies and periodic surveys of the flora and fauna in the river corridor. The population status of each major alien species will be detailed in the baseline, annual and summary monitoring reports. Management actions will be developed, reviewed, and presented in the CRMP summary report.

In addition to listed, endemic and alien species, the NPS monitoring program will periodically evaluate the status of the river corridor habitat, including beach campsite availability and size; the distribution, cover and change in vegetation along the Colorado River and its tributaries; and changes in xeric sites. So too, the population status of indicator species will be pursued. For example, populations of (Uta stansburiana), riparian obligate bird species, and/or small mammals may be used to evaluate ecosystem changes. These data will be compiled and presented in a baseline report and updated for the summary monitoring report.

RESOURCE MONITORING ISSUE 2: CAMP AND ATTRACTION SITE QUALITY

Trailing, refuse accumulation, and the destruction of vegetation and cultural resources is a perennial problem in the river corridor. Sites historically prone to visitor use impacts are listed in Table 1. These sites, as well as others which may sustain high levels of use in the future, require an active program of photo documentation, baseline data accumulation, and monitoring.

The site quality monitoring program will involve the following steps:

1) Baseline data will be compiled for each site. Existing information, photographs and maps will be compiled for each site to serve as the 1990 baseline, against which future change will be measured. These baseline data will include location, slope and aspect, parent rock type, sand color (in beach areas), amount and type of vegetational cover, flora and fauna of special importance (listed, endemic or alien species), type of site (campsite, attraction site, or other), extent of impacts (trampling, trailing, rock movement and destruction, litter and waste accumulation), and a detailed map of each site. At each site a comparable low/no impact site will be established to serve as a control against which future changes will be evaluated. If these baseline data are not currently available, data will be gathered and compiled by qualified personnel.

2) A use area map will be developed for each site, to be used to document present conditions and to identify critical locations for monitoring. For example, the camping area at a beach camp site should be mapped, and the impact area calculated for comparison through time. As another example, trail width and trail depth may be measured at 30 pre-designated sites along an attraction site trail and compared over time to evaluate trail area increases.

3) Use-impact sites will be monitored through time during ranger patrol river trips. The map previously prepared for each site will be used to evaluate and/or measure changes in the field. Fire pits and fractured rocks will be counted, litter accumulation will be assessed through predetermined transects, and sand color in the heavily used areas will be determined using a set of grey cards. Data will be compiled following the patrol trip and entered into the pre-existing, computerized data base.

4) Management priorities will be established by ranking sites according to level of impact: sites with the highest levels of impact will receive immediate management attention, as compared to sites with low impact levels. High priority sites will be monitored at yearly intervals, while low-priority sites will be monitored at 2 to 3 year intervals. Patrol rangers will visit all high and low-priority sites over the course of a year and report any pronounced changes in resource quality at any site. However, actual monitoring/assessment activity at low priority sites will

take place at 2 to 3 year intervals. Improved protection and recovery of damaged attraction sites will be assured by establishing management priorities for each site and by providing sufficient time for an evaluation team to complete an adequate assessment of each site. Thus, all primary sites will be monitored each fall, but secondary impact sites may only be evaluated every other year.

5) A report on the status of each site will be completed for the annual summary CRMP monitoring report. This report will document management actions taken, and recommendations for future management action based on the results obtained during the monitoring program.

6) If impacts are significant and/or exceed a pre-designated percentage (not to exceed 5%) of the 1990 baseline level, management action will be taken. This decision will be announced publicly through press releases, at constituent meetings and will be posted at Lees Ferry, Phantom Ranch and Pierce Ferry. Depending on the severity, urgency and magnitude of the problem, management action may consist of any of the following: a) voluntary reduction in use; b) reclamation activity directed by NPS staff; and/or c) administrative closure of specified camps, attraction sites, or beaches until recovery to the 1990 baseline state has occurred.

Reclamation activities of degraded areas may include litter reduction, trail work, and/or revegetation of selected sites by NPS staff and volunteers. Efforts currently underway have been successful and will be continued.

7) Continued monitoring will assess recovery rates of managed sites and will be used to evaluate the duration of management action. Completion of management action will be announced publicly.

8) The management of Upper Marble Canyon (Mile 0 to Mile 13) entails special considerations due to conflicting use patterns and multiple jurisdictions. The use of the Colorado River shoreline in upper Marble Canyon by fishermen has increased sharply in recent years. Sanitation and litter accumulation are worsening, and fisherman have been using beach camps also required by river runners. With major river camps destroyed by debris flows at Miles 18 and 19, and with camps at 6 Mile Wash, Badger Creek, Soap Creek, Salt Water Wash, and 13 Mile Camp often preempted by fishermen, few camps remain in the critical first day reach for private and commercial river parties. Conflicts between fishermen and the river running parties are expected to worsen in the near future.

Use levels, site degradation, and waste accumulation on these beaches will be documented on a monthly basis to at least Mile 8. Rigorous efforts will be undertaken with the Navajo Tribe concerning management of the affected reach, and the success of this management effort will be reported in the annual and summary CRMP monitoring reports.

TABLE 1: Camps and attraction sites in the Colorado River corridor in the Grand Canyon with moderate to high levels of estimated use-related impacts.

SITE	MILE	TYPE OF IMPACT*	ESTIMATED LEVEL OF IMPACT**
Lees Ferry Area	0.0R	A,C,D,F	M
Upper Marble Canyon	1.0-13.0L,R	H,F	M-H
4 -Mile	4.0L	H,F	H
6-Mile	6.0R	C,F	M-H
Jackass Canyon	8.0L	H,F	H
Salt Water Wash	12.0L	H,F	M
19 1/2-Mile	19.5L	C	M-H
North Canyon	20.0R	C,A	M
24 1/2-Mile	24.5L	C	M-H
South Canyon	30.5R	C,A,F,H	M-H
Redwall Cavern	33.0L	A	M
Martha's Camp	38.4L	C	M-H
Buck Farm Canyon	41.0R	C,A	M
Royal Arches	41.5R	C,A	M
Anasazi Bridge	43.0R	A	H
President Harding Camp	43.9L	H,A	M-H
Triple Alcoves	46.5R	C,A	M
Saddle Canyon	47.0R	C,A	H
Nankoweap Area	52.0R	C,A	H
Kwagunt Canyon	56.0R	A	M
Little Colorado River	61.0L	A	H
Carbon Creek	64.5R	C,A	M
Chuar Canyon	65.3R	C,A	M
Palisades Delta	65.5L	A	M
Tanner Canyon	67.5L	A,H	H
Cardenas Creek	71.0L	C,A	M-H
Furnace Flats	71.2R	A	M
Unkar Delta	72.3R	C,A	M-H
Red Canyon	76.5L	C,R,H	M-H
Cremation Camp	87.5L	C	H
Phantom Ranch	88.0R	A,D,H,F	M-H
Pipe Creek	89.0L	D,H	M
Monument Creek	93.0L	C,H	H
Hermit Creek	94.0L	H	H
Crystal Creek	98.0R	C,R	H
North Bass Camp	108.0R	C,A	M-H
Shinumo Creek	108.5R	A,F	H
Garnet Canyon	115.0L	A,H	M-H
Upper Royal Arch Creek	116.5L	H	M
Elves Chasm	116.5L	A	M-H
Blacktail Canyon	120.0R	C,A	M-H
Forster Canyon	123.0L	C	M
Galloway Canyon	131.8L	C,A	M-H
Stone Creek	132.0R	C,A	M-H
Tapeats Creek	133.5R	C,A,F,H	M-H
hunder R./Tapeats Cv.	133.5R	C,H	M-H
Surprise Valley	136.0R	H	M

Table 1 cont.

SITE	MILE	TYPE OF IMPACT	ESTIMATED LEVEL OF IMPACT
Christmas Tree Cave	135.4R	A	M
Deer Creek Area	135.8-136.3L&R	A,C,H	H
Poncho's Kitchen	138.0L	C,A	H
Kanab Creek	144.0R	A,H	L-M
Olo Canyon	145.0L	C?,A	L-M
Matkatamiba Canyon	148.0L	A	M-H
Slime Canyon	155.0R	A	L-M
Havasu Canyon	157.0L	A	H
National Canyon	166.5L	C,A	M-H
Mohawk/Stairway Cyns.	171.5L&R	C,A	M
Fern Glen Canyon	168.0R	C,A	M-H
Lava Falls	179.0L&R	R	H
Helicopter Pad	87.0L	D	H
Whitmore Wash Tr. Area	187.5R	A,H,D	H
Granite Park	208.5L	C	H
Granite Park Springs	208.7L	A	M
220 Camp	220.0R	C	H
Diamond Creek	226.5L	D	H
Travertine Canyon	229.0L	A,C	H
Spencer Canyon	246.0L	A,C	M
Surprise Canyon	248.0R	A,C	M
Bat Towers	266.3R	A	M
Rampart Cave	274.5L	A	M-H
Pearce Ferry	279.5L	D	H

* Type of Impacts: A = attraction site with trailing; C = campsite; D = departure site; F = fishing-related impacts (waste and trailing); H = hiking-related impacts; R = r a p i d scouting and trailing

** Level of Impact: L = low, M = medium; H = high; estimated from current observations

RESOURCE MONITORING ISSUE 3: VISITOR EXPERIENCE IN THE RIVER CORRIDOR

The challenge and thrill of the Colorado River's many rapids have made river running in the Grand Canyon a much sought after experience. Summer use is strongly dominated by commercial concession-operated trips. Spring, autumn and winter use is predominantly enjoyed by private parties. To balance the many and different demands for river recreation, this plan recognizes the value of a "Recreational Opportunity Spectrum", in which various kinds and lengths of commercial and non-commercial river trips can take place, depending on the season and historical use patterns.

To clarify the many conflicting viewpoints regarding use of the river corridor, visitor experience will be evaluated through a comprehensive sociological monitoring program during the period of baseline data compilation. This evaluation will be designed and implemented by qualified recreation sociologists. "Visitor experience" should be defined to permit management of use levels in the Grand Canyon. Visitor experience depends on individual preconceptions and expectations, not simply on visitor satisfaction. Present evidence suggests that visitor trip preferences and expectations have and will continue to evolve. Scientific investigations will be directed at determining which components of visitor experience are manageable and the optimal values of those experiential qualities. Some of the components of visitor experience include:

a) the number of contacts with other parties
b) trip size
c) trip length
d) boatman qualifications
    1) guiding skills
    2) interpretation skills
    3) safety skills
e) crowding at attraction sites
f) camping beach quality and size
g) sanitation

Each component will be evaluated. The sociological monitoring program will also include a thorough documentation of the extensive recreation sociology research conducted in this and other systems. Methodology of this program may include: mailings to passengers and whitewater guides; on-river evaluation and interviews; and experimentation with different types of river trip experiences to determine the importance of key parameters. Results will be compiled into a baseline report within three years of implementation of the CRMP.

RESOURCE MONITORING ISSUE 4: WATER QUALITY IN THE COLORADO RIVER CORRIDOR

A comprehensive water resources management plan for Grand Canyon National Park was prepared in 1984. This plan addressed all relevant issues pertaining to maintenance of water quality and public health in the Colorado River corridor. Since the release of that plan, concerns have been expressed over radioactive wastes from tributaries, and at least one new water-borne disease organism appears to have entered the system. The recommendations made in the 1984 water resources management plan need to be implemented by the park. Effective management of water quality will require: 1) an updated literature review on the water quality in this system; 2) establishment of baseline criteria for river and tributary water chemistry, physical parameters, bacteria, and disease organisms; 3) a monitoring program for the mainstream and major tributaries; 4) development of an integrated data management system for data compilation and ease of analysis of resource status; 5) definition of management options for maintaining water quality in this system; 6) a plan for implementation of management actions; and 7) assessment of effectiveness of management actions.

Essential baseline information regarding water quality in the park will be provided through an integrated sampling program in the river corridor and tributaries. This program will include an assessment of water quality (including bacterial and other disease organism counts) in the Colorado River at three stations (Lees Ferry, Phantom Ranch and Diamond Creek) for a period of three years at seasonal intervals. Thereafter, one river station (Diamond Creek) should be sampled regularly throughout the year. Major tributaries (the Paria River, the Little Colorado River, Bright Angel Creek, Kanab Creek, Tapeats Creek and Havasu Creek) should be sampled at base flow and during flooding during the initial 3-year period and resampled at least every other year after that time. Parameters to be sampled are listed in Table 2. Collections should consist of 3 or more separate samples from the main current to provide an estimate of variance at each site, and sampling should conform to accepted standards of the United States Environmental Protection Agency and Arizona State Department of Health.

The Water Resources Division of the U.S. Geological Survey (USGS) in Tucson is presently developing a research plan for assessing water quality in the Colorado River drainage in the Grand Canyon. This research would emphasize the status of physical and chemical water characteristics, major ions, heavy metals, bacteria and disease organisms in the mainstream and in selected tributaries. In the interest of conserving money and time, the NPS will request access to the USGS water quality data, should such a program be undertaken by the USGS. The project could provide the NPS with pertinent water quality data, and the NPS would assist in development of research criteria, such as sampling sites, sampling regime, replication, and sampling schedule.

TABLE 2: Physical, chemical and bacteriological parameters for analysis of water quality in the Colorado River corridor in Grand Canyon National Park.

PHYSICAL PARAMETERS
- Temperature
- Flow
- Turbidity

MAJOR CONSTITUENTS
- pH (field and lab)
- Alkalinity
- Hardness
- Specific conductance
- Total Dissolved Solids
- Chloride
- Sulfate
- Calcium
- Magnesium
- Potassium
- Sodium
- Bicarbonate
- Fluoride
- Silica
- Dissolved Oxygen

NUTRIENTS
- Nitrate
- Phosphate

TRACE ELEMENTS
- Aluminum
- Arsenic
- Boron
- Cadmium
- Copper
- Iron
- Lead
- Manganese
- Mercury
- Molybdenum
- Nickel
- Selenium
- Vanadium
- Zinc

RADIONUCLIDES
- Gross alpha
- Gross beta
- Combined Ra 226, 228
- Strontium 90

DISEASE ORGANISMS
- Fecal coliform
- Streptococcal and total coliform
- Shigella sonnei
- Salmonella spp.
- Giardia lambla
- Unidentified podophilic bacterium

RESOURCE MONITORING ISSUE 5: CULTURAL RESOURCES

Archeological resources in the Colorado River corridor have received a considerable amount of attention from NPS staff. Many major archeological sites have been identified along the river, and a site specific monitoring program has been initiated for some of these. Monitoring priorities have been established on a six-year monitoring cycle in which major sites are monitored annually, and some sites may require no monitoring. The six-year monitoring cycle is adequate for minor sites to allow staff to identify changing resource conditions, however, major sites will continue to be monitored annually. NPS archeologists have found that visitor impacts and natural impacts to archeological sites are often interrelated; for example, trailing may cause drainage channels to further expose archeological deposits. The CRMP identifies the need for additional monitoring activity necessary to insure resource managers keep pace with changing conditions.

The same process will be followed for cultural resource monitoring as has been proposed for natural and experiential resources. A site-specific baseline inventory will be completed for each site, including consideration of control sites. The staff archeologist presently maintains a list of all recorded sites, and the baseline inventory report has already been completed for most of those sites. Monitoring priorities will be established or modified when baseline information has been compiled or when additional information is obtained. Monitoring will be carried out on a six-year cycle, with an annual monitoring report prepared for all major and/or stabilized sites, and with less frequent monitoring of minor sites. A summary report will be prepared for the periodic revision of the CRMP.

Cultural resource data differ from those obtained from other resources by falling primarily into nominal and ordinal categories and, consequently, require the use of nonparametric statistical analyses for interpretation. Within the LAC management approach, no or very low levels of change are acceptable at most archeological sites. These difference not withstanding, management decisions will be made in the same fashion as for other park resources. If management action is warranted, options will include stabilization, data recovery, and/or closure to visitation. Several sites have already been stabilized in the river corridor, and closure has been required at several sites (the Anasazi Bridge, the Hopi Salt Mines and the Furnace Flats area).

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ADDENDUM A: BALD EAGLE RESEARCH PROGRAM

The NPS bald eagle research program must be timed to coincide with the wintering foraging activity period of the eagles (November through March). Questions to be addressed in this plan include:

a) What is the pertinent literature on bald eagle wintering behavior, habitat requirements, sensitivity to human disturbance, and changes in distribution patterns?

b) What is the range and duration of wintering bald eagle presence in the Grand Canyon, including upper Lake Mead?

c) What are wintering bald eagle habitat requirements and are those requirements limiting bald eagle presence in Grand Canyon: 1) Do wintering bald eagles specifically require spawning trout populations in tributaries (a period of observation during which the river is turbid is required here); 2) do dam releases or low flow years restrict trout access to spawning tributaries or limit eagle foraging success; 3) what is the carrying capacity of this system?

d) What levels of human presence interrupt bald eagle foraging and roosting behavior?

This research should involve frequent observations of eagle presence at Nankoweap, with several periods of long-term observation to gather foraging data and population dynamics. Special attention should be given to the arrival period in late November and the staging/departure period in February/March.

After these data are collected, a biological assessment will be prepared, in accordance with Section 7 protocol. Should the bald eagle presence continue and impacts indicate a need for mitigation, the NPS will examine management options for minimizing disturbance of the eagles by recreationists. These options and management decision will be reviewed in consultation with the USFWS office in Phoenix, Arizona.

Appendix B

LIMITS OF ACCEPTABLE CHANGE

The "Limits of Acceptable Change" concept was developed by Stanke, et al. It has become an accepted planning scheme, used by the U.S. Forest Service, Bureau of Land Management and National Park Service for recreational use management.

"Limits of Acceptable Change" identify those levels at which management action will be taken. Their foundation lies in management objectives which are either measurable or based upon some value of the resource or sociological condition.

If a management objective is to be stated, there should also be an evaluation of the alternative means of assuring attainment; otherwise, there is no commitment for accomplishment and no incentive for the public to accept either a lower level means or the limit of acceptable change. By evaluating all alternatives, some should become evidently more favorable and thus, more willingly adopted if necessary. The lowest level of management action and intervention will be the NPS posture in assuring that recreational use impacts are within the "Limits of Acceptable Change".

The accompanying matrix does the following: it states the management objective and the level of change or recreational influence at which management action will be taken; it identifies the various means available for assuring attainment of the stated objective, listed with a brief description of the consequence of each; it prescribes a monitoring program and its objectives, along with the desired form of results and the means which will be employed to evaluate them; and, specifies the relationship of the monitoring program to the "means of assuring attainment". It should be clear that the intent of the matrix is to provide the means of translating a management objective into a management action.

In the temporal "Recreational Opportunity Spectrum (ROS)", use levels and patterns of recent years were used as baseline. Contact levels for each of the periods specified in the ROS are taken from results of research completed in 1976, which are believed to adequately approximate current contact probabilitiies. Three experience opportunity periods are defined: high and moderate use-level periods, within the Primary Season, and a low use-level period within the Secondary Season. The ROS is intended to serve several purposes: to specify objectives for managing visitor experience opportunities; to provide the visitor the opportunity to make clear choices as to the use period that will satisfy their preferences; and, give the NPS clearer direction for monitoring and applying management action.

The following criteria were considered in developing the management objectives: (1) each objective should clearly reflect a specific social, physical, natural or administrative condition of the Colorado River corridor; (2) each objective should reflect a value which can be altered or influenced by changing management practices; and, (3) each objective should be sensitive to recreational use.

A. Topic	B. Management Objective:	C. Level of Change/Influence at which action is taken:	D. Means of Assuring Attainment of Mgt. Objective:	E. Consequences of Such Action:	F. Monitoring Program:	G. Objectives of Monitoring Program:	H. Desired Form of Results:	I. Evaluation of Results:	J. Relationship of Monitoring to Item C:
1. Temporal "Recreational Opportunity Spectrum":	1(a). Primary Season (high use period--6/1-8/15): This use period will be managed for higher density use. Density will be managed below those thresholds at which private and commercial boatmen begin making significant adjustments for crowding which limit the number of sites visited to 10 to 14 attraction sites. -During this period of year, demand on the commercial sector is historically greatest (June is peak use month of the year). The commercial customer in most cases brings the least defined set of preferences - high density use will likely have the least impact on this group. The private boater that uses this period assumes higher density related impacts, given they bring expectations for greater solitude.	1(a). High Density Use Period: i. Launch limits: 166 people/day; 1000 people/week. ii. # river contacts/day: 80% probability that a party will make contact with up to 7 parties per day, with up to one and a half hour insight of up to 125 people. iii. # attraction site contacts/day: 80% probability of contacts with other groups at 70% of the sites; but the probability of meeting other groups at the Little Colorado River, Elves Chasm, Deer Ck. and Havasu Ck. increases to nearly 100%, with as many as 150 people. iv. # campsite contacts: 10% probability of camping within sight or sound of another group.	1(a). i. Voluntary Compliance with "no layovers" stipulations and suggested attraction site stop durations. ii. Establish weekly trip launch limits. iii. Equalize distribution of trip launches throughout the week. iv. Launch Schedules - computerized, with no two groups of the same trip length/itinerary leaving on the same day. v. Above with first day and mid-point designated checkpoints or campsites. vi. Above, with designated campsites for the entire river corridor. vii. Reduction of number of trips per week allowed.	1(a). i. Least restrictive/most freedom to public/concessionaire. Greatest likely-hood of non-attainment of objective levels. ii. Leveling of use through period. iii. On-river freedoms preserved while some concessions loose preferred launch dates. iv. On-river freedoms; greater manipulation of concession launch schedules. v. Only two assigned camps but resultant rate of travel. vi. Highly restrictive/regulated rates of travel. No visitor choice in camp selection. Likelihood of limiting social contacts. vii. Limitation on the number of visitors or trips granted access, to assure attainment.	1(a). 1. Sociological Research Program. Results desired by December 1990. 2. Contacts/crowding monitoring program: -on-river (within and between parties); -destination sites; and, -campsites. Results desired prior to annual revision of annual operating requirements.	1(a). 1. Monitor changes in experience preferences; perceptions of use levels. Monitor success at matching visitor with appropriate use period. 2. Indicate whether contact levels on the river (within and between parties), at destination sites, and at campsites are within objective ranges for all use periods. Attraction sites include: S. Can., Redwall Cav., Saddle Can., Nankoweap Ck., Little Col. River, Phantom Ranch, Lower Bass Camp/Shinumo Ck., Elves Chasm, Upper Elves Chasm, Tapeats Ck/Thunder Riv., Deer Ck., Olo Can., Matkat. Can., Havasu Can., Silver Grotto., Blacktail Can., Fern Glen Can., National Can., and Nautiloid Can.	1(a). 1. Range/ distribution of compatible experience preferences and perceptions for users of all use periods. 2. Value (with confidence) for contact levels on river (within and between parties), at destination sites, and at camp, including a mean value for # of destination sites used for that use period.	1(a). 1. Subjective evaluation as to whether conflicts (resulting from contact) commonly exists between groups and population subsets for a given use period. 2. Sample means within +/- 10% of the mean, 80% confidence level.	1(a). 1. Planning action support. 2. Value outside of satisfactory limits will initiate use of the next regulatory level for tha use period.

A. Topic	B. Management Objective:	C. Level of Change/Influence at which action is taken:	D. Means of Assuring Attainment of Mgt. Objective:	E. Consequences of Such Action:	F. Monitoring Program:	G. Objectives of Monitoring Program:	H. Desired Form of Results:	I. Evaluation of Results:	J. Relationship of Monitoring to Item C:
1. Temporal "Recreational Opportunity Spectrum" (continued):	1(b). Primary Season (shoulder seasons--5/1-6/1 and 8/15-9/30): These use periods will be managed for medium density use; levels at which neither private or commercial boaters make significant adjustments for crowding (probability of one schedule change every other day). Optimum opportunity for up to 14 site visits over the trip. -During this period, demand for the commercial sector on the whole is less, affording the opportunity for private boaters and commercial passengers who wish to avoid highest use levels.	1(b). Medium density use. i. launch limits: 166 people/day, up to 700 people in a week. ii. # river contacts/day: 80% probability of up to 4 on-river contacts/day, with a daily mean of approx. 40 minutes within site of less than 65 people. iii. # destination site contacts: 80% prob. that at less than 50% of the sites visited other groups will be encountered; but prob. at L.C., Elves Chasm, Deer Ck. increases to 65%, with as many as 70 people; at Havasu Ck.- 90% prob, with 50-100 people. iv. campsite contacts: 10% probability of camping within sight or sound of other groups.	1(b). i. Voluntary Compliance with "no layovers" stipulations and suggested attraction site stop durations. ii. Establish weekly trip launch limits. iii. Equalize distribution of trip launches throughout the week. iv. Launch Schedules - computerized, with no two groups of the same trip length/itinerary leaving on the same day. v. Above with first day and mid-point designated checkpoints or campsites. vi. Above, with designated campsites for the entire river corridor. vii. Reduction of number of trips per week allowed.	1(b). i. Least restrictive/most freedom to public/concessionaire. Greatest likely-hood of non-attainment of objective levels. ii. Leveling of use through period. iii. On-river freedoms preserved while some concessions loose preferred launch dates. iv. On-river freedoms; greater manipulation of concession launch schedules. v. Only two assigned camps but resultant rate of travel effects. vi. Highly restrictive/regulated rates of travel. No visitor choice in camp selection. Likelihood of limiting social contacts. vii. Limitation on the number of visitors or trips granted access, to assure attainment.	1(b). 1. Sociological Research Program. Results desired prior December 1990. 2. Contacts/crowding monitoring program: -on-river (within and between parties); -destination sites; and, -campsites. Results desired prior to annual revision of annual operating plans for commercial and private users (October 1 of each year).	1(b). 1. Monitor changes in experience preferences; perceptions of use levels. Monitor success at matching visitor with appropriate use period. 2. Indicate whether contact levels on the river (within and between parties), at destination sites, and at campsites are within objective ranges for all use periods.	1(b). 1. Range/ distribution of compatible experience preferences and perceptions for users of all use periods. 2. Value (with confidence) for contact levels on river (within and between parties), at destination sites, and at camp, including a mean value for # of destination sites used for that use period.	1(b). 1. Subjective evaluation as to whether conflicts (resulting from contact) commonly exists between groups and population subsets for a given use period. 2. Sample means within +/- 10% of the mean, 80% confidence level.	1(b). 1. Planning action support. 2. Value outside of satisfactory limits will initiate use of the next regulatory level for tha use period.

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1. Temporal "Recreational Opportunity Spectrum" (continued):	1(c). Secondary Season (Low Use Period -- 10/1-4/30): Optimum opportunity for experience with low density use. Low prob. of either private or commercial boatmen making adjustments for crowding; opportunity of 16 or more site visits over the duration of the trip. -Secondary season visitors will likely have the most defined expectations with respect to crowding and general solitude. 10/1-12/15 is the quietest period with least prob. of conflicts due to the lack of motors and minimal on-river contacts with other groups.	1(c). Low Density Use i. launch limits: 12 trips per week; 2 trips/ day; 332 people/week. ii. # river contacts/day: 80% probability of less than 2 contacts/day. Less than 20 minutes in site of less than 40 people/day. iii. # destination site contacts/day: 80% prob of contacts at 20% or less of the destination sites. Probability of meeting other groups at L.C., Deer Ck., Elves Chasm and Havasu Ck. remains high (60%) but as lesser densities (less than 40 people). iv. Campsite contacts: Less than a 10% probability of camping within sight or sound of other groups.	1(c). i. Voluntary Compliance with "no layovers" stipulations and suggested attraction site stop durations. ii. Establish weekly trip launch limits. iii. Equalize distribution of trip launches throughout the week. iv. Launch Schedules - computerized, with no two groups of the same trip length/itinerary leaving on the same day. v. Above with first day and mid-point designated checkpoints or campsites. vi. Above, with designated campsites for the entire river corridor. vii. Reduction of number of trips per week allowed.	1(c). i. Least restrictive/most freedom to public/concessionaire. Greatest likely-hood of non-attainment of objective levels. ii. Leveling of use through period. iii. On-river freedoms preserved while some concessions loose preferred launch dates. iv. On-river freedoms; greater manipulation of concession launch schedules. v. Only two assigned camps but resultant rate of travel effects. vi. Highly restrictive/ regulated rates of travel. No visitor choice in camp selection. Likelihood of limiting social contacts. vii. Limitation on the number of visitors or trips granted access, to assure attainment.	1(c). 1. Sociological Research Program. Results desired by December 1990. 2. Contacts/ crowding monitoring program: -on-river (within and between parties); -destination sites; and, -campsites. Results desired prior to annual revision of annual operating plans for commercial and private users (October 1 of each year).	1(c). 1. Monitor changes in experience preferences; perceptions of use levels. Monitor success at matching visitor with appropriate use period. 2. Indicate whether contact levels on the river (within and between parties), at destination sites, and at campsites are within objective ranges for all use periods.	1(c). 1. Range/ distribution of compatible experience preferences and perceptions for users of all use periods. 2. Value (with confidence) for contact levels on river (within and between parties), at destination sites, and at camp, including a mean value for # of destination sites used for that use period.	1(c). 1. Subjective evaluation as to whether conflicts (resulting from contact) commonly exists between groups and population subsets for a given use period. 2. Sample means within +/- 10% of the mean, 80% confidence level.	1(c). 1. Planning action support. 2. Value outside of satisfactory limits will initiate use of the next regulatory level for tha use period.

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2. Influence of Recreational Use on the Natural Environment:	2. Identify and localize recreational impacts within plant communities. ZONE DESCRIPTIONS: 3(a). New High Water Zone: This Plant community's development is characterized by rapidly proliferating species, such as Tamarix, Salix, Pluchea, Alhagi, Bromus, and Baccharis, as well as slow colonizing species such as acacia and mesquite. Tamarisk will invade the wetted perimeter, but under managed conditions may be replaced by native species, such as Salix (Stevens, 1988). Extent of Acacia and Prosopis in the NHWZ will depend on seedling establishment and survival (influenced by Glen Canyon Dam).	2. There should be no longterm modification of plant community development as a result of recreational use on areas outside campsites and trails. Acceptable: impacts that will recover in one growing season. 3(a). Acceptable Impacts: Localized exclusion of vegetation on camping beaches allowed, due to the dynamic nature of the plant community and the recruitment/ survival strategy of plant species. Wood collection in this zone only. Unacceptable Impacts: - Visitor use related encroachment of camping area into vegetated area by more than 5% surface area above baseline. -Human waste deposition. -Fire related impacts to beach sands. -Food waste accumulation. -Rock scars.	2(a). (i). Continue Regulations: -Human waste carry out requirements. -Fire pan requirements and fire restrictions. -Sanitation and food preparation requirements. (ii). Education: Encourage use of core area of camping beaches. (iii). Rehabilitation /re-vegetation of impacted sites, increasing cover of appropriate plant species. (iv). Cyclic beach closure, to allow vegetation recovery and regrowth for scour resistance.	2.(a). (i). Regulated visitor activities, but resource integrity retained. (ii). Possibility of localized use, allowing perimeter growth/ improvement. (iii). Some altering of natural scene to protect plantings; plan for prescribed actions required. (iv). Some vegetative recovery for stabilizing beaches, but increased impacts possible at other camping beaches.	2(a). (i). Campsite area inventory and monitoring program; annual or cyclic assessment.	2(a). Baseline map for each site, including: location; slope and aspect; parent rock type; sand color in beach areas; amount and type of vegetational cover (recruitment and demography); flora and fauna of special importance (listed, endemic or exotic species); type of site (campsite, attraction site or other); and extent of impacts (trampling, trailing, rock movement and destruction, and litter and waste accumulation).	2(a). Measured change in site parameters, using repeated measures and statistical analysis.	2(a). Rated into condition class (high, medium, low) based on relative impacts within the population of campsites. This management objective will be revised upon completion of baseline surveys to adopt an acceptable limits on numbers within highly impacted condition classes, by length of the river.	2(a). Regulatory, educational or rehabilitation/ revegetation actions taken as indicated annually; cyclic closures only after evaluation of local camping opportunities and assessmen of expected impacts.

2. Influence of Recreational Use on the Natural Environment (continued):	2(b). Old High Water Zone (OHWZ): The acacia and mesquite which comprise much of this vegetation zone have declined in growth (Anderson, 1986) and cover (Pucherelli, 1987), although the community is rather stable. Numbers in mature age classes exceed those of seedlings and saplings; although recruitment into older age classes probable for mesquite in deep fine grained substrates such as sand and silty alluvium, and for acacia in talus and silty alluvium. 3(c). Desert Zone: Glen Canyon Dam has had little or no influence on this zone. This ecological community is not resilient and human activities, especially trailing and fire, pose the greatest threats.	2(b). Acceptable Vegetative Loss: Should occur only as a result of trail management and/ or visitor use along one trail. Unacceptable: site disturbance should not exceed 225 sq. ft. at any site; camping, fires and human waste deposition are not allowed. No loss of trees due to human activity. Any destruction of dead, standing vegetation. Recruitment of Acacia and Mesquite: No less than a 5% decline in mature age classes between high activity areas and control sites. 3(c). Acceptable: Trailing will be allowed only in the form of one trail to an attraction site; impacts that will recover in one growth season. Unacceptable: Disturbance should not exceed 225 sq. ft. at any site. No long-term modification of natural plant succession; no campsites, fires, wood collecting or deposition of human wastes.	2(b). (i). Education - increased efforts to assure that the public concentrates its activities in lower zones. (ii). Rehabilitation and reduction to one trail to localize impacts. (iii). Trail definition to the extent that it will be used by the public, allowing some local erosional impacts but causing little or no change to vegetative patterns outside the trail tread. (iv). Closure and revegetation, to encourage local native species; however, xeric conditions hinder such efforts. 3(c). Same as above.	2(b). (i). Least impact on the public with possibility of attainment or continued impacts on the possibly senescent OHWZ. (ii). Impacts accepted but localized and limited. (iii). Same as above but level of trail development may have negative impacts on the primitive character of the area; human impacts localized. (iv). Loss of freedom to the public and alteration of visitation patterns; local conditions may improve but impacts may shift in unknown ways. 3(c). Same as above, except (iv).	2(b). (i). Photodocumentation and monitoring of trailing and site disturbance. (ii). Acacia and mesquite recruitment and age-class monitoring program (using methods and study areas established by Anderson and Ruffner, 1986) 3(c). Trailing and site disturbance photodocumentation and monitoring program, including xerophyte monitoring.	2(b). Document levels of impact; rehabilitation efforts and success of rehabilitation efforts. (ii). Determine whether human impacts have an influence above those levels exerted by flows induced by Glen Canyon Dam; determine whether a stable age class distribution exists to assure replacement of mesquite and acacia in the OHWZ. 3(c). Document impacts and evaluate the success of rehabilitation efforts. Establish a record of recurring social trailing and other impacts. Determine if xerophytic vegetation is stable.	2(b). Photos with descriptive narratives documenting impacts and rehab efforts and success. (ii). For control sites and human use areas, numbers of acacia and mesquite by age class; change in density of mature age classes/ 1000 sq. m on preestablished quadrats. Analysis through repeated measures and statistical design. 3(c). Black and white photos at established photopoints with statistical descriptions of impacts and exotic vegetation. Evaluate survivorship of rehab plants.	2(b). +/- change at rehab sites; prescribed mitigation for new impacts. (ii). Hypothesis testing of management objectives: H o: Density of adult acacia and mesquite did not decrease significantly with human use, vs. H a: Density of adult acacia and mesquite decreased significantly with human use; chi-squared statistics for each site. 3(c). +/- change at rehabilitated sites; prescribed mitigation for new impacts.	2(b). Education, rehab and revegetation used annually as indicated by monitoring; increased trail definition used only in sensitive areas or in areas of repeated failure of above; closures used only as indicated by data and review of management objectives. 3(c). Same a. above.

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3. Influence of Glen Canyon Dam on Natural Environment, Flow Regime:	Consistent with the 1982 agreement between the NPS and BOR, the position of the NPS with regard to BOR plans of operation and environmental review documents relating to Glen Canyon Dam operations will be to propose an integrated approach to management of all river resources so that one release scenario (that may include such provisions as seasonally fluctuating flows) is adopted that benefits all resources to the greatest extent possible. No one flow regime meets the needs for managing or minimizing impact on resources; this indicates the need for and value of research, as called for by the Sec. of the Interior in his extension of GCES. (The National Park Service is limited in its ability to manage and protect these resources since the primary responsibility for Glen Canyon Dam lies with the Bureau of Reclamation.)	3. Key Values/NPS Goal: (a). Sediment deposits: Minimize the loss of sediment in the riverine system. (b). Riparian Vegetation: Minimize the disruption of riparian zone to afford fluvial sediments protection from scouring, and to manage conditions to allow replacement of riparian aliens w/ native species. Minimize disruption to the establishing New High Water Zone, so that succession can take place allowing components of the tributaries and the Old High Water Zone to colonize this presently unstable community. (c). Invertebrate populations: Allow conditions that sustain stable populations of invertebrates, which may support preybase of peregrine falcon, etc (d). Humpback Chub: Seasonally fluctuating flow, as verified by research, that meet the needs of the various life history stages of the Humpback Chub Determine any conflicts in backwater areas between aquatic and terrestrial life as a result of flows. (e). Visitor Safety: Flows that contribute to river rafting safety and a quality recreational experience.	3. Because the NPS does not manage operations of Glen Canyon Dam, it is unable to manage limits of acceptable change. The NPS is required to cooperate in and support research programs directed at development of an integrated approach to management of all Colorado River resources.	3. Consequences of continued Glen Canyon Dam operations without water release schedules adopted in an integrated approach to management of all river resources. (a). Loss of sediment in the system through erosion, mass wasting (Graf and Schmidt, 1987). (b). Significant disturbance to riparian ecosystem through periodic flooding (as much as 50% reduction of plants in NHWZ, Stevens and Waring, 1985). (c). Potentially reduced populations of invertebrates, which are an important part of food chain for aquatic and terrestrial organisms. (d). Potential lack of habitat needed to support various life stages of the humpback chub. (e). Potential of increased accidents under some release levels. (f). And other effects, known and unknown.	3. NPS will support GCES studies to research and monitor the effects of Glen Canyon Dam operations, specifically GCES, Part II, and its study of socioeconomics and fisheries, including humpback chub. Other methods of notable worth: (a). Sediment and beach profiles monitoring, methods as in: Dolan, 1974; Ferrari, 1987; Schmidt and Graf, 1987. (b). Soil and vegetation monitoring methods, as in Stevens and Waring (1986), and Anderson and Ruffner (1986). (c). Invertebrate population stability, as in Stevens and Waring. (d). Fisheries, including Humpback Chub, as in Arizona Fish and Game, 1987	3. Define the effects of Glen Canyon Dam and develop and refine a release schedule that meets the management objective. (a). Define change in beach profiles; (b) Define levels of leaching and loss of base cations, nutrients and fine particle substrates; (c) Assess plant survival; (d) Assess vegetative community structure and diversity; (e) Assess stability of native invertebrate populations. (f). Assess humpback chub life stage requirements. (g). Assess relation of flows to accident rates.	3. Results that satisfy concerns expressed in the review by the National Academy of Science.	3. Evaluation that supports management action and decision making, relative to the management objective.	3. Refined rang of flows, contributive to management of - Colorado River values, and attaining the management objective.

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4. Management of Water Quality:	4. Maintain compliance with State of Arizona water quality criteria for designated protected uses on the Colorado River and its side streams (as per State of Arizona Official Compilation of Administrative Rules and Regulations Sec. R9-21-208), as far as the influence of man on water quality is concerned. The public will be informed of situations where natural, ambient levels pose human health risks.	4(a). The Following areas will be managed to be within "Full Body Contact Areas (FBCA's) Standards": Colorado River, Vasey's Paradise, Bright Angel Creek, Hermit Creek, Royal Arch Creek and Havasu Creek. The following will be managed to be within "Partial Body Contact Areas (PBCA's) standards": Paria River, Nankoweap, Grapevine Ck., Phantom Ck., Garden Ck., Monument Ck., Boucher Ck., Shimumo Ck., Tapeats Ck., Deer Ck., Kanab Ck. and Diamond Ck. The following will be managed to be within Designated "Cold Water Fisheries (CWF's) standards": Colorado River, Phantom Ck., Bright Angel Ck., Tapeats Ck., Deer Ck., Diamond Creek. ..."Warm Water Fisheries (WWF's)" standards: Colorado River and Kanab Creek. The following will be managed to be within Designated "Domestic Water Sources (DWS's)" standards: Colorado River and all others except Phantom, Horn, Kanab, Havasu and Diamond.	4. (a). If limits exceeded by natural sources of contamination or ambient levels, educational efforts are prescribed to inform the public of the hazards, health risks and preventative measures, if any. (b). If limits exceeded by human causation, such as levels of fecal coliform: (i). Education: To effect changes in practices. (ii). Closures: To prevent human access into non-compliance areas, and to allow time for levels to return to within state standards. (iii). Change in Use Regulations: To prohibit certain practices and make others mandatory.	4. (a). The public will continue to be exposed to natural human health risks but will be informed so that they can alter activities. (i). Change in human practices required. (ii). Loss of opportunity for the public, but the need exists because of human health risks and impacts on natural environment. (iii). Control of human activities.	4. (a). Chemical properties monitoring program, completed annually. (b). Microbiological Monitoring Program, completed on a 5-year cycle. (c). Radionuclides Monitoring Program, completed in cooperation with the U.S.G.S.	4. (a). Monitor pH levels, dissolved oxygen and turbidity on an annual basis; Monitor river seasonally at 3 sites (Lees Ferry, Phantom Ranch and Diamond Cr.) during baseline period, thereafter seasonally at one site (Diamond Cr.). Toxic elements regulated by the State of Arizona will be monitored on a 5-year cycle. (b). Monitor levels of total and fecal coliforms, fecal streptococcus, Giardia and other aquatic disease organisms, including Shigella, for major and minor tributaries under flood and base flow conditions (sites and methods of Tunnicliff and Brickler, 1981); thereafter monitor main tributaries annually, and minor tribs tri-annually. (c). Monitor levels of combined radium 226 and 228, gross alpha particle activity, tritium, and Strontium 90.	4. (a). Range of values or level of concentration for each constituent, as appropriate. (b). Range of values or level of concentration for each constituent, as appropriate. Densities in colony forming units/ 100 ml. (c). Levels in $(pCi/ml)^3$.	4. (a). Compared to past results for percent change; Evaluated against State of Arizona criteria. (b). Compared to baseline results of Tunnicliff and Brickler; evaluated against State of Arizona criteria. Multivariate repeated measures; statistical approach with univariate analysis. (c). Compared to baseline results of Tunnicliff and Brickler; and, evaluated against State of Arizona criteria for recreation contact waters.	4. In the event of non-compliance levels of toxic elements, fecal coliforms resulting from natural contaminates, and radionuclides, the public will be informed in a educational process. In the event of non-compliance levels of fecal coliforms resulting from human contamination, area may be closed to comply with State of Arizona criteria and allow site recovery; site specific education measures may be implemented.

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5. Influence of Man on Cultural Resources:	5. Maintain compliance with National Historic Preservation Act, to mitigate impacts and consider effects of NPS undertakings, including management actions.	5. Any actual or anticipated impacts to cultural resources will initiate management action, as mandated.	5. Step up Plan a. Monitoring and prescribed restabilization, rerouting of use, etc. b. Collection, excavation or stabilization to prevent loss of resources. c. Closure of site following impacts due to public access; or, closure to prevent exacerbation of erosional processes.	5. a. Visitor freedom but continued susceptibility / degradation of the resource. b. Manipulation of resource by NPS; protection but lost value of site context. Visitor freedom at site while also obtaining some site data. c. Lost visitor freedom to site assure protection and preservation.	5. Photodocumentation of resource status, conducted annually or cyclically, as indicated by site trends. Site mapping and remapping, as needed.	5. Indicate evidence of change/loss of cultural resources.	5. Photos with description narratives on current condition/ change/impacts. Site maps.	5. Site specific prescribed action. Non-parametric statistical analysis of data.	5. Detected impacts initiate management action. Subsequent evaluation indicates which level management intervention.

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6. Trailing Development:	6. Localize the impacts of social trailing to minimize the influence of man on the natural scene, especially in the Old High Water and Desert Zones.	6. No more than one primary trail from a mooring location to a destination site, through the Old High Water and Desert Zone.	6. a. Confine human use to one defined, evident, primary trail; eliminate other social trails. b. Education effort and programs discussing human impacts and the man-hours required for rehab. c. Close the area and allow rehabilitation	6. a. Defined visitor traffic in an area; localized and limited impacts. b. Understanding that will contribute to compliance, lesser amounts of trailing, and resource improvement. c. Loss of access to the public for many years.	6. Photodocumentation of impacts and before and after photos of sites where mitigation/ rehab work was conducted.	6. Provide documentation of impacts. Provide basis for evaluating the success of rehabilitation efforts. Establish record for recurring social trailing.	6. Black and White photos at established photopoints with descriptive narratives of impacts.	6. +/- change at rehabed sites; prescribed mitigation for new impacts. Non-parametric statistical analysis of impacts.	6. Initiates action prescribed in C(a). Documentation required for C(b).

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7. Fisheries:	7(a). Humpback Chub: For conservation of the Humpback Chub, the NPS will cooperate in an interagency effort (with USFWS as lead agency) to protect the Chub and plan for its management, recognizing that the chub can be effected by far reaching activities within the watershed. Much is unknown about the requirements of the Chub, and impacts of other recreational activities are unknown. (b). Sport Fisheries: The status of trout as a resource will be defined to allow the NPS and AZ Fish and Game to cooperate in whatever management is deemed appropriate; including evaluation of concession guided fishing trips and their impacts.	7. (a)(i). Activities will be restricted in known Humpback Chub habitat. (ii). All humpback Chub caught by sport fishermen must be released; educational efforts for the release program will be continued. (iii). To assist management agencies, the educational effort will be expanded to encourage the public to call in tag numbers and colors and location for each tagged Humpback Chub caught. (iv). As a management agency, the NPS will support further studies of humpback chub. (b). A definition, within constraints of NPS policy and guidelines, as to the status of trout as a resource will be developed; potential impacts of commercial fishing trips will be evaluated.	7. (i). Fishing and activity restrictions at the confluence of the Little Colorado (ii). Regulatory means and patrol action. (iii). Educational materials and bulletin boards revised to request public to call in information on tagged chub. (iv). As a result, NPS will implement recommendations resulting from studies. (b). Initiate counsultation with Arizona Game and Fish to identify appropriate levels of sport fishery use.	7. (a)(i). Current restrictions at confluence of Little Colorado seem to be working. Occasional chub catches at other locations may not indicate a need for new closures, but they support the need for continued educational efforts for releases of the chub. (iii). Request for information on caught tagged chub will provide information that may benefit in the future management of the species. (iv). Benefit to humpback chub through improved management. (b). This may result in limits on fishermen, following counsultation and research.	7. (a). Patrol function, conducted on a frequent basis. (b). Review of educational materials; likely when new data available or new program initiated. (c). Coordination with Glen Canyon Environmental Studies.	7. (a). Detect violations of species protection closures. (b). Improved educational effort. (c). Ensure survival of Humpback Chub.	7. (a). Violations of area closures and species release laws. (b). N/A	7. (a). Data on incident occurrence for use by management agencies. (b). N/A	7. Closures and educational efforts evaluated and refined.

A. Topic	B. Management Objective:	C. Level of Change/Influence at which action is taken:	D. Means of Assuring Attainment of Mgt. Objective:	E. Consequences of Such Action:	F. Monitoring Program:	G. Objectives of Monitoring Program:	H. Desired Form of Results:	I. Evaluation of Results:	J. Relationship of Monitoring to Item C:
8. Aircraft Use:	8. Offer, to the extent possible, a primitive river experience without intrusion from the aircraft. Limit, to the extent possible, activities and amounts of aircraft use that would preclude the experiences afforded and managed for under the Recreation Opportunity Spectrum. Note: Public Law 100-91, Sec. 3 (c)., allows for helicopter flights for river runners "...between a point on the north rim outside of the Grand Canyon National Park and locations on the Hualapai Indian Reservation (as designated by the Tribe)" and for the "...sole purpose of transporting individuals to or from boat trips on the Colorado River and any guide of such a trip."	8. (a) NPS Operations: Aircraft use below rim level limited to administrative and emergency uses only; Probability of contact highest at Phantom Ranch Ranger Station, where ranger contact available for seeking help. (b). Concession Takeouts: Concession takeouts outside the route described in Public Law 100-91 are unacceptable. Landings may not be made in Grand Canyon National Park, and any landings made on the Hualapai Reservation cannot be made without the permission of the Hualapai Tribe. Probability of contact highest at Whitmore Wash. (c) Concession Use of Shuttles: Shuttles of commercial river company passengers and employees must observe flight ceilings and avoid flight-free zones, as per P.L. 100-91.	8. (a). Emergency Use, helicopter use may be necessary in life or death situations. (b). Administrative Use, alternatives to helicopter use may exist. (b)(i). Mitigate impacts by assuring regulations promulgated under Public Law 100-91 are adhered to. (ii). Mitigate impacts by routinely maintaining (to Threshold Zone "Stock" Standards) the Whitmore Wash Trail to assure that options to helicopter takeouts exist (specifically, stock and hike takeouts for passenger exchanges). (c). Mitigate impacts by assuring regulations promulgated under P.L. 100-91 are adhered to by concessionaires.	8. (a). N/A (b). Some impacts possible, but only to carry out the administrative and emergency missions of the NPS. (b)(i). Liabilities, as per FAA. (ii). Unknown potential for reduction in helicopters due to opportunity for concessions and private trips to hike out or use stock at Whitmore Wash as opposed to incurring the expense of helicopter takeout. (c). Liabilities, as per FAA.	8. (a). N/A (b). Review process for programmed flights. (b)(i). Patrols and visitor sightings. (ii). Cyclic trail survey and maintenance to Threshold Zone standards. (c). Patrols and visitor sightings.	8. (a). N/A (b). To limit the use of NPS administrative flights and find alternate means of achieving the same purpose. (b)(i). Detect violations of P.L 100-91. (ii). Determine trail conditions and work needs. (c). Detect violations of P.L. 100-91.	8. (a). N/A (b). Flight purpose. (b)(i). FAA issued "N" numbers, location of incident, date and time. (ii). Trail conditions, erosion and washouts, etc. (c). FAA issued "N" numbers	8. (a). N/A (b). Committee approval of programmed flights. (b)(i). Report to FAA. (ii). Programmed trail work; generated work orders. (c). Report to FAA.	8. (a). N/A (b). Alternatives to helicopter flight may be chosen. (b)(i). FAA initiates action. (ii). Work i conducted to assure that takeout options exist (c). FAA initiates contact of punitive action.

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COLORADO RIVER MANAGEMENT PLAN
APPENDIX C
DRAFT COMMERCIAL OPERATING REQUIREMENTS

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I. WATERCRAFT AND CAPACITIES

A. Those types of watercraft listed below are acceptable. While most current designs have offered a reasonable degree of safety, additional improvements that afford increased safety and comfort of passengers and crew will be strongly recommended. Changes must be approved by the Superintendent.

B. Capacities - Specific capacities have been set for each company and the specific boats it operates. All capacities are for total numbers of persons on any watercraft, crew included. The capacities are outlined below:

Company	Boat	Capacity
Adventure West, Inc.	S-Rig - 33 ft or 37 ft	17
	G-Rig	20
Arizona Raft Adventures	Maravia Santana - 17 ft	6
	Snout - 22 ft	8
	Havasu - 17 ft	6
	Avon Spirit - 18 ft	6
	C-Craft - 32 ft	18
	Paddle boat (Santana)	7
	Paddle boat (Domar)	7
Arizona River Runners	S-Rig - 33 ft or 37 ft	17
Canyoneers	C-Craft - 37 ft	23
	C-Craft - 32 ft to 34 ft	20
	Maravia Santana - 22 ft	8
Canyon Explorations	Havasu - 17 ft	6
	Riken Aztek - 18 ft	6
	Paddle Boat (Riken)	7
Colorado River & Trail Expeditions	S-Rig - 33 ft	17
	Havasu - 17 ft	6
	Leyland - 17 ft	6
	Green River - 17 ft	6
Diamond River Adventures	S-Rig - 33 ft or 37 ft	17
	Havasu - 17 ft	6
	Snout - 22 ft	8
Expeditions, Inc.	Tandem Oar Snout - 22 ft	9
	Rogue River - 18 ft	6
	Maravia Chubasco - 22 ft	8
	Rogue River - 20 ft	8
	Paddle Boat (Rogue River)	7
Georgie's Royal River Rats	G-Rig	28
	Green River Triple Rig	16
	10 man raft	5
	10 man triple-rigged raft	15
	S-Rig - 35 ft	17

Company	Boat	Capacity
Grand Canyon Dories	Dory	6
	Maravia Chubasco - 22 ft	8
	Avon Spirit - 18 ft	6
Grand Canyon Expeditions	S-Rig - 37 ft	17
Hatch River Expeditions	S-Rig - 33 ft	17
Mark Sleight Expeditions	S-Rig - 33 ft or 37 ft	17
	Leyland - 18 ft	6
	Havasu - 17 ft	6
Moki Mac River Expeditions	S-Rig - 33 ft	17
	Snout - 22 ft	8
	Rubber Crafters - 18 ft	6
OARS	Domar Zambezi - 17 ft	6
	Caligari - 17 ft	6
Outdoors Unlimited	Maravia Chubasco - 22 ft	8
	Avon Spirit - 18 ft	6
Tour West	S-Rig - 33 ft	17
	S-Rig - 37 ft	18
	Domar Zambezi - 17 ft	6
Western River Expeditions	J-Rig - 37 ft	20
	J-Rig - 27 ft	10
	Rogue River - 18 ft	6
White Water River Expeditions	Modified S-Rig - 37 ft	20
Wilderness River Adventures	S-Rig - 33 ft or 37 ft	17
	Havasu - 17 ft	6
	Snout - 22 ft	8

C. Registration - All watercraft operating on the Colorado River within Grand Canyon National Park will be registered in accordance with the Arizona Boating and Water Sports Law (AGF, Article 5, R12-4-501 through R12-4-505).

II. EMERGENCY EQUIPMENT AND PROCEDURES

A. Life Preservers

1. One U.S. Coast Guard approved personal flotation device (PFD) Type I or V for each passenger. Each passenger's PFD will have an identifying mark and will be fitted for that particular passenger and worn only by that passenger for the entire trip. One extra PFD for every 10 passengers or one extra PFD per passenger-carrying oar-powered boat to be carried on the boat (excluding kayaks, canoes, and sportyaks) whichever

number is greater. Life jackets must be worn at all times while on the river and kept properly fastened and adjusted to fit. Boatmen and crew may use U.S. Coast Guard approved Type I, III, or V PFD's. Each PFD will be inspected at Lees Ferry for serviceability in compliance with U.S. Coast Guard standards. Unserviceable jackets will not be used. Passengers on kayak support trips may wear Type III PFD's while kayaking.

2. Each boat 16 ft. or greater in length must carry and have available a U.S. Coast Guard approved Type IV throwable PFD.
3. Rafts and boats operating on Lake Mead at night must comply with U.S. Coast Guard running light requirements.
4. A rescue rope throw bag is recommended.

B. First Aid

A major first aid kit, as suggested in the attached First Aid Supplement, shall be carried on each trip, with a smaller kit on each additional boat.

C. Communications and Signaling

1. Emergency signaling equipment will include a signal mirror of the U.S. Air Force type, and a set of orange signal panels, 3 ft. by 10 ft.
2. Additional recommended equipment is a ground-to-air radio transceiver on frequency 122.75 east of Supai, frequency 122.85 east of Whitmore Wash, frequency 124.85 for contacting commercial airliners, and frequency 121.5 EMERGENCY.

D. Other Emergency Items

1. One extra set of oars must be carried on each oar-powered boat or raft. Two extra paddles are acceptable for inflatable paddle craft. Kayaks and white water canoes must have a spare paddle which can be carried on the support boat or on individual boats.
2. One extra motor must be carried for each motorized raft used. Also to be carried are spare parts of the types most commonly found to break and need replacement under river-running conditions, i.e., propellers, water pumps, shafts, etc.
3. When inflatable rafts or pontoons are used, each river trip will carry an air pump.
4. Every river trip will carry a boat patching and repair kit.
5. All motorized craft are required to carry two B-I or one B-II fire extinguishers.
6. A supply of ropes and canteens should be carried.
7. Each trip will carry one or more accurate maps or guides of the Colorado River in Grand Canyon National Park.

E. Incident Reports

Any incidents resulting in evacuation from the canyon, personal injury requiring a physician's attention, or property damage over $100 must be reported to Grand Canyon National Park. Incident forms

should be given to a National Park Service Ranger at the time of evacuation, to the Ranger at Phantom Ranch or Lake Mead, or mailed to the River Subdistrict Office within 7 days of the end of the trip. Incident forms will be supplied by Grand Canyon National Park and carried on each trip (see Supplement H).

F. Helicopter Evacuation (See Supplement E for evacuation procedures)

In the event of an emergency requiring helicopter evacuation and rescue, arrangements will be made for the rescue only by Grand Canyon National Park Service personnel. The outfitter will be responsible for the cost of the rescue, but may in turn bill the rescued passenger(s) for such rescue costs.

Requests by someone not on the river trip (relative or friend, etc., for family death or other emergency) for helicopter evacuation of a trip passenger will be made through Grand Canyon National Park. The outfitter and/or the person requesting the evacuation is responsible for costs of such evacuations, as indicated above.

III. TRIP LEADER AND GUIDE REQUIREMENTS

A. Certification

The following qualification requirements must be met before guiding or leading a trip on the Colorado River through Grand Canyon National Park.

1. Guide - An individual who meets the following qualifications:

   a. Must be age 18 or older.
   b. Must have made at least six trips through Grand Canyon National Park on the Colorado River as a boat operator or as an apprentice under a qualified guide, at least three of which must be in the type of craft to be operated with passengers on board. With the approval of the Superintendent, comparable experience on other rivers may be substituted for not more than three of the six trips. Any exceptions must be approved by the Superintendent on a case-by-case basis. The Superintendent in his sole discretion will determine what constitutes comparable experience.
   c. Must be able to "read" the river and operate a boat accordingly.
   d. Must be able to operate the emergency communications equipment carried by the outfitter and know the evacuation procedures.
   e. Must have knowledge of State, U.S. Coast Guard, and National Park Service regulations applicable to boats carrying passengers for hire.
   f. Must have a knowledge of Grand Canyon natural and human history and the points of interest encountered, and the ability and willingness to impart this knowledge to passengers.

g. Must have a working knowledge of the safety aspects and equipment repair procedures for each craft operated.
h. Must hold a valid first aid certificate equivalent to the "American Red Cross Advanced First Aid and Personal Safety" or current Emergency Medical Technician credential. Current certification in CPR is required.
i. Must hold a valid Commercial Operating Requirement Certification for guide status.
j. Must have a working knowledge of all environmental protection equipment and sanitation procedures for river trips in Grand Canyon National Park.

2. Trip Leader - A person whose character, personality, and capabilities qualify him as a responsible leader shall be in charge of each river trip. In addition to meeting the guide qualifications specified above, the trip leader:

a. Must have made at least 10 total trips through Grand Canyon National Park on the Colorado River as a guide.
b. Must be knowledgeable and capable of giving a suitable orientation talk to all passengers throughout the trip. This required orientation will cover life preservers, boating safety, swimming, hiking safety, drinking water, sanitation, and cultural and natural history of the Grand Canyon.
c. Must hold a valid Commercial Operating Requirements Certification for trip leader status.

B. Resumes

All guides must file updated resume forms (available from the River Subdistrict Office or Lees Ferry) with the River Subdistrict, P.O. Box 129, Grand Canyon, Arizona 86023. Photocopies of current advance first aid (or equivalent) and CPR credentials must also be submitted. Resumes will be accepted after sufficient river experience and required first aid training for guide status are completed. Resumes must be updated for trip leader status.

C. Commercial Operating Requirements Certification

All guides and trip leaders must demonstrate satisfactory knowledge of the Commercial Operating Requirements by passing the Commercial Operating Requirements Certification examination. Only individuals with valid resumes and current CPR and first aid credentials will be permitted to take the examination. Passing score for guide status is 75 percent. Passing score for trip leader status is 85 percent. Those failing to achieve the required score may be granted a 30-day probationary period during which they may retake the examination. Upon successful completion of the examination, a Guide or Trip Leader Commercial Operating Requirements Certification card will be issued. This card must be available upon request of the Lees Ferry Ranger during the pre-launch checkout. A copy of the Commercial Operating Requirements and a study guide for the examination are available at Lees Ferry and the River Subdistrict Office at the South Rim. The test can be administered at either location.

It is the responsibility of the concessioners to hire and operate with qualified guides and trip leaders. Any deficiencies will be documented in concessioner evaluations. Nothing shall prohibit a concessioner from establishing requirements more stringent than those established by the NPS.

IV. ENVIRONMENTAL PROTECTION AND SANITATION

A. Refuse

Cans, rubbish, and other refuse MAY NOT BE DISCARDED IN THE WATER OR ALONG THE SHORE OF THE RIVER, or side canyons, trails, escape routes, or any other portions of the canyon. All refuse material must be carried out. Deposits may not be made at Phantom Ranch, Diamond Creek, Pearce Ferry, or South Cove. Liquid garbage will be strained through a fine mesh screen into the river, and the solids then placed in garbage bags. The trip leader must ensure that all trip members properly dispose of refuse. Can smashing must be done in a way which leaves the beach free of liquids, food, and paper particles.

B. Soap

The use of soap is restricted to the Colorado River only. Use of soap in side streams or within 100 yards of any side stream is prohibited.

C. Portable Toilets

Each boat party must carry a toilet system capable of containing and removing solid human waste from the canyon. The carry-out system described in Supplement B is the minimum allowable. Upon arrival at camp, these facilities will be set up in an area affording reasonable privacy. For groups larger than 26, 2 toilets will be provided (the day-use toilet may be considered a second facility provided it is available at a convenient on-shore location such as near the hand wash containers). The toilet will remain set up until the party breaks camp. Toilet paper must be deposited with human waste. A day-use toilet, as described in Supplement B, MUST be available when the portable toilet is not set up. Urination should occur in the wet sand below the high water line.

D. Fires

Gas stoves (propane, white gas, etc.) with sufficient fuel for cooking are required on all trips. Manufactured charcoal briquettes may be used for cooking. Wood fires may be used for warmth or aesthetics, but not for cooking. From May 1 through September 30, all wood for fires must be carried into the canyon from an outside source. From October 1 through April 30, driftwood from beaches may be used for warming and aesthetic fires. Gathering of wood from standing or fallen trees, dead or alive, is prohibited. This includes introduced species such as tamarisk. All fires (wood or

charcoal) must be contained in a fire pan that is at least 432 square inches on the bottom and has a 3-inch-high lip around its edge. Charcoal briquettes may be contained in fire pans 12 inches by 12 inches by 3 inches which are approved during pre-launch checkout at Lees Ferry. All ash and charcoal residue must be carried out of the canyon. The kindling of open fires using gathered wood, charcoal, or similar fuels is prohibited at any time when away from beaches. Gas stoves are required for overnight trips away from the river when cooking is planned.

E. Public Health

Each trip will comply with the requirements found in the Commercial Sanitation and Food Preparation Supplement (Supplement A).

F. Multiple Trails

Multiple trailing and its consequent impact on vegetation and soils comprises a perennial problem at attraction sites and along backcountry trails. Guides should stress to their passengers the need to stay on established trails. All group hikes will be led by a guide familiar with the trail taken.

G. Campsite Impacts

Impacts above the sandy, postdam riparian zone at camping areas continue to be a problem. Desert and old pre-dam riparian plant communities are particularly susceptible to damage and erosion due to trampling. Guides should stress the necessity of conducting camp activities in the more resistant post-dam sandbar areas. Passengers should be instructed not to blaze new hiking routes or sleeping areas in the fragile, desert zones.

V. RESTRICTED AREAS

Areas along the Colorado River closed to either camping or visitation by order of the Superintendent (36 CFR 1.5 a), or requiring special environmental regulations include:

A. Colorado/Paria River confluence to Navajo Bridge - no camping.

B. Anasazi Bridge - closed to all visitation.

C. Red Wall Cavern - no camping and no fires.

D. Nankoweap - special camping regulations (see Supplement F).

E. Little Colorado River confluence - no camping from mile 60.5 to mile 65.0 on the southeast (left) side of the Colorado River.

F. Hopi Salt Mine - no visitation from mile 63.0 to mile 64.5 on the east (left) side of the Colorado River.

G. Mile 71.0 to Mile 71.3 - Furnace Flats archeological site, north side, no visitation.

H. Hance Mine - no visitation along the trail from mile 77.0 (north bank) to and including Hance Mine (closure due to asbestos hazard).

I. During the primary season, it is recommended that camps in the entire corridor from Hance Rapid to Phantom Ranch be utilized only by trips with passenger exchanges.

J. Phantom Ranch - mile 87.0 to mile 89.25

1. Left bank - 87 Mile Camp (Cremation) is reserved for river trips requiring exchanges at Phantom Ranch. The capacity of the camp is two parties. No camping is permitted from the black bridge to 1/4 mile downstream from Pipe Creek (Garden Creek).
2. Right bank - no camping from mile 87.0 to mile 89.23 except in an emergency. Emergency camping in this area, including Roy's Beach, must be approved in advance by the Phantom Ranger. Wood fires are not allowed at any time in this area. Passengers leaving trips at Phantom Ranch and wishing to camp at either Bright Angel Campground or Indian Gardens must have an overnight permit (which requires advance reservations) for these areas. Permits may be obtained from the Backcountry Reservations Office by writing to Grand Canyon National Park, P.O. Box 129, Grand Canyon, Arizona 86023 (see Section XIII).

K. Bass Mine, Hakatai Canyon - no visitation to the area immediately surrounding the mine, talus slope, and camp (closure due to asbestos hazard).

L. Elves Chasm - no camping within 1/4 mile of Royal Arch Creek's confluence with the Colorado River or within the chasm.

M. Deer Creek Falls - no camping on the north side of the Colorado River within 1/4 mile upstream or 1/2 mile downstream of its confluence with Deer Creek.

N. Matkatamiba - day use only, no camping in the canyon.

O. Havasu Creek - no camping within one hundred yards upstream and 1/2 mile downstream of Havasu Creek's confluence with the Colorado River. Overnight use is permissible only within the Havasupai Campground. No camping is allowed between Beaver Falls and the Colorado River. See Section XIV for reservations at Havasu Campground.

P. Hualapai Tribal Lands - no visitation without prior approval from the Tribe.

Q. Other areas as listed on the bulletin board at Lees Ferry.

VI. USER-DAY POOL

The policy for temporary loan of user days is as follows:

A. The user-day pool will be administered by the park. All requests must go through the River Permits Office, (602) 638-7843.

B. Companies may call or write after the 1st or the 15th of each month from May 1 through August 31 to request or donate user days. Requests do not carry over. Donated user days will be evenly distributed among those making requests on the first business day after the 1st and the 15th of the month.

C. Companies donating user days earlier in the season will have a priority claim for up to the amount donated should they need user days later in the season.

D. Allocations will not be permitted to be exceeded unless user days are obtained from the pool before the trip begins.

E. If a company has not used 40 percent of its user-day allocation with trips launching on or before June 30 and 60 percent of the allocation by July 31, use for the rest of the season must be substantiated by the 10th of the following month. Unsubstantiated user days will be donated automatically for distribution on the first business day after the 15th of July and August.

F. User days in excess of 200 not donated to the pool prior to August 31 will be removed from the company's base allocation for the following summer season.

G. The first 500 user days donated to the pool will be held by the park for coverage of accidental bookkeeping errors of up to 50 user days per company. This does not increase any outfitter's allocation by 50 user days; it is only a means of covering small accounting errors. On the assumption that not all companies will make such errors, only 500 rather than 1,000 user days are being withheld.

H. Any concessioner exceeding its adjusted allocation (i.e., base allocation plus any user days obtained from the pool) by more than the 50 user days allowed for accidental bookkeeping errors will be penalized for the entire amount exceeding the adjusted allocation, including the 50 user days allowed for accidental bookkeeping errors. These 50 user days are only provided for administrative errors and do not represent an increase in a company's user day allocation. The excess number of user days will be deducted from the company's current allocation for the next operating season, and access to the user-day pool will be denied to that company for 1 year.

VII. LAUNCH LIMITATIONS

A. The maximum number of commercial passengers per trip (travelling and/or camping together) will be 36. In areas of limited campsites, separate trips are encouraged to camp together when no other camps are available.

B. The daily number of commercial passengers departing from Lees Ferry shall not exceed 150. Passengers launching between Lees Ferry and River Mile 15 will be included in the total number of passengers launched at the Lees Ferry Ramp. After a private double launch date is established, the commercial passenger limit may not exceed 134.

The number of passengers to be picked up downriver for deadhead trips to Phantom Ranch or Whitmore Wash will be included in the 150 passenger limit on the day of the boat departure from Lees Ferry. Deadhead trips will be required to adhere to crew limitations as specified in the Annual Commercial Operating Requirements and will be required to expedite travel to the passenger pick up point. Motor trips must arrive at Phantom Ranch within 48 hours from leaving Lees Ferry, and oar-powered trips must arrive at Phantom Ranch on the fourth day. Motor trips deadheading to Whitmore Wash must arrive on their third day out from Lees Ferry. Exceptions to these deadhead trip lengths will be contingent upon adverse water conditions. Deadhead trips will not stop at attraction sites and will utilize small lesser used camps.

All companies must schedule departures with the River Subdistrict prior to arrival at Lees Ferry. No company will be allowed more than 110 percent of its allocation on the calendar unless it has obtained user days from the pool in excess of 110 percent.

C. Each boat carrying passengers for hire will have at least one qualified guide or trip leader on board. Motorized craft are allowed two assistants per boat in addition to the regular guide or trip leader.

Non-motorized trips will be allowed two assistants in addition to the regular compliment of guides necessary to directly operate the boats (i.e., one guide per boat). Exceptions will allow for two crew on tandem snouts, oar-powered triple rigs, etc.

"Trainees" may be counted as crew provided they are (1) working in the capacity of an assistant on a motor rig as specified above; or (2) operating a boat <u>not carrying passengers for hire</u>. Such craft may have one additional assistant for safety and/or training purposes in addition to those specified above.

Any participant other than those described above must be essential to accomplishing the specific purpose of a given trip in order to be considered crew. They must be approved in advance by the Superintendent, and such requests must be submitted in writing at least two weeks prior to the launch date.

VIII. <u>TRIP LIMITATIONS</u>

A. Maximum trip speed allowed shall average no more than 40 miles per day and may not travel farther than 50 miles in any one day except in an emergency or when necessitated by water releases from Glen Canyon Dam which creates unforseen travel requirements.

B. No vessel shall engage in primarily upstream motorized travel above Diamond Creek.

C. No vessel shall be rated in excess of 55 horsepower.

D. Maximum allowable trip lengths to Diamond Creek are as follows:

Launch Date:	
	16 APR - 15 OCT ... 18 days
	16 OCT - 30 NOV ... 21 days
	01 DEC - 29 FEB ... 30 days
	01 MAR - 15 APR ... 21 days

IX. WINTER SEASON

A. The commercial winter season includes launches occurring October 1 through April 30. The user-day allocation for this period is 9,344.

B. One commercial trip is allowed to launch each day. A trip is defined as a group which travels and camps together. No splitting of trips is allowed after the launch. Deadhead boats (boats leaving Lees Ferry without passengers) will be counted as a launch.

C. Each company is allowed two launches for the winter season. The user days allocated for these trips are based on their historical average use per trip or the overall average user days for the type trip that company operates whichever is greater. During the winter seasons of 1981 through 1986, the overall average for an oar-powered trip was 184 user days and a motor-powered trip averaged 156 user days. The number of passengers and user days needed for the trip must be submitted to the River Permits Office.

D. The user-day pool will be available to all concessioners, with priority access to those with the greatest average historical winter use. Requests from the pool will be based upon the individual company's historic user-day average for one trip or the overall average for the type trip operated. No additional winter trips may be added without user days being available in the winter user-day pool. Requests for the user-day pool will be taken monthly beginning May 1 through March 31.

X. CURRENT USER-DAY BASE ALLOCATIONS PER COMPANY (non-adjusted)

User day allocations are administered solely by the National Park Service. These allocations may be adjusted by the National Park Service as a result of the assesment of penalties or sale of a company.

COMPANY	SUMMER USER-DAY ALLOCATION	WINTER USER-DAY ALLOCATION	WINTER POOL PRIORITY #
Adventure West, Inc.	7,113*	322	15
Arizona River Runners	3,300	349	16
Arizona Raft Adventures, Inc.	9,782	564	4
Canyon Explorations, Inc.	3,720	368	10
Canyoneers, Inc.	4,060	312	17
Colorado River & Trail Expd.	2,500	428	9
Diamond River Adventures	6,860	340	12
Expeditions, Inc.	2,325	432	3
Georgie's Royal River Rats	2,600	312	20
Grand Canyon Dories	4,225	744	1
Grand Canyon Expeditions	8,877	326	8
Hatch River Expeditions	10,656	332	7
Moki Mac River Expeditions, Inc.	3,350	340	13
OARS, Inc.	2,800	406	2
Outdoors Unlimited	2,365	368	18
Mark Sleight Expeditions	2,980	340	11
Tour West, Inc.	4,480	312	14
Western River Expeditions, Inc.	10,651	312	6
SOBEK White Water River Expd.	4,380	312	19
Wilderness River Adventures	9,132	340	5
Initial User-day Pool	0	1,785	
Total Allocation	106,156	9,344	

* Based on the demonstrated ability of this company to fully use their total allocation in 1989.

XI. TRAINING TRIPS

Trips may be conducted for the purpose of training new boatmen or familiarizing boatmen with new types of equipment, interpretive methods, and operational requirements. These trips must be requested by the outfitter at least 2 weeks prior to the trip, and must be approved by the Chief of Visitor Protection. Training trips will not be allowed during the peak season from Memorial Day to Labor Day. A work project such as campsite cleanup or trail maintenance may be assigned by the Chief of Visitor Protection at that time. The outfitter or a designated representative must accompany the trip. A list of participants and their positions with the company must accompany the request. These trips will be conducted for the benefit of company personnel only, not for relatives, friends, etc. Training trips will be inspected before departure at Lees Ferry and must meet the conditions set forth in the Operating Requirements. User days are not charged for these trips unless persons other than company employees accompany the trip.

XII. SUBLETTING OF USER DAYS

User days may not be sublet to another company or to a private trip. Current policies are outlined below.

A. All fees paid must go directly to the concessioner actually running the trip. A booking agent may be used, but they must not advertise, organize, and operate the trip. A person or organization may not collect fees for a trip, pay a concessioner a franchise fee, and then personally run the trip.

B. It is not the intent of the National Park Service to prevent a river concessioner from making incidental passenger bookings for another concessioner on an occasional basis. However, strict adherence to procedural guidelines will be required to avoid contractual violations. These include:

1. Passengers booked by one outfitter for another outfitter must be made aware that their trip will be outfitted by another company.
2. Equipment and personnel exchanges cannot be a part of the procedure of transferring passengers from one company to another company. Thereby eliminating potential for misuse of company-specific user day allocations.
3. No concessioner may pay or receive payment from another concessioner for any "commission" or other fee for the exchange of passengers (however, this does not apply to the transfer of money equal to the actual published fares for the trip being reserved as described in Subsection XI.B. above).
4. In the event a concessioner becomes unable to run a scheduled trip and wishes to transfer the entire trip to another concessioner, written details of circumstances necessitating the exchange must be submitted for review, and prior approval of the trip exchange must be received from the National Park Service. No such exchange will occur until both concessioners receive approval from the NPS.

There should not be a need for concessioners to book one another's passengers unless such bookings are in response to last minute cancellations, emergencies, etc., and will result in saving passengers' deposits and payments by transferring them to a trip with another concessioner.

C. All trip participants must be covered by the contractually required insurance coverage of the concessioner. Separate insurance provided by charter groups, etc., is permissible, but must be in addition to regular insurance provided by the river concessioner.

D. If rental or borrowed boating equipment is used, it must not have any company names on the boats other than the river concessioner company name that is running the trip.

E. All employees must be regular salaried or paid employees. Freelance boatmen or boatmen for one or two trips may be used provided

they are paid in the same fashion as all other boatmen for the trip. All boatmen must meet standards outlined in Section III above.

F. In summary, it is clearly a sublet of user days where a person advertises, organizes, books, and operates a trip with his/her own equipment, personnel, and insurance, all of which is separate from that of the authorized river concessioner, and that concessioner is paid a fee for the use of its user days. The National Park Service reserves the right at all times, in its sole discretion and based on available information, to determine whether or not a trip is a sublet trip.

XIII. OTHER CONDITIONS

A. A fee is charged for each person, boat, and truck to traverse the Diamond Creek Road. Permits are required in advance. For current information, contact Ms. Donnita Selana, Acting Director, Hualapai River Running Department, P.O. Box 246, Peach Springs, Arizona 86434, (602) 769-2210 or 769-2219.

B. No cats, dogs, or other pets are permitted on a river trip. Requests to use guide dogs for visually or hearing impaired passengers must be cleared in advance through the Canyon District Ranger's Office.

C. Trips may be delayed at Lees Ferry if conditions, as set forth above, are not met or until noted deficiencies are corrected. Approval of conditions prior to departure shall be solely determined by the Lees Ferry Ranger on duty.

D. River parties are encouraged to avoid heavily used campsites.

E. A copy of these Commercial Operating Requirements must be carried on each trip, and all guides must have a sound knowledge of these requirements.

F. All trips shall complete a pre-trip checkout with the park ranger on duty prior to launching at Lees Ferry.

G. Orientation talks are required. See Supplement D.

H. The lead guide or trip leader must carry a passenger manifest list.

XIV. LEES FERRY LAUNCHING PROCEDURES

Launching procedures must be carried out in such a manner as to ensure maximum efficiency in the rigging and launching of river trips.

A. The launch ramp may not be used to perform maintenance projects on equipment.

B. During rigging procedures, only river equipment and National Park Service vehicles may park on the ramp. The loading/unloading of passengers and river bags must take place off the ramp.

C. Equipment vehicles must be moved to upper parking lots after equipment is loaded/unloaded.

D. Cooking of meals is not permitted on the launch ramp.

E. A maximum of two people per company are allowed to stay with equipment overnight on the ramp. All other trip participants must sleep in the guides' campground.

F. Boats that are rigged 24 hours or more prior to their launch date shall be moved off the ramp to make room for trips with more current launch dates.

G. Because of ever increasing congestion at Lees Ferry launch ramp, rigging between the hours of 9:30 a.m. and 11:30 a.m. will be only for those trips leaving that day.

H. Use of Paria Beach to launch trips will be permissible provided the Lees Ferry Ranger has given prior approval.

XV. BACKCOUNTRY OR OFF-RIVER CAMPING

Permits and/or reservations are necessary for off-river camping in all areas of Grand Canyon National Park.

To receive off-river camping permits, mail a camping request to the Backcountry Reservations Office, P.O. Box 129, Grand Canyon, Arizona 86023, and include the number of people, date, and location of the hike. Requests must be received 2 weeks prior to the launch date. Off-river camping may not be used to reduce user-day totals.

For camping reservations at Havasu Campground, telephone the Havasupai Indian Tribe at (602) 448-2121. A fee is charged for each person entering or crossing the Supai Indian Reservation, payable at the time of entry (above Beaver Falls). An additional charge is made for each night of camping within the reservation.

Hualapai Tribal land extends from river mile 165 to river mile 273 on the south (left) side of the Colorado River. Any overnight use away from the river area requires permission from the Hualapai Tribal Council.

Supplement A

COMMERCIAL SANITATION AND FOOD PREPARATION

Proper food handling and sanitation techniques are necessary to prevent the spread of communicable diseases among the members of your trip. Gastrointestinal illnesses are of primary concern. The usual source of gastrointestinal organisms is the human intestinal tract. Some organisms found in the nose or infected skin lesions can produce a powerful toxin, which cannot be destroyed by heat, causing severe gastrointestinal illness. In addition to the human sources, meat and poultry products may be contaminated with disease organisms at the slaughterhouse or butcher shop. If these foods are inadequately cooked, the bacteria survive. Bacteria in food will result in the contamination of utensils, preparation surfaces, and the hands of handlers, which leads to contamination of other foods.

Following contamination of a food, it is usually necessary for reproduction of the bacteria to take place before an infective dose is developed. In order for a contaminating organism to grow or reproduce enough to develop an infective dose or a large amount of toxin, three factors are required - time, temperature, and a nutrient source.

It usually takes no more than 3 to 4 hours after food has been contaminated to produce enough bacterial growth to cause illness in a large number of people. Most of the organisms of concern will grow well between 77 degrees Fahrenheit and 114 degrees Fahrenheit. The contaminated food provides a nutrient source.

In order to prevent contamination of food during its preparation along the river, personal and environmental cleanliness are vitally important. No one with symptoms of a communicable disease, especially diarrhea, should be allowed to prepare food or handle utensils for others. Neither should anyone with infected wounds or boils be permitted to handle food. As disease-causing organisms often get into food by the hands of a person preparing food, scrupulous personal cleanliness is important. Washing the hands with soap and water is essential after going to the toilet, handling raw meat and poultry, putting fingers in the nose, or handling objects that may be contaminated.

All surfaces with which food comes into contact during preparation, including knives, utensils, and table tops, must be clean and sanitary. Tables and equipment used for preparing raw meats and poultry should not be used for cooked foods until they have been cleaned and sanitized thoroughly.

FOOD PREPARATION - The means by which foods become contaminated with disease organisms, and the subsequent processes through which these organisms pass in order to become dangerous to human health, dictate the procedures necessary to interrupt the chain of events leading to an outbreak of human illness. Briefly stated, these procedures are:

A. After going to the toilet or handling raw meat or poultry, wash hands with soap and water before handling and preparing foods.

B. Cooked or other prepared foods should come in contact only with clean and sanitized surfaces, equipment, and utensils. Equipment

used for raw foods should be washed and sanitized before being used with cooked foods.

C. Persons with communicable diseases, infected wounds on the hands and arms, or boils should not be allowed to prepare food.

D. Stored perishable food should be kept at temperatures below 45 degrees Fahrenheit.

E. Foods such as meat and poultry products should be well-cooked (165 degrees Fahrenheit) to destroy disease organisms.

F. After preparation and prior to serving, keep hot foods hot (above 140 degrees Fahrenheit) and cold foods cold (below 45 degrees Fahrenheit).

G. Each group of boatmen is required to have in their possession a dial thermometer for checking food temperatures during preparation and serving.

H. Leftover perishable food should be discarded or refrigerated immediately in clean, protected, labeled containers.

I. Leftover perishable food should be thoroughly reheated before use (to 165 degrees Fahrenheit).

DISHWASHING - The most effective means of sanitizing dishes and utensils on a river trip is the three-bucket system. Place three buckets below the high water mark or in such a way as to leave the beach free of soap and food spillage. The system is as follows:

A. Use three buckets large enough to immerse largest plates and eating utensils, two buckets of which are heated to near boiling. Allow dishwater to settle, and remove sediments before use if the river is muddy. The use of alum is recommended for settling.

B. Add detergent to one heated bucket, leaving the other heated bucket clear for rinsing, and to the third bucket add chlorine at the rate of 3 to 4 ounces per 5 gallons for sanitizing. Set up sanitizing rinse 30 minutes prior to washing dishes to allow chlorine to work.

C. Wash dishes and utensils in the first tub to remove grease and food particles. Water temperature should be 120 degrees Fahrenheit to 140 degrees Fahrenheit.

D. Dip rinse in the second tub.

E. Immerse articles in the third bucket for 60 seconds, double time if towel-dried. The effectiveness of chlorine for disinfection is directly related to time of exposure. Be sure to allow time for the chlorine to sanitize.

F. Rack for air-drying or wipe dry with fresh paper towels.

G. Store the articles in a clean, dry location, and they will be ready for the next meal.

WATER PURIFICATION - All water for river user consumption or cooking must be disinfected. Research during 1981 on the Colorado River and its tributaries indicated that the increased sediment from flooding or other causes may pose a high risk to river users. The following water disinfection steps should be followed:

A. Use the main course of the Colorado River to collect water for disinfection, unless the river is quite cloudy from sediment.

B. Use side streams as a water source when the main river is heavily laden with suspended sediment and the side stream is running clear. Avoid the following tributaries because of the consistently poor water quality: Paria River, Little Colorado River, Bright Angel Creek, Garden Creek, Hermit Creek, Elves Chasm, Havasu Creek, and Diamond Creek.

C. To disinfect visually clear water, add eight drops of liquid chlorine bleach per gallon, mix the water, and let it stand uncovered for at least 2 hours.

D. Cloudy, sediment-laden water must be cleared before disinfection. Settle overnight or use flocculating procedures. Water that is cloudy after settling must receive 10 to 12 drops of liquid chlorine bleach per gallon and be allowed disinfection time of at least 2 hours.

E. The effectiveness of chlorine bleach deteriorates rapidly when the individual containers are exposed to high temperatures. The effectiveness of liquid chlorine bleach that has been on the shelf for extended periods cannot be assured. Outfitters should rotate stock and assure that only the amounts of bleach that can be quickly used be purchased at one time.

F. Use of an approved filter alone will remove bacteria and cysts; however, to assure removal of viruses, the use of a disinfectant and a filter is recommended. Some filters currently available on the market contain components having a disinfectant action during filtration. However, bear in mind that these may not provide a protective residual to guard against recontamination once the water is filtered.

G. Portable filters (either gravity flow or piston pump) having a nominal pore size of 0.45 microns or less may also be used. Settled water will extend filter life. In addition to overnight settling, alum may be added at the rate of 1/4 teaspoon per 1 1/2 gallons. Decant the clarified portion, filter, and disinfect by adding 1 to 2 drops of fresh bleach per gallon. Water treated in this manner should be allowed as long a contact time as possible but no less than 1 hour.

H. An alternative to filtration and chemical treatment is to boil river water for a minimum of 1 minute prior to use.

Supplement B

HUMAN WASTE CARRY-OUT METHOD

With the porta-potti burial system of human waste disposal, over 5,000 burials took place within the river corridor each year. Because of the impact on soils and vegetation and the hazard to human health presented by the burial system, it is now required that all solid human waste be removed from the canyon. At first glance this requirement may seem impossible to comply with. It is much simpler than it appears, and is actually a lot easier than the old burial system.

The cheapest and, so far, most effective means of transporting the solid wastes is by the use of air-tight ammo boxes and plastic bags. The items necessary are:

A. Ammo cans (rocket boxes), the big ones, commonly 18 inches by 14 inches by 8 inches.

B. Toilet seat.

C. Large, heavy-duty plastic garbage bags.

D. Deodorant chemical: Aqua Chem (blue goo), chlorine bleach, slaked lime, Clorox II (Dry Bleach).

E. Toilet paper, hand washing water dispenser, and soap. Avoid the use of bar soap. Use a system which allows flowing water to rinse off the soap. It is recommended that the rinse system not employ the use of beverage coolers due to possible contamination of the spigot.

F. When feasible, place the toilet system near river's edge to discourage passengers from urinating above the wet soil of the river's edge.

G. For groups greater than 26, 2 toilets are required. The day use toilet described below may be substituted for the second toilet provided it is readily available at an on-shore location such as near the hand wash facility.

The system is set up as follows. One of the rocket boxes serves as the actual toilet container. The rocket box is first lined with one of the heavy-duty large garbage bags; fold the excess bag around the edge of the can. Pour the deodorant chemical into the open bag and place the toilet seat on top of the can. The toilet is now ready for use. The hand washing water dispenser and the hand soap can be placed close by. Used toilet paper, tampons, and sanitary napkins can be placed directly into the toilet. After each deposit, the toilet should be covered with a large heavy-duty garbage bag or lid to the toilet seat to discourage flies. When camp is to be broken, it takes only a few minutes to dismantle the toilet system and store the feces. Squeeze the excess air out of the bag and then tie it off. Place the bag containing the feces into yet another garbage bag and store subsequent bags in it. This is a security measure against leakage. The bag is then tied off as before and placed into a rocket box with the lid sealed and the container ready for storage until the next day's use. The toilet seat, plastic bags, toilet paper, and deodorant are stored in

another ammo can ready for the next camp's use. It is necessary to remove only two cans per night from the boat, one for the storage of the equipment, another for actual use as a toilet and the subsequent storage of the fecal products.

The amount of chemical used per day depends on the type used and the number of people on the trip. With liquid deodorant, a few ounces at the bottom of the bag is sufficient for six or seven people. If you are using bleach, more is required, approximately double. If used, slaked lime and dry bleach should be sprinkled over feces after each use. The chemical reduces bacterial growth in the feces and the production of methane gas. The number of ammo cans needed is dependent on the number of people and the length of the trip. We have found that it is easy to containerize about 50 uses in one ammo box. Thus, for an 8-day, 10-person trip, you would need only two ammo boxes for feces and one ammo box for equipment.

Collection containers are no longer available at Pearce Ferry. Do not dump human waste in any container at Pearce Ferry. Feces must be disposed of in a sanitary landfill or RV dump station. You should check in your area before leaving the river.

The above is the basic system, and there will undoubtedly be many innovative improvements on this system. The basic tenet is to safely containerize the feces and prevent it from generating methane gas in the absence of air in the ammo cans.

Day Use Toilet System

A day use toilet system is required when the regular toilet is not set up. Store toilet paper, plastic bags, coffee can, hand soap, and a small container of toilet chemical in a small ammo can or similar container that passengers can obtain when needed. Instruct users to deposit human waste and toilet paper in plastic bag with a squirt of bleach or other disinfectant chemical. To reduce the odor and increase the tidiness of the ammo can, the full plastic bags can be stored in a 1-pound coffee can (sealed) until dumped. Guides can then empty the used bags directly into the waste storage cans. This solves the problem of toilet paper disposal and the accumulation of human waste at beaches and attraction sites.

Supplement C

SUGGESTED FIRST AID ITEMS

Items should be neatly stored in an easy to locate and identifiable waterproof container.

Highly recommended

First aid kit inventory list taped to the inside lid of the container, Red Cross First Aid Manual, or equivalent.

Instruments	Description	Uses
Scissors (EMT type)	1 (medium size)	Cutting tape, dressings, clothes
Razor blade, single	2	For removing hair before taping
Tweezers	1	To remove wood splinters, etc.
Safety pins	10 (various sizes)	Mending and triangular bandage
Q-Tips (Cotton swabs)	1 package	Cleaning lacerations, eyes, etc.
Pencil/Note pad	1 each	Documenting injuries and items used in treatment
Relief of Discomfort		
Pain reliever (aspirin or substitute)	36 tablets (5 grain)	1-2 every 4 hours for headache, minor pain, and fever
Ibuprofen (Advil) or Generic brand	200 mg tablets	Muscle strains, minor pain, or menstrual cramps
Antacid	18 tablets	For indigestion or heartburn
Antihistamine	18 tablets	1 every 4 hours for insect bites, colds, hives, or rashes
"Gookinaid" or similar electrolyte replacement drink	1 tub minimum	Relieve or prevent muscle cramps and symptoms of heat exhaustion
Oil of clove	1 small bottle	Relief of toothache
Calamine lotion or ivy, Cortisone cream	1 bottle	Relief of itching from poison life preserver rash, or allergies
Solarcaine	1 bottle	Relief of sunburn pain

Zinc oxide/PABA or other sun block	1 bottle	Prevent sunburn
Benadryl Syrup	1 bottle	minor allergic reactions

Other

Antibacterial soap (Phisoderm, tincture of zephesis, Hibiclens)	8 to 12 ounces	Antiseptic for wounds
Moleskin	1 package	For blisters
Betadine	1 bottle	For cleaning wounds
Band-aids	36 (1-inch)	For lacerations
Anti-bacterial ointment (Bacitracin, etc.)	2 tubes	For lacerations and wounds
Butterfly Band-aids (or know how to make)	18 (various sizes)	For closing lacerations
Carlisle (trauma dressing) or substitute (such as Kotex)	3 (4-inch)	For large bleeding wounds
Elastic bandage	2 (3-inch)	For sprains and securing rigid splints
Steri-pad gauze pads	18 (4 inch by 4 inch)	For large wounds
Steri-pad gauze pads	18 (2 inch by 2 inch)	For small wounds
Tape, waterproof adhesive	2 (2-inch rolls)	For sprains, securing dressing, etc.
Triangular bandage or Muslin pieces from	4 (40-inch)	For securing rigid splints, slinging and securing extremeties, and protecting dressing contamination
Roller gauze sing	5 rolls (2 inch by 5 yards)	For holding gauze pads in place, securing splints, and improvi- slings
Rigid splint, arm board, sam splint	1	For in-line fracture, pressure bandage
Rigid splint, leg board, sam splint	1	For in-line fracture, pressure bandage

Thermometers; 1 oral, 1 rectal (a hypothermia thermometer is recommended)	2	Diagnosing fever or other illnesses; heatstroke, hypothermia exposure
Signal Mirror	1	Signaling aircraft in case of emergency
Dimes and quarters	Several	Making phone calls in case of emergency
Optional		
Mineral oil	Small bottle	Constipation
Syrup of Ipecac	Small bottle	Induce vomiting
Kaopectate	Small bottle	Diarrhea
Ophthalmic wash and/or Eye drops	Small bottle	Eye wash/irritation
Ear drops	Small bottle	Clogged/Infected ears
Water purification tablets (use bleach for river hikes water)	Small bottle	Purify water on side-canyon
Eye pad	2	Injured eye
Tincture of Benzoin	2 small bottles	To hold tape in place and protect skin
Insect repellent	Large can or bottle	Flies, ants, mosquitoes

A Note About Hypothermia (Exposure):

Should someone fall in the river, it is extremely important to get them out of the water as quickly as possible. After 5 minutes of floating in 50-degree water, muscular strength and coordination rapidly diminish. Generally after 10 to 15 minutes, a person is totally unable to help himself.

Supplement D

ORIENTATION TALKS

All companies recognize the importance of orientation talks. Orientation talks may be given on a bus while traveling to Lees Ferry, or at other times or locations, if approved in advance by the River Subdistrict Ranger. To ensure that each company covers the points stressed by the National Park Service, an outline and description of the items that must be covered is included here:

A. Passengers should be informed that they will be traveling throughout their trip in Grand Canyon National Park, and all natural, historical, archeological, and wildlife components are not to be disturbed.

B. On motor trips, boatmen will shut down the motor to interpret all natural features when safe to do so.

C. Purified drinking water will be provided for those who desire it.

D. Life jackets must be worn at all times while on the river and kept properly fastened and adjusted to fit. A demonstration of how to fasten and adjust the life preserver and what to do if they find themselves in the river should also be given.

E. Chemical toilets or other means of containerization of human waste will be provided for them and must be used while they are in camp, explaining reasons for this rule. Passengers should also be informed of the proper means of disposing of human waste while not in camp.

1. Urinate in wet sand below high water line. Go "high and far" to urinate at off-river places such as Havasu to avoid the buildup of feces and urine. Passengers should be informed that the boats will occasionally be stopping above scenic stops for these needs, to prevent human waste buildup at such places as Deer Creek, Redwall Cavern, and the Little Colorado River.
2. Passengers will be informed how to dispose of human feces and toilet paper while not in camp. Availability of a day use toilet system is required (see Supplement B).

F. They will be advised to stay on trails at scenic stops, and that a boatman will lead the way to these areas.

G. If fires are to be used during winter trips, passengers will be informed of the limitations on the use of natural firewood.

H. Companies will be checked to ensure that this orientation talk is occurring prior to departure at Lees Ferry, and that it includes the above points.

Spot checks at Lake Mead will be made by the Lower Gorge ranger to ensure these points are stressed during the trip. Failure to do this will be documented and included in the concessioner evaluation.

Supplement E

HELICOPTER EVACUATIONS

A. JUSTIFICATION - Helicopter evacuations are available for medical or other emergencies only.

B. Request Procedures

1. Arrangements for helicopter evacuations will only be made by the NPS.
2. Requests for evacuation can be made by (1) contacting the NPS directly (river patrols, Lees Ferry, Phantom Ranch) or, after using an escape route, by telephoning Grand Canyon dispatch at (602) 638-2477; (2) contacting aircraft by ground-to-air radio; (3) mirror flash or other signaling device directed toward passing aircraft or rim overlook locations.
3. When contacting aircraft by radio, be sure to provide accurate and concise information. Remember, your message may be relayed several times before it reaches the Park Service dispatch. Provide information in the following order:

   (a) Give your location. State that you are a river trip requesting helicopter evacuation at a given river mile in the Grand Canyon.
   (b) Briefly state the problem (suspected spinal injury, severe head injury, hypothermia, etc.).
   (c) If the injury is minor and stable, state that fact. This will allow EMS personnel to determine priorities in the event of simultaneous requests for medical responses. Ask the pilot to repeat the message so that you know he understands your situation.

4. A mirror flash is often the most reliable method of contacting aircraft, so be sure you understand how to use the mirror as a signaling device. Remember that the mirror flash presents problems in that no patient assessment information is relayed and your location is not certain to be reported correctly.

C. Landing Zone Selection and Preparation

1. Select a level area approximately 10 feet by 10 feet. Be sure that it is clear of obstacles such as trees and large rocks for a diameter of 50 feet. Such areas are virtually non-existent in some stretches of river (i.e., below Crystal to Bass, Olo to Havasu, etc.). While the pilot and crew can conduct hover exits and one-skid landings, these attempts can be dangerous and will not be attempted except as a last resort in life-threatening situations. Unless such travel poses serious problems for the patient, transport by boat to a safe landing zone will generally provide a faster and safer evacuation.
2. Set up an X with the orange panels. Do not locate the panels directly on the landing zone. Remove the panels once the pilot locates your position in the event he selects that site for landing.

This will assist the pilot in determining your party from others in the vicinity.

3. Prepare your group and camp for the evacuation. It is extremely important that everyone be gathered together away from the landing zone and in full view of the pilot. Be certain that no loose items are in the landing zone since the downwash will lift and toss articles, possibly into the rotor or into your group. Secure loose equipment in the camp (sleeping bags, ground cloths, tables, life jackets, etc.) in the event the pilot must pass over the area.
4. Wet down as much of the landing area as possible just prior to the helicopter's arrival. This helps the pilot's visibility, decreases the amount of sand blown into eyes, boats, and food, and reduces damage to the helicopter's surface and engine.
5. The pilot's awareness of wind direction is critical for safe landings. The helicopter must fly directly into the wind when landing and taking off. Do not locate your group in the flight path. You can assist the pilot by indicating wind direction. The easiest method is to simply toss a handful of sand directly upward. The pilot can then observe the direction of drift. Another method is to stand with your back into wind and extend both arms forward pointing into the direction the wind is blowing.
6. NEVER APPROACH THE HELICOPTER UNLESS DIRECTED TO DO SO BY THE PILOT OR CREW. Never approach from the rear of the helicopter. Keep your group together and in one location. When directed to do so, approach the helicopter in full view of the pilot. Walk in a crouched position to avoid being struck in the head by the helicopter rotor blades.

Supplement F

NANKOWEAP SPECIAL USE AREA

Because of impacts of multiple trailing and campsite competition and congestion in the Nankoweap area, the following special camping regulations are in effect. Camping for river runners in the Nankoweap Delta area, Mile 52.0 to Mile 53.0, right bank, is restricted to the three river camps identified on the map as First Camp, Main Camp, and Lower Camp. The First Camp is located in a large cove behind a gravel bar, approximately 1/2 mile downstream of the confluence with Nankoweap Creek. The camp is visible on the right from the tail waves of Nankoweap Rapid. The Main Camp is also visible several hundred yards downstream. The Lower Camp is a small, boulder-covered sand bar forming a point of land 100 yards downstream and around a corner from Main Camp. Each camp has a capacity of one river party only. River parties wishing to hike must disembark at any one of the three camp locations or at the mouth of Nankoweap Creek (Hiker's Camp) only. This requirement is due to past problems of multiple trailing. Groups camping early or on layovers should expect other groups to pull in for hikes.

Supplement G

TRAINING TRIP REQUEST

OUTFITTER: _____ DEPARTURE DATE: _____

NUMBER OF BOATS: _____ COMPLETION DATE: _____

LIST OF PARTICIPANTS:

1._____ 8._____

2._____ 9._____

3._____ 10._____

4._____ 11._____

5._____ 12._____

6._____ 13._____

7._____ 14._____

15._____

OBJECTIVE OF TRIP: _____

_____

_____

_____

_____

WORK PROJECT TO BE ACCOMPLISHED ON TRIP: _____

_____

_____

_____

_____

_____

OUTFITTER'S SIGNATURE

_____

OUTFITTER'S DESIGNATED TRIP LEADER

Supplement H

RIVER INCIDENT REPORT

THE RIVER SUBDISTRICT
GRAND CANYON NATIONAL PARK
P.O. BOX 129
GRAND CANYON, ARIZONA 86023

Company: _____ Trip Leader: _____

Date: _____ Location of Incident: _____

NATURE OF INCIDENT _____

INVOLVED PERSONS	ADDRESS	PHONE	SEX	AGE	DOB

OCCURRED: Ashore _____ Boat _____ In water _____ Other _____

WATER LEVEL: _____ cfs

DESCRIPTION: How did the incident occur? _____

When did it happen (date and time)? _____

First Aid given: _____

Medications given (dose and time): _____

10/88
C_90

_____
Signature

COLORADO RIVER MANAGEMENT PLAN

APPENDIX D

NONCOMMERCIAL OPERATING REQUIREMENTS

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A. NONCOMMERCIAL RIVER PERMIT SYSTEM GUIDELINES

I. Definition of a Noncommercial River Trip

A. A noncommercial river trip must be participatory in nature. Trip preparation (including logistics, food purchase, equipment assembly, transportation, and vehicle shuttle) and conduct of the trip (including food preparation and sanitation) must be shared by members of the group. Collecting a set fee (monetary compensation), payable to an individual, group, or organization, for conducting, leading, guiding, or outfitting a private river trip is not allowed. The trip permittee should delegate responsibility (financial and otherwise) for various aspects of trip preparation and conduct.

B. Trips may be considered noncommercial when a member of the trip receives a salary, but not directly through fees contributed by members of the party.

II. Noncommercial Waiting List Guidelines:

A. New applicants to the waiting list will be charged a non-refundable $25 waiting list application fee. Written requests postmarked between February 1 and February 29 requesting to be added to the waiting list and containing a money order of $25 will be accepted. Information needed at the time of placement on the list is name, address, telephone number, and social security number. Those on the waiting list when this policy is adopted and implemented will not be charged the application fee as long as they remain on the list.

B. All persons on the waiting list are responsible for informing the River Subdistrict in writing each year between December 15 and January 31 that they wish to remain on the waiting list. Letters must be postmarked between December 15 and January 31 to be accepted; all others will be returned to sender. When continuing your interest on the waiting list, please list the last recorded address, any new address, telephone number, and your social security number. Waiting list members will be allowed to miss one continuing interest filing period for their length of wait on the list. Waiting list members are responsible to notify the River Permits Office of any change of address.

It is highly recommended that the letters confirming interest in remaining on the list and letters of new addition to the list be sent by Certified Mail, Return Receipt Required to ensure that the letter has been received by the River Subdistrict. We cannot take responsibility for letters not received due to Postal Service error. Notification of placement on the waiting list will be sent in March.

C. There is no limit to the number of river trips a person may participate in during a year. However, those on the waiting list will be allowed to be a participant on only one noncommercial trip for their

length of wait on the list. The second noncommercial trip they participate in will result in immediate removal from the waiting list. After the second river trip is completed, the person may follow procedures for the February filing period for new additions to the list.

III. Scheduling of Noncommercial Permits:

A. Initially Scheduled Launch Dates.

1. Those at the top of the list will be contacted in October for their preferred launch dates for the next season and the following season. The number of people contacted will be determined by the following:

   a) number of permits available for the upcoming season occurring from advanced cancellations
   b) 40% (the current short-term cancellation rate) of the total number of available permits will be contacted to fill possible cancellations for the upcoming season
   c) number of permits available for the following season (2 years in advance)

2. Those contacted must list a minimum of 15 launch dates. Supplemental information will be obtained to determine the possibilities of claiming cancellations with a minimum notice of 120 days, 90 days, 60 days, and 30 days specified with a preferred launch period of two consecutive weeks.

3. Launch dates will be assigned in waiting list priority order.

4. Those who listed 15 launch dates in the initial process and possibilities of accepting cancellations and did not receive a scheduled launch will be contacted the following year for preferred launches.

5. Deferrals (rescheduling to the next year) will not be allowed unless there is a confirmed medical problem with the permittee that will not allow them to participate in a river trip. Exceptions may be requested in writing addressed to the Chief of Visitor and Resource Protection.

6. Launch dates may only be <u>rescheduled for the same year</u> if notification of more than 60 days is given and only if a launch date is available.

7. Cancellation of a launch date more than 60 days prior to the scheduled launch date will not result in restriction from the waiting list. Those cancelling less than 60 days prior to the scheduled launch date, will be restricted from the waiting list for one year. Cancellations less than 30 days prior to launch will be restricted from the waiting list for two years.

B. Scheduling Cancelled or Unclaimed Launch Dates:

An attempt will be made to fill any cancelled launch date with those at the top of the list thorough information gathered as described in Section III.A.2.

1. If the cancellation occurs greater than 90 days prior to the launch date, written notification will be sent to all those expressing interest in that particular time period and interested parties then notify the River Permits Office in writing or by phone by a specified time not to be less than 5 days from notification.

2. If the cancellation occurs less than 90 and greater than 30 days prior to the launch date, the River Permits Office will attempt to locate persons expressing interest in that particular time period by phone during a two working-day period from that cancellation.

3. The launch date will be given to the person with the lowest waiting list number who is willing to accept the launch date.

4. Call-in System
   a. Applicants with official verification from the River Permits Office of placement on the waiting list are eligible to utilize the Call-in System.
   b. Dates not claimed by the process outlined above will be open to anyone on the waiting list, regardless of their position on the list, on a first-call-first-served basis.
   c. The first working day in January is the first day that those on the list may call to check on unclaimed launch dates for the upcoming season. To allow for geographical differences, only telephone requests will be accepted during the first week of January.

5. Those claiming a cancelled date will be deleted immediately from the waiting list. Rescheduling of launch dates is not allowed when accepting a cancelled date. Cancellation of a launch date more than 60 days prior to the scheduled launch date will not result in restriction from the waiting list. Those cancelling less than 60 days prior to the scheduled launch date, will be restricted from the waiting list for one year. Cancellations less than 30 days prior to launch will be restricted from the waiting list for two years. However, if a date is accepted with less than 30 days notice prior to launch, restriction from the waiting list will be for only one year if that date is cancelled at a later time.

6. No open dates with less than 10 work days of lead time will be considered available. This time is necessary for processing the permit.

C. Permit Application Fee

A non-refundable $50 permit application fee is due 30 days prior to launch along with the permit application form.

IV. Allocation, Launch, and Trip Limits:

A. The seasonal noncommercial user-day allocation is defined as follows:

Primary Season:	April 16 - October 15:	43,920 user days
Secondary Season:	October 16 - April 15:	10,530 user days

B. During the primary season, 221 launches will be available and will be scheduled one per day with two launches occurring on one day per week April 16 through October 15. No more than three double launches will occur in a week with at least a day between the double launches. The double launches will be scheduled on days that traditionally launch fewer commercial trips and the commercial passenger launch limit will be held to 134 on these days. On launch dates with two noncommercial trips, a morning and afternoon departure will be imposed to let the Lees Ferry Ranger effectively carry out the required check-out procedures and orientation as well as to mitigate downstream crowding.

C. During the secondary season, 52 launches will be available. Five launches per week will be allowed, with trips launching on no more than 2 consecutive days.

D. Maximum trip lengths allowed on the river between Lees Ferry and Diamond Creek (including layovers and off-river hiking days) are:

Launch Date	Trip Length
April 16 - October 15	18 Days
October 16 - November 30	21 Days
December 1 - February 29	30 Days
March 1 - April 15	21 Days

E. A three month period has been set exclusively for oar-powered craft on the river. Motor-powered boats are prohibited from launching from September 16 through December 15. During the remainder of the year, both oar and motor-powered boats may launch.

F. Maximum size for a noncommercial river trip is 16 people, including the trip leader.

V. User-day Pool:

A. User days resulting from trips already completed will be pooled beginning June 1. Double launches will be added for the months of August, September, and October upon availability of the maximum number of user days for a primary season trip (18 days X 16 passengers = 288 user days).

B. These launch dates will be filled by the process described in Section III.B. which discusses scheduling cancelled or unclaimed launch dates.

VI. Little Colorado River Trips (Kayak or canoe only)

With an increased interest in kayaking the Little Colorado, the permit process has been outlined. A permit to traverse tribal lands must be obtained from the Navajo tribe. Two options of traversing through Grand Canyon National Park are described below:

A. Prior arrangements may be made to meet a commercial or noncommercial river trip. Notification must be given to the River Permits Office prior to launch. The rendezvous must take place at the confluence of the Little Colorado and must be reported to the Lees Ferry Ranger at the time of the launch. Recreational user days will be charged as appropriate. If any camping is planned prior to being picked up at the confluence, a backcountry permit is required from the Grand Canyon Backcountry Office.

B. A noncommercial permit may be obtained by the scheduling process described in Section III. by anyone on the waiting list. Due to the unpredictable water flow of the Little Colorado, the launch date from the entry point must coincide with noncommercial Lees Ferry launches. This secured launch date would allow the party to launch from Lees Ferry should the water flows from the Little Colorado not be adequate. The secondary season scheduling regulations have increased the number of weekly and seasonal launches, allowing for flexibility to schedule impromptu launches.

Please note that at the discretion of the Superintendent, any serious violation of noncommercial river permit system guidelines may result in removal from, or not being permitted to be placed on, the waiting list for a period of no more than three years.

B. NONCOMMERCIAL REGULATIONS

Noncommercial River Trip Terms and Criteria

A noncommercial river trip permit, issued by the authority of the Superintendent, is required for all noncommercial travel on the Colorado River between Lees Ferry and Pearce Ferry. Failure to comply with terms of the permit may result in administrative actions resulting in your exclusion from any future trips.

I. General Requirements

A. Only the trip permittee may complete the application. The noncommercial permit is not transferrable, and the permittee must accompany the entire river trip.

B. No trip shall carry more than 16 persons (including the trip permittee) in any one party. Persons traveling under one permit must travel and camp together and occupy only one beach.

C. There is no limit to the number of river trips a person may participate in during a year. However, those on the waiting list will be allowed to be a participant on only one noncommercial trip for their length of wait on the list. The second trip they participate in will result in immediate removal from the waiting list. After the second river trip is completed, the person may follow procedures for the February filing period for new additions to the list.

D. Failure to comply with any portion of the permit application procedure, or participation in advertising resulting in profit, will result in the cancellation of those permits. (See Private Use Affidavit on application form.) The trip permittee is solely responsible for the actions of his/her party.

E. Noncommercial trips must be on a cost-sharing basis. (See Private Use Affidavit.) Failure to comply will cause cancellation of the permit and may jeopardize any future applications.

F. Substitution of participants may occur at Lees Ferry. Only the permittee must be present the entire trip.

G. All trips must complete a trip checkout form with the Lees Ferry ranger prior to departing. All trip participants must have a valid, unaltered photo identification to present to the ranger at this time. All trip members will complete an orientation program at Lees Ferry prior to their trip departure.

H. It is the permittee's responsibility to notify the River Permits Office of their inability to use their scheduled launch date. (See Section II.)

I. Maximum trip lengths allowed between Lees Ferry and Diamond Creek are April 16 - October 15: 18 days; October 16 - November 30: 21 days; December 1 - February 29: 30 days; and March 1 - April 15: 21 days.

This includes layover or off-river hiking days. The breakdown of season dates is as follows: PRIMARY LAUNCHES - April 16 through October 15, SECONDARY LAUNCHES - October 16 through April 15. Failure to meet these seasonal trip lengths will result in a citation and possible administrative decision that may affect future use of the Colorado River. All dates listed above refer to launch dates from Lees Ferry.

J. All participants hiking into the canyon to meet a river trip must contact the River Permits Office on the South Rim. Identification must be available upon request. Any inner canyon camping while waiting for a river trip must be approved by the Backcountry Reservations Office through the reservation system.

K. While conducting your trip, rangers may contact your party and request information such as a copy of your permit or passenger list. They may also request to check camping procedures to see that regulations are being followed.

II. Cancellation Policies

A. Cancellation more than 60 days prior to the scheduled launch date will not result in restriction from the waiting list. Parties may reschedule their trip if the date was not claimed from a cancellation.

B. Anyone cancelling less than 60 days prior to the scheduled launch date will be restricted from the waiting list for one year.

C. Anyone cancelling less than 30 days prior to the scheduled launch date will be restricted from the waiting list for two years.

D. Deferrals (rescheduling to the next year) will not be allowed unless there is a confirmed medical problem with the permittee that will not allow them to participate in a river trip. Exceptions may be requested in writing addressed to the Chief of Visitor and Resource Protection.

E. If a launch date is accepted less than 30 days notice prior to launch, restriction from the waiting list will be for only one year if that date is cancelled at a later time.

III. Leader of Party and Boatman Experience

Experience in the Grand Canyon or one or more of the other comparable white water rivers is mandatory. The trip permittee or another member of the party should be familiar with the Grand Canyon portion of the Colorado

River.

The trip permittee and boatmen must have a working knowledge of white water safety, general first aid, river equipment repair, and the techniques of white water navigation.

IV. Water Craft

A. Types

1. Inflatable Rafts and Dories - All trip applications will be reviewed to determine if the numbers of rafts and/or dories are adequate in size and number in order to meet all equipment requirements (see Sections V and VI) and boat capacities (Section IV.B).

2. Fiberglass or Plastic White Water Canoes and Kayaks - Kayaks and canoes must be in good condition, and the front deck should be reinforced with extra layers or a sturdy brace. All trips must have the capacity to carry the minimum equipment required. (See Sections V and VI.)

   Open or canvas-decked canoes are not acceptable as primary craft. Open canoes are acceptable provided paddlers have extensive high-volume river experience. Canoes should have sturdy reinforcements and adequate flotation. Spare paddles and helmets are strongly recommended.

3. Motorized Water Craft - Motor-powered boats are prohibited from launching between September 16 and December 15. During the remainder of the year, both oar and motor-powered boats may launch.

B. Capacities: Passenger capacities for boat sizes (including gear) are listed below.

1. Dories: 16-18 feet in length: 5 passengers

2. Inflatable rafts and pontoons:

   a. less than 12 feet in length: 2 passengers
   b. up to 14 feet in length: 3 passengers
   c. up to 16 feet in length: 4 passengers
   d. up to 17 feet in length: 5 passengers
   e. up to 18 feet in length: 6 passengers
   f. 22 foot snout: 8 passengers
   g. 22-27 feet in length: 9 passengers
   h. 33 feet and over in length with outriggers: 16 passengers
      33 feet and over in length without outriggers: 12 passengers

C. Boat Registration

All watercraft operating in Grand Canyon National Park must be registered and must display numbers and decals in accordance with the Arizona Boating and Water Sports Law, (AGF, Article 5, R12-4-501 through R12-4-505). Arizona accepts home state rules of registration for a 90-day period and also honors home state regulations pertaining to registration of watercraft.

V. Emergency Equipment

A. Life Preservers and Regulations

Each participant MUST have a serviceable U.S. Coast Guard approved personal flotation device (PFD) Type I, II, III, or V. One extra PFD must be carried for every 10 persons, or one per boat, whichever number is greater. These must be maintained in good and serviceable condition in compliance with U.S. Coast Guard Standards AND MUST BE WORN AT ALL TIMES WHILE ON THE RIVER. A throwable cushion (U.S. Coast Guard approved, Type IV) is required for each watercraft 16 feet in length and over.

B. First Aid

A major first aid kit is required and shall be carried on each trip. A smaller kit must be carried on each boat. (See Supplement C, Suggested First Aid Items.)

C. Communications and Signalling

1. Emergency signalling equipment must include a signal mirror of the U.S. Air Force type and two 3-foot by 10-foot panels of international orange that can be placed in an "X" so as to be visible from aircraft. In the event of an emergency, the symbol "X" marked or placed on the ground by any means will signify that help or emergency aid is necessary. Upon notification by observers, a helicopter will be dispatched by the National Park Service.

2. A ground-to-air radio transceiver is recommended (although not required) equipment. Tune to frequency 122.75 east of Supai, frequency 122.85 east of Whitmore Wash and west of Supai, frequency 121.95 west of Whitmore Wash, and frequency 121.5 for EMERGENCY. Maps are available upon request for radio frequencies.

D. Other Emergency Items

One extra set of oars must be carried on each oar-powered boat or raft. Two extra paddles must be carried on rafts that are paddle-powered.

One extra motor must be carried on each motorized boat. Also, spare motor parts of the types most commonly found to break and need

replacement under river-running conditions (such as propellers, shafts, water pumps, etc.) should be carried. All motorized craft are required to carry one B-II or two B-I fire extinguishers.

When inflatable rafts or pontoons are used, each river trip will carry at least one air pump.

Every trip will carry a boat patching and repair kit.

One or more of the following maps or guides or their equivalent should be carried on each boat: Grand Canyon River Guide by Buzz Belknap, "Pictorial Color Map of Grand Canyon" by Jack Currey, appropriate U.S.G.S. quadrangles, Brigham Young University guidebooks to the Colorado River, Colorado River Guidebook by Troy L. Pewe, A River Runner's Guide to the History of Grand Canyon by Kim Crumbo, and A Guide to the Colorado River in Grand Canyon by Larry Stevens.

E. Incident Reports

Any incidents resulting in personal injury requiring a physician's attention, evacuation from the canyon, or property damage over $100 must be reported to Grand Canyon National Park. Incident forms must be given to an NPS ranger at the time of evacuation or to the ranger at Phantom Ranch or Pearce Ferry, or they may be mailed to the River Subdistrict within 5 days of the end of your trip. Incident forms will be supplied by Grand Canyon National Park with the trip permit.

F. Helicopter Evacuation (See Supplement E for evacuation procedures.)

In the event of an emergency requiring helicopter evacuation, arrangements will be made for the rescue service by Grand Canyon National Park only. The permittee will be responsible for the cost of the helicopter evacuation if the passenger is unable to pay.

VI. Environmental Protection and Sanitation

A. Refuse

Cans, rubbish and other refuse MAY NOT BE DISCARDED IN THE WATER OR ALONG THE SHORE OF THE RIVER, or side canyons, trails, escape routes, or any other portions of the canyon. All refuse material must be carried out. Deposits cannot be made at Phantom Ranch or Diamond Creek. Liquid garbage will be strained directly into the river through a fine mesh screen capable of holding small food particles; the solids will then be placed in garbage bags. Can smashing must be done on a tarp or below the high water line in a manner that will not leave food particles, liquids, or paper on the beach. The trip permittee is responsible to ensure that participants properly dispose of refuse.

B. The Use of Soap

The use of soap (low phosphate) is restricted to the Colorado River

only. Use of soap in side streams or within 100 yards of any side stream junction with the Colorado River is prohibited.

C. Portable Toilets

HUMAN WASTE CONTAINERS MUST CONSIST OF 20MM AMMO BOXES ONLY. It is the responsibility of each boat party to remove its solid human waste from the canyon. A human waste carry-out system will accompany all trips on the river. This system must be a minimum of that described in Supplement B or other previously inspected and NPS approved toilet system. These facilities will be set up in camp and remain until the party breaks camp. A small, accessible toilet is required for day use. Deposit toilet paper in a suitable container. DO NOT BURN TOILET PAPER. Urination should occur in river or in the wet sand below the high water line.

D. Fires

Gas stoves (propane, white gas, etc.) are required on all trips. Charcoal briquettes may be used for cooking. Wood fires may only be used for warmth or aesthetics. From May 1 through September 30, all wood must be carried into the canyon from an outside source. From October 1 through April 30, driftwood from along beaches may be used for warming and aesthetic fires. Gathering of wood from any standing or on-site fallen trees, dead or alive, is prohibited. All wood fires must be contained in a fire pan measuring 432 square inches; the lip of the pan must be 3 inches high. Charcoal briquettes may be contained in fire pans 12 inches by 12 inches by 3 inches. All ash and residue will be carried out of the canyon. Trips launching from October 1 through April 30 must carry an approved fire pan. Wood or charcoal fires are not allowed outside of the river corridor beaches.

VII. Restricted Areas

Areas along the Colorado River closed to either camping (including no open fires) or visitation include:

A. Colorado/Paria River confluence to Navajo Bridge - no camping.

B. Redwall Cavern - no camping and no fires.

C. Anasazi Bridge - closed to all visitation.

D. Nankoweap - special camping regulations (see Supplement F).

E. Little Colorado River - no camping from Mile 61 to Mile 65 on south-east (left) side of the Colorado River.

F. Hopi Salt Mine - no visitation east side of river from Mile 63 to Mile 64.5 on the east (left) side of the Colorado River.

G. Mile 71 to Mile 71.3 on north side (Furnace Flats) - no visitation.

H. Hance Mine - no visitation along trail from mile 77.0 (north bank) to and including Hance Mine (closure due to asbestos hazard).

I. From Memorial Day to Labor Day, it is recommended that camps in the entire corridor between Hance and Phantom Ranch be utilized only by trips with passenger exchanges.

J. Phantom Ranch (Mile 87 to Mile 89.25).

1. Left bank: 87 Mile Camp (Cremation) is for river trips requiring exchanges at Phantom Ranch. The capacity of the camp is two parties. No camping is permitted from the black bridge to 1/4 mile downstream of Pipe Creek (Garden Creek). Trip leader must notify the Phantom Ranch ranger at time of exchange of passengers.

2. Right bank: No camping from Mile 87 to Mile 89.25 except in an emergency. Emergency camping in this area, including "Roy's Beach," must be approved by the Phantom Ranch ranger. Wood fires will not be allowed at any time in this area. Passengers leaving trips at Phantom Ranch and wishing to camp at either Bright Angel Campground or Indian Gardens must have an overnight permit. (See Section X.)

K. Bass Mine, Hakatai Canyon - no visitation of area immediately surrounding the mine, talus slope, and camp (closure due to asbestos hazard).

L. Elves Chasm - no camping within 1/4 mile of the confluence of Royal Arch Creek with the river or within the chasm.

M. Deer Creek Falls - no camping on the north side of the Colorado River within 1/4 mile upstream or 1/2 mile downstream of its confluence with Deer Creek.

N. Matkatamiba - day use only, no camping in the canyon.

O. Havasu Creek - no camping within 100 yards upstream of the confluence of Havasu Creek with the river or 1/2 mile downriver from the confluence. Overnight use is permissible only within the Havasupai Campground. No camping is allowed between Beaver Falls and the river. A fee is charged for entrance to the Havasupai Reservation. For reservations at Havasu Campground, telephone the Havasupai Indian Tribe at (602) 448-2121 or 448-2141.

P. The left or south side of the canyon above the historical high water line between Mile 165 and Mile 273 is Hualapai Tribal lands. Any use of those lands for camping or hiking must be cleared with the Hualapai Tribe at Peach Springs, Arizona.

Q. Other areas as listed on the bulletin board at Lees Ferry.

VIII. Other Conditions

A. A fee is charged for each person and truck to traverse the Diamond Creek Road. Permits are required. For further information, contact Donnita Selana, Acting Director, Hualapai River Running Department, P.O. Box 246, Peach Springs, Arizona 86434, (602) 769-2210 or 769-2219.

B. Rafts/boats operating on Lake Mead at night must comply with U.S. Coast Guard running light requirements.

C. No cats, dogs, or other pets are permitted on a raft trip.

D. Trips may be delayed or cancelled at Lees Ferry if river trip terms and criteria are not met. Approval of conditions prior to departure shall be solely determined by the park ranger on duty.

E. An NPS river ranger may, on occasion, travel or camp with private parties.

F. Natural or historical features such as rocks, old mining artifacts, fossils, flowers, or Indian artifacts may not be removed or disturbed (36 CFR 2.1).

G. No vessel shall engage in primarily upstream travel or have a total horsepower of greater than 55.

H. Lees Ferry Launch Ramp Procedures - (See Supplement D).

IX. Noncommercial Use Affidavit

(See page 12 of application form.)

X. Backcountry or Off-river Camping

Permits are necessary for off-river camping in all areas of Grand Canyon National Park. All backcountry areas have group and/or party limits. A party is 8 or less people and a group is 16 or less people.

A backcountry permit is necessary for all off-river overnight use. Permits may be obtained from the Backcountry Office by requesting them in writing. Telephone requests are not accepted. The Backcountry Office accepts permit requests beginning October 1 for the following calendar year. All requests for overnight off-river camping should be sent to:

Backcountry Reservations Office
National Park Service
P.O. Box 129
Grand Canyon, Arizona 86023

Be sure to read Part VII, Restricted Areas.

XI. Derigging

All trips derigging at the Pearce Ferry boat ramp may not block the ramp or restrict the access of any other visitor wishing to use the boat ramp. River parties may not derig within the area between the deep water launch rig signs at Pearce Ferry boat ramp.

XII. Advisory to River Trips

A. Flash floods occur in side canyons of the Grand Canyon occasionally during the summer. The likelihood of flash floods increases during the afternoon. It is advisable to plan takeouts at Diamond Creek during the morning. Keep the possibility of flash floods in mind when camping at side canyons.

B. Water releases from Glen Canyon Dam have varied widely during past years. In 1988, daily fluctuations have occurred. Flows have ranged from 3,000 cfs to 20,000 cfs with averages of 12,000 cfs between July and September. Flows in the remainder of 1988 generally ranged between 3,000 cfs and 18,000 cfs with averages of 10,000 cfs. In prior years (1984-1986), flows were higher but consistent. The high releases were due to higher than normal precipitation in Utah and Colorado accompanied with relatively little storage space at Lake Powell. During these years, flows peaked in May or June from 45,000 cfs to 48,000 cfs. Although there are no minimum boat size restrictions, boats of at least 16 feet are recommended during these high releases.

Supplement A
SANITATION AND FOOD PREPARATION

Proper food handling and sanitation techniques are necessary to prevent the spread of communicable diseases among the members of your trip. Gastrointestinal illnesses are of primary concern. The usual source of gastrointestinal organisms is the human intestinal tract. Some organisms found in the nose or in infected skin lesions can produce a powerful toxin which cannot be destroyed by heat, and which can cause severe gastrointestinal illness. In addition to human sources, meat and poultry may be contaminated. If these foods are inadequately cooked, the result will be the contamination of utensils, preparation surfaces, and the hands of handlers.

Following contamination of a food, it is usually necessary for the bacteria to reproduce before an infective dose is developed. Three factors are required for reproduction - time, temperature, and a nutrient source.

It usually takes no more than 3 to 4 hours after food has been contaminated to produce enough bacterial growth to cause illness in a large number of people. Most of the organisms of concern will grow well between 77°F and 114°F. The contaminated food provides a nutrient source.

In order to prevent contamination of food during its preparation along the river, personal and environmental cleanliness are vitally important. No one with symptoms of a communicable disease, especially diarrhea, should be allowed to prepare food or handle utensils for others. Neither should anyone with infected wounds or boils be permitted to handle food. As disease-causing organisms often get into food from hands of a person preparing food, scrupulous personal cleanliness is important. Washing the hands with soap and water is essential after going to the toilet, handling raw meat and poultry, putting fingers in the nose, or handling objects that may be contaminated.

All surfaces with which food comes into contact during preparation, including knives, utensils, and table tops, must be clean and sanitary. Tables and equipment used for preparing raw meats and poultry should not be used for cooked foods until they have been cleaned and sanitized thoroughly.

The means by which foods become contaminated with disease organisms, and the subsequent processes through which these organisms pass in order to become dangerous to human health, dictate the procedures necessary to interrupt the chain of events leading to an outbreak of human illness. Briefly stated, these procedures are:

1. After handling or going to the toilet or handling raw meat or poultry, wash hands with soap and water before handling utensils and preparing foods.

2. Cooked or other prepared foods should come in contact only with clean and sanitized surfaces, equipment, and utensils. Equipment used for raw foods should be washed and sanitized before being used with cooked foods.

3. Persons with communicable diseases, infected wounds on the hands and arms,

or boils should not be allowed to prepare food.

4. Stored perishable food should be kept at temperatures below 45°F.

5. Foods such as meat and poultry products should be well-cooked (165°F) to destroy disease organisms.

6. After preparation and prior to serving, keep hot foods hot (above 140°F) and cold foods cold (below 45°F).

7. Leftover perishable food should be discarded or refrigerated immediately in clean, protected, labeled containers.

8. Leftover perishable food should be thoroughly reheated before use (to 165°F).

It is recommended to sanitize dishes and utensils using the three-bucket system. Place three buckets of water below the high water mark to leave the beach free of soap and spilled food. The system is as follows:

1. Use three buckets large enough to immerse the largest plates and eating utensils. Heat two buckets of water to near boiling. If the river is muddy, allow dishwater to settle and remove sediment before use. The use of alum is recommended for settling.

2. Add detergent to one heated bucket of water, leaving the other heated bucket of water clear for rinsing. To the third bucket of water, add chlorine at the rate of 3 to 4 ounces per 5 gallons for sanitizing. Set up sanitizing rinse 30 minutes prior to washing dishes to allow chlorine to work.

3. Wash dishes and utensils in first bucket to remove grease and food particles. Water temperature should be 120°F to 140°F.

4. Dip rinse in second bucket.

5. Immerse articles in the third bucket for 60 seconds, double time if towel-dried. The effectiveness of chlorine for disinfection is directly related to time of exposure. Be sure to allow time for the chlorine to sanitize.

6. Place dishes on a rack for air-drying or wipe dry with fresh paper towels. Store the articles in a clean, dry location to be ready for the next meal.

WATER PURIFICATION

All water consumption or cooking must be disinfected. Research during 1981 on the Colorado River and its tributaries indicates that the increased sediment from flooding or other causes may pose a high risk to river users. The following water disinfection steps should be followed:

1. Use the main course of the Colorado River to collect water unless the river is quite cloudy from sediment.

River, Bright Angel Creek, Garden Creek, Hermit Creek, Elves Chasm, Havasu Creek, and Diamond Creek.

3. To disinfect visually clear water, add eight drops of liquid chlorine bleach per gallon; mix the water; and let it stand uncovered for at least 2 hours.

4. Cloudy, sediment-laden water must be cleared before disinfection. Settle overnight or use floccing procedures. Water that is cloudy after settling must receive 10 to 12 drops of liquid chlorine bleach per gallon and let set for at least 2 hours before using.

5. The effectiveness of chlorine bleach deteriorates rapidly when exposed to high temperatures or have been on the shelf for extended periods.

6. A. Use of an approved filter alone will remove bacteria and cysts, however, to assure removal of viruses, the use of a disinfectant and a filter is recommended. Some filters currently available on the market contain components having a disinfectant action during filtration. However, bear in mind that these may not provide a protective residual to guard against recontamination once the water is filtered.

   B. Portable filters (either gravity flow or piston pump) having a nominal pore size of 0.45 microns or less may also be used. Settled water will extend filter life. In addition to overnight settling, alum may be added at the rate of 1/4 teaspoon per 1 1/2 gallons. Decant the clarified portion, filter, and disinfect by adding 1 to 2 drops of fresh bleach per gallon. Water treated in this manner should be allowed as long a contact time as possible but no less than one hour in all cases.

Supplement B

HUMAN WASTE CARRY-OUT METHOD

Previously, over 5,000 burials of human waste took place within the river corridor each year. Due to the impact on soils and vegetation and the hazard to human health presented by the burial system, it is now required that all solid human waste be carried from the canyon.

The cheapest and, so far, most effective means of transporting solid waste is by the use of air-tight ammo boxes and plastic bags. The items necessary are:

1. Large ammo cans (rocket boxes, 18 inches by 14 inches by 8 inches. Plastic buckets are not acceptable.

2. Toilet seat.

3. Large, heavy-duty plastic garbage bags.

4. Deodorant chemical: Aqua Chem (blue goo), chlorine bleach, slaked lime, Clorox II (dry bleach).

5. Toilet paper, hand washing water dispenser, and soap. Bar soap is not recommended. Use a system which allows flowing water to rinse soap off hands. It is recommended that the rinse system not employ the use of beverage coolers due to possible contamination of the spigot.

6. When feasible, place toilet system near river's edge and encourage urination in the river.

The system is set next to the river if possible. One of the rocket boxes serves as the actual toilet container. The rocket box is first lined with one of the heavy-duty, large garbage bags (fold the excess bag around the edge of the can). Pour some of the deodorant chemical into the open bag and place the toilet seat on top of the can. The toilet is now ready for use. The hand washing water dispenser and the hand soap can be placed close by. Used toilet paper, tampons, and sanitary napkins should be placed directly into the toilet. After each deposit, the toilet should then be covered with a large heavy-duty garbage bag or by the lid to discourage flies. When camp is to be broken, it takes only a few minutes to dismantle the toilet system and store the feces. Squeeze the excess air out of the bag and then tie it off. At this point, place the bag containing the feces into another garbage bag, and store subsequent bags in it. This is a security measure against leakage. This is then tied off as before. The storage bag is then placed into the rocket box, the lid is sealed, and the container ready for storage until the next day's use. The toilet seat, plastic bags, toilet paper, and deodorant are then stored in another ammo can ready for the next camp's use. It is necessary to remove only two cans per night from the boat - one for the storage of the equipment, another for actual use as a toilet and the subsequent storage of the fecal products.

The amount of chemical used per day depends on the type used and the number of people on the trip. With liquid deodorant, a few ounces at the bottom of the bag is sufficient for six or seven people. If you are using bleach, more is

required, approximately double. If used, slaked lime and dry bleach should be sprinkled over feces after each use. The chemical reduces bacterial growth in the feces and the production of methane gas. The number of ammo cans needed is dependent on the number of people and the length of the trip. We have found that it is easy to contain about 50 uses in one ammo box. Thus, for an 8-day, 10-person trip, you would need only two ammo boxes for feces and one ammo box for equipment. Please indicate on the application the number of ammo cans you intend to bring.

The above is the basic system. The basic tenant is to safely contain feces and prevent the generation of methane gas.

If you take out at Pearce Ferry, do not dump human waste in any container at Pearce Ferry. feces must be disposed of in a sanitary landfill or RV dump station. You should check in your area before leaving the river. You will have carried the material with you down hundreds of miles of river; be sure to take it to a proper deposit location.

Day Use Toilet System

A day use toilet system is required during the times when the regular toilet is not set up. Store toilet paper, plastic bags, coffee can, hand soap, and a small container of toilet chemical in a small ammo can or similar container that passengers can obtain when needed. Instruct users to deposit human waste and toilet paper in plastic bag with a squirt of bleach or other disinfectant chemical. To reduce the odor and increase the tidiness of the ammo can, the full plastic bags can be stored in a 1-pound coffee can (sealed) until dumped. Empty the used bags directly into the waste storage cans in the evening. This solves the problem of toilet paper disposal and the accumulation of human waste at beaches and attraction sites

Supplement C

SUGGESTED FIRST AID ITEMS

Items should be neatly stored in an easy to locate and identifiable waterproof container.

Highly recommended

First aid kit inventory list taped to the inside lid of the container, and Red Cross First Aid Manual, or equivalent.

Instruments	Description	Uses
Scissors (EMT type)	1 (medium size)	Cutting tape, dressings, clothes
Razor blade, single edge	2	For removing hair before applying tape
Tweezers	1	To remove wood splinters, etc.
Safety pins	10 (various sizes)	Mending and triangular bandage
Q-Tips (Cotton swabs)	1 package	Cleaning lacerations, eyes, etc.
Pencil/Note pad	1 each	Documenting injuries and items used in treatment
Relief of Discomfort		
Pain reliever (aspirin or substitute)	36 tablets (5 grain)	1-2 every 4 hours for headache, minor pain, and fever
Ibuprofen (Advil) or Generic brand	200 mg tablets	Muscle strains, minor pain, or menstrual cramps
Antacid	18 tablets	For indigestion or heartburn
Antihistamine	18 tablets	1 every 4 hours for insect bites Colds, hives, or rashes
"Gookinaid" or similar electrolyte replacement drink	1 tub minimum	Relieve or prevent muscle cramps and symptoms of heat exhaustion
Oil of clove	1 small bottle	Relief of toothache
Calamine lotion or Cortisone cream	1 bottle	Relief of itching from poison ivy Life preserver rash, or allergies
Solarcaine	1 bottle	Relief of sunburn pain

Zinc oxide/PABA or other sun block	1 bottle	Prevent sunburn
Benadryl Syrup	1 bottle	Minor allergic reactions

Other

Antibacterial soap (Phisoderm, tincture of zephesis, Hibiclens)	8 to 12 ounces	Antiseptic for wounds
Moleskin	1 package	For blisters
Betadine	1 bottle	For cleaning wounds
Band-aids	36 (1-inch)	For lacerations
Anti-bacterial ointment (Bacitracin, etc.)	2 tubes	For lacerations and wounds
Butterfly Band-aids (or know how to make)	18 (various sizes)	For closing lacerations
Carlisle (trauma dressing) or substitute (such as Kotex)	3 (4-inch)	For large bleeding wounds
Elastic bandage	2 (3-inch)	For sprains and securing rigid splints
Steri-pad gauze pads	18 (4 inch by 4 inch)	For large wounds
Steri-pad gauze pads	18 (2 inch by 2 inch)	For small wounds
Tape, waterproof adhesive	2 (2-inch rolls)	For sprains, securing dressing, etc.
Triangular bandage or muslin pieces	4 (40-inch)	For securing rigid splints, slinging and securing extremeties, and protecting dressing from contamination
Roller gauze	5 rolls (2 inch by 5 yards)	For holding gauze pads in place, securing splints, and improvising slings
Rigid splint, arm board, sam splint	1	For in-line fracture, pressure bandage
Rigid splint, leg board, sam splint	1	For in-line fracture, pressure bandage

Thermometers; exposure 1 oral, 1 rectal (a hypothermia thermometer is recommended)	2	Diagnosing fever or other Illnesses; heatstroke, hypothermia
Signal Mirror	1	Signaling aircraft in case of emergency
Dimes and quarters	Several	Making phone calls in case of emergency
<u>Optional</u>		
Mineral oil	Small bottle	Constipation
Syrup of Ipecac	Small bottle	Induce vomiting
Kaopectate	Small bottle	Diarrhea
Ophthalmic wash and/or Eye drops	Small bottle	Eye wash/irritation
Ear drops	Small bottle	Clogged/infected ears
Water purification	Small bottle	Purify water on side-canyon hikes tablets (use bleach for river water)
Eye pad	2	Injured eye
Tincture of Benzoin	2 small bottles	To hold tape in place and protect skin
Insect repellent	Large can or bottle	Flies, ants, mosquitoes

<u>A Note About Hypothermia (Exposure)</u>:

Should people fall in the river, <u>it is extremely important to get them out of the water as quickly as possible</u>. After 5 minutes of floating in 50-degree water, muscular strength and coordination rapidly diminish. Generally after 10 to 15 minutes, people are totally unable to help themselves.

Supplement D

LEES FERRY INFORMATION SHEET
1990

The procedures and regulations for using the campground and other facilities at Lees Ferry are listed below.

LAUNCH RAMP PROCEDURES

(1) The trip leader will check-in with the ranger on duty prior to rigging for launch. Arrangements for attending the river passenger orientation program may be made with the ranger at this time. If launching on a day when two noncommercial trips are scheduled, you will be assigned to either a morning or afternoon check-in and orientation.

(2) Trucks and cars may be parked on the ramp only long enough to unload gear. The vehicles must then be moved. Vehicles should be left in the 14-day parking area. There is NO OVERNIGHT PARKING on the launch ramp.

(3) Bathing, washing dishes, and sleeping in the launch ramp rest rooms is prohibited. This includes the water spigots near the rest rooms.

(4) Preparation and cooking of meals or setting up tables on the ramp is prohibited.

(5) Due to the congestion and high level of activity on the launch ramp in the morning, the use of radios and tape players is prohibited.

(6) A maximum of two trip members may sleep on the ramp with their gear. Everyone else must use the campground provided for noncommercial river parties.

(7) There is no camping at or near the historic buildings.

(8) If returning to Lees Ferry after your trip, there is no de-rigging allowed on the launch ramp. Neither garbage nor human waste is to be deposited at Lees Ferry. Camping is only allowed in the 14-day area upon return from your trip.

CAMPING PROCEDURES

A three site camping area has been designated near the launch ramp for noncommercial use. The camping area is located 100 yards west of the launch ramp. A sign ("Private River Runners Camp") designates this area. The Lees Ferry Campground, which is 1.5 miles from the launch ramp, may also be used, however, this is a fee area. The regulations for the camping area for noncommercial river runners are:

(1) The trip leader will check-in with the ranger on duty prior to setting up camp during working hours.

(2) Camping procedures must comply with the noncommercial river trip regulations. Stoves, fire pans, dish washing systems, and human waste system will be set up depending on the need.

(3) Human waste will be carried downriver.

(4) Charcoal ash will be carried downriver. Gathering of firewood is prohibited.

(5) Trash will be bagged and deposited in the containers near the launch ramp.

(6) A maximum of 16 river trip participants per site is allowed.

(7) Quiet hours are from 10 p.m. to 6 a.m. No loud noise will be tolerated.

(8) There is a two day limit in the camping area. If you arrive earlier, you will have to use the Lees Ferry Campground.

(9) Groups arriving at Lees Ferry late at night must use the Lees Ferry campground fee area. The following day, they may check-in with the ranger on duty for the use the noncommercial river runners campground or rigging area.

Thank you for your cooperation with other river runners at Lees Ferry.

Supplement E

HELICOPTER EVACUATIONS

A. JUSTIFICATION - Helicopter evacuations are available for medical or other emergencies only.

B. Request Procedures

1. Arrangements for helicopter evacuations will only be made by the NPS.
2. Requests for evacuation can be made by, (1) contacting the NPS directly (river patrols, Lees Ferry, Phantom Ranch) or, after using an escape route, by telephoning Grand Canyon dispatch at (602) 638-2477, (2) contacting aircraft by ground-to-air radio, (3) mirror flash or other signaling device directed toward passing aircraft or rim overlooks.
3. When contacting aircraft by radio, be sure to provide accurate and concise information. Remember, your message may be relayed several times before it reaches the Park Service dispatch. Provide information in the following order:

   (a) Give your location. State that you are a river trip requesting helicopter evacuation at a given river mile in the Grand Canyon.
   (b) Briefly state the problem (suspected spinal injury, severe head injury, hypothermia, etc.).
   (c) If the injury is minor and stable, state that fact. This will allow EMS personnel to determine priorities in the event of simultaneous requests for medical responses. Ask the pilot to repeat the message so that you know they understand your situation.

4. A mirror flash is often the most reliable method of contacting aircraft, so be sure you understand how to use the mirror as a signaling device. Remember that the mirror flash presents problems in that no patient assessment information is relayed and your location is not certain to be reported correctly.

C. Landing Zone Selection and Preparation

1. Select a level area approximately 10 feet by 10 feet. Be sure that it is clear of obstacles such as trees and large rocks for a diameter of 50 feet. Such areas are virtually non-existent in some stretches of river (i.e., below Crystal to Bass, Olo to Havasu, etc.). While the pilot and crew can conduct hover exits and one-skid landings, these attempts are dangerous and will not be attempted except as a last resort in life-threatening situations. Unless such travel poses serious problems for the patient, transport by boat to a safe landing zone will generally provide a faster and safer evacuation.
2. Set up an X with the orange panels. Do not locate the panels directly on the landing zone. Remove the panels once the pilot

locates your position in the event he selects that site for landing. This will assist the pilot in determining your party from others in the vicinity.

3. Prepare your group and camp for the evacuation. It is extremely important that everyone be gathered together away from the landing zone and in full view of the pilot. Be certain that no loose items are in the landing zone since the downwash will lift and toss articles, possibly into the rotor or your group. Secure loose equipment in the camp (sleeping bags, ground cloths, tables, lifejackets, etc.) in the event the pilot must pass over the area.
4. Wet down as much of the landing area as possible just prior to the helicopter's arrival. This helps the pilot's visibility, decreases the amount of sand blown into eyes, boats, and food, and reduces damage to the helicopter's surface and engine.
5. The pilot's awareness of wind direction is critical for safe landings. The helicopter must fly directly into the wind when landing and taking off. Do not locate your group in the flight path. You can assist the pilot by indicating wind direction. The easiest method is to simply toss a handful of sand directly upward. The pilot can then observe the direction of drift. Another method is to stand with your back against wind and extend both arms forward pointing the direction the wind is blowing.
6. NEVER APPROACH THE HELICOPTER UNLESS DIRECTED TO DO SO BY THE PILOT OR CREW. Never approach from the rear of the helicopter. Keep your group together and in one location. When directed to do so, approach the helicopter in full view of the pilot. Walk in a crouched position to avoid being struck by the helicopter rotor blades.

Supplement F

NANKOWEAP SPECIAL USE AREA

Due to the impacts of multiple trailing, campsite competition, and congestion in the Nankoweap area, the following special camping regulations are in effect. Camping for river runners in the Nankoweap Delta area, Mile 52.0 to Mile 53.0, right bank, is restricted to the three river camps identified ^R
on the map as First Camp, Main Camp, and Lower Camp. The First Camp is located in a large cove behind a gravel bar, approximately 1/2 mile downstream of the confluence with Nankoweap Creek. The camp is visible on the right from the tail waves of Nankoweap Rapid. The Main Camp is also visible several hundred yards downstream. The Lower Camp is a small, boulder-covered sand bar forming a point of land 100 yards downstream and around a corner from Main Camp. Each camp has a capacity of one river party only. River parties wishing to hike must disembark at any one of the three camp locations or at the mouth of Nankoweap Creek (Hiker's Camp) only. This requirement is due to past problems of multiple trailing. Groups camping early or on layovers should expect other groups to pull in for hikes.

Supplement G

RIVER INCIDENT REPORT

Trip Leader/Permittee: _____

Date: _____ Location of Incident: _____

NATURE OF INCIDENT: _____

INVOLVED PERSONS	ADDRESS	PHONE	SEX	AGE	DOB

OCCURRED: Ashore _____ Boat _____ In water _____ Other _____

WATER LEVEL: _____cfs

DESCRIPTION: How did the incident occur? _____

When did it happen (date and time)? _____

First Aid given: _____

Medications given (dose and time): _____

_____
Signature

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
GRAND CANYON NATIONAL PARK
P.O. Box 129
Grand Canyon, Arizona 86023
(602) 638-7843

C. NONCOMMERCIAL RIVER TRIP PERMIT APPLICATION

INSTRUCTIONS

I. Enclosed are the following:

A. Copy of trip regulations and

B. Permit application form which includes the listing of adverse actions and penalties with respect to violations of permit requirements.

II. Please read the entire packet prior to completing the application or signing any part of it. Your signature is required on pages 2 and 12.

III. You have been assigned a launch date for a river trip in Grand Canyon National Park as indicated on page 3. Complete the application and return it to Grand Canyon National Park no less than 30 days prior to the launch date, enclosing a non-refundable $50 application fee. Only money orders will be accepted. Upon receipt, your application will be reviewed and approved or disapproved. If disapproved, you will be contacted by telephone as soon as possible to correct the situation. This permit is subject to final approval by the park ranger on duty at Lees Ferry.

IV. Cancellation Policies

A. Anyone cancelling more than 60 days prior to the scheduled launch date will not be restricted from the waiting list and may reschedule their trip if the date was not claimed from a cancellation.

B. Anyone cancelling less than 60 days prior to the scheduled launch date will be restricted from the waiting list for one year.

C. Anyone cancelling less than 30 days prior to the scheduled launch date will be restricted from the waiting list for two years.

D. Deferrals (rescheduling to the next year) will not be allowed unless there is a confirmed medical problem with the permittee that will not allow them to participate in a river trip. Exceptions may be requested in writing addressed to the Chief of Visitor Protection.

E. If a launch date is accepted less than 30 days notice prior to launch, restriction from the waiting list will be for only one year if that date is cancelled at a later time.

NOTICE OF ADVERSE ACTIONS OR PENALTIES

You, as trip permittee for a noncommercial river trip conducted within Grand Canyon National Park, have the responsibility for ensuring that this trip and all participants comply with the terms and conditions of the permit.

In the event that any violations of the terms and conditions of the permit do occur, you may be subject to the following adverse consequences and/or penalties. You, as trip permittee, and/or any member of your party may incur these penalties:

A. You or any member of your party may be required to appear personally before the U.S. Magistrate at Grand Canyon National Park regarding any violation.

B. You or any member of your party may be fined not more than $500 per person per incident.

C. At the discretion of the U.S. Magistrate, you or any member of your party may be sentenced to a period of incarceration not to exceed 6 months, subsequent to a serious violation of the permit terms and conditions.

D. At the discretion of the Superintendent of Grand Canyon National Park, you or any member of your party may be prohibited from participation in any future commercial or noncommercial river trips in Grand Canyon National Park for a period of no more than 3 years, subsequent to any violations of the permit terms and conditions.

E. At the discretion of the Superintendent, your approved river trip permit may be revoked and your trip terminated at any point within Grand Canyon National Park subsequent to any violations of the permit terms and conditions. Should this occur, you, any, or all members of your party along with any or all of your party's equipment, may be removed from Grand Canyon by helicopter, boat, or other means. This action may result in any or all of your equipment being impounded until transportation costs are paid. Transportation costs could be $5,000 or more.

Your signature below indicates that you have read and understand these penalties and adverse actions which may result subsequent to any violations of the terms and conditions of the permit.

Your signature further indicates that you accept full responsibility for any reasonable and customary expenses and/or impound fees incurred by the National Park Service during the removal of any or all of your party from Grand Canyon subsequent to violations of the permit terms and conditions.

Permittee's Signature _____ Date _____

Approved by _____
Date _____

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
GRAND CANYON NATIONAL PARK
P.O. Box 129
Grand Canyon, Arizona 86023
(602) 638-7843

THIS MUST BE RETURNED NO LESS THAN 30 DAYS PRIOR TO LAUNCH DATE.

NONCOMMERCIAL RIVER TRIP APPLICATION

Launch date _____ Takeout date _____

Top 300 _____ Open Season _____ Waiting list number _____

Permittee _____

Address _____

City _____ State _____ Zip Code _____

Daytime telephone no. (_____) _____
area code

Qualifying Boatman Experience

The permittee or one other qualified boatman who will be present on the entire trip must have participated in a previous Grand Canyon river trip as a boatman in command of a boat or participated as a boatman in command of a boat on a river of similar difficulty.

A list of rivers of similar difficulty appears below; this list is not all-inclusive.

Cataract Canyon, UT	Lodore Canyon, CO
Westwater Canyon, UT	Rogue River, OR
Green River, UT	Selway River, ID
Yampa River, CO	Tuolumne River, CA
Main Salmon, ID	Middle Fork Salmon, ID

In the space provided on the following page, permittee may show evidence of qualifying experience for himself/herself or one other trip participant. The selection of all other boatmen/kayakers will be the responsibility of the permittee. He/she should be guided by a thorough understanding of the technical skill required to navigate the major rapids found in Grand Canyon National Park. Questions may be directed to the River Subdistrict at (602) 638-7843.

Qualifying Boatman

Name _____

Address _____

City _____ State _____ Zip Code _____

Daytime telephone no. (_____) _____
area code

River	Type of Experience	Type of Craft
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Further Comments:

Participant List

PLEASE PRINT LEGIBLY

All participants must have a valid form of picture identification. Identification such as a driver's license, State ID, bank cards that have the owner's picture, and notarized affidavits are acceptable. Documents such as credit cards, altered birth certificates, etc., are not acceptable.

FAILURE TO PRESENT A VALID ID TO THE LEES FERRY RANGER WILL RESULT IN A PARTICIPANT BEING REMOVED FROM YOUR PERMIT.

	Participant's Name	Address	Phone #	Social Security #
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				

Address to which the permit should be sent:

_____

_____

Note: Any last-minute changes in your passenger list are acceptable and may be made by the ranger on duty at Lees Ferry at the time of your launch.

Maximum trip lengths allowed from Lees Ferry to Diamond Creek are:

April 16 - October 15: 18 days
October 16 - November 30: 21 days
December 1 - February 29: 30 days
March 1 - April 15: 21 days

PROPOSED ITINERARY

List dates and miles of progress as accurately as possible. A permit will be necessary for all off-river camping use. Please identify sites where research work will take place. Please include all nights of the trip.

Day #	Camp Name (Mile #)	Date	Day #	Camp Name (Mile #)	Date
1.			16.		
2.			17.		
3.			18.		
4.			19.		
5.			20.		
6.			21.		
7.			22.		
8.			23.		
9.			24.		
10.			25.		
11.			26.		
12.			27.		
13.			28.		
14.			29.		
15.			30.		

Location of takeout: _____ Date: _____

ON-RIVER EQUIPMENT AND PROCEDURES

A. Watercraft

Note: Motor-powered boats are prohibited from launching between September 16 and December 15. During the remainder of the year, both oar and motor-powered boats may launch.

Boat #1 Kayak _____ Raft _____ Other _____

_____ _____
Boat Manufacturer and Model Dimensions

_____
Type of frame and method of propulsion

_____ _____
Registration Numbers Name of Boat Owner
(See Part IV.C. of Permit Regulations.)

Boat #2 Kayak _____ Raft _____ Other _____

_____ _____
Boat Manufacturer and Model Dimensions

_____
Type of frame and method of propulsion

_____ _____
Registration Numbers Name of Boat Owner
(See part IV.C. of Permit Regulations.)

Boat #3 Kayak _____ Raft _____ Other _____

_____ _____
Boat Manufacturer and Model Dimensions

_____
Type of frame and method of propulsion

_____ _____
Registration Numbers Name of Boat Owner
(See part IV.C. of Permit Regulations.)

Boat #4 Kayak _____ Raft _____ Other _____

_____ _____
Boat Manufacturer and Model Dimensions

_____
Type of frame and method of propulsion

_____ _____
Registration Numbers Name of Boat Owner
(See part IV.C. of Permit Regulations.)

Boat #5 Kayak _____ Raft _____ Other _____

_____ _____
Boat Manufacturer and Model Dimensions

_____
Type of frame and method of propulsion

_____ _____
Registration Numbers Name of Boat Owner
(See part IV.C. of Permit Regulation.)

If more boats are to be used, use a separate sheet using the above format for each additional boat.

B. Life Preservers: (Only USCG approved Type I, II, III, or V are acceptable.) In addition to each participant's life preserver, 1 spare life preserver is required per boat or 1 spare per 10 persons, whichever is greater.

Type I - - - - - - - - - - - - - - - - Number of Each _____

Type II - - - - - - - - - - - - - - - - Number of Each _____

Type III - - - - - - - - - - - - - - - Number of Each _____

Type IV (1/boat 16' & over) - - - - Number of Each _____

Type V - - - - - - - - - - - - - - - - Number of Each _____

C. First Aid and Emergency Equipment

Number of first aid kits

How do you propose to handle a serious injury? Remoteness and isolation should be given heavy consideration.

D. Emergency Communications Equipment:

Type of Radio (optional) _____ Frequencies _____

Type of signal mirrors (required) _____ Number _____

Type and color of signal panels (required)_____

_____ Number _____

Other _____

_____

Passing trips, either commercial or private, should not be considered a reliable source of assistance in an emergency.

E. Describe spare items, repair kits, and spare means of propulsion for watercraft. Adequacy will be important on your trip.

ENVIRONMENTAL PROTECTION AND SANITATION

A. Describe how refuse, garbage, and dishwater will be disposed of and/or handled while on the trip. A straining screen is required. No trash may be dumped at Diamond Creek. There is a trash receptacle available at Pearce Ferry.

B. Describe your toilet facilities and methods of disposal; indicate number and capacity of containers you will carry. (Allow 50 uses per 20mm ammo can.) A small, accessible day-use toilet is required. No human waste may be dumped at Diamond Creek. Human waste dumping is available at Pearce Ferry in the blue human waste dumpsters only. These are located 1/2 mile up the road from the boat ramp.

C. If you are planning to have a fire, provisions for containing it, hauling out charcoal and ash, and your fuel source must be described. (See Regulations, Part VI.D.)

Between May 1 and September 30, all fuel for fires must be brought in from outside Grand Canyon National Park. Between October 1 and April 30, DRIFTWOOD along beaches may be gathered and burned. Do not collect dead and down wood, and do not cut any tree or other vegetation. Fires may not be used for cooking. All trips launching between October 1 and April 30 must carry an approved firepan.

OTHER INFORMATION

A. In the event that your party is in need of emergency assistance (medical evacuation, search and rescue, or emergency message), please describe in detail any information that would be helpful in locating your party from an aircraft. This includes colors of boats, rigging, tarps, frames, or any unusual equipment.

B. Please give any additional information which you feel would be helpful in evaluating your application.

C. Please plan to attend a required hour-long orientation program at Lees Ferry before launching. You may contact the duty ranger to make arrangements.

****

☐ There are several companies which provide services such as shuttles, equipment rentals, and tows. If you would like the list of these companies, please check the box.

****

ITEMIZED EXPENSES

Cost

Food - $_____

Travel - $_____

Rental Equipment - $_____

(From _____)

Car/Air Shuttles - $_____

(From _____)

Tows - $_____

Car Storage - $_____

Other _____ $_____

_____ $_____

_____ $_____

_____ $_____

Total Cost to be Shared $_____

Number of Participants _____

Cost per Person _____

PRIVATE USE AFFIDAVIT

Your signature in this section indicates that you have considered the permit conditions and that your trip is organized in the spirit, as well as the intent, of these conditions (pursuant to Title 36, Code of Federal Regulations). Failure to abide by these conditions will jeopardize future applications, and will result in permit cancellation.

1. A private river trip must be participatory in nature. Trip preparation (including logistics, food purchase, equipment assembly, transportation, and vehicle shuttle) and conduct of the trip (including food preparation and sanitation) must be shared by members of the group. Collecting a set fee (monetary compensation), payable to an individual, group, or organization, for conducting, leading, guiding, or outfitting a private river trip is not allowed. Trips may be considered noncommercial when a member of the trip receives a salary, but not directly through fees contributed by members of the party. The trip permittee should delegate responsibility (financial and otherwise) for various aspects of trip preparation and conduct.

2. The purpose of the trip must be for its recreational values. The trip will not be conducted for the purpose of monetary gain (either as a direct or indirect result of the trip); acquisition of new equipment to the advantage of an individual, group, or organization; or for the purpose of amortizing equipment.

3. Media, direct mail, or other advertising is not permissible.

4. Estimated overall trip cost: $_____ (based on _____ trip members).

5. A complete itinerary including off-river days and a listing of qualifying boatmen, experience, equipment, and other information insuring compliance with the Part A criteria must be provided to the River Subdistrict no less than 30 days prior to trip launch.

6. The noncommercial river permit is not transferable. The permittee must accompany the entire river trip.

I have given complete and accurate descriptions and answers to all questions. I agree to comply with all park rules and regulations as stated in Terms and Conditions of this application, and appropriate parts of the Code of Federal Regulations, AND ASSUME FULL RESPONSIBILITY FOR THE CONDUCT OF MY ENTIRE PARTY IN OBEYING THESE RULES AND REGULATIONS. I understand that falsification of names will make my permit application invalid. I also acknowledge that I have read and agree with all terms in the above Private Use Affidavit.

I understand that it is unlawful to knowingly and willfully falsify or conceal by a trick, scheme, or by any false, fictitious, or fraudulent statements or representations or make use of any false writings or documents knowing the same to contain any false, fictitious, or fraudulent statement or entry. Violators will be subject to a fine of not more than $10,000 or imprisonment for not more than 5 years or both. (18 U.S.C. 1001 (1970)).

Applicant's Signature _____ Date _____

COLORADO RIVER MANAGEMENT PLAN

APPENDIX E

GUIDELINES FOR CONDUCTING RESEARCH ON THE COLORADO RIVER WITHIN GRAND CANYON NATIONAL PARK

The Colorado River Corridor through Grand Canyon National Park offers the scientific community unique opportunities for study and research projects. River trips offer the researcher access to Canyon resources not readily available by other methods of transportation. No limit has been placed on the number or size of research trips, however, former permit procedures allowed for misuse of these special river use opportunities. It is the intent of Grand Canyon National Park to more closely monitor and evaluate the impact of research river trips upon the natural and social environment of the river corridor. It is also the responsibility of the National Park Service (NPS) to assure all research endeavors are conducted as scientific ventures sincerely managed to accomplish the stated objectives of the research permit.

All research along the Colorado River through Grand Canyon National Park will continue to be subject to approval by the Superintendent through the Division of Resources Management and Planning prior to launching. Trip proposals must be submitted in writing to the Superintendent's Office no later than December 1 of the year prior to the research trip. Trip proposals must include an explanation as to why a river trip is necessary to accomplish the research.

Upon approval of the research proposal by the NPS, the researcher must submit an application to the River Permits Office. This application is similar to the noncommercial trip application and requires a justification statement explaining why each trip member's participation is essential to accomplishing the purpose of the trip. The completed application must be received in the River Permits Office no later than 45 prior to the launch date.

Approved researchers will have three options to outfit their trip: 1) to utilize privately owned or rented equipment, much like a noncommercial river trip; 2) to contract with an approved commercial concessioner; or 3) to use another approved outfitter. Personnel and equipment must meet the qualifications and standards identified in the Colorado River Management Plan. Research trips must acquire an adequate insurance bond in order to secure permit approval.

Within 30 days of trip completion, a journal of trip activities and accomplishments must be submitted to the Superintendent. Similarly, if the study results in a technical report or professional paper, this information must be submitted to the park no later than 30 days following publication.

In order to monitor current research utilizing the Colorado River, the following Colorado River Research Application has been designed to help park managers more completely evaluate requests for research trips.

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
GRAND CANYON NATIONAL PARK
P.O. Box 129
Grand Canyon, Arizona 86023
(602) 638-7843

RESEARCH RIVER TRIP PERMIT APPLICATION

INSTRUCTIONS

I. Enclosed are the following:

Part A. This section applies to all research river trips. Please read carefully and sign pages 4 and 5. Trips utilizing an approved Grand Canyon commercial outfitter must complete only Part A.

Part B. All non-outfitted trips and those using commercially contracted outfitters other than approved Grand Canyon commercial outfitters must complete this entire section, Part B., in addition to Part A.

II. Please read the entire packet prior to completing the application or signing any part of it.

III. Please complete the application and return it to Grand Canyon National Park no less than 45 days prior to the proposed launch date; we will process your research trip application upon receipt. If your application is not approved, you will be contacted by telephone as soon as possible. This permit is subject to final approval by the park ranger on duty at Lees Ferry.

IV. Cancellation of scheduled research trip - It is the permittee's responsibility to notify the River Subdistrict Office of their inability to use the scheduled launch date. If appropriate a new launch date will be assigned.

V. Please attach a copy of your approved research proposal, research permit and collecting permit (if applicable) to your completed application. Your request to launch will not be approved without this information.

VI. All research river trips must be conducted in compliance with all safety, environmental, and health standards as outlined in the annual Noncommercial Operating Requirements enclosed with this application.

VII. All research trip participants must attend a one hour river orientation program prior to launching. Contact the ranger on duty to make arrangements.

OFFICE USE:
Approved by _____
Date _____

PART A

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
GRAND CANYON NATIONAL PARK
P.O. Box 129
Grand Canyon, Arizona 86023
(602) 638-7843

THIS MUST BE RETURNED NO LESS THAN 45 DAYS PRIOR TO PROPOSED LAUNCH DATE.

RESEARCH RIVER TRIP APPLICATION

Proposed Launch date _____ Takeout date/Location _____

Permittee _____
First Middle Last

Address _____
Street or P.O. Box

City _____ State _____ Zip Code _____

Daytime telephone no. (_____) _____
area code

Those research trips utilizing an approved Grand Canyon commercial outfitter should complete the following:

Grand Canyon Commercial Outfitter _____

Certified Grand Canyon Lead Boatman _____

Boat Type and Registration Numbers _____

_____

PARTICIPANT LIST

Please list each trip participant by name, their specific function, and state why the participant's role is essential to the purpose of the research trip. Please include participant telephone numbers.

	Name	Function	Justification	Telephone
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				

Please attach addition sheets if necessary. Substitutions to this list must be made prior to launching at Lees Ferry with notification made to the River Permits Office.

River Research Trip Permits will be mailed to the Research Permit holder.

It is recommended that research trips be of a duration in which research is completed in the shortest possible time. Please give adequate consideration to boat propulsion type (motor or oars) in terms of travel and work to be accomplished. Research trips scheduled during the primary season (May 1 through September 30) are excluded from stopping at "attraction sites" not specifically identified as research targets. It is required that research trips select nightly camps not heavily used by noncommercial or commercial operators and that they discuss proposed campsites with other river trips traveling on similar schedules.

Maximum trip lengths allowed from Lees Ferry to Diamond Creek are:

April 16 - October 15	18 days	December 1 - February 29	30 days
October 16 - November 30	21 days	March 1 - April 15	21 days

PROPOSED ITINERARY

List dates and miles of progress as accurately as possible. A permit will be necessary for all off-river camping use. Please identify sites where research work will take place. Please include all nights of the trip.

Day #	Camp Name (Mile #)	Date	Day #	Camp Name (Mile #)	Date
1.			16.		
2.			17.		
3.			18.		
4.			19.		
5.			20.		
6.			21.		
7.			22.		
8.			23.		
9.			24.		
10.			25.		
11.			26.		
12.			27.		
13.			28.		
14.			29.		
15.			30.		

Location of takeout: _____ Date: _____

NOTICE OF ADVERSE ACTIONS OR PENALTIES

You, as trip permittee for a research river trip conducted within Grand Canyon National Park, have the responsibility for ensuring that this trip and all participants comply with the terms and conditions of the Colorado River Management Plan.

In the event that any violations of the terms and conditions of these permits do occur, you may be subject to the following adverse consequences and/or penalties. You, as trip permittee, and/or any member of your party may incur these penalties:

A. Violation of the conditions of the Research Permit Conditions may result in a fine not more than $500 per person per incident. At the discretion of the U.S. Magistrate, you or any member of your party may be sentenced to a period of incarceration not to exceed 6 months, subsequent to a serious violation of the permit terms and conditions.

B. At the discretion of the Superintendent of Grand Canyon National Park, you or any member of your party may be prohibited from participation in any future research, commercial, or noncommercial river trips in Grand Canyon National Park for a period of no more than 3 years subsequent to any violations of the permit terms and conditions.

C. At the discretion of the Superintendent, your approved research river trip permit may be revoked and your trip terminated at any point within Grand Canyon National Park subsequent to any violations of the permit terms and conditions. Should this occur, you or members of your party along with any or all of your party's equipment, may be removed from Grand Canyon by helicopter, boat, or other means. This action may result in any or all of your equipment being impounded until transportation costs are paid. Transportation costs could be $5,000 or more.

Your signature below indicates that you have read and understand these penalties and adverse actions which may result subsequent to any violations of the terms and conditions of the permit.

Your signature further indicates that you accept full responsibility for any reasonable and customary expenses and/or impound fees incurred by the National Park Service during the removal of any or all of your party from Grand Canyon subsequent to violations of the permit terms and conditions.

Permittee's Signature _____ Date _____

RESEARCH USE AFFIDAVIT

Your signature on this page indicates that you have considered the permit conditions and that your trip is organized in the spirit, as well as the intent, of these conditions (pursuant to Title 36, Code of Federal Regulations). Failure to abide by these conditions may jeopardize future applications, and may result in permit cancellation.

1. A research river trip must be participatory in nature. Collecting a set fee (monetary compensation), payable to an individual, group, or organization, for conducting, leading, or guiding a research river trip is not allowed. The trip permittee is responsible (financial and otherwise) for all aspects of trip preparation and conduct. If not completely funded by the permit holder trip costs are to be shared equally by all research trip participants.

2. The purpose of the trip must be for research purposes only. The trip will not be conducted for the purpose of monetary gain (either as a direct or indirect result of the trip); acquisition of new equipment to the advantage of an individual, group, or organization; or for the purpose of amortizing equipment.

3. Media, direct mail, or other advertising is not permissible. Recruitment of student researchers will be allowed, however, class or course fees are prohibited from being used to cover research trip expenses. Only the sharing of actual trip cost is allowed.

4. Estimated overall trip cost: $_____ (based on _____ trip members). Estimated participant cost $_____.

5. A complete itinerary including off-river days and a listing of qualifying boatmen, experience, equipment, and other information insuring compliance with the Part A criteria must be provided to the River Subdistrict no less than 45 days prior to trip launch.

6. The river research permit is not transferable without prior approval from the River Permits Office. The permittee must accompany the entire river trip.

7. River research trips will abide by all applicable guidelines established for noncommercial users.

I have given complete and accurate descriptions and answers to all questions. I agree to comply with all park rules and regulations as stated in Terms and Conditions of this application, and appropriate parts of the Code of Federal Regulations, AND ASSUME FULL RESPONSIBILITY FOR THE CONDUCT OF MY ENTIRE PARTY IN ABIDING BY THESE RULES AND REGULATIONS. I understand that falsification of names will make my permit application invalid. I also acknowledge that I have read and agree with all terms in the above River Research Use Affidavit.

I understand that it is unlawful to knowingly and willfully falsify or conceal by an trick, scheme, or by any false, fictitious, or fraudulent statements or representations or make use of any false writings or documents knowing the same to contain any false, fictitious, or fraudulent statement or entry. Violators will be subject to a fine of not more than $10,000 or imprisonment for not more than 5 years or both. (18 U.S.C. 1001 (1970)).

Applicant's Signature _____ Date _____

PART B

All trips conducted with other than approved Grand Canyon commercial outfitters must complete this section in addition to Part A.

QUALIFYING BOATMAN EXPERIENCE

The permittee or one other qualified boatman who will be present on the entire trip must have participated in 6 previous Grand Canyon river trips as a boatman in command of a boat or participated as a boatman in command of a boat on rivers of similar difficulty.

A sample list of rivers of similar difficulty appears below.

Cataract Canyon, UT	Lodore Canyon, CO
Westwater Canyon, UT	Rogue River, OR
Green River, UT	Selway River, ID
Yampa River, CO	Tuolumne River, CA
Main Salmon, ID	Middle Fork Salmon, ID

In the space provided below, please show evidence of qualifying experience for the permittee or one other trip participant. The selection of all other boatmen/kayakers will be the responsibility of the permittee. He/she should be guided by a thorough understanding of the technical skill required to navigate the major rapids found in Grand Canyon National Park. Questions may be directed to the River Subdistrict at (602) 638-7843.

Qualifying Boatman

Name _____

Address _____

City _____ State _____ Zip Code_____

Daytime telephone no. (_____) _____
area code

River	Type of Experience	Type of Craft
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Further Comments:

ON-RIVER EQUIPMENT AND PROCEDURES

A. Watercraft

Note: Motor-powered boats are prohibited from launching between September 16 and December 15. During the remainder of the year, both oar and motor-powered boats may launch.

Boat #1 Kayak _____ Raft _____ Other _____

_____ _____
Boat Manufacturer and Model Dimensions

_____
Type of frame and method of propulsion

_____ _____
Registration Numbers Name of Boat Owner
(See part IV.C. of Noncommercial Permit Regulations)

Boat #2 Kayak _____ Raft _____ Other _____

_____ _____
Boat Manufacturer and Model Dimensions

_____
Type of frame and method of propulsion

_____ _____
Registration Numbers Name of Boat Owner
(See part IV.C.)

Boat #3 Kayak _____ Raft _____ Other _____

_____ _____
Boat Manufacturer and Model Dimensions

_____
Type of frame and method of propulsion

_____ _____
Registration Numbers Name of Boat Owner
(See part IV.C.)

Boat #4 Kayak _____ Raft _____ Other _____

_____ _____
Boat Manufacturer and Model Dimensions

_____
Type of frame and method of propulsion

_____ _____
Registration Numbers Name of Boat Owner
(See part IV.C.)

Boat #5 Kayak _____ Raft _____ Other _____

_____ _____
Boat Manufacturer and Model Dimensions

_____
Type of frame and method of propulsion

_____ _____
Registration Numbers Name of Boat Owner
(See part IV.C.)

If more boats are to be used, use a separate sheet using the above format for each additional boat.

B. Life Preservers: (Only USCG approved Type I, II, III, or V are acceptable.) In addition to each participant's life preserver, 1 spare life preserver is required per boat or 1 spare per 10 persons, whichever is greater.

Type I - - - - - - - - - - - - - - - Number of Each _____

Type II - - - - - - - - - - - - - - - Number of Each _____

Type III - - - - - - - - - - - - - - Number of Each _____

Type IV (1/boat 16' & over) - - - - Number of Each _____

Type V - - - - - - - - - - - - - - - Number of Each _____

C. First Aid and Emergency Equipment

Number of first aid kits _____?

How do you propose to handle a serious injury? Remoteness and isolation should be given heavy consideration.

D. Emergency Communications Equipment:

Type of Radio (optional) _____ Frequencies _____

Type of signal mirrors (required) _____ Number _____

Type and color of signal panels (required)_____

_____ Number _____

Other _____

_____

Do not rely passing trips, either commercial or private, for help in an emergency situation.

E. Describe spare items, repair kits, and spare means of propulsion for watercraft.

ENVIRONMENTAL PROTECTION AND SANITATION

A. Describe how refuse, garbage, and dishwater will be disposed of and/or handled while on the trip. A straining screen is required. No trash may be dumped at Diamond Creek. There is a trash receptacle available at Pearce Ferry.

B. Describe your toilet facilities and methods of disposal; indicate number and capacity of containers you will carry. (Allow 50 uses per 20mm ammo can.) A small, accessible day-use toilet is required. No human waste may be dumped at Diamond Creek or Pearce Ferry.

C. If you are planning to have a fire, provisions for containing it, hauling out charcoal and ash, and your fuel source must be described. (See Terms and Criteria, Part VI, D.)

Between May 1 and September 30, all fuel for fires must be brought in from outside Grand Canyon National Park. Between October 1 and April 30, DRIFTWOOD along beaches may be gathered and burned. Do not collect dead and down wood, and do not cut any tree or other vegetation. Fires may not be used for cooking. All trips launching between October 1 and April 30 must carry an approved firepan.

OTHER INFORMATION

A. In the event that your party is in need of emergency assistance (medical evacuation, search and rescue, or emergency message), please describe in detail any information that would be helpful in locating your party from an aircraft. This includes colors of boats, rigging, tarps, frames, or any unusual equipment.

B. Please give any additional information which you feel would be helpful in evaluating your application.

9/88
RESEARC

COLORADO RIVER MANAGEMENT PLAN

APPENDIX F

LOWER GRANITE GORGE INTERIM GUIDELINES

I. INTRODUCTION

This document is the Lower Granite Gorge Interim Guidelines (LGGIG) of the Colorado River within Grand Canyon National Park (GRCA). It is to cover the same time period and become an appendix of the all inclusive 1988 Colorado River Management Plan (CRMP). Additionally, the LGGIG will be included in future CRMP review processes.

The Lower Gorge is defined as that portion of the Colorado River Corridor from Diamond Creek (River Mile 225) to Grand Canyon's western boundary (Mile 277). Currently the management of the Colorado River, from Lees Ferry (river mile 0) to the western park boundary is outlined in the 1981 Colorado River Management Plan.

For the purposes of the LGGIG, Grand Canyon National Park recognizes the park boundary as defined by the Grand Canyon Enlargement Act of 1975. A portion of the park boundary is located at the pre-dam highwater mark on the south side of the river and is adjacent to the Hualapai Indian Reservation.

The LGGIG recommends that an inventory of natural and cultural resources be completed. Additionally, the LGGIG recommends, over the next three years, a comprehensive public review process be completed to assist park managers in writing a final document. A research and monitoring program will be instituted to collect baseline data against which visitor impacts and resource use patterns will be evaluated in the future. The LGGIG will be responsive to observations and data collected during these studies, which will be reviewed annually prior to development of a permanent Lower Gorge Management Plan. Lands outside the Lower Gorge river corridor are identified and managed according to the 1988 Backcountry Management Plan.

It is understood that the guidelines will be subject to extensive review and modification due to the dynamic nature of the area. A resource inventory, research, and monitoring program will facilitate the identification of resource problems and management concerns.

II. HISTORY

The Boulder Canyon Project Act of 1928 authorized the construction of Hoover Dam on the Colorado River. This project, completed in 1936, created Lake Mead, the waters of which extend into the western portion of Grand Canyon National Monument. The free-flowing river, up to Separation Canyon (Mile 239.5), was buried beneath placid lake waters. Lake Mead

National Recreation Area (LAME) was created at the same time. The expansion of Grand Canyon National Park, following the Enlargement Act of 1975, included Grand Canyon National Monument and portions of Lake Mead National Recreation Area, the Kaibab National Forest, and Bureau of Land Management lands.

III. ACCESS

The waters of Lake Mead extend into the Lower Gorge to Separation Canyon (Mile 239.5, elevation 1221 feet). Launch ramps with access by all-weather roads are located at the eastern end of Lake Mead. These provide easy access for power boats to the Lower Gorge area. The Colorado River and the Diamond Creek Road on the Hualapai Indian Reservation provide down river access to the Lower Gorge.

IV. CURRENT MANAGEMENT ISSUES

There are an increasing number of impacts on the natural and cultural resources and the opportunities for solitude in the Lower Gorge Area. This area includes portions of the park to the south of the Colorado River at the Grand Wash Cliffs and the areas along the north side of the Colorado River below the rim of the Sanup and Shivwits Plateaus. Fluctuations of both lake and river levels affect recreational activity, beach composition, and other resources. The current list of impacts include:

A. Power Boat Recreation

The increasing number of hard-hulled craft, houseboats, and small cruisers arriving from the western reaches of Lake Mead has caused congestion near the limited number of attraction sites accessible by water (i.e., Columbine Falls). Currently, most visitation is day use. As more people become familiar with the area, the impacts caused by camping, off-river hiking, and associated problems (human waste, trash, fire pits, multiple trailing, etc.) will increase.

The logistical problems that once hindered power boat use are now being resolved. The road to South Cove (approximately river mile 290) from Dolan Springs is being paved. LAME is allowing expansion of houseboat rentals to include an outlet at Temple Bar. Boat gas is now available for sale at Meadview.

B. Local population and development

The most obvious year-round impact comes from the activities of the retirement community of Meadview. The local developer is very active and more lots are being sold. This will increase the number of people who have the time to fully explore the entire area. It will be necessary to include this community in the planning process. Their cooperation and acceptance of this planning effort are vital to its long term success.

Plans to complete a "pump back storage" dam near Meadview may increase the population of the area dramatically during construction. This may result in increased impacts as members of the construction population seek to utilize the area for recreational activities.

C. Whitmore Wash

Although Whitmore Wash (mile 187.5) is east of the Lower Gorge management area, the activities taking place there have considerable influence. The construction of a modern lodge (The Bar Ten Ranch), approximately 8 miles north of the North Rim, and the use of helicopters have increased the number of passenger transfers. In 1987, 44.6% of all commercial river passengers either joined or finished a river trip at the Whitmore Wash helicopter pad. Whitewater river outfitters have developed a market for 2 and 3 day trips from Whitmore Wash through the Lower Gorge to Lake Mead. This, combined with trips conducted by the Hualapai Tribal River Trips and Tours Company below Diamond Creek and the full-length canyon trips normally offered, has increased the demand for overnight campsites below Diamond Creek.

Because user days are not assessed to the park's commercial outfitters below Diamond Creek, the desire to market 3 day trips, through the Lower Gorge has increased. Controlling this use may mean extending the user day assessment point to the park's western boundary.

D. Livestock

Feral burros are a threat and can enter GRCA from Lake Mead where a large population still exists. The burro fence, erected approximately one mile west of the park boundary, is breached regularly by flash floods at Pearce Wash and in several other places where burros can get through.

Cattle are found in many of the side canyons that provide access to the Sanup and Shivwits plateaus. Burnt Springs Canyon exhibits the most obvious impact. GRCA is fencing the heads of these canyons, which should eliminate most of the problem. GRCA lands south of the Colorado River and those on top of the Grand Wash Cliffs are grazed by cattle on a regular basis. Fencing this area would exclude the cattle, however, there is fear that without wildlife panels this action may hinder the movements of Desert Bighorn sheep. In addition, the lack of regular grazing may increase the potential of fire danger, through the increase of annual grasses, in the joshua tree forest areas.

E. Hualapai Indian Reservation

Although there is disagreement between GRCA and the Hualapai Tribe over the legal location of GRCA's southern boundary, a sound working relationship exists between the two entities.

The Hualapai tribe has encouraged several commercial ventures which may impact the GRCA lands along their mutual boundaries. They are as follows:

1. Whitmore Wash Helicopter Shuttle: The Hualapai Tribe has authorized a landing pad on the south side of the river at mile 187.5. This landing area is utilized for the shuttle of passengers coming on and off river trips to the Bar Ten Ranch. Helicopter traffic is heavy at certain times on particular days of the week. Safety and solitude are major concerns.

2. "Grand Canyon West": This development is located at Guano Point (Mile 266.2). An airstrip has been constructed approximately 3 miles south of the old tramway towers. Currently, 30 to 60 persons per day are flown in from Las Vegas and given a meal and tour of the rim. Future development plans propose a helicopter landing pad located at lake level, and a "canoe ride" concession; both to be located in a cove at River Mile 267.

3. Desert Bighorn Sheep Hunting: The Hualapai Tribe allows a limited number of desert bighorn sheep to be taken per year. This is a "guide required" hunt, and access to the hunting area is usually by boat from Pearce Ferry.

4. Helicopter Tours: The Hualapai Tribal Government has authorized several helicopter landing permits which allow tour companies to land with passengers near the river or in remote locations to provide a specialty meal. A per-person charge is paid to the Tribal Government.

5. Hualapai River Trips: The Hualapai Tribal River Trips and Tours Company runs 1 and 2 day river trips from Diamond Creek to Pearce Ferry. In 1987, approximately 200 people participated in these trips. Approximately 80 percent of these were on the 1 day tours.

V. MANAGEMENT OBJECTIVES

A. Management objectives of the LGGIG are primarily the same as those of the Colorado River Management Plan.

B. Due to the different types of access and use, additional objectives specific to the area are necessary. The foundation of these objectives will be the establishment of two distinguishable use zones. Thus, the Colorado River in the Lower Gorge will be divided

into lake and whitewater river. These zones will be established to reflect boater safety concerns associated with the fluctuation of river and lake levels, and with strong river currents. Separation Canyon (mile 239.5) will be the established boundary between the lake and white water river use zones.

1. Whitewater River Use Zone
   The river corridor from Diamond Creek to Separation Canyon will be restricted to river running, backpacking, and power boats using equipment designed for whitewater travel, i.e. zodiacs.

2. Lake Use Zone
   The lake use area is that portion of the Lower Gorge below Separation Canyon (River Mile 237.5) where the lake meets the free flowing river current.

C. Specific objectives include:

1. Manage visitor use and recreation in such a manner that allows a quality recreational experience consistent with preservation of the area's natural and cultural resources.

2. Define and maintain overall use limits that will ensure a quality experience for both day use and overnight trips.

3. Provide opportunities for all user groups (off-lake, river runners, and backpackers) to have access to the Lower Granite Gorge experience they wish.

4. Maintain a zero population of feral animals i.e., burros and cattle.

5. Prevent and/or eliminate cultural and natural resource vandalism.

6. Develop a resource inventory and monitoring program.

7. Develop cooperative agreements with adjoining land management agencies and tribal governments, which will further overall management objectives within the Lower Gorge.

8. Expand visitor information services on LAME lands at Meadview and in the Lower Gorge utilizing watercraft, (i.e. houseboats, platform boats, etc.) Develop educational programs for the local population centers (Meadview, Dolan Springs, Kingman, Las Vegas). This would include developing maps and brochures for the Lower Gorge area and adjacent lands.

VI. Restrictions on Use

Dramatic increases in Lower Gorge use due to development in and around Lake Mead and the Hualapai Indian Reservation may necessitate immediate action to restrict use to protect park resources and to preserve the quality of the visitor experience.

A. Travel by hard-hulled power boats is prohibited above Separation Canyon.

B. Except in emergencies, upstream travel above Diamond Creek is prohibited.

C. Due to shallow water hazards houseboats, sailboats, and other large craft are restricted to the lake area below the Bat Cave (Mile 266).

D. Areas in the Lower Gorge closed to either camping or visitation are:

1. Bat Cave (Mile 266) - Entry to the cave is prohibited.
2. Rampart Cave (Mile 274.5) - Entry to the cave is prohibited.
3. Columbine Falls (Mile 274.3) - Camping within 300 yards of the falls is prohibited

VII. Commercial Use

All groups and organizations using the Lower Gorge area for commercial purposes must obtain written authorization from the Grand Canyon National Park Office of Concessions Management prior to use. Commercial river trips must comply with the provisions of the CRMP. Groups must obtain permission to use the Diamond Creek Road, and pay all fees required by the Hualapai Tribe.

VIII. Noncommercial Use

All noncommercial groups launching from Diamond Creek must obtain a permit from the Grand Canyon National Park River Subdistrict Office. All river trips must comply with the provisions of the CRMP outlined in the Noncommercial River Trip Terms and Criteria. Noncommercial groups must obtain permission to use the Diamond Creek Road and pay all fees required to the Hualapai Indian Tribe.

IX. Recreational Upriver Use

Recreational boaters in the Lower Gorge area will be required to comply with all requirements established in the CRMP regarding safety and resource and environmental protection.

X. RESOURCE AND ENVIRONMENTAL PROTECTION

A. Human Waste/Refuse Disposal

The aesthetic and environmental health problems related to human waste are a major concern associated with river and backcountry use. Protection of environmental quality requires that all human waste be removed from the Lower Gorge area. All Lower Gorge boaters must follow the operating procedures for human waste disposal as outlined in the CRMP. A depository for human waste will be maintained at Pearce Ferry.

B. Refuse disposal

In order to maintain a healthy and quality experience, all trash and litter must be carried out of the Lower Gorge area.

C. All other regulations which must be adhered to regarding resource protection, environmental protection and sanitation are addressed in the Colorado River and Backcountry Management Plans.

XI. EMERGENCY MEDICAL SERVICES

Emergencies requiring evacuation or rescue will be coordinated by Grand Canyon National Park personnel. Responsibility for the cost of such evacuation will be paid by the outfitter and/or the person requesting evacuation.

COLORADO RIVER MANAGEMENT PLAN

APPENDIX G

DRAFT ENVIRONMENTAL ASSESSMENT

I. Purpose and Need:

"A river management plan will be developed for each unit of the National Park System having significant river use or the potential for such use."

"In order to enhance visitor enjoyment and safety, and to preserve environmental quality, the National Park Service will regulate the use of rivers, as necessary, within units of the National Park System."

"Using scientific research and other applicable data, the service will establish the level of boating and related use that each river system can sustain without causing unacceptable changes in the ecosystem or degradation of the environment or the park experience."

"Persons or private companies may be authorized to provide river boating experiences for park visitors; such authorization will be limited to the number necessary to provide adequate visitor services in conformity with established visitor use capacities. Where public demand exceeds an established river use ceiling, use may be rationed."

Chapter VII, NPS Management Policies, 1978.

In 1979, the Colorado River Management Plan (CRMP) and Environmental Impact Statement (EIS) were completed and approved through the NEPA process with full public review and disclosure. Due to the controversial nature of the plan and its provisions, and due to congressional actions that prevented implementation of the approved preferred alternative, a revised CRMP was issued in 1981. This plan assumed that the 1979 EIS was still valid and combined provisions of several of the alternatives evaluated in the 1979 EIS. As a result, no formal environmental review was associated with the 1981 CRMP.

The 1981 CRMP defined two use periods (summer and winter use seasons), two user sectors (Commercial and Non-commercial) and user day ceilings by use period and sector. Operating guidelines and research and monitoring provisions were outlined in the plan.

In response to provisions of the 1981 plan calling for periodic modification and updating, a review of the issues addressed and provisions outlined by the CRMP was begun in 1987. If management

actions proposed in any revision are significant, the 1981 plan calls for a complete public review of any revisions (NPS, 1981).

II. Affected Environment:

A. Natural Resources:

1. Vegetation:

a. Pre-dam: Before the construction of Glen Canyon Dam, three distinct zones of vegetation paralleled the river from Lee's Ferry to the Grand Wash Cliffs. The zone closest to the river, and subject to annual flooding, was composed of many ephemeral herbaceous species adapted to periodic disturbance, and mesophytic woody plants such as seep willow and desert broom (Baccharis), and the true willows (Salix), that an attempt to become established before the next scouring flood. Above the ephemeral zone was a belt of vegetation whose lower boundaries were delineated by the high water line of major floods which would periodically scour away all vegetation growing below the zone. Typical plant species of this high water line zone were Apache plume (Fallugia paradoxa), redbud (Cercis occidentalis), honey mesquite (Prosopis juliflora) and acacia (Acacia greggii). On the talus slopes above this zone lived desert species that were not influenced by the river environment below; e.g., brittle brush (Encelia farinosa); various cacti, creosote bush (Larrea tridentata), and Mormon tea (Ephedra trifurca).

b. Post-dam: The construction of Glen Canyon Dam has caused a significant reduction of the high flood waters and sediment deposition which maintained the pre-dam riparian ecosystem and sediment regime of aggradation and degradation along the river course. Diurnal fluctuating flows, flood level flows in 1983-85 and resumption of highly fluctuating flows from 1986 to present have caused identifiable vegetation and substrate impacts. Such impacts could be considered deleterious, due to the fact that sediment is a near-nonrenewable resource.

Due to the regulated flows, vegetation changes have occurred along a resultant moisture gradient. Though not highly defined, four vegetative communities can be described along this moisture gradient: a New Riparian Zone, characterized by rapid proliferation species, such as Tamarix, Salix, Pluchea and Baccharis, which helps protect alluvial deposits from scouring (Tamarisk will invade the water's edge and under managed conditions will be replaced by native species,

such as Salix); New High Water Zone, an unstable community of short lived invasion species, such as Alhagi, Salsola, Descuraina, and Bromus, which will compete with species of the Old High Water Zone that now have the opportunity to migrate to the New High Water Zone when water is available to allow Acacia and Prosopis seedling establishment and survival; Old High Water Zone, which is now characterized by reduction in extent and growth of mesquite and acacia, though the community will remain relatively stable; and, the Desert Zone, a community that the Glen Canyon Dam has had little influence upon, which is a resistent though not resilient community susceptible to the influence of recreational use.

2. Wildlife:

a. Fishes: Of the eight native fish species formerly found in the Colorado River below Glen Canyon Dam, only three species remain common: speckled dace, bluehead sucker and flannelmouth sucker. Two others, the endangered humpback chub and the razorback sucker, are rare in occurrence. Humpback Chub is presently classified an endangered species under the Endangered Species Act of 1973. Razorback sucker apparently does not reproduce in Grand Canyon and soon may be extirpated from this reach of the Colorado River; a report of sighting was made from Bright Angel Creek in April 1987. However, an extensive survey conducted about two weeks later by Arizona Game and Fish failed to verify this observation. Therefore, the observations are considered anecdotal and the presence of the fish at this site highly problematic. Three species are already extirpated from the Grand Canyon: Colorado squawfish, bonytail chub and roundtail chub.

The native fish depended on backwaters, and seasonally fluctuating flows and water temperatures. The requirements of various life history stages are not totally understood but the cold, stabilized temperatures and flows have limited the breeding of humpback chub to warm sidestreams.

With temperatures around 50 degrees F., the river below Glen Canyon Dam allows year-round growth and provides suitable temperatures for natural reproduction of rainbow trout, which is not native to the Colorado River through Grand Canyon.

b. Reptiles: Ten lizard species are found in the river corridor. Total lizard population densities are approximately ten times higher in shoreline habitats than in adjacent non-riparian habitats; reproduction is significantly higher in shoreline areas than in adjacent non-shore and non-riparian habitats. Reptiles include: desert spiny lizard (Sceloporus magister), western whiptail (Cnemidophorus tigris), tree lizard (Urosaurus ornatus wrightii), western rattlesnake (Crotalus viridis) and a (possibly new) subspecies of Rana pipiens.

c. Birds: Nearly 30 species of birds are known to nest in the river corridor, 11 of which are referred to as "obligate riparian birds" due to their complete dependence on well-developed riparian vegetation in which to breed. Ninety percent of the nests of the obligate riparian birds are believed to be located within the New High Water Zone. Bell's vireo, common yellowthroat and yellow-breasted chat are the species most affected by river flows because they nest low to the ground and close to the water; direct nest losses from inundation are common.

Willow flycatcher is a species of special concern in the river corridor due to its rare status within the region; it has been greatly reduced in numbers in the southwest as riparian habitat has disappeared.

Peregrine falcon, a federally listed endangered species, is found in the canyon and depends on riparian bird-life for its preybase.

Rare along the Colorado River prior to the construction of Glen Canyon Dam, wintering Bald Eagles (Haliaeetus leucocephalus) have since increased in the Grand Canyon. A wintering population has occupied the mouth of Nankoweap Creek since the early 1980's, sustained by a food resource of easily accessible spawning trout.

d. Insects: Three major insect communities are present in the riparian zone: aquatic insects, which depend on the water for part of their life cycle; fossorial, or ground-dwelling insects; and phytophagous, or plant-feeding insects. Insects are important in the Grand Canyon ecosystem as food resources, decomposers, predators and pollinators. For these reasons, changes in insect

communities may have subtle but profound long-term effects on the entire riparian and aquatic ecosystems.

3. Physical environment: Flow regulation, as a result of Glen Canyon Dam, began in 1963. From that time until the filling of Lake Powell in 1980, releases stayed between 1,000 cfs and 31,500 cfs. Higher releases were rare. Although the dam produced fluctuating flows, it also eliminated the very large spring and summer floods which had annually scoured Grand Canyon. The elimination of annual flooding allowed a more diverse and extensive riparian vegetative and wildlife community to colonize the old high water zone.

   Pre-Glen Canyon Dam, the Colorado River carried a large suspended sediment load through Grand Canyon National Park. Suspended sediment at the U.S.G.S. gaging station at Lee's Ferry between 1928 and 1959 commonly exceeded 10,000 parts per million (ppm); post-dam samples are typically less than 200 ppm.

   When Lake Powell filled in 1980, a 17-year period with virtually no releases over 31,500 cfs came to an end. The capacity of the reservoir to store unusually high spring runoff was severely reduced, leading to the current situation in which "flood" releases (over 31,500 cfs) are more likely. Concerns were raised over the effect of these flood releases on sediment deposits and vegetation in the river corridor, aquatic and terrestrial wildlife and on the quality and safety of river recreation.

   Flows since the filling of Lake Powell have varied considerably and have included flood flows, flows of less than 5,000 cfs, nearly steady flows and daily, highly fluctuating flows.

B. Cultural Resources:

Archeological resources, both historic and prehistoric, constitute a primary research and interpretive value along the Colorado River. Since the first trip down the Colorado River by John Wesley Powell in 1869, archaeological sites have been reported along the river. While the first professional survey did not consider the river corridor to contain many ruins (Taylor, 1958), subsequent surveys have recorded many sites. At the present time, over 150 archaeological

sites have been recorded adjacent to the Colorado River from Lee's Ferry to the Grand Wash Cliffs and Lake Mead. Sites are located not only along the river corridor, but in the tributary canyons comprising the river system. Sites are both prehistoric and historic, dating from the Archaic period of time nearly 4000 years ago to the historic mining attempts of the early 1900's. Types of sites commonly found and visited along the river represent the remains of pueblo villages, rockshelter and cave sites, rock art sites, cliff granaries, and historic mining camps. Many of these sites are undergoing rapid and irreversible impacts, some due to natural erosive forces, but others due to the considerable impact from visitor activities. Often, natural impacts are exacerbated by visitor impacts. Sometimes, these forces are interrelated, each generating increased impacts on the other.

Significance of the sites along the river has been evaluated in the past as part of the entire prehistoric and historic record. All sites within Grand Canyon have been nominated for inclusion in the National Register of Historic Places. As of this writing, the sites are considered eligible by the Arizona Advisory Council but not yet listed by the National Register. Complete documentation and listing of the archaeological resources of Grand Canyon on the National Register is expected in the near future.

C. Recreational Resources and Existing Visitor Use

The Colorado River through the Grand Canyon is the longest stretch of river (277 miles long) for recreational use entirely within a national park. It is surrounded by more than 1 million acres of land with little human development. Some of the world's most difficult and exciting white water occurs here. The Colorado River's isolation in the mile deep gorge of the Grand Canyon gives it primitive recreational qualities while enhancing off-river hiking, climbing, sightseeing, and solitude.

Prior to the early 1960's, there was little need to be concerned with resource impacts along the river; few visitors entered the canyon or ran the river. From 1960 to 1972, the number of boaters annually running the river grew from 205 persons to 16,432. The rapid growth of white-water boating in Grand Canyon was paralleled by a dramatic increase nationwide. In 1972, increasing problems with management of fire, human waste and trash along the river, damage to fragile

soils and vegetation, trailing, and destruction of

prehistoric sites prompted the NPS to regulate river use more closely.

As an interim measure, the commercial use allotment for 1972 was set at 105,000 user days (one user day equals one passenger on the river for one day); this was readjusted to 89,000 in 1973 and maintained at that level until 1979. Noncommercial use was 7,600 user days in 1972 and this level was maintained until 1979.

In 1979, with the development of the Colorado River Management Plan, use levels were to have been expanded, launch schedules implemented and motors phased out in favor of oar-powered river trips. Due to the controversial nature of this plan, and congressional action that limited the agency's ability to implement the approved, preferred alternative, a revised plan was released in 1981 that established new use ceilings: total commercial and noncommercial use levels of 150,076 user days (106,156 user days commercial allotment; 43,920 user days noncommercial allotment) for the summer season and 19,874 user days (9,344 user days commercial allotment; 10,530 user days noncommercial allotment) for the winter season. These numbers reflected historic use levels, increases for the growing demand for the private, noncommercial allotment, and an across-the-board increase for each concessioner. Use ceilings have been maintained at that level since 1981. Although the allotments have never been totally utilized, the commercial utilization has reached near-100% levels in recent years due to the use of a user day pool; noncommercial average group size and trip length are below limits, resulting in less that total utilization of allocation.

Since the gates of Glen Canyon Dam closed, fluctuating flows have been common, stranding moored boats, reducing camping beach sediments and resulting in perceivably unnatural changes in water level. Under low flow conditions, passage in some parts of the corridor becomes more difficult and, in some cases, constitutes a high risk. After Lake Powell filled, flood releases above 30,000 cfs were experienced during 1983-86; this resulted in sustained flows above levels that could be considered safe.

Another recreational use of the corridor is fishing; some humpback chub waters are closed and any caught must be released. Although the waters of the Colorado River are now a sustaining trout fishery, salmonids are alien species, and NPS Management Policies preclude their management as a primary resource.

III. Alternative Actions:

A. Alternative A: No Action, Continue Action under 1981 Plan Guidelines.

B. Alternative B: Initiate Management under the Revised Plan.

Summary of Management Actions Proposed by the Revised Plan Which Represent Changes From the 1981 Plan:

1. Guide Certification:

Alternative A: No Action-1981 Plan
No test was required for guide certification.

Alternative B: 1988 Plan
All commercial guides carrying passengers for hire on the Colorado River through Grand Canyon National Park would be required to pass a written exam based on the Annual Commercial Operating Requirements.

2. Administrative Charges for Noncommercial Users:

Alternative A: No Action-1981 Plan
There were no administrative charges for noncommercial users.

Alternative B: 1988 Plan
Applicants to the noncommercial waiting list will be required to pay a nonrefundable $25 charge in order to be placed on the list. All trip leaders will be required to pay $50 upon confirmation of a launch date and the subsequent return of their noncommercial river trip application. Both charges will be non-refundable.

3. Scheduling of Noncommercial Launch Dates:

Alternative A: No Action-1981 Plan
Noncommercial launches are scheduled in January, for the year beginning April 16 (ending April 15 the following year).

Alternative B: 1988 Plan
Noncommercial launches dates will be scheduled two years in advance. Each year a sufficient number of waiting list applicants will be contacted in order to fill available launch dates, for both primary and secondary seasons, for two years (N.B., under the proposed revision, the summer is designated the primary season and winter the secondary season).

4. Noncommercial Double Launches and Resultant Effects on Commercial Launch Calendar:

Alternative A: No Action-1981 Plan
Noncommercial sector is limited to one launch per day during the summer season.

Alternative B: 1988 Plan
Effects on Commercial Launch Calendar: In order to more fully utilize the noncommercial allocation in the primary season, 40 additional noncommercial launches have been added.

5. Noncommercial Continuing Interest and Participant Rules:

Alternative A: No Action-1981 Plan
Applicants missing one continuing interest deadline are removed from the waiting list; participation on another private trip while on the waiting list results in removal from the list.

Alternative B: 1988 Plan
All applicants to the noncommercial waiting list will be allowed to miss one continuing interest deadline and may participate in one noncommercial river trip other than their own for the duration of the time they are on the list.

6. Call-in System/Filling of Open Noncommercial Launch Dates:

Alternative A: No Action-1981 Plan
Call-in system is used for allowing individuals on the waiting list to claim unused launch dates.

Alternative B: 1988 Plan
Any noncommercial date in the two year scheduling period which is not filled by the initial scheduling/preferred launch sheet system, or becomes open due to cancellations, will initially be filled by the River Subdistrict Office contacting applicants at the top of the list by phone and/or in writing. If a date is not filled by this method, the date may be claimed by anyone on the waiting list under the Call-in System Guidelines.

7. Commercial Deadhead Trips:

Alternative A: No Action-1981 Plan
Commercial deadhead launches are not counted against the commercial passenger launch limit for any launch day, contributing to increased congestion and crowding downriver of Phantom Ranch; this causes a situation where there are more trips below Phantom Ranch than would normally have resulted under daily 166 person launch limits.

Commercial deadhead trips are not required to expedite travel to

Phantom Ranch and they are allowed to stop at attraction sites and use any campsites, except for closed ones.

Alternative B: 1988 Plan
Commercial trips traveling downriver with empty boats for the purpose of picking up passengers at Phantom Ranch or Whitmore Wash will be required to expedite travel to those destinations. These boats will not be allowed to stop at attraction sites, and will be required to use smaller, less popular camps. On days that deadhead trips depart Lee's Ferry, the number of passengers being picked up downriver will be counted against that day's commercial passenger launch limit.

8. River Trips Conducted for Research Purposes:

Alternative A: No Action-1981 Plan
Research trips were allowed, but means of administering research permits/launches were not outlined.

Alternative B: 1988 Plan
Research conducted on the Colorado River and using rafts as the mode of transportation will be required to submit research proposals prior to trip launch, as well as justifications for each trip member's participation. Following completion of each trip, a journal of trip activities, as well as research findings and results will be required to be submitted to Grand Canyon National Park in a timely manner.

9. Commercial Secondary Season Use:

Alternative A: No Action-1981 Plan
Winter season user day utilization by the commercial sector was on a first-come, first served basis.

Alternative B: 1988 Plan
The secondary (winter) season commercial allocation will be divided among the 20 commercial outfitters in such a way that each company will have sufficient user days to operate two trips of the size and duration as historically established by each company. Remaining user days will be administered as a pool by the NPS. Companies with the highest historical use will have priority access to the pool until all user days are distributed.

10. Noncommercial User Day Pool:

Alternative A: No Action-1981 Plan
No user day pool for noncommercial sector; allocation controlled by the number of trips launched from Lee's Ferry on a daily (summer) or weekly (winter) basis.

Alternative B: 1988 Plan
Noncommercial user days which become available due to trips with fewer than the maximum allowed participants or on-river days will become available through an NPS administered pool. As sufficient days become available, additional noncommercial launches will be scheduled as double launches throughout the primary (summer) and

secondary (winter) seasons.

11. Lower Gorge Management:

Alternative A: No Action-1981 Plan
Visitor use limits, through user-day allocations and use restrictions, are not imposed for the area below Diamond Creek.

Alternative B: 1988 Plan
Use in the lower gorge below Diamond Creek will be monitored and regulated to determine future management needs. Interim Guidelines are designed to regulate primary upriver use during development of a comprehensive Colorado River Lower Gorge Management Plan.

12. Noncommercial Deferral Policy:

Alternative A: No Action-1981 Plan
Noncommercial waiting list applicants allowed to defer their launch date.

Alternative B: 1988 Plan
Noncommercial waiting list applicants will no longer have the option of deferring their launch date by one year.

13. Management Objectives and Limits of Acceptable Change:

Alternative A: No Action-1981 Plan
Two undefined management objectives were stated: (1) protection of the riparian environment from unacceptable change caused by river running activities; and, (2) provision of an opportunity to enjoy a high quality, rewarding river running experience. Allowable levels of influence/change were not specified.

Alternative B: 1988 Plan
Allowable levels of influence/change have been identified for recreational usage of the Colorado River corridor. Management objectives are included, specific to the following: temporal "recreation opportunity spectrum" (identifying three experience opportunities, based on probability and level of contacts while on the river, at attraction sites and at campsites); maximum group size; influence of recreational use on the natural environment; management of water quality; influence of recreational use on cultural resources; trailing development; fisheries; aircraft use; and, baseline data gathering. The rationale for NPS posture on Glen Canyon Environmental Studies and dam operations is also articulated. Alternative means of assuring attainment of each management objective are identified. Specific monitoring programs are designed to support each of the objectives.

IV. Impacts and Mitigations:

A. Alternative A: No Action, Continue Management Under 1981 Plan Guidelines.

No change from the present condition of the resources. Continued adverse impacts due to overcrowding at attraction sites and multiple trailing through sites.

Under implementation of the 1981 plan, the following provisions and impacts resulted:

1. User Day Ceilings: The user day ceilings for the two sectors were established, but specific management objectives relative to sociological experience were not specified. The lack of seasonal objectives resulted in the public not being able to make clear decisions at to the period of year to visit the corridor in order to experience desired preferences.

2. Trailing and other Visitor Impacts: The plan outlined general objectives for managing impacts of man. A level of trailing mitigation resulted: human waste carry-out provisions were implemented resulting in apparent positive impacts through reduction in human waste deposition; and, required practices related to campfire and food preparation and sanitation resulted in apparent positive impacts through the reduction in impacts to beach sediments. Improvements were noticeable at camping beaches and in previously multiple-trailed areas through Old High Water and Desert Zones; however, these changes have not been quantified and officially documented. The plan outlined monitoring and research goals which led to some elimination of informational deficiencies.

3. Commercial and Noncommercial Operating Requirements: The plan outlined operating requirements, for both sectors, that resulted in better understanding of NPS operating requirements.

B. Alternative B: Initiate Management Under the Revised Plan.

With implementation of the revised plan, the following impacts would occur beyond that of the 1981 plan:

1. Guide Certification:

a. Resource impacts: Having increased quality control on guide certification would result in indirect beneficial impacts due to the increased amount of environmental and visitor safety awareness. Benefits would depend on the intensity of the certification program; for example, putting a

strong emphasis on archaeological site and endangered species protection, and minimum impact camping.

b. Socioeconomic: No direct impact except to individuals. If they fail certification test, someone else would take their job. No regional impacts realized.

2. Administrative Charges for Noncommercial Users:

a. Resource impacts: No impacts realized.

b. Socioeconomic impacts: Monetary impacts upon some individuals may result in unwillness to apply for and obtain a permit. This provision will also result in a decrease in numbers on the waiting list because the frequency of multiple applications by an individual or family will decrease.

3. Scheduling of Noncommercial Launch Dates:

a. Resource Impacts: No impacts realized.

b. Socioeconomic Impacts: Sociological impacts, undetermined at this time.

4. Noncommercial Double Launches and Resultant Effects on Commercial Launch Calendar:

a. Resource Impacts: Conceivable increase in resource impacts, especially in camping areas. The proposal increases the probability and frequency of groups doubling up on camping beaches; thus, contributing to some impacts to periphery vegetation and sediments. An increase in use frequency for all camping beaches is assured, with unknown and unquantified known impacts to vegetation, beach sediments and cultural resources.

b. Socioeconomic Impacts: Observations and monitoring of double launches and their effects during the 1988 summer season did not appear to reveal a significant crowding problem, at that time. As a possible means of minimizing crowding and congestion, double launches will be scheduled on days of the week traditionally not fully utilized by commercial companies; additional crowding at campsites and attraction sites may still occur. Beginning in the 1989 noncommercial primary season, 1 double launch will be scheduled per week. On the double launch day, the commercial launch limit will be held to 134 passengers. During the secondary season, 12 additional launches will be scheduled, with up to 2 double launches per week being scheduled in the shoulder months (April, May, September and October).

5. Noncommercial Continuing Interest and Participant Rules:

a. Resource Impacts: No impacts realized.

b. Socioeconomic Impacts: No negative impact; less chance of being taken off the waiting list due as a result of failure to return continuing interest cards or for taking another trip as a passenger.

6. Call-in System/Filling of Open Noncommercial Launch Dates:

a. Resource Impacts: No impacts realized.

b. Socioeconomic Impacts: No economic impacts realized; sociological impacts should be positive, due to greater access to allocation.

7. Commercial Deadhead Trips:

a. Resource Impacts: No impacts realized.

b. Socioeconomic Impacts: No economic impacts realized. Compared to levels experienced under the 1981 plan, sociological impacts, such as competition for the better campsites and contacts at popular attraction sites, should decrease below Phantom Ranch, as some 2,500 user days previously not included within the Lee's Ferry launch limits will be tabulated at time of launch.

8. River Trips Conducted for Research Purposes:

a. Resource Impacts: No impacts expected; however, some information of value in managing river corridor resources may be lost, as a result of researchers failure to meet permit requirements.

b. Socioeconomic Impacts: No impacts realized.

9. Commercial Secondary Season Use:

a. Resource Impacts: No impacts expected.

b. Socioeconomic Impacts: Economic impacts may be realized by those companies that had previously used the greatest number of secondary season user days. Use will be distributed among river companies and will assure that the commercial allocation is not used exclusively by oar companies during the non-motors season; motor use may increase during the motors-allowed portion of the secondary season.

10. Noncommercial User Day Pool:

a. Resource Impacts: No impacts expected, beyond those identified under 4. Noncommercial Double Launches.

b. Socioeconomic Impacts: No impacts expected.

11. Lower Gorge Management:

a. Resource Impacts: Proposal will potentially result in greater understanding of resource conditions, allowing the development of management actions, to be undertaken to assure their preservation.

b. Socioeconomic Impacts: Economic impacts will likely be a result of any changes necessary upon completion of a Lower Gorge Management Plan; all commercial activities originating from Lake Mead will conflict with down-river use and will be prohibited above Separation Canyon.

12. Noncommercial Deferral Policy:

a. Resource Impacts: No impacts realized.

b. Socioeconomic Impacts: No economic impacts

realized; sociological impacts due to the possibility of lost river trip opportunities for those who cannot schedule a river trip when their name comes up on the waiting list.

13. Management Objectives and Limits of Acceptable Change:

a. Resource Impacts: Providing management objectives and acceptable limits of change enable park staff to readily focus on, measure and mitigate impacts to natural and cultural resources.

b. Socioeconomic Impacts: Because use levels are not being changed, only defined, no significant economic impacts are expected. No economic impacts under most means of attainment for the temporal "recreational opportunity spectrum; reductions in use levels will be undertaken only following separate environmental assessment. The temporal "recreational opportunity spectrum" will allow recreational users of the Colorado River corridor to make clear choices as to the type of experience in which they wish to participate, given the use-period ceilings, and be reasonably assured that their expectations will be met. The contact levels identified provide clear objectives for direction of sociological monitoring program.

14. Cumulative Impacts Beyond those of the 1981 CRMP: The major changes in the proposed revision of the CRMP constitute operational refinements and do not appear to establish actions and incremental impacts adversely affecting natural and cultural resources beyond those levels resulting under the 1981 plan.

Management objectives have been more clearly defined and limits of acceptable change adopted. These do not constitute a change in management of the Colorado River Corridor, but instead serve to define: specific management objectives; the levels of impact/change to the natural and sociological condition that are acceptable; the means of assuring attainment of objectives; and, the monitoring to support decisions and management actions. Any negative socioeconomic impacts will be a result of limits applied in order to protect natural and cultural resources; those limits applied to manage sociological experiences will have mostly positive impacts through improved visitor experiences.

V. Agencies and Individuals Consulted:

Frank Baucom, U.S.F.W.S, Phoenix, AZ
Dennis Kubly, Arizona Game and Fish, Phoenix, AZ
Larry Stevens, Northern Arizona University, Flagstaff, AZ
James Huddlestun, NPS, Western Regional Office, San Francisco, CA
Steve Hodapp, NPS, Washington (formerly of Grand Canyon National Park)

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