

## **APPENDIX F: CONSULTATION**

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**United States Department of the Interior**

U.S. Fish and Wildlife Service  
2321 West Royal Palm Road, Suite 103  
Phoenix, Arizona 85021-4951  
Telephone: (602) 242-0210 FAX: (602) 242-2513



In Reply Refer to:

AESO/SE  
02-21-89-I-0106-R1

April 29, 2004

Ms. Lenore Grover-Bullington  
Grand Canyon National Park  
823 North San Francisco Street Ste B  
Flagstaff, Arizona 86001

Dear Ms. Grover-Bullington:

On March 23, 2004, we received your memorandum regarding review of the Colorado River Management Plan (CRMP) Administrative Draft Environmental Impact Statement (ADEIS). Your memorandum indicated that the attached ADEIS was being provided so that we could become familiar with the draft preferred alternatives and the potential impacts they may have on biological resources along the river. Your memorandum indicated that you would accept comments on the ADEIS until April 2, 2004, but that you were primarily interested in a list of species that should be included in a biological assessment of the proposed action.

Unfortunately, the timeframe provided was too short for us to review the ADEIS and provide comments by April 2. We understand that a Draft Environmental Impact Statement (DEIS) may be available for review by May 15, 2004. Please advise us whether you want comments on the ADEIS at this point and/or whether review of the DEIS may be more useful to you.

In addition to the general information below that we routinely provide in response to requests for formal consultation, we offer the following list of species that may be appropriate for consideration in your biological assessment of the proposed action.

bald eagle (*Haliaeetus leucocephalus*) - threatened  
California condor (*Gymnogyps californianus*) - threatened (in Grand Canyon NP)  
Mexican spotted owl (*Strix occidentalis lucida*) - threatened  
southwestern willow flycatcher (*Empidonax traillii extimus*) - endangered  
Yuma clapper rail (*Rallus longirostris yumanensis*) - endangered  
humpback chub (*Gila cypha*) - endangered  
razorback sucker (*Xyrauchen texanus*) - endangered  
Kanab ambersnail (*Oxyloma haydeni kanabensis*) - endangered  
yellow-billed cuckoo (*Coccyzus americanus*) - candidate  
relict leopard frog (*Rana onca*) - candidate

Ms. Lenore Grover-Bullington

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For species lists, the Arizona Ecological Services Field Office has posted lists of the endangered, threatened, proposed and candidate species occurring in each of Arizona's 15 counties on the Internet. Please refer to the following web page for species information in the county where your project occurs: <http://arizonaes.fws.gov>. If you have difficulty obtaining a list, please contact our office and we will mail or fax you a list as soon as possible.

After opening the web site, click the Threatened and Endangered button on the left hand side of the page. Then scroll to the bottom of the page where there is a map of Arizona. You can either click on your county of choice on the map or from the list. The arrows on the left will guide you through the information on the species that are listed, proposed, candidates, or have conservation agreements. Here you will find information on the species' status, a physical description, and counties where the species occurs, habitat, elevation, and some general comments. Additional information can be obtained by going back to the main page. On the left side of the screen, click on Document Library, then click on Documents by Species, then click on the name of the species of interest to obtain General Species Information, or other documents that may be available. Click on the cactus icon to view the desired document.

Please note that your action area may not necessarily include all or any of these species. The information provided includes general descriptions, habitat requirements, and other information of each species on the list. Under the General Species Information, citations for the Federal Register (FR) are included for each listed and proposed species. The FR is available at most public libraries, and on the Internet. This information should assist you in determining which species may or may not occur within the action area. Site-specific surveys could also be helpful and may be needed to verify the presence or absence of a species or its habitat as required for the evaluation of proposed project-related impacts. We are also prepared to assist you in defining a species list for your project, particularly when we know more about the extent of the action.

Endangered and threatened species are protected by Federal law and must be considered prior to project development. If the action agency determines that listed species or critical habitat may be adversely affected by a federally funded, permitted or authorized activity, the action agency will need to request formal consultation with us. If the action agency determines that the planned action may jeopardize a proposed species or destroy or adversely modify proposed critical habitat, the action agency will need to enter into a section 7 conference. The county list may also contain candidate species. Candidate species are those for which there is sufficient information to support a proposal for listing. Although candidate species have no legal protection under the Act, we recommend that they be considered in the planning process in the event that they become listed or proposed for listing prior to project completion. In addition to species listed under the Act, we recommend you consider species protected under the Migratory Bird Treaty Act.

If any proposed action occurs in or near areas with trees and shrubs growing along watercourses, known as riparian habitat, we recommend the protection of these areas. Riparian areas are critical to biological community diversity and provide linear corridors important to migratory species. In addition, if the project will result in the deposition of dredged or fill materials into

Ms. Lenore Grover-Bullington

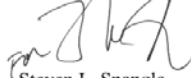
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waterways, we recommend you contact the Army Corps of Engineers which regulates these activities under Section 404 of the Clean Water Act.

The State of Arizona and some of the Native American Tribes protect some plant and animal species not protected by Federal law. We recommend you contact the Arizona Departments of Game and Fish, and Agriculture for State-listed or sensitive species, or contact the appropriate Native American Tribe to determine if sensitive species are protected by Tribal governments in your action area. We recommend that you invite the Arizona Game and Fish Department and any Native American Tribes in or near your project area to participate in your information or formal section 7 consultation process.

Thank you for the opportunity to review and comment on the proposed action. If we can be of further assistance, please contact Bill Austin (928) 226-0614 x102 or Brenda Smith (x101).

Sincerely,



Steven L. Spangle  
Field Supervisor

cc: Director, Science Center, Grand Canyon National Park, Grand Canyon AZ  
Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix AZ

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L7617 (GRCA 8213)

JUN 22 2005

LJoe  
RVWard  
LPowell  
KCannon  
JFAlston

Mr. Steve Spangle  
U.S. Fish and Wildlife Service  
Arizona Ecological Services Field Office  
2321 West Royal Palm Road, Suite 103  
Phoenix, Arizona 85021

Dear Mr. Spangle:

Grand Canyon National Park is in the final stages of a large-scale planning effort to develop a Colorado River Management Plan (CRMP) and associated Environmental Impact Statement. The Management Plan will be fashioned to protect natural and cultural resources while managing recreational use along the Colorado River corridor within Grand Canyon National Park (GRCA). As you are no doubt aware, management of recreational use on the Colorado River is a highly complex and controversial undertaking. For years, the park has been struggling with the level and type of use, allocation of use between commercial and non-commercial sectors, and protection and preservation of natural and cultural resources. All of these issues contribute to the complexity of the current planning effort.

This letter submits the Biological Assessment (BA) for the Preferred Alternative for the Colorado River Management Plan to your agency. A draft of this BA was informally reviewed by Mr. William Austin of your Flagstaff office in May of this year. We have incorporated all comments and recommendations made by Mr. Austin in that review. The submission of this BA will continue our consultation with the U.S. Fish and Wildlife Service which was begun in March 2004, pursuant to the requirements of the Endangered Species Act and National Park Service Management Policies. The NPS is asking for your concurrence with our findings that the proposed action (Preferred Alternative):

1. May effect, and is likely to adversely affect, the bald eagle, California condor, Mexican spotted owl, southwestern willow flycatcher, California brown pelican, humpback chub, razorback sucker, Kanab ambersnail and the desert tortoise.
2. May effect, but is not likely to adversely affect, the Yuma clapper rail.
3. May effect, but is not likely to adversely affect, Critical Habitat for the Mexican spotted owl and razorback sucker.
4. May effect, and is likely to adversely affect, Critical Habitat for the humpback chub.
5. Will not result in adverse modification of proposed Critical Habitat for the southwestern willow flycatcher.
6. Is not likely to jeopardize the continued existence of the candidate species relict leopard frog and yellow-billed cuckoo.

As requested by Mr. Austin, the BA will be sent directly to him and the associated maps will be delivered to his office during the week of June 20, 2005.

Should you have any questions concerning this matter please contact our Wildlife Program Manager, R.V. Ward at 928-638-7756.

Sincerely,

*JF Alston*  
Joseph F. Alston  
Superintendent

Enclosures (3) - Biological Assessment  
- Appendix A Proposed Action  
- Appendix B Carrying Capacity Standards

cc:

Bill Austin, USFWS, 323 N. Leroux Street, Suite 101, Flagstaff, Arizona 86001

bcc:

RV Ward (GRCA-8213)

FNP:RVWard:lj:6/20/05:928.638.7863



United States Department of the Interior

U.S. Fish and Wildlife Service  
2321 West Royal Palm Road, Suite 103  
Phoenix, Arizona 85021-4951  
Telephone: (602) 242-0210 FAX: (602) 242-2513



received  
7-26-05

In Reply Refer to:

AESO/SE  
02-21-89-F-0106-R1

July 22, 2005

Memorandum

To: Superintendent, Grand Canyon National Park, Grand Canyon, Arizona  
From: Field Supervisor  
Subject: Request for Formal Section 7 Consultation on the Colorado River Management Plan

Thank you for your June 22, 2005, letter and accompanying June 2005 biological assessment (BA) requesting initiation of a formal section 7 consultation under the Endangered Species Act (16 U.S.C. 1531-1544), as amended (Act), which we received on June 24, 2005. The requested consultation concerns the possible effects of the Colorado River Management Plan on the bald eagle (*Haliaeetus leucocephalus*), California condor (*Gymnogyps californianus*), Mexican spotted owl (*Strix occidentalis lucida*) (MSO), southwestern willow flycatcher (*Empidonax traillii extimus*), brown pelican (*Pelecanus occidentalis californicus*), humpback chub (*Gila cypha*) and its critical habitat, razorback sucker (*Xyrauchen texanus*), Kanab ambersnail (*Oxyloma haydeni kanabensis*), and desert tortoise (*Gopherus agassizii*).

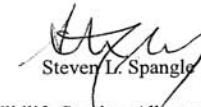
The information necessary to initiate formal consultation was either included with your letter or is otherwise accessible for our consideration and reference. Additional information may help us with our analysis as the consultation progresses. We will advise you of any such requests as soon as possible. We have assigned log number 2-21-89-F-0106-R1 to this consultation. Please refer to that number in future correspondence on this consultation.

Section 7 allows the Service up to 90 calendar days to conclude formal consultation with your agency and an additional 45 calendar days to prepare our biological opinion (unless we mutually agree to an extension). Therefore we expect to provide you with our biological opinion no later than November 6, 2005. Although these are the required time frames, we will make every effort to complete this consultation at the earliest date possible. In order to ensure the accuracy of our biological opinion, we intend to provide you with a draft for your evaluation.

As a reminder, the Act requires that, after initiation of formal consultation, the Federal action agency may not make any irreversible or irretrievable commitment of resources that limits future options. This practice insures that agency actions do not preclude the formulation or implementation of reasonable and prudent alternatives that avoid jeopardizing the continued existence of endangered or threatened species or destroying or adversely modifying their critical habitat.

In keeping with our trust responsibilities to Native American Tribes, by this memorandum we will notify the Hualapai Tribe, which may be affected by this proposed action and encourage you to invite the Bureau of Indian Affairs to participate in the review of this project. We encourage you to coordinate the review of this project with the Arizona Game and Fish Department.

We appreciate your concern for listed and sensitive species, and the lands they occupy. If you have any questions or concerns about this consultation or the consultation process in general, please contact Bill Austin (x102) or Brenda Smith (x101) at (928) 226-0614.

  
Steven L. Spangle

cc: Field Supervisor, Fish and Wildlife Service, Albuquerque, NM  
Project Leader, Arizona Fishery Resources Office, Pinetop, AZ  
Director, Science Center, Grand Canyon National Park, Grand Canyon, AZ  
Chairperson, Hualapai Tribe, Peach Springs, AZ  
Environmental Specialist, Environmental Services, Western Regional Office, Bureau of Indian Affairs, Phoenix, AZ  
Director, Natural Resources Department, Hualapai Tribe, Peach Springs, AZ  
Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ

**FINAL  
BIOLOGICAL ASSESSMENT**

**COLORADO RIVER MANAGEMENT PLAN**

National Park Service, Grand Canyon National Park  
Coconino and Mohave Counties

June 2005  
Redacted and Revised

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## I. INTRODUCTION

This Biological Assessment (BA) has been prepared in conjunction with the Draft Environmental Impact Statement for the Colorado River Management Plan (CRMP). This document assesses the potential effects of implementing the preferred alternatives on federally listed and candidate species and their designated critical habitat.

The CRMP is primarily a visitor use management plan, which specifies actions to preserve park resources and the visitor experience while enhancing recreational opportunities. The plan prescribes standards and measures for visitor experiences and resource conditions that are to be achieved and maintained in the Colorado River corridor over time. The plan creates or modifies standards and programs where management objectives, research, and public input indicate a need. Although Grand Canyon National Park (GRCA) intends this plan to cover at least the next ten years, the Park recognizes that some of the plan's goals, objectives, and desired conditions may require a longer period of time than that to achieve. The plan prescribes monitoring to measure progress toward meeting resource condition and visitor experience objectives. Inherent to the plan is a commitment by GRCA to provide the budget and staff to implement the plan through adaptive management and to respond to the findings of the monitoring program.

The CRMP focuses on visitor use issues and the associated impacts to natural and cultural resources. Glen Canyon Dam operations, allocation of administrative use, Wild and Scenic River designation, formal Wilderness designation, backcountry operations, and commercial overflights are outside the scope of the CRMP.

Grand Canyon National Park (GRCA) developed a CRMP in 1980; this plan was revised in 1981 and 1989. The Park's 1995 *General Management Plan* (GMP) set as an objective the management of "the Colorado River corridor through Grand Canyon National Park to protect and preserve the resource in a wild and primitive condition." The GMP also stated, "The Park's 1989 *Colorado River Management Plan* will be revised as needed to conform with the direction given in the management objectives of the *General Management Plan*."

In 1997, GRCA initiated a review of the 1989 CRMP. During this same time period, the Park was in the process of developing a Draft Wilderness Management Plan (an update of the 1988 *Backcountry Management Plan*), and released a draft plan and Environmental Assessment in June 1988. In February 2000, the National Park Service halted the process of revising the CRMP, and ceased efforts to develop a combined land-and-river-based plan. A lawsuit was filed in U.S. District Court for the District of Arizona in July 2000 to compel the Park to resume the process of reviewing and revising the 1989 CRMP. Settlement was reached in January 2002. The settlement agreement required CRCA to restart the Colorado River planning process and to address specific issues including allocation of use between commercial and non-commercial users, and the appropriate level of motorized rafting use. Under the settlement agreement, GRCA must issue a final



NEPA compliance document by December 31, 2004, and following completion of the CRMP, will initiate the revision of the *Backcounty Management Plan*.

The objective for threatened, endangered and sensitive species as it relates to Grand Canyon’s overall management is: “Manage ecosystems to preserve critical processes and linkages that ensure the preservation of rare, endemic and specially protect (threatened and endangered) plant and animal species.” The objective for threatened, endangered, and sensitive species as it relates to management of recreational river use in the Grand Canyon is: “Protect all threatened, endangered, sensitive, and candidate species and their habitats from impacts associated with river recreational activities.”

All species listed as threatened, endangered, or proposed for listing as determined by the U.S. Fish and Wildlife Service (USFWS) receive the full protection of the federal Endangered Species Act of 1973 (ESA), as amended, and may not be harmed under penalty of law. Table 1 includes all federally protected wildlife species and candidate species that have been recorded or are likely to occur within the area potentially affected by river recreationists in the Park.

Table 1. Threatened, Endangered and Candidate Species Known or Likely to Occur in the Colorado River Corridor in GRCA

Common Name	Scientific Name	Federal Status
<b>Invertebrates</b>		
Kanab ambersnail	<i>Oxyloma haydeni kanabensis</i>	Endangered
<b>Fish</b>		
Humpback chub	<i>Gila cypha</i>	Endangered with critical habitat
Razorback sucker	<i>Xyrauchen texanus</i>	Endangered with critical habitat
<b>Birds</b>		
California brown pelican	<i>Pelecanus occidentalis californicus</i>	Endangered
California condor	<i>Gymnogyps californianus</i>	Endangered (Threatened in GRCA)
Bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened
Yuma clapper rail	<i>Rallus longirostris yumanensis</i>	Endangered
Mexican spotted owl	<i>Strix occidentalis lucida</i>	Threatened with critical habitat
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	Endangered with proposed critical habitat
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	Candidate
<b>Reptiles</b>		
Desert tortoise	<i>Gopherus agassizii</i> (Mohave Population)	Threatened
<b>Amphibians</b>		
Relict leopard frog	<i>Rana onca</i>	Candidate

## II. PURPOSE AND NEED

The purpose of and need to take action is to evaluate a range of reasonable alternatives and strategies to address long-standing Colorado River management issues, resolve conflicts, and ensure compliance with federal laws, regulations, policies, previous planning decisions, the park's vision, and other mandates for the management of river recreational use within the Colorado River corridor.

The 1995 General Management Plan outlines a vision for managing resources and visitor experiences for undeveloped areas in the park, including the Colorado River. The following Vision Statement for management of the Colorado River corridor in GRCA is adopted from the 1995 GMP and revised based on comments received during opportunities for public participation in this planning process:

The Colorado River Corridor in Grand Canyon National Park will be managed to provide a wilderness river experience in which visitors can intimately relate to the majesty of the Grand Canyon and its natural and cultural resources. Visitors traveling through the canyon on the Colorado River will have the opportunity for a variety of personal outdoor experiences, ranging from solitary to social, with as little influence from the modern world as possible. The Colorado River corridor will be protected and preserved in a wild and primitive condition.

A key part of this vision is the concept of a “wilderness river experience.”<sup>1</sup> Areas proposed or eligible for wilderness designation, including the Colorado River, “offer visitors opportunities for solitude and primitive recreation. The management of these areas should preserve the wilderness values and character.” Components of a “wilderness river experience” include:

- The natural sound, silence, smells, and sights of the canyon and the river predominate over those that are human-caused.
- Provides outstanding opportunities for solitude or a primitive and unconfined type of recreation.
- The river is experienced on its own terms (i.e., visitors accept an undeveloped, primitive environment and assume the potential risks and responsibilities).
- The natural and cultural objects in the riparian zone and side canyons are viewed in a state as little affected as possible by people, given the existence of dams on the Colorado River.

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<sup>1</sup> This definition is derived from the Wilderness Act, NPS Management Policies (DO #41 & DO #47), the 1995 GMP, and the 1989 and 1980 CRMP documents. The definition is supported by responses to survey questions in the 1998 Colorado River Boaters Survey and comments from the 2002 CRMP public scoping period.

- The effect of the river runner's presence is temporary rather than long lasting.

The vision of the Hualapai Tribe is to protect the resources of the Tribe and provide for the development of economic opportunity for existing and future members of the Tribe. The Tribe has limited economic resource potential and looks to the Colorado River corridor as a source of growth for tribal economic development and employment.

The revision of the CRMP is needed to address long-standing Colorado River management issues, including the following:

- Appropriate level of visitor use consistent with natural and cultural resource protection and visitor experience goals
- Allocation of use between commercial and non-commercial groups
- Non-commercial permit waiting list
- Level of motorized and non-motorized boat use
- Range of services provided to the public
- Use of helicopters to transport river passengers to and from the river
- Impacts to natural and cultural resources
- Appropriate levels and types of upstream travel from Lake Mead

There is almost universal recognition, reflected in public scoping comments, of the special nature of the resources and experiences in the park's river corridor. People used terms such as superlative, life changing, unique, and awe-inspiring in their comments to describe the canyon and their experiences while floating the river, hiking side canyons, viewing and learning about scenery, wildlife and natural and cultural resources of GRCA. Preserving the special values of the river corridor identified by the public and improving recreational opportunities for visitors while protecting resources are the objectives of this plan.

## ACTION AREA DESCRIPTION

Grand Canyon National Park (GRCA) encompasses approximately 1.2 million acres in northern Arizona, on the southern end of the Colorado Plateau (Figure 1), in both Coconino and Mohave Counties. The action area of the CRMP includes all of the 277-mile stretch of the Colorado River that runs through the Park.

The Park contains several major ecosystems from mixed Mohave desertscrub of the lower canyon to the coniferous forests of the North Rim. Climatic conditions in the Grand Canyon region are diverse and elevation-based. Most of the precipitation comes from summer thunderstorms and winter rain and snow. Elevations range from 9,200 feet on the North Rim to 1,200 feet near Lake Mead. At Phantom Ranch in the inner canyon, average annual precipitation is 9 inches a year, while at the far western desert, precipitation dwindles to a scant 6 inches per year (Houk and Brown 1996).

The inner canyon is characterized by pinyon-juniper woodland and chaparral communities below the rim edges from about 7,500 feet to 4,000 feet in elevation. Below this, desertscrub vegetation dominates, with blackbrush (*Coloegyne ramosissima*) being

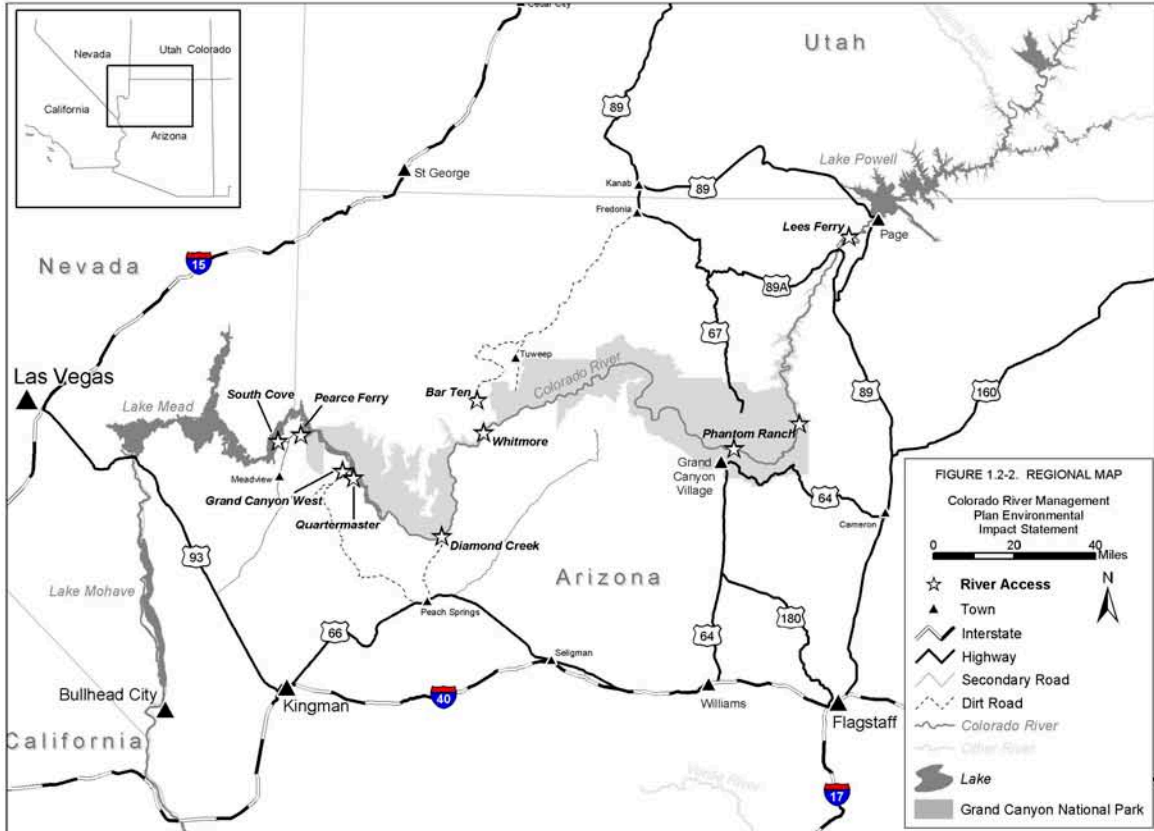


Figure 1. Grand Canyon National Park

the dominant plant species on the Tonto platform to the inner gorge. The Grand Canyon is situated in a transition region between three of the four major desert regions of North America. The inner canyon near the bottom, essentially below 4,000 feet in elevation has vegetation characteristics of both Sonoran and Mohave desertscrub, although according to Warren *et al.* (1982), Mohave species are more dominant. Above 4,000 feet in elevation, and below the woodland and chaparral communities, vegetation is most characteristic of Great Basin Desert.

Riparian communities dominate the inner gorge along the Colorado River, its tributaries, springs and seeps. Riparian scrub communities occur along ephemeral and intermittent systems. Riparian forest and woodland communities associated with large spring systems are highly diverse in Grand Canyon. Side canyons throughout the Park are characterized by cottonwood (*Populus fremontii*) and willow (*Salix spp.*). A few large springs support floras that are quite diverse and contain uncommon species such as scarlet sumac (*Rhus glabra*), water birch (*Betula occidentalis*), and red-osier dogwood (*Cornus stolonifera*). Introduced exotic riparian species also occur in many areas of the inner canyon; species include salt cedar (*Tamarix ramosissima*), Camelthorn (*Alhagi maurorum*), perennial pepperweed (*Lepidium latifolium*) red brome (*Bromus rubens*), and weeping lovegrass (*Eragrostis curvula*) (Warren *et al.* 1982, Houk and Brown 1996, Mararick 2002)

The GMP identifies several management zones within the Park. The action area for the CRMP falls entirely within the natural zone. This zone is “managed to conserve natural resources and ecological processes and to provide for their use and enjoyment by the public in ways that do not adversely affect these resources and processes” (Chapter 2, NPS Management Policies). The natural zone includes the Colorado River, proposed wilderness, Havasupai Use lands, and South Rim undeveloped areas.

The action area is defined for the purposes of the analysis conducted in this Biological Assessment as the Colorado River corridor from Lees Ferry through GRCA and adjacent tribal lands to Lake Mead. The corridor is the band of river and riparian and desert habitats adjacent to the Colorado River between Lees Ferry and Lake Mead. The corridor includes the lower portions of the tributaries and side canyons to the mainstem Colorado, namely those areas potentially visited by recreationists hiking off the river. In addition, the action area includes the air above and adjacent to the river corridor, namely, the places where helicopters travel when taking recreationists to or from the river corridor. Except for cumulative impacts analysis or as specifically stated in the text, the analysis area does not include areas upstream from Lees Ferry (including Glen Canyon Dam), Lees Ferry itself (which is part of Glen Canyon NRA), or areas in Lake Mead NRA (including Pearce Ferry and South Cove).

### III. PROPOSED ACTION

Two different sets of alternatives have been developed by GRCA for the CRMP:

Lees Ferry Alternatives: These alternatives consist of a no-action alternative (Alternative A) and a set of seven additional alternatives (Alternatives B through H) for management of the section of the river from Lees Ferry (River Mile [RM] 0) to Diamond Creek (RM 226).

Lower Gorge Alternatives: These alternatives consist of a no-action alternative (Alternative 1) and a set of four additional alternatives (Alternatives 2 through 5) for management of the section of the river from Diamond Creek (RM 226) to Lake Mead (RM 277).

GRCA has selected two preferred alternatives. The preferred alternatives that will be examined and analyzed in this Biological Assessment are the Lees Ferry Modified Preferred Alternative H and the Lower Gorge Modified Preferred Alternative 4. The modified preferred alternatives are fully described in Appendix A of this document. These two alternatives can be considered together as the NPS preferred alternative for the entire Colorado River Corridor in Grand Canyon National Park.

## V. SPECIES EVALUATION

Impacts on threatened and endangered species were analyzed using the best site-specific data available for species locations and distributions within GRCA. This information included, but was not limited to, the CRMP Mixed Resource Map, inventories and research conducted by GRCA biologists, personal communications with resource specialists, Hualapai tribal data, and Grand Canyon Monitoring and Research Center studies. Species information was compared with Campsite Use Intensity Tables and the Human Impacts Monitoring Database (Brown and Jalbert 2003). It should be noted that there is a distinct lack of recreational disturbance and habitat alteration impact research specific to the Grand Canyon river corridor. Therefore, considerable use was made of research conducted in other areas and extrapolated to the present conditions in GRCA. This technical literature was used to determine the most susceptible aspects of a particular species' or group of species' life cycle and habitat use areas.

Analysis of an impact to a particular species or group of species involves a complex examination of the interaction of proximity of the action, distribution of the species, timing, duration, disturbance frequency, disturbance intensity, and disturbance severity to each species and its habitat. In the absence of site-specific data regarding effects of recreational impacts to species in the river corridor, these determinations of effect are based on best professional judgment and are conservative in nature.

For the purposes of section 7 consultation under the Endangered Species Act, the following definitions are used when determining the level of anticipated effect for each listed species and its habitat (USFWS 1998a):

No effect: The proposed action will not affect listed species or designated critical habitat.

Is not likely to adversely affect: Effects of the proposed action on listed species is expected to be discountable, insignificant, or completely beneficial.

Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.

Insignificant effects relate to the size of the impact and should never reach the level where incidental take may occur.

Beneficial effects are contemporaneous positive effects without any adverse effects to the species. In the event that the overall effect of the proposed action is beneficial to the listed species, but also likely to cause some adverse effects, then the proposed action "is likely to adversely affect" the listed species.

Is likely to adversely affect: Effects of the proposed action on listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial.

## Assumptions

Assumptions that specifically relate to the CRMP preferred alternatives and their effect on threatened and endangered species are:

- As there are no data to empirically support or refute the position that guided trips are better controlled and result in less resource damage, the assumption is made that all individuals whether guided or private have an equal chance of adversely interacting with wildlife and its habitat.
- User Discretionary Time (see Appendix B) provides the opportunity for a certain proportion of river recreationists to adversely interact with terrestrial wildlife and its habitat.
- The Lower Gorge modified preferred alternative is treated with the assumption that maximum use limits, as presented in the alternative description, would be reached.

## Conservation Measures for the Preferred Alternatives

GRCA has committed to the following reasonable mitigations for impacts to threatened, endangered, and candidate species:

- Conduct a regularly scheduled monitoring program.
- Increase the number of patrol trips and the level of resource protection enforcement activities.
- Increase the level of resource education that each river recreation participant receives.
- Compare indicator species abundance, richness and diversity in and near camping and attraction sites with areas seldom visited by recreationists.
- Close southwestern willow flycatcher nesting habitat.
- Measure vegetation change through time by means of remote sensing imagery. This will serve as a less expensive, but less precise, surrogate for direct monitoring of populations as called for in the previous mitigation measures.
- Institute site closures of sensitive and impacted areas.
- Actively manage impacted areas through revegetation efforts.
- Construct official trails and aggressively close and rehabilitate all other trails.
- Limit or prohibit use of down woody material for fire wood.
- Institute closure of Upper Elves Chasm.
- Close all caves to visitation until bat inventory complete.

The mitigation measures that relate directly to threatened and endangered species will be described in more detail within this document.

### **Bald Eagle (*Haliaeetus leucocephalus*)**

The bald eagle was listed as endangered in 1967. The species was reclassified from endangered to threatened in July 1995.

Bald eagles occur in Arizona as either breeding populations or winter migrants. Arizona bald eagles occur at elevations between 460 and 7,390 feet. Nests occur in tall trees, cliff faces, ledges, and pinnacles near open water for foraging. Perches for shelter, roosting, foraging and guarding are important habitat components. The diet of eagles is comprised mainly of fish, with small mammals, carrion, birds and reptiles eaten to a lesser extent. Nesting occurs along central Arizona rivers including the Salt and Verde Rivers. New nest sites along the Gila, Bill Williams, Agua Fria, and San Pedro drainages indicate that the Arizona population is increasing. Since 1992, nearly 250 winter bald eagles have been observed each year in Arizona, with most occurring close to water in coniferous forests near Flagstaff and the White Mountains (AGFD 1996). Bald eagle nesting does not occur within GRCA, but wintering eagles are often observed within the Park boundaries.

Abundance and distribution of wintering bald eagles along the Colorado River was unknown before 1963; however, post-dam winter surveys suggest that eagles were not present immediately after construction of the dam (Brown *et al.* 1989). Commercial river guides on the Colorado River first noted winter bald eagle concentrations on the southern Colorado Plateau below Glen Canyon Dam at Nankoweap Creek in the early 1980's (Van Riper *et al.* 1995). Wintering bald eagles increased in numbers along the Colorado River in GRCA, evidently in response to trout availability in Nankoweap Creek and in the river; by 1988 the mouth of Nankoweap Creek (RM 52) was a concentration point for eagle activity due to the apparent ease with which eagles could forage on spawning trout in the shallow, exposed creek channel; eagles have also been located in other areas above the confluence of the Little Colorado River (Brown *et al.* 1989; Van Riper *et al.* 1995). Wintering bald eagles are present each year along the upper half of the Colorado River corridor from late fall (October-November) through early spring (March-April). Wintering eagles also occur at Lake Mead. During surveys conducted between 1989-1994 in GRCA, eagles were observed during every aerial survey with numbers ranging from 2 to 23; eagles were found to be distributed evenly along the river corridor when conditions were suitable and rainbow trout were spawning in tributaries, except in January and February when the birds concentrated at the small tributaries (Van Riper *et al.* 1995).

Three sites in GRCA have been identified as winter roost areas: [REDACTED]

[REDACTED]. During the winter peak (late February - early March), bald eagles ranged in number from 13 to 24 birds between Glen Canyon Dam and the confluence with the Little Colorado River (Sogge *et al.* 1995). As mentioned previously, a concentration of eagles occurred at the mouth of Nankoweap Creek in the late 1980s and early 1990s, but in 1995, Nankoweap flashed, altering the delta and the spawning habitat of trout at that





and can displace eagles. Steidl and Anthony (1995) studied the effects of non-motorized recreational boating on non-breeding bald eagles in Alaska and found that 50% flushed in response to rafts approaching. River or hiking traffic in the morning hours and evening hours are more likely to flush perched or foraging eagles. January through March is the time of the year when bald eagles congregate in the upper portions of the river corridor at the mouths of creeks to feed upon trout. River running traffic during this time period can harass foraging and roosting eagles and disrupt feeding. The affect of river traffic on wintering bald eagles within the Grand Canyon are not known.

### Conclusion

In Modified Preferred Alternative H, the number of river runners will be relatively low between January and the end of March when no motors are permitted. No commercial trips will occur in the winter season, November through March. A maximum of one trip launch per day will be permitted in the winter (November – February) and *two noncommercial launches in March. Commercial use begins in April with three launches per day in the first half of April and 3.5 permitted from April 16-30.* Thus, the likelihood of river runners harassing wintering eagles increases in March due to a *doubling* of the number of boats that will pass foraging/roosting sites on any given day, however, these boats will be non-motorized.

GRCA will implement the following conservation measures to reduce negative impacts to wintering eagles during implementation of Preferred Alternative H:

- 1) In March of each year, river running trips (commercial, private, and science) will avoid stopping near Nankoweap Creek (RM 52) if eagles are observed in the area. GRCA will provide educational material to all river runners about minimizing the potential harassment bald eagles in this area in March, and about the potential for bald eagles to occur in Grand Canyon at other places, and at other times of the year. GRCA will request that they report any eagle sightings. GRCA will report all eagle sightings by river runners or those observed during bird surveys to the U.S. Fish and Wildlife Service.
- 2) Roosting eagles *in the vicinity of* Phantom Ranch will be monitored for three years to determine the extent of recreational impacts.

GRCA believes that adverse affects to wintering eagles may occur between January and March each year. While the mitigation measure described above will assist in reducing impacts to wintering eagles, it does not remove all potential negative impacts. Therefore, we have determined that Modified Preferred Alternative H may effect, and is likely to adversely affect the bald eagle. Wintering eagles are primarily concentrated in the portion of the canyon between Lees Ferry and Diamond Creek, however, because eagles do winter at Lake Mead, it is possible that some eagles may move up the river corridor into GRCA to forage. However, because these eagles are concentrated at Lake Mead, the likelihood of harassment by river runners is low. GRCA has determined that Lower Gorge Modified Preferred Alternative 4 may effect, is not likely to adversely affect the bald eagle.

## **California Condor (*Gymnogyps californianus*)**

The California condor was listed as an endangered species in March 1967 and remains classified as endangered today. In 1996, the U.S. Fish and Wildlife Service established a nonessential, experimental population of condors in northern Arizona. In December 1996, the first condors were released in the Vermillion Cliffs area of Coconino County, Arizona, approximately 48 kilometers (30 miles) north of GRCA. Subsequent releases have brought the total condor population in Arizona as of August 2004 to 53 (44 free-flying and two chicks) (pers. com. Elaine Leslie, GRCA). By declaring the population “experimental, nonessential”, the U.S. Fish and Wildlife Service can treat this population as “threatened” and develop regulations for management of the population that are less restrictive than mandatory prohibitions covering endangered species. This facilitates efforts to return the condor to the wild by providing increased opportunities to minimize conflict between the management of the condors with other activities. Within GRCA and other National Parks and Monuments, the condor has the full protection of a threatened species (NPS Management Policies).

California condors are strict scavengers and rely on finding their food visually, often by investigating the activity of ravens, coyotes, eagles, and other scavengers. Without the guidance of their parents, young, inexperienced juveniles may also investigate human activity. As young condors learn and mature, this human-directed curiosity diminishes. Nesting habitat for California condors includes various types of rock formations such as crevices, overhung ledges, and potholes. Roost sites include cliffs and tall trees, including snags (USFWS 1996). California condors typically forage in open terrain, although recent records are indicating that foraging is occurring in close proximity to clusters of trees. Typical foraging behavior includes long-distance reconnaissance flights, lengthy circling flights over a carcass, and hours of waiting at a roost or on the ground near a carcass.

All individual condors in northern Arizona are fitted with radio transmitters allowing field biologists to monitor their movements. The condors have been observed as far west as the Virgin Mountains near Mesquite, Nevada; south to the San Francisco Peaks outside of Flagstaff, Arizona; north to Zion and Bryce National Parks and beyond to Minersville, Utah; and east to Mesa Verde, Colorado and the Four Corners region (The Peregrine Fund 2000). Monitoring data indicate condors are using habitat throughout GRCA, with concentration areas in Marble Canyon, Desert View to the Village on the South Rim, the Village to Hermits Rest, and Bright Angel Point on the North Rim. A growing number of condors typically begin visiting the Marble Canyon portion of the Colorado River corridor in February, March, and April (Peregrine Fund 2003). Condors have been observed at Phantom Ranch. The presence of river runners in the river corridor may attract some condors, especially younger condors. Interaction with humans is discouraged and temporary removal of condors from the wild due to negative interactions with humans has been a relatively common practice during reintroduction efforts in Arizona.

Recent information gained from transmitters indicates some use by condors in the Whitmore area and this is thought to be a possible corridor to the Hurricane Cliffs; tracking also shows some use at Pearce Ferry at Lake Mead (just west of the project area) (pers. comm. Elaine Leslie to Lenore Grover-Bullington, GRCA, March 11, 2004). GRCA and the U.S. Fish and Wildlife Service recognize that the potential for aircraft collisions exists in the Park. In 2000, the U.S. Fish and Wildlife Service completed a biological opinion for the new flight rules in the vicinity of GRCA. The opinion states that condors may be adversely affected through harassment or accidental displacement when startled individuals are flushed from a perch site by low level flights, and the FWS estimates that one condor in 5 years may be killed due to collision with aircraft (USFWS 2000). Under the CRMP Lower Gorge Modified Preferred Alternative 4, helicopter use associated with river use would be limited to Hualapai River Runners (HRR) exchanges and pontoon passenger access/egress in the Quartermaster area (RM 262-263). This alternative clearly states that there are no limits on helicopter use for passengers on the Hualapai Reservation and that because helicopter operations in the Quatermaster area take off and land on sovereign tribal lands, the Park Service does not regulate helicopter use in this area. While the predicted number of flights in the Quatermaster area are not known under this alternative, and while the number of flights in this area are likely to be far less than those predicted under the new flight rules and analyzed in the 2000 USFWS biological opinion, flights in the Quartermaster area will be concentrated in a small area. This concentration in use may increase the likelihood of condor-helicopter collision.

Of concern as well is the recent tracking information that indicates use by condors in Whitmore area (RM 185). Under Preferred Modified Alternative H, helicopter exchanges would be allowed *from April 1 through September 15 at current passenger exchange ratios (estimated at 5,715 out and up to 4,035 passengers in) and a time-of-day restriction will be imposed (i.e. all exchanges must be completed by 10:00 am local time each day). Trips launching during the mixed-use season would also be allowed to exchange passengers at Whitmore, even if the exchange occurs during the nonmotorized season (e.g., commercial motorized trips launching on September 15 could have their passengers exchange at Whitmore on September 25). Hiking exchanges would only be allowed during the mixed use season.* Helicopter flights in this area are under the control of the Hualapai Tribe and GRCA has no control over them. Public Law 100-91 states that “helicopter flights shall not be prohibited 1) which fly a direct route between a point on the north rim outside of Grand Canyon National Park and locations on the Hualapai Indian reservation; and 2) whose sole purpose is transporting individuals to or from boat trips on the Colorado River and any guide of such trip.” *However, GRCA is prescribing a limit on the number of passenger exchanges in and out of Whitmore Wash by allowing only companies currently exchanging at Whitmore to conduct helicopter exchanges at current passenger exchange rates.*

For purposes of analysis, GRCA assumes the number of passengers exchanged at Whitmore will comply with the figures presented in the Modified Preferred Alternative H. GRCA assumes 5 persons per helicopter trip at Whitmore. [REDACTED]

[REDACTED] As in the Quatermaster area, helicopter use will

occur in a concentrated small area and this may increase the risk of condor-helicopter collision. GRCA believes that adverse effects to the condor from helicopter flights have been addressed by the FWS in their January 26, 2000 Biological Opinion.

Because helicopter flights in the Quartermaster and Whitmore areas are not under the control of the Park Service, GRCA cannot require specific conservation measures that apply to these aircraft operators. However, GRCA is working closely with the FAA to enact the reasonable and prudent measure and implementing terms and conditions of the Service's January 26, 2000 Biological Opinion for New Flight Rules in the Vicinity of Grand Canyon National Park. These terms and conditions include:

- A. The FAA, in cooperation with the NPS, shall conduct an education/awareness program with the air tour operators to develop and implement measures to identify and avoid collisions with and other types of impacts on the (condor). Information on bird strikes shall be reported.
- B. The FAA, in cooperation with the NPS, shall develop and implement bird avoidance measures (e.g., alarms or other scaring techniques) to minimize condor use of the airport vicinity.

As part of GRCA's work with the FAA, we have completed a graphic display of known condor flight activity overlaid on a copy of the most recent "Grand Canyon" and "Las Vegas" VFR Aeronautical Charts for use in training of pilots. This was provided to the FAA for use in training pilots in 2003 or 2004. GRCA does not know how much training the FAA has conducted to date (pers. comm. Ken McMullen, Overflights and Natural Soundscape Program Manager, GRCA). GRCA believes we have assisted the FAA to the extent they have requested/allowed, and the training of pilots is the FAA's responsibility. GRCA will continue to work with them to ensure this training is completed. Such training will assist in addressing concerns and minimizing condor-helicopter collisions in the Quatermaster and Whitmore areas.

### Conclusion

River runner interactions with condors in the corridor will likely occur. While these interactions are generally considered negative for the condors (and may result in their temporary removal from the wild), they are hard to avoid. GRCA will implement the following mitigation measure to address this issue:

- 1) River runners will receive educational information about condors during the beginning of their river running experience. This educational information will emphasize appropriate interactions with condors.
- 2) *GRCA will work cooperatively with other condor recovery partners and the Hualapai Tribe to determine patterns of condor use (e.g. flight routes) of the Whitmore Canyon and Quartermaster Canyon areas.*

3) ***GRCA will make condor avoidance training presentations for air tour (including helicopter) pilots at FAA sponsored pilot safety meetings. GRCA will distribute brochures and make graphics of summer and winter flight routes available to the pilots. Pilots will be informed to actively watch for condors and to maintain safe distances between aircraft and condors.***

Given the concentrated use at Quartermaster (RM 262-263) and the unknown number of helicopter flights in that area, and given the number of helicopter flights at Whitmore (RM 185) (up to 4 per day during the 6-month season), GRCA believes condors using these areas may be harassed by helicopters and the likelihood of helicopter-condor collision exists. While the incidence of collision may be rare, the possibility exists during the 10-year lifespan of the CRMP. Therefore, GRCA determines that both modified preferred alternatives H and 4 may affect, and are likely to adversely affect the California condor.

### **Mexican Spotted Owl (*Strix occidentalis lucida*)**

Mexican spotted owls (MSO) occur in Arizona, New Mexico, southern Utah, and portions of Colorado and in Mexico. The MSO was listed as a threatened species in March 1993. Critical habitat was designated within GRCA on February 1, 2001 (66 FR 8530) and on August 31, 2004 (69 FR 53182). The MSO Recovery Plan (USFWS 1995a) identifies six recovery units; GRCA is located within the Colorado Plateau Recovery Unit.

MSO are typically associated with late seral forests and are generally found in habitat that includes mixed conifer or pine-oak forests, riparian madrean woodland, and sandstone canyonlands (USFWS 1995a). However, MSO have been found in relatively open shrub and woodland vegetation in arid canyonland habitat (Willey 1995). MSO do not build nests, but use naturally occurring sites, often in large diameter trees, cliff cavities, and abandoned hawk or raven nests. MSO prey mainly on small mammals, particularly arboreal or semi-arboreal species, although birds, insects, reptiles, and other types of small mammals are taken as well. Prey species composition varies by cover type. MSO are known to occur in the canyon habitat of GRCA and multiple territories (Protected Activity Centers) have been designated.

Mexican spotted owls have been reported in Grand Canyon since the 1920s (wildlife records, Natural Resources Office, GRCA). The presence of MSO within GRCA was confirmed in 1992 through field surveys of approximately 6,000 acres of suitable habitat on the north and south rims and in canyons extending up from the Colorado River (Willey 1992; Willey 2000). Additional MSO surveys were conducted on the South Rim in 1994 and 1995 (Kuenzi, unpubl. report) and in 1998 and 1999 on the North Rim (Willey 1998, 1999), however no owls were confirmed during these surveys. In 1999, additional surveys were conducted in side canyon habitat along the Colorado River corridor and MSO responses were received at six locations. Additional surveys were conducted in 2001 along the river corridor and 15 new MSO territories were located (Willey *et al.* 2002). A second year of survey in the river corridor was conducted in 2002

and 13 new territories were found and 13 of the owl sites located in 2001 were visited to determine occupancy and nesting status. Surveys in 2001 and 2002 in Grand Canyon located 34 previously-unknown MSO territories (Willey *et al.* 2002). Limited monitoring of known territories took place in 2003.

Canyon habitat for the MSO is scattered throughout Grand Canyon below the rims. Willey and Spotskey (1997) predicted that the owl's breeding habitat occurs within steep-walled canyonlands and mixed-conifer forest, including much of the Red Wall formation and steep forest on the North Rim. Predicted habitat in GRCA has been spatially defined through a geographic information system (GIS) model (Willey and Spotskey 1997) and is described as cool canyon habitat having low thermal intensity, short thermal duration, and steep slopes (Spotskey and Willey 2000). The coolness and short thermal duration is generally the result of vertical rock cliffs, cliff wall, and aspect, and is seldom due to dense vegetative canopy cover. Modeling of MSO canyon habitat has resulted in an estimate of 3,127 acres within the Park (USFWS 2003). The results of the habitat modeling have directed recent MSO survey efforts.

Willey *et al.* (2002) report that nesting and roosting areas used by spotted owls in GRCA are generally located in the upper headwaters of steep walled canyons. Results support the idea that the owl primarily occupies rugged canyonland terrain below the main rims. All known breeding sites in Grand Canyon have so far been located below the canyon rims within steep walled sandstone canyons. In these locations, the owl is associated with steep sandstone canyons with relatively open Great Basin or Mojave Desert scrub or Great Basin Conifer Woodland vegetation communities (Brown 1982). Owl sites in 2002 (except one site) were located below the main canyon rims within arid vegetation and canyonland habitat types.

A MSO radio telemetry study began in 2004 and will continue for the next two years (through 2006); six MSO, each from different territories, were fitted with telemetry equipment in 2004 (pers. comm. RV Ward, GRCA). The data have not yet been processed, but this study may provide useful information in determining movements of owls from territories located within the river corridor.

The size and extent of the MSO population at GCRA is currently unknown. As a result of the surveys to date, the Park has found approximately 60 MSO individuals and has designated 40 MSO Protected Activity Centers (PACs) (Carmen Sipe, GRCA, pers. comm., July 21, 2004). An additional PAC was designated in 2004 [REDACTED] (pers. comm. RV Ward). The average size of designated PACs is 762 acres. These PACs have been designated largely below the rims of the Grand Canyon, however several are adjacent to the rims of the Canyon. Because the MSO in GRCA are generally located in very rugged topography, very little is known about the occupancy or reproductive success within these PACs. Willey *et al.* (2002) reported three pairs nesting and one pair with 2 owlets in 2001, but no nesting was observed in 2002. In 2004, at least two nests are known, both containing triplets (pers. comm. RV Ward). As of June 15, 2005, the [REDACTED] PAC had three young (one of which was found dead below the

nest), the [REDACTED] PAC had two young, and the [REDACTED] PAC had two young (pers. comm. Tim Bowden, June 15, 2005).

It is possible that the Grand Canyon population of MSO may be a source population for other smaller canyonland subpopulations in the Colorado Plateau Recovery Unit. Willey *et al.* (2002) report that MSO surveys have covered approximately half of the rugged suitable habitat predicted to be within GRCA, thus they predict a population of over 200 spotted owls could be present within GRCA given the current occupancy rates.

Designated PACs

Table 3 provides a summary of the designated PACs within GRCA and a determination of which PACs may be adversely affected by implementation of Preferred Alternative H. No PACs are designated within GRCA within the Lower Gorge however unsurveyed habitat in that area is discussed in this biological assessment.

Table 3. GRCA Designated MSO PACs, PAC Acres, Likelihood of Potential Effects from Implementation of Preferred Alternative H, and Brief Notes

PAC Name	PAC Acres	Potential Adverse Effects from Preferred Alternative H	Notes
[REDACTED]	[REDACTED]	[REDACTED]	
[REDACTED]	[REDACTED]	[REDACTED]	
[REDACTED]	[REDACTED]	[REDACTED]	
[REDACTED]	[REDACTED]	[REDACTED]	
[REDACTED]	[REDACTED]	[REDACTED]	
[REDACTED]	[REDACTED]	[REDACTED]	
[REDACTED]	[REDACTED]	[REDACTED]	
[REDACTED]	[REDACTED]	[REDACTED]	
[REDACTED]	[REDACTED]	[REDACTED]	
[REDACTED]	[REDACTED]	[REDACTED]	
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			[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Nine designated PACs within GRCA may be negatively affected by river recreation as outlined in Preferred Alternative H. The determination of possible effects to these nine PACs was based upon a combination of several factors: 1) proximity of the PAC to the River; 2) known trails (as determined by GRCA's Known Resources Maps) that provide access up side canyons where MSO have been located; and, 3) impact ratings at sites within the River corridor proximate to the relevant side canyon, as determined by Colorado River Impact Monitoring (Brown and Jalbert 2003). Limitations exist with the methodology used to determine potential effects. For instance, in the case of the [REDACTED] PAC, while the MSO location site is a mere ½ mile from the River, no trail is designated within the side canyon and no known campsites, attraction sites, or hiking sites are noted in the monitoring databases. However, GRCA files note that a reliable source indicates that river runners were accessing the side canyon after word

spread of a MSO located at the site. This is a cause for concern because follow-up monitoring conducted the year following the identification of a male, no MSO were located. While it is impossible to prove, it is very possible that the river runner visitation to this site negatively impacted MSO. Based upon the situation at [REDACTED] GRCA has attempted to provide a reasonable estimate of the specific PACs that have the most likelihood of potential negative effects caused by river runners.

Effects would come largely from recreational hiking by river runners in side canyons where MSO are located. These side canyon hikes likely result in the most significant impacts to MSO in terms of disturbance during sensitive time periods and trampling of vegetation. The potential for negative effects caused by hiking in these side canyons is highest during the MSO breeding season (March 1 – August 31). The MSO breeding season corresponds to the peak season of river running activity (March through October). The highest numbers of river runners are present during this time period and therefore, the potential for recreationists to negatively impact MSO in side canyons is highest during the time period when MSO are most sensitive to disturbance. Disturbance to nesting MSO, nestlings, or fledglings during this time period may result in lowered fitness of these owls, nest abandonment, or lowered productivity.

MSO and their habitat may be affected directly and indirectly by recreation: directly through disturbances to the nest, roost, or foraging sites, and indirectly through alteration of habitat caused by trampling. Recreation may cause nest or territory abandonment, reduced productivity (through increased mortality of young by reduced ability to provide food to nestlings, increased predation, or increased nestling exposure), egg loss, and/or disrupted nesting, roosting, or foraging behavior. Disturbances at foraging sites may influence MSO's ability to capture food and this in turn may lead to reduced fitness of adults, which in turn may lead to lessened egg production, and lower nestling and/or adult survival. Although MSO are predominantly nocturnal hunters, they have been observed hunting during the day during the breeding season. Both adult and fledged young are known to drink from small seeps and creeks (Gutierrez *et al.* 1995), and recreation in side canyons during the crepuscular time may impact access to the small pools of water that may be present in the side canyons within GRCA.

Flushing of MSO from roost or nest sites can cause the expenditure of energy and can create increased exposure of birds to predators. The potential for hikers to disturb owls is probably greatest where hiking is concentrated in narrow canyon bottoms occupied by nesting or roosting owls (USFWS 1995a). Raptors are generally most sensitive to disturbances near the nest site during the breeding season. Disturbance effects will vary depending on the type of disturbance (hiking versus OHV use for instance), and the time of year and nesting status of the birds.

While no studies have been undertaken in Grand Canyon to measure the disturbance effects on MSO or other avian species in the canyon environment, Swarthout and Steidl (2001; 2003) conducted research in the slickrock canyons of the Colorado Plateau on responses of MSO to a single hiker. They found that 95% of both adult and juvenile MSO became alert to an approaching hiker at distances of  $\leq 55$  meters. In addition, they

found that 95% of adult MSO flushed at  $\leq 9$  meters from the hiker (Swarthout and Steidl 2001). Ninety-five percent of juveniles flushed at  $\leq 6$  meters from the hiker. Perch height was an important factor in determining flush response and flushing decreased with increasing perch height. However, females in nests highest above hiking trails showed the strongest response in decreasing their handling of prey, suggesting that a higher vantage point may expose these owls to disturbance from hikers for a longer period of time (Swarthout and Steidl 2003). Swarthout and Steidl (2003) also found that activity budgets of owls did not change markedly when hikers were near nests, however, during hiking treatments females decreased the amount of time they handled prey by 57% and decreased the amount of time they performed maintenance behaviors by 30%.

Hikers caused both male and females to increase the frequency of contact and vocalizations by 58% and 534%, respectively; increase vocalization occurred when hikers were present during the evening periods (Swarthout and Steidl 2003). These effects, caused by the presence of hikers, could adversely affect the reproductive success of MSO. In particular, females apportioned less time to handling prey when hikers were present. Swarthout and Steidl (2003) point out that this may be a result of females spending less time eating, or eating at a faster rate, or the females are eating less food. Females responded more to hikers than males. Because females attend nests almost exclusively, egg and nestling survival depend largely upon their behavior. Any reduction in the already low survival rates of juveniles ( $< 29\%$ ) may result in non-hatching or reduced energy intake, or may make juveniles more susceptible to predation and starvation.

The study conducted by Swarthout and Steidl (2001; 2003) looked at the effects of a single hiker in a narrow canyon. Within GRCA, most hiking would be done in groups; these groups could be up to the size of the number of people on a raft (32 passengers per raft in the summer for a total of over 18,000 passengers during the summer), and in popular canyons, multiple raft groups may be hiking at the same time. MSO may be more likely to flush in the presence of large groups. Energetic demands of avoidance flights increase heat production, which may be exacerbated by flying during the day, and this could increase heat-related stress (Swarthout and Steidl 2001). Flushing potentially exposes owls to predation from diurnal predators. Swarthout and Steidl recommend buffers for occupied MSO territories in high-use canyons, which are defined as both those receiving  $\geq 2$  hikers per hour (2001) or  $> 48$  hiking groups/day (2003). Given the situation within GRCA, hiking groups would likely visit side canyons at rates of less than one group per hour (with the exception of popular canyons), however the number of hikers would be far greater than 2.

In addition to the direct impacts of hikers in side canyons as discussed above, indirect effects of hiking include trampling caused by hikers or by camping (in this case, camping taking place on the River at the mouth of a side canyon, for instance [REDACTED]) can affect the vegetative structure of the area and tend to simplify the habitat. This may lead to loss of vegetation and increased soil erosion. This in turn may negatively affect MSO prey species. This indirect effect is very difficult to quantify, but consistent monitoring

of the vegetation in these side canyons will help to identify potential impacts prior to significant effects occurring.

Flight paths of helicopters traveling to and from the Whitmore area may be located over known MSO PACs. As outlined in the January 26, 2000 Biological Opinion for New Flight Rules in the Vicinity of Grand Canyon National Park, these flights could directly affect MSO through noise disturbance associated with the continued use of daily overflight routes. Noise disturbance caused by overflight activities over and within 1/4 mile (0.4 km) of nest/roost sites during the breeding season (March 1- August 31) could affect breeding through either disrupting the breeding attempt altogether or displacing a nesting female, and thus causing mortality to eggs and chicks. Although the spotted owl is primarily nocturnal, disturbance that results from continued and constant low-level overflights could potentially startle roosting and incubating birds. See the following section for further discussion of the potential effects of low-flying helicopters on MSO.

#### Unsurveyed and Inadequately Surveyed Habitat

The MSO Recovery Plan (USFWS 1995a) provides for three levels of habitat management: protected habitat, restricted habitat, and other forest and woodland types. Protected habitat in the Colorado Plateau Recovery Unit includes any PACs, designated wilderness areas, and any mixed conifer forests on slopes over 40 percent. GRCA has not calculated the acreage of protected habitat within Park boundaries, however the Park contains 30,477 acres of habitat within 40 designated PACs which are automatically considered protected habitat. In addition, the Park contains an estimated 64,922 acres of restricted habitat (USFWS 2003). Of concern is the potential nesting habitat in GRCA that has either never been surveyed, or for which only one year of survey has been conducted with little or no further monitoring.

Willey and Spotskey's modeling of potential MSO habitat within GRCA indicates 3,127 acres of canyon habitat (USFWS 2003), and while some of this is located within designated PACs, the vast majority of this habitat is unsurveyed or surveyed only once due to limitations in funding and access. A review of the model predicting potential nesting habitat in GRCA indicates that some of this habitat is located proximate to the river corridor. Some of this habitat occurs on Hualapai and Havasupai Tribal lands and the status of surveys in the tribal land is unknown. Of particular concern is the significant amount of predicted nesting habitat in and near Havasu Canyon (on Havasupai Tribal land). Havasu Canyon (RM 157) is a very popular hiking attraction for river runners, and GRCA data indicates that this canyon receives a high impact rating and a high intensity use rating (Brown and Jalbert 2003). If MSO are present in this canyon they are likely to be affected by river runner hiking originating from the River. Unsurveyed potential habitat is present in the greatest densities within the river corridor above RM 226; potential nesting habitat is also present in the Lower Gorge but to a lesser degree.

Although no MSO PACs are currently known in the proximity of Whitmore Wash, some unsurveyed habitat is present in the area. It is possible that helicopter overflights in this

area may impact MSO in nearby side canyons. See the discussion of predicted numbers of helicopter trips at Whitmore in the Condor analysis.

Delaney *et al.* (1999) found that MSO decreased prey delivery rates after disturbance from helicopters and chainsaw-related noise, and the effect was stronger when stimuli approached more closely. Delaney *et al.* (1999) found in their study that helicopters typically became audible at approximately 2000 meters; MSO exhibited no alert response when helicopters were more than 600 meters distant and alert response were exhibited to helicopters at 403 (+/- 148) meters. Delaney *et al.* (1999) conclude that the mean alert response threshold they observed corroborates a regional USFWS policy that recommends a 400-meter (or 0.25 mile) buffer zone around spotted owl nest sites. However, Delaney *et al.* (1999) caution against using their findings to infer how MSO would respond under different circumstances that were not directly tested, such as spotted owl responses during early courtship and incubation, responses to more than 1 helicopter or overflight, or responses in different nesting habitat or under different foraging conditions. This study was conducted in mixed conifer forested habitat in mountainous terrain, whereas MSO habitat in the project area consists of steep walled canyons at fairly low elevations. However, the finding of Delaney *et al.* (1999) suggest that low-flying helicopters may negatively impact MSO, and in fact the impacts in steep walled canyons such as those in GRCA may be more significant due to the magnification of sound. Thus, if MSO are present in unsurveyed habitat in the Whitmore Wash and Quatermaster areas, they may be negatively affected by helicopter flights.

GRCA is initiating a study to collect sound information at known MSO locations and at potential MSO habitat as predicted by GRCA GIS modeling (pers comm. Ken McMullen, Overflights and Natural Soundscape Program Manager, GRCA): Sound information would be collected within at least three to five known MSO PACs and three-to five areas of potential MSO habitat. Data would be collected in these areas for at least 90 days. Information would be collected in the form of WAV files that would characterize the acoustic environment. The Overflights Program at GRCA expects to start this work in the 2006 season and is coordinating the details of the study with GRCA Wildlife Staff, and is seeking peer and scientific review of the study proposal prior to its implementation. After the initial study in 2006, GRCA would look at the need and possibility of monitoring these sites and tracing acoustic trends, statistical acceptance of methods/results, and/or the need to make adjustments to the methodology or protocol used to gather the data. If there is a need for a longer term study, GRCA will actively seek the funding to accomplish such work.

A review of the habitat modeling completed for GRCA indicates other areas of potential nesting habitat that have not been surveyed to date. [REDACTED]

[REDACTED]

This area is not in close proximity to any known PACs, however, due to lack of funding, GRCA has been unable to follow up on this report to determine occupancy (pers. comm. RV Ward, June 21, 2004; pers. comm. Tim Bowden, June 15, 2005). [REDACTED]



## Conclusion

GRCA will apply the following conservation measures to the preferred alternatives for MSO:

- 1) River access to *MSO PACs* known to be occupied or *for which there is no occupancy information* will be restricted during the breeding season (March 1- August 31), where feasible and *as determined by the GRCA wildlife biologist*. The closures will include all reasonably accessible PACs (whether accessible by known trail or not) known to be occupied in a given year *or for which occupancy is unknown*; PACs will be closed during the breeding season unless doing so would significantly impact hikers from the rim or river. *MSO PACs up side canyons* will not be closed if they are not within day-hiking distance of the river *or not likely to be impacted by recreational activity*. PAC closures will be determined on a year-by-year basis by the GRCA wildlife biologist, and will therefore change yearly based on occupancy information. A notice of seasonal closures of these areas will be provided to all non-commercial and commercial river runners and researchers prior to or just after the beginning of the peak season (March-April) and will be updated if necessary during the following months.
- 2) *As resources allow, GRCA will continue to survey MSO habitat accessible by recreationists from the river.*
- 3) *Contingent upon availability of funding*, GRCA will conduct regularly-scheduled vegetative monitoring in a representative number of accessible side canyons in which PACs have been designated (as well as the same number of canyons which are not considered easily accessible to river runners) to determine if recreational impacts are negatively affecting vegetation and other critical habitat primary constituent elements as defined by the USFWS.
- 4) *Contingent upon availability of funding*, GRCA will conduct a study of the impact of human disturbance on MSO within the Grand Canyon.
- 5) *In consultation with the Hualapai Tribe, GRCA will work to determine the feasibility of surveying MSO habitat under helicopter flights associated with CRMP in the Quartermaster Canyon area. Contingent upon availability of funding, and if the Hualapai Tribe agrees, GRCA will work with the Tribe to conduct these MSO surveys.*
- 6) *If MSO are found as a result of the surveys, GRCA, in consultation with the Hualapai Tribe and the FAA, will work to determine the necessity and feasibility (i.e., economically, safety-wise) of adjusting helicopter flight*

*routes to avoid resident MSO. GRCA will advise the FAA on possible flight route adjustments. If adjustments are deemed to be appropriate and feasible and the parties agree, they will work cooperatively to determine flight route adjustments.*

While the mitigation measures outlined above will minimize impacts to known occupied PACs on a yearly basis, it is impossible to know definitively if all occupied PACs will be included in the seasonal closures and if the restrictions in these areas will be truly followed. In addition, some occupied PACs may not be closed due to infeasibility (for instance, if doing so would significantly impact hikers accessing the area from the rim). The potential for negative impacts due to river runner recreational hiking in unsurveyed and inadequately surveyed potential nesting habitat in side canyons accessible by river runners (both within GRCA and in adjoining Tribal lands) exists, as does the potential for negative impacts to known PACs and unsurveyed habitat in the vicinity of Whitmore Wash. Thus, GRCA has determined that Modified Preferred Alternative H may affect, is likely to adversely affect the MSO.

Although no MSO are known from the Lower Gorge area, unsurveyed potential habitat is present. Recreational hiking by river runners may directly and indirectly affect MSO if they are present in side canyons in the Lower Gorge. Therefore, GRCA determines that the Modified Lower Gorge Preferred Alternative 4 may effect, is likely to adversely affect MSO. GRCA believes that adverse effects to the MSO from helicopter flights over both occupied and unsurveyed habitat have been addressed by the FWS in their January 26, 2000 Biological Opinion.

### Critical Habitat

Critical habitat for the MSO was designated in GRCA in 2001 and again in 2004. The action area is within MSO critical habitat unit CP-10. The boundaries of this unit essentially include GRCA in its entirety, except the South Rim. The unit is 918,847 acres in size (69 FR 53182). The final rule designating critical habitat states that only habitat within the critical habitat boundaries that contain primary constituent elements is considered critical habitat. Because the owls are found in both forested and canyon habitat, primary constituent elements are defined for each type of habitat and for prey species (69 FR 53182). The primary constituent elements are:

#### *Forest habitat*

- A range of tree species, including mixed conifer, pine-oak, and riparian forest types, composed of different tree sizes reflecting different ages of trees, 30 percent to 45 percent of which are large trees with a trunk diameter of 12 inches (0.3meters) or more when measured at 4.5 feet (1.4 meters) from the ground;
- A shade canopy created by the tree branches covering 40 percent or more of the ground;
- Large dead trees (snags) with a trunk diameter of at least 12 inches when measures at 4.5 feet from the ground.



*Prey species habitat*

- High volumes of fallen trees and other woody debris;
- A wide range of tree and plant species, including hardwoods; and
- adequate levels of residual plant cover to maintain fruits, seeds, and allow plant regeneration.

*Canyon habitat (one or more of the following)*

- Presence of water (often providing cooler and often more humid conditions than the surrounding areas);
- Clumps or stringers of mixed conifer, pine-oak, pinyon-juniper, and/or riparian vegetation;
- Canyon wall containing crevices, ledges, or caves; and
- High percent of ground litter and woody debris

There are approximately 75,432 acres of forested critical habitat within the designated critical habitat unit boundary; an additional 3,127 acres of canyon critical habitat occurs within the unit (USFWS 2003). All critical habitat potentially affected within the action area is canyon habitat.

Recreational use by river runners of the side canyons that provide habitat for MSO will not affect the structure of the canyons themselves (or crevices, ledges and caves) that provide the cooler and more humid conditions. However, as discussed under indirect effects above, hikers may trample existing vegetation in the canyons, impacting riparian or woody vegetation if present, crushing woody debris if present, and potentially affect the growth of existing and future trees in these canyons.

Conclusion

GRCA believes the likelihood of impacts to the primary constituent elements of critical habitat are extremely low, however, impacts are possible. The implementation of mitigation measure 3 described above will assist in determining if impacts to constituent elements is occurring and the extent of those impacts. GRCA has determined that the Preferred Alternatives H and 4 may effect, are not likely to adversely affect designated critical habitat. If monitoring as described in mitigation measure 3 above indicates impacts are occurring, GRCA will review this determination and enter into formal consultation if effects of recreation in the side canyons are determined to be adversely affecting primary constituent elements of critical habitat.

**Southwestern Willow Flycatcher (*Empidonax traillii extimus*)**

The southwestern willow flycatcher was listed as endangered in 1995. This small migratory bird occurs in dense riparian habitats along streams, rivers, and other wetlands where cottonwood, willow, box elder, tamarisk, Russian olive, buttonbush, and

arrowweed are present. This species nests in dense thickets of trees and shrubs at elevations below 8,500 feet.

The historical breeding range of the southwestern willow flycatcher included southern California, southern Nevada, southern Utah, Arizona, New Mexico, west Texas, and extreme northwestern Mexico. The flycatcher's current range is similar to its historic range, but the quantity of suitable habitat within that range is much reduced from historic levels (USFWS 2002a). Southwestern willow flycatcher populations are present in Arizona on the upper Gila River, Little Colorado River, the middle Salt River, the lower San Pedro River, Colorado River, San Francisco River, Hassayampa River, the upper Verde River, Big Sandy River, Santa Maria River, Tonto Creek, and the Bill Williams River. The southwestern willow flycatcher was listed primarily due to riparian habitat reduction, degradation and elimination as a result of agricultural and urban development.

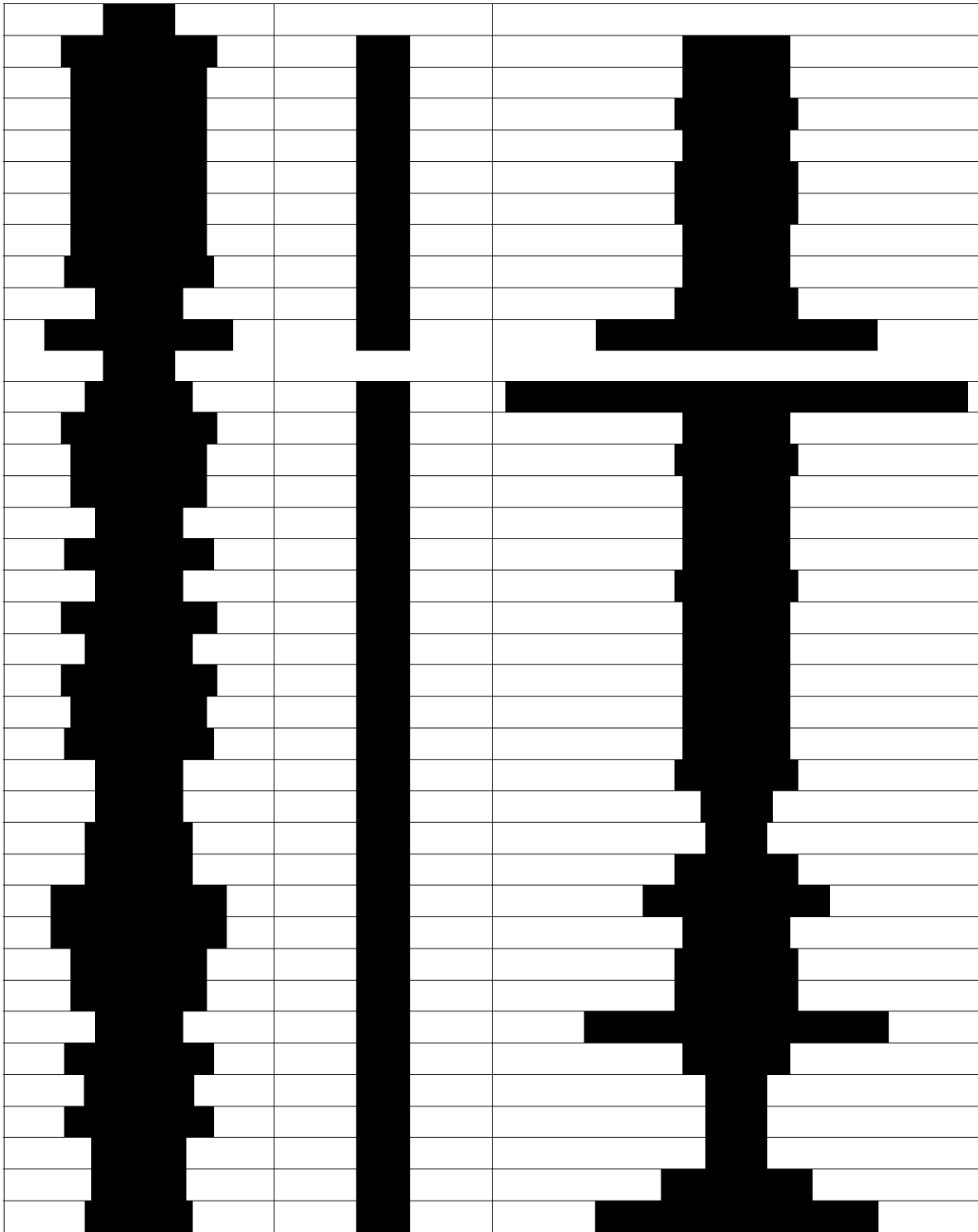
In 1997, 599 river miles of flycatcher critical habitat were designated in southwestern New Mexico, southern California, and Arizona. In 2001, the 10<sup>th</sup> Circuit Court of Appeals set aside designated critical habitat in those states under the Circuit's jurisdiction (New Mexico). The FWS set aside critical habitat designated in California and Arizona until a reassessment of the economic effects of designation could be completed. The FWS again proposed critical habitat on October 12, 2004 (USFWS 2004a).

In August 2002, the FWS released the Final Recovery Plan for the Southwestern Willow Flycatcher. The Recovery Plan establishes six recovery units that are further subdivided into management units. These Recovery and Management Units are based on watershed and hydrologic units within the breeding range of the flycatcher (USFWS 2002a). GRCA falls within the Lower Colorado Recovery Unit. This Recovery Unit encompasses the Colorado River and its tributaries from Glen Canyon Dam downstream to the Mexican border. Despite the large size of this Recovery Unit, the unit contains only 146 known territories (15% of the rangewide total) (USFWS 2002a).

The Recovery Plan defines two commonly used habitat terms: "Currently suitable habitat" (or "suitable habitat") refers to a riparian area with all of the components needed to provide conditions suitable for breeding flycatchers. These conditions are generally dense, mesic riparian shrub and tree communities 0.1 ha (0.25 acres) or greater in size within floodplains large enough to accommodate riparian patches of at least 10 meters (33 feet) wide (measured perpendicular to the channel) (USFWS 2002a). Suitable habitat may be occupied or unoccupied. "Potentially suitable habitat" (or "potential habitat") is defined as a riparian system that does not currently have all of the components needed to provide conditions suitable for nesting flycatchers, but which could – if managed appropriately – develop these components over time (USFWS 2002a).

Southwestern willow flycatchers generally arrive at breeding grounds between early May and early June, although a few individuals may establish territories in late April (USFWS 2002a). Sogge *et al.* (1997) report the earliest record of a male on breeding territory as May 8, with most nesting activity noted from early June through mid-July, but starting as early as May 22.





Summary: Lees Ferry to Diamond Creek

Southwestern willow flycatchers have consistently nested along the Colorado River in the Grand Canyon in recent years (Sogge *et al.* 1997). Suitable habitat is extremely disjunct

through the river corridor from approximately RM 28.3 to RM 274 (CRMP Planning Maps of Known Resources, Draft Final, January 7, 2004). Surveys conducted between 1992 and 2004 indicate a very small resident breeding population between Lees Ferry and Diamond Creek.

Since 1993, flycatchers have consistently been present during the breeding season at [REDACTED]. Since 2003, the area around [REDACTED] has shown occupancy. Another area of importance in the mid-1990s was [REDACTED] however, this area does not appear to have been occupied for the last 10 years.

In 2004, GRCA placed an emergency closure in place at two sites. This closure was in effect between May 1 and July 15 and included closure of visitor use, including hiking, camping, and river landings at [REDACTED], river left and [REDACTED], river left. Closures at [REDACTED] have been put in place intermittently in the past; closure at [REDACTED] was instituted in the early and mid-1990s.

#### Summary: Lower Gorge

The FWS reports that newly developed habitat supporting a relatively large breeding population at the Colorado inflow to Lake Mead was recently inundated, and flycatchers no longer breed at that site (USFWS 2002). Koronkiewicz *et al.* (2004) reports that the Colorado River in Grand Canyon downstream of Separation Canyon is strongly influenced by water levels in Lake Mead. Potential willow flycatcher habitat in this area has changed dramatically in the last three years as the result of a 27-m drop in the level of Lake Mead since 2000. Areas that were inundated in the late 1990s are now well above the current water level and the existing riparian vegetation in many of these areas is dead or dying.

In 2002 and 2003, the lower gorge area of Grand Canyon [REDACTED] had no resident flycatchers (Smith *et al.* 2004). This was a decrease from 12 territories in 2001 and the second consecutive year without residents since surveys began in 1997 (Smith *et al.* 2004). In 2003, Koronkiewicz *et al.* (2004) conducted surveys in the lower gorge at locations surveyed during previous years of willow flycatcher studies on the lower Colorado ([REDACTED] to the western boundary of GRCA [RM 276] (McKernan and Braden 1998). Koronkiewicz *et al.* (2004) identified habitat within the Lower Gorge of GRCA at:

[REDACTED]

[REDACTED]

No southwestern willow flycatchers were detected in the Lower Gorge within GRCA in 2003. Surveys in 2004 in the Lower Gorge located a single resident southwestern willow flycatcher [REDACTED] (8 and 24 June; Hualapai biologists reported single detection on 28 May) and a single nesting pair [REDACTED] (with three fledglings) (McLeod *et al.* 2005)

#### Discussion of Effects of both Preferred Alternatives

Human disturbance of the flycatcher's breeding areas in GRCA is possible because these areas are usually adjacent to sandy beaches, which are often popular camping sites (Sogge *et al.* 1997). Although there is little evidence of direct impacts on southwestern willow flycatchers or their habitat due to recreational impacts, increasing human populations, coupled with the attraction of limited riparian areas for recreation, make willow flycatcher habitat a vulnerable resource (USFWS 2002).

Sogge *et al.* (1997) report that flycatchers bred for at least 10 years within about 100 meters of popular camping areas such as the [REDACTED] site, suggesting that they may be tolerant of low-level human activity that is not directly adjacent to or within the breeding territory. However, the literature indicates that there may be a direct correlation between recreational activity and decreased riparian bird abundance (Taylor 1986, Blakesley and Reese 1988).

The potential for recreational activity to produce negative impacts depends on the frequency, intensity, location, and type of use. For example, a hiking trail placed outside of suitable habitat is less likely to impact willow flycatchers than a trail and campground placed within suitable habitat (USFWS 2002a). A trail that receives daily use is likely to result in greater habitat damage and impacts to local wildlife than one that receives occasional use. As the frequency and intensity of use increase we can expect to see increases in multiple trampling, soil compaction, vegetation loss, erosion, trash and human waste, pollution, scavengers, predators, brown-headed cowbirds (*Molothrus ater*), and noise disturbance (USFWS 2002a).

In addition to affecting flycatchers by causing disturbance during critical flycatcher nesting periods, recreationists can also impact suitable habitat. Changes in the structure, density and composition of vegetation can occur from recreation induced soil compaction and erosion (USFWS 2002a). Current recreation may be preventing suitable flycatcher habitat from developing where trampling and soil compaction are impeding regeneration.

Habitat may be directly impacted in the Lower Gorge: *Modified* Alternative 4 proposes to build three new campsites within the high water zone (considered within GRCA; associated facilities such as toilets and armadas would be placed on adjacent Hualapai land). The creation of these campsites may require removal of suitable or potential flycatcher habitat, but will only take place if and when HRR overnight trips increase and

these additional camp sites are needed. If additional camps are needed, the creation of the campsites will be phased-in over time and Section 7 consultation will occur at that time. GRCA may also propose to conduct vegetative management at additional campsites in the future if it is determined that such management can improve camping areas. GRCA will consult with the USFWS prior to any such vegetation management. A new dock is proposed at RM 262.5, but that will not affect flycatchers as this area does not contain habitat (pers. comm. Jeff Cross, GRCA).

### Conclusion

Recreational access, as outlined in Modified Preferred Alternatives H and 4, have the potential to directly impact the southwestern willow flycatcher through disturbance during the nesting period, and directly and indirectly impact their habitat through trampling and otherwise affecting their habitat (both nesting and migratory) and causing soil erosion and compaction. Given that suitable habitat within GRCA can vary from year to year, as can presence of the species, GRCA will implement the following conservation measure as part of the implementation of Modified Preferred Alternatives H and 4:

- 1) ***Contingent upon availability of funding***, GRCA will ***conduct*** annual surveys (using FWS protocols) for ***Southwestern willow*** flycatchers that include nest monitoring. GRCA will continue to place emergency closures (with a 0.5-mile buffer) ***on a case by case basis at flycatcher locations encountered during surveys if the sites are likely to receive recreation use (e.g., hiking, camping, river landings)***. ***Closures will also be implemented at unsurveyed, previously known flycatcher nest sites (if they still contain suitable habitat) that are likely to be impacted by river recreationists' activities. These closures will be determined by the GRCA wildlife biologist***, will be in place from May 1 to July 15 and include closure of visitor use, including hiking, camping, and river landings.

While the implementation of this conservation measure will prevent or limit disturbance to nest sites, these closures can only be put in place where flycatchers are known or suspected to be nesting. Surveys for the species may not detect all nesting southwestern willow flycatchers. Direct and indirect impacts to habitat will continue despite the temporary closure. The three new campsites proposed for construction in Modified Preferred Alternative 4 will be located on the south side of the river and will likely require removal of flycatcher habitat. However, the location of these sites has not yet been selected and GRCA will coordinate closely with the FWS to determine the exact locations of these campsites (pers. comm. Lenore Grover-Bullington, GRCA). GRCA may also propose additional vegetation management in campsites in the future. Given the above, GRCA has determined that Modified Preferred Alternatives H and 4 may effect, are likely to adversely affect the southwestern willow flycatcher.

### Proposed Critical Habitat

Critical habitat for the southwestern willow flycatcher was proposed within GRCA on October 12, 2004. Proposed critical habitat is proposed along the Colorado River from Spencer Canyon (RM 246) to the Lake Mead delta (RM 278) (USFWS 2004a). The Southwestern Willow Flycatcher Recovery Plan (USFWS 2002a) indicates that this is the area where substantial recovery value exists with existing and potential nesting habitat.

As discussed above, recreational use within suitable or potential nesting habitat can change the density and composition of this habitat. Such use in currently non-suitable habitat may cause soil compaction and erosion and prevent the development of suitable nesting habitat. Recreational activity is likely to negatively impact proposed critical habitat within GRCA. The proposed creation of three campsites as outlined in Modified Preferred Alternative 4, as well as possible additional vegetation removal may require removal of proposed critical habitat. However, impacts to habitat caused by implementation of Preferred Alternative 4 are not expected to adversely modify proposed critical habitat.

### **Yuma Clapper Rail (*Rallus longirostris yumanensis*)**

The Yuma clapper rail was listed as endangered in 1967. Critical habitat has not been designated for the species. The current range of the species includes the Colorado River from the lower Virgin River to Mexico and various locations in the Gila River Drainage.

The Yuma clapper rail is a secretive species and is not often seen in the wild; however it does have a series of distinctive calls. This bird inhabits freshwater or brackish stream-sides and marshes under 4,500 feet in elevation. It is associated with dense riparian and marsh vegetation, dominated by cattails. The rail requires a wet substrate such as a mudflat, sandbar or slough bottom that supports cattail stands of moderate to high density adjacent to shorelines. Another important factor is the presence of vegetated edges between marshes and shrubby riparian habitat (saltcedar or willow thickets) and the amount and rate of water level fluctuations. Nests are built three to six inches above the surface in sloughs and backwaters that support dense stands of bulrush and cattails, and breeding occurs from March to early July. Non-native crayfish provide the primary food base for the clapper rail today; prior to the introduction of crayfish, isopods, aquatic and terrestrial insects, clams, plant seeds, and small fish likely dominated the diet (USFWS 2004). Most Yuma clapper rails do not migrate. Very little is known about the dispersal of adult or juvenile birds, but there is evidence of populations expanding northward along the lower Colorado River, the Salton Sea, and central Arizona over the last 80 years (USFWS 2004b).

Threats to Yuma clapper rails may include selenium in crayfish, the major prey item of the species. The USFWS (2004b) indicates that new information points to levels of selenium in crayfish from Yuma clapper rail habitats were high enough to cause concern for potential reproductive effects. No adverse effects from selenium have been observed; however due to the clapper rail's secretive nature, nests are very difficult to find and young birds difficult to observe (USFWS 2004b).



GRCA's wildlife observation database indicates that this species has been recorded in the area of Lake Mead, outside the project area: one male Yuma clapper rail was observed at [REDACTED] on July 18, 1999, and a female rail at [REDACTED] on June 15, 2000.

McKernan and Braden (1999) report the presence of Yuma clapper rails *in the Lower Gorge* between Spencer (RM 246) and the boundary of GRCA (RM 277); these observations were made while conducting southwestern willow flycatcher surveys in the area. Specifically, McKernan and Braden (1999) report at least one clapper rail observed between May 26, 1996 and June 30, 1996 and they indicate that nesting was confirmed. They report at least one clapper rail observed between May 14, 1997 and June 17, 1997, but indicate that nesting was not confirmed (McKernan and Braden 1997). Surveys for the southwestern willow flycatcher in 2004 did not record any incidental detections for the clapper rail in GRCA (McLeod et al. 2005). These are the only known recorded locations of this species on the Colorado River in GRCA.

Habitat is present in a very limited quantity within the Lower Gorge in GRCA. Koronkiewicz *et al.* (2004) and McLeod et al. (2005) report the presence of live cattails at [REDACTED]. Again, the observation of cattails was made as part of habitat observations while surveying for southwestern willow flycatcher habitat between Spencer Canyon and the western GRCA boundary. It is not known if such habitat is present in sufficient quantity to allow for nesting.

### Conclusion

Because information about the clapper rail and its habitat in the Lower Gorge is extremely limited and surveys specifically for the species have not been conducted in the area, GRCA must rely heavily upon the limited information available. Given that Yuma clapper rails were recorded twice during the breeding season within the project area, and given that nesting habitat, may be present in limited but sufficient quantity for nesting, GRCA assumes that the clapper rail may be present in the Lower Gorge during the lifetime of this CRMP. Given the clapper rail's use of marshy habitat, it is unlikely that river runners will use this habitat for camping; however, some disruption of habitat is possible. With the implementation of the mitigation measures outlined below, GRCA believes that recreational access as described in Lower Gorge Modified Preferred Alternative 4 may effect, but is not likely to adversely affect the Yuma clapper rail. Habitat is not present in the Lees Ferry to Diamond Creek area therefore Modified Alternative 4 will have no effect on the Yuma clapper rail.

Conservation measures for the Yuma clapper rail:

- 1) *Contingent upon availability of funding, GRCA will conduct surveys for the Yuma clapper rail in the Lower Gorge.* Such surveys may be combined with surveys for breeding birds and/or willow flycatchers. *Clapper rail* surveys should be conducted once every 3 years for the life of the CRMP.
- 2) If Yuma clapper rails are found in GRCA during the breeding season or if nests are located *and these sites are determined by the GRCA wildlife biologist to be*

***affected by river recreationists' activities***, GRCA will establish a closure of suitable breeding habitat ***at specific sites***, with an appropriate buffer, during the length of the breeding season. ***In addition, any previously known Yuma clapper rail nest sites that are not surveyed or monitored, that are likely to be impacted by recreation activity, will also be closed.***

### **California Brown Pelican (*Pelecanus occidentalis californicus*)**

The California brown pelican was listed as endangered in 1970 in all of its historic range. In 1985, the species was delisted in Alabama, Florida, Georgia, and South and North Carolina and northward; it is currently listed in California, Texas, and Louisiana. Its habitat is primarily warm coastal and estuarine environments. Numbers of brown pelicans in the United States have increased dramatically since the late 1950s to early 1970s when pesticides reduced populations to their lowest levels; total population size now exceeds historical levels (Shields 2002).

Threats to the species include pesticides and other contaminants, including oil pollution. Additional threats include collisions with stationary or moving structures or objects such as power transmission lines (Shields 2002). One bird was reported killed at Everglades National Park after diving into a boat (Shields 2002, citing Kushlan and Frohring 1985). There were 17 reports of aircraft strikes by brown and American white pelicans in the United States between January 1991 and May 1998 (Shields 2002, citing Dolbeer *et al.* 2000). Entanglement in sport fishing gear is a major cause of mortality of brown pelicans in the southeastern U.S. Over 700 adults and immature birds die each year in Florida alone, and hundreds are treated for hook and line injuries each year (Shields 2002). Hooks may tear a hole in the gular pouch, impairing the ability of the bird to capture fish, resulting in starvation; monofilament line may entangle wings or legs, making flight difficult or impossible, or wrap tightly around limbs, causing necrosis and infection (Shields 2002, citing USFWS 1983).

While nesting generally occurs in the coast areas, the brown pelican was first reported breeding at the Salton Sea in 1996. The range of the pelican is known to expand during the non-breeding season. Pelicans are regularly observed up to 175 kilometers from the southern California mainland during the fall and winter (Shields 2002, citing Briggs *et al.* 1981). However, little is known about the behavior and ecology of the birds during the non-breeding season or the 3-5 years prior to first breeding (Shields 2002).

The brown pelican is generally rare inland, but is a regular post-breeding visitor to inland waters of the Southwestern U.S. and central Florida (Shields 2002). A few Gulf of California migrants occasionally remain throughout the winter in southern Arizona (Shields 2002, citing Stejskal *et al.* 1994). The brown pelican is found occasionally along rivers and lakes in Arizona. Most Arizona records are along the Colorado River including north to Davis Dam and to Lake Mead, and the Gila Valley. Sightings of brown pelicans in Arizona increased in 2004. The Arizona Game and Fish Department reported approximately 30 injured or dehydrated brown pelicans were found in Arizona

in a two week period after attempting to land on pavement they believed was water. It was believed that the birds were experiencing a food shortage along the west coast and Sea of Cortez in 2004 and were heading to Arizona in search of fish (Arizona Game and Fish Department 2004).

Brown pelicans were observed along the Colorado River corridor in GRCA in mid to late June 2004. These were thought to be immature pelicans moving upstream from areas such as Lake Mohave. Reports include an aggressive pelican at Phantom Ranch near the boat docking area. A pelican was observed fishing around Hermit and approaching boats out of curiosity (Brian Bloom, Phantom Ranch Ranger, e-mail to Elaine Leslie, June 28, 2004). There was also a report of a possible dead pelican at Lava Chuar in late June 2004. It is not known if these reports were of separate pelicans.

While pelicans are rare along the river corridor in GRCA, they are present and in some years are present in higher than usual numbers. From the reports of 2004 it appears that interactions with river runners are possible when pelicans are within the corridor. These interactions may consist of interruptions to fishing efforts caused by river rafts passing and flushing the birds downstream. Given river rafts relatively slow speed, collisions with boats are unlikely although possible; this likelihood may increase if fish are present in the boat or if the pelican is excessively curious. Sport fishing within the river corridor may impact pelicans if monofilament and hooks are not disposed of properly.

### Conclusion

Pelicans are rare visitors to the river corridor within GRCA, and although interactions with river runners are likely to be few in number and likely not to harm individuals, the potential for harassment and possibly harm is possible. GRCA determines that the Modified Preferred Lees Ferry and Lower Gorge alternatives may affect, and are likely to adversely affect the California brown pelican.

Conservation measure for the brown pelican:

- 1) GRCA will educate all river runners regarding the potential for brown pelicans to occur in the river corridor *and that* interactions with the birds are to be avoided and the birds are not to be harassed or harmed. ***Recreationists will be asked to report*** observations of the species to GRCA. GRCA will report any brown pelican sightings by river runners or any observed during bird surveys to the U.S. Fish and Wildlife Service.

## **Humpback Chub (*Gila cypha*)**

The humpback chub was listed as endangered in 1967. Critical habitat was designated in 1994. The humpback chub is endemic to the Colorado River Basin and is found in the Colorado River between Nevada and Arizona. The population in the Colorado and Little Colorado Rivers in the Grand Canyon is the largest remaining in the basin (USFWS 1994b). The humpback chub is part of an ichthyofaunal assemblage with the highest level of species endemism (74% or 26 species) of any major basin in North America (Miller 1959). Long periods of geographic isolation for the Colorado River, together with high gradient, high sediment, and variable flow volumes and temperatures have combined to shape this unique assemblage (Valdez and Ryel 1995). It is surmised that the humpback chub speciated from a bonytail-like form in canyons of Northern Arizona about three million years ago (Miller 1946; Minckley *et al.* 1986).

The humpback chub's preferred habitat is large, warm turbid rivers, especially canyons with deep, fast water. The humpback chub is endangered due to destruction and modification of habitat through impoundment (e.g., stream inundation, reduced water temperatures, and reduced spring flows resulting from construction of Hoover Dam, Glen Canyon Dam, and Flaming Gorge Dam); introduced competitors and predators; and, hybridization with other *Gila* species. Flow reductions and low water temperatures may curtail successful spawning and increase competition with other species.

Seven reaches of the Colorado River system (379 miles) were designated as critical habitat for humpback chub. In Arizona, critical habitat includes most of the habitat now used by the Grand Canyon population of chub: the lower 8 miles of the Little Colorado River and the Colorado River from RM 34 to RM 208 (Granite Park). Constituent elements include water, physical habitat, and biological environment as required for each life stage.

Adult humpback chub are found in deep, swift waters of varying depths where they utilize a variety of habitats including pools, riffles, and eddies. They spawn in the spring between March and May in the Little Colorado River when water temperatures are between 60.8 and 71.6 degrees Fahrenheit. Spring flows and proper temperatures for humpback chub are important; flow reductions and low water temperatures in the Grand Canyon are factors that curtail successful spawning and increase competition from other fishes (USFWS 1994b). Other reasons for decline include inundation of habitat behind Glen Canyon dam, coldwater releases below the dam, modified habitat from channel geomorphic changes, altered flow regimes, invasion by non-native fishes, alien parasites and diseases.

Within the Grand Canyon, the majority of the humpback chubs are associated with the [REDACTED] (Valdez and Ryel 1995).

Consistent successful reproduction appears to occur only in the Little Colorado River, with insignificant reproduction in other major tributaries (e.g., Bright Angel Creek, Shinumo Creek, Kanab Creek) in Grand Canyon (Valdez and Ryel 1995). The

consistently low recruitment experienced by humpback chub in the Little Colorado River Basin is resulting in a decline in the overall abundance of the population. In 2002, humpback chub abundance was estimated to be between 2,000 and 4,700 adults (USFWS 2002b).

The warmer water associated with the Little Colorado River is a critical element in the successful spawning and survival of young humpback chub. None of the humpback chub aggregations outside the Little Colorado River region have large enough numbers of adults to form viable populations without input from the Little Colorado River population (Valdez and Ryel 1995), and the present population of humpback chub in Grand Canyon is almost entirely dependent upon the Little Colorado River. Humpback chub spawn between March and May, and chub from the main stem usually stage at the mouth of the Little Colorado in March and move variable distances upstream during April to June to spawn.

The U.S. Fish and Wildlife Service made recommendations for the conservation of endangered and native fishes in the Grand Canyon (Gorman 1997). These recommendations included the directive to protect key tributary confluences for native fishes. Humpback chub have been collected (both adults and young of the year) at the confluences of Little Colorado, Paria, Bright Angel, Shinumo, Kanab and Havasu creeks. The tributary confluences provide some of the most productive and warm habitat for native fishes in the Grand Canyon. The FWS stresses that management strategies to enhance or stabilize native fish populations must include tributary confluences. Some of these tributaries (in particular the Little Colorado, Bright Angel, Shinumo, and Havasu) are heavily affected by human activities during summer months, including destruction of benthic communities, building dams, and disposal of human wastes. At present, the long-term effects of perturbation of these environments on native fishes is not known (Gorman 1997). The recommendations of the FWS are to protect the tributary confluences from undue disturbance during spring and summer months to minimize impacts on spawning and rearing life stages of native fishes. As an interim measure, the FWS recommends that the lower 500 meters of the Little Colorado River and the lower 200 meters of other tributaries be protected during the period February – July. This period encompasses the spawning season and early life history stages of native fishes. The FWS's recommendations conclude by stating that at other times of the year the amount of traffic and activities of tourists should be controlled to minimize impacts.

The effects of river runners on humpback chub and their habitat are not known. Recreational use of the lower reaches of the Little Colorado River is high between mid-April and mid-October. Recreational use in the lower Little Colorado and at the confluence by river runners may be negatively affecting spawning potential and successful reproduction and survival of humpback chub in this area. Recreation in the Little Colorado River could directly affect adult chub, young-of-the-year, and eggs. The presence of river runners in the Little Colorado may alter the staging of adult chubs, their spawning, and feeding activities. It is possible that the activity of recreationists at the confluence and in the lower reaches of the Little Colorado River may result in humpback chub avoidance of this area. Recreationists may indirectly affect nearshore habitats and

introduce suntan lotion into the water. Impacts of recreation may result in humpback chub avoidance of the Little Colorado River. In addition, while the lower end of the Little Colorado River is currently closed to fishing, anglers may catch humpback chub when fishing for trout. Recreational use is adversely affecting both the species and designated critical habitat.

Because of the importance of the lower Little Colorado River and the area surrounding the confluence of this river with the Colorado River for spawning humpback chub, as well as other important tributaries, GRCA will implement the following conservation measures for this species and its critical habitat:

- 1) ***No boats will be allowed to enter or park in the Little Colorado River. To stop in the vicinity of the LCR, boats may park upstream or downstream of the river's mouth. Swimming and wading in the LCR will be allowed year round in the northern half of the river. The southern half of the river from the confluence to the park boundary (located approximately two miles upstream) will be closed to river runner swimming and wading from March 1 to November 30. River runners hiking the Little Colorado River who need to cross between the north and south sides will be allowed to wade and cross at the established crossing (marked by cairns), approximately 0.2 miles upstream of the confluence. Camping and fishing bans will remain in place. The purpose of these restrictions is to protect native fish habitat (including Phragmites along the south bank of the LCR) and spawning and young of the year humpback chub.***
- 2) ***Contingent upon availability of funding, GRCA will implement a contaminants study that examines levels of potentially toxic chemicals and PPCPs (pharmaceuticals and personal care products) present in the Colorado River, including the LCR at its confluence. Surrogate aquatic biota will be examined, primarily trout, and results will then be extrapolated to the humpback chub. Non-lethal sampling of humpback chub may also be included, but under separate permit. The study would complement existing water quality studies that look at the impacts of recreation within GRCA.***
- 3) ***Contingent upon availability of funding, GRCA will implement a study to examine behavioral changes of humpback chub in response to recreation in the LCR (feeding, avoidance of predators, etc.).***
- 4) ***Contingent upon availability of funding, GRCA will implement a study to determine recreational impacts to native fish habitat. Two or more tributaries (such as Shinumo) will be examined and factors such as changes in vegetation and abundance of *invertebrates* will be measured.***

The implementation of these mitigation measures will assist greatly in reducing the level of adverse impacts to the humpback chub and its critical habitat. However, negative impacts to the species and critical habitat, while reduced, are still possible. Adult humpback chub occur within the mainstem of the Colorado River in a wide area around the confluence of the Little Colorado River [REDACTED]

[REDACTED], and humpback chub young of the year are known to remain within the Little Colorado River through the fall and winter if they are not flushed out by flooding (Gorman 1997). Tributary confluences other than the Little Colorado River that may be important to adult and young of the year humpback chub are not included in the mitigation measure above. Therefore, GRCA believes that some adverse effects to the humpback chub and its critical habitat are likely to occur from implementation of Modified Preferred Alternative H. Thus, we have determined that modified preferred alternative H, with the implementation of the above mitigation measures, may effect, is likely to adversely affect the endangered humpback chub and its designated critical habitat. Because the humpback chub rarely occurs in the Lower Gorge, Modified Preferred Alternative 4 will not affect the species or its critical habitat.

### **Razorback Sucker (*Xyrauchen texanus*)**

The razorback sucker was listed as endangered in 1991. Critical habitat was designated in 15 river reaches 1994. The razorback sucker is the only representative of the genus *Xyrauchen* in Arizona. Records for this long-lived species indicate that it was abundant in the Lower Colorado and Gila River drainages in the late 1800s and early 1900s (Minckley 1983).

Razorback suckers have been declining for much of the last century. This decline is a result of extensive water development projects that have depleted flows, altered flows regimes, changed water quality, and fragmented habitat (USFWS 1998b). The introduction on non-native fishes that predate upon razorback suckers has also caused a significant decline in recruitment. In the Lower Basin, this species remains in the Colorado River from Grand Canyon to near the Mexican border. Small numbers occur in Lake Mead and in the Grand Canyon where individuals are found sporadically downstream on the mainstem river and associated impoundments and canals (USFWS 1998b citing Marsh and Minckley 1989). With the exception of the very large population remaining at Lake Mohave, these populations are very small and recruitment is virtually non-existent (USFWS 1994b). Current populations consist primarily of old fish believed to be nearing their maximum life expectancy (Minckley *et al.* 1991). There is no historic population estimate for this fish, but it is presumed that extant populations represent a 90% decline in historic range and abundance (USFWS 1998b).

The razorback sucker is adapted to the fluctuating hydrologic environment of the historic Colorado River with its periodically extreme flow conditions and high turbidities (USFWS 1998b). Spawning is known to take place in Lake Mohave and in the Colorado River below Hoover Dam. At Lake Mohave, spawning occurs early in the year, from January through April/May (USFWS 1998b). Adult razorback suckers use a variety of habitats including reservoirs and low-velocity riverine sections of canyon-bound areas. Young razorback suckers presumably require quiet, warm, shallow water (e.g., eddies and back waters) for nursery habitats in riverine environments (USFWS 1998b).

The Lake Mead population is estimated at 100-2000 individuals (not including some stocked fish); while none of the populations are confirmed to be self-sustaining, recent recruitment of wild-bred young are only documented in the Lake Mead population (USFWS 2005). The two known spawning areas for the razorback in Lake Mead are both in immediate proximity to a developed marina; [REDACTED] Las Vegas Marina, and [REDACTED] Echo Bay Marina within the Bay (USFWS 2002c). Telemetry studies show that adult razorback suckers use the spawning areas intensively during the November to April spawning period and may also be found in the area during the non-spawning period (USFWS 2002c). There is ongoing research into dispersal of stocked fish into the system, habitat preferences and use, monitoring of spawning at Lake Mead and research into the reasons for successful recruitment to that population (USFWS 2005).

A small number of razorback larvae were captured in the upper Lake Mead near Pearce Ferry Bay in 2000, and in 2001 they were found further downstream near Driftwood Island Bay (pers. comm. Ross Haley, Lake Mead NRA, May 11, 2005). Over the last few years there have been rather extensive netting efforts conducted in this area in an attempt to find the adults that produced the larvae, but adults have not been located. Four sonic tagged adult razorbacks were planted in that area of Lake Mead in the hope that they would lead biologists to fish already living there, but again, those attempts failed. Biologists concluded that there must have been some adults in that general area (or farther up river in GRCA) as recently as 2001 because of the presence of the larvae (pers. comm. Ross Haley, Lake Mead NRA, May 11, 2005).

There are few historic records of razorback suckers in the Grand and Marble canyons, possibly due to lack of historic sampling in these inaccessible whitewater canyons (Minckley *et al.* 1991). Although the fish has been extirpated from its historic riverine habitats in the lower Colorado River basin, the species may never have been common in whitewater canyons there (USFWS 1998b citing Bestgen 1990).

The decline of razorback suckers corresponds to major changes in their physical, chemical, and biological environment. Physical changes were the result of the construction and operation of the many dams and diversions in the Colorado River Basin since 1905. Changes in water quality have occurred since human presence has increased and the introduction of contaminants that can exist at levels high enough to harm the species. And, in many areas, the introduction of non-native fishes are the most significant threat to the survival of the razorback sucker (USFWS 1998b).

Critical habitat designation includes the 100-year floodplain of the Colorado River through Grand Canyon from the confluence with the Paria River (approximately RM 1) to Hoover Dam including Lake Mead to the full pool elevation. There are five features of critical habitat that require special management or protection for recovery of the razorback sucker: space for growth and normal behavior; food, water, or other nutritional or physiological requirements; cover or shelter; breeding and rearing sites; habitats protected from disturbance or representative of geographical and ecological distributions.



These features generally fall into three areas that are considered primary constituent elements: water, physical habitat, and the biological environment (USFWD 1998b).

The water element refers to water quality and quantity. Water quality is defined by parameters such as temperature, dissolved oxygen, environmental contaminants, nutrients, turbidity, and others. Water quantity refers to the amount of water that must reach specific locations at a given time of year to maintain biological processes and to support the various life stages of the species. The physical habitat element includes areas of the Colorado River system that are or could be suitable habitat for spawning, nursery, rearing, and feeding, as well as corridors between such areas. Habitat types include bottomland, main and side channels, secondary channels, oxbows, backwaters, and other areas in the 100-year floodplain, which when inundated may provide habitat or corridors to habitat necessary for the feeding and nursery needs of the razorback sucker. The biological environment element includes living components of the food supply and interspecific interactions. Food supply is a function of nutrient supply, productivity, and availability to each life stage. Negative interactions include predation and competition with introduced nonnative fishes.

### Conclusion

While the razorback sucker is known to occur only rarely within the Lower Gorge of GRCA, larvae were located in 2000 and 2001 in the vicinity of Pearce Ferry in Lake Mead, near the GRCA/Lake Mead interface. It is possible that the adults associated with those larvae could have come from within GRCA boundaries. Boats take out from GRCA at South Cove within Lake Mead. South Cove is located downstream of Pearce Ferry, thus boats that have run the river within GRCA traverse through potentially occupied razorback habitat within the far western edge of GRCA, the interface between GRCA and Lake Mead, and within Lake Mead to the take-out at South Cove. Effects to razorbacks, if present in these areas, is likely to be in the form of harassment from boat noise, fuel and other pollutants, and reduction in undisturbed shoreline habitats. If razorback spawning is or may be occurring at South Cove, concentrated use of this area during the spawning period of November – April, may result in disruption of spawning. Effects to razorback suckers present in Lake Mead, the west end of GRCA, and along the GRCA/Lake Mead interface may occur due to the use of motorized rafts and the use of jet boats. The use of motors in GRCA for **5.5 months each year above Diamond Creek and year round in the Lower Gorge** brings with it the potential for oil and gas contamination within the river corridor. In addition, in the Lower Gorge, jet boats can be used up to **Separation Rapid at RM 240**.

While introduction of contaminants to the river corridor is unlikely, it is a real possibility. Such introduction of contaminants would be localized in nature, but if the contaminants enter the river corridor, they could reach the Lake Mead where occupied habitat and individual razorback suckers are known.

Designated critical habitat occurs within the entire river corridor within GRCA. The vast majority of primary constituent elements for the species in GRCA are affected by water

flows controlled by the operation of Glen Canyon Dam and the presence of non-native fishes. The implementation of modified preferred alternatives H and 4 will have no impact on these important factors affecting critical habitat.

Modified preferred alternatives H and 4 could, however, affect water quality (environmental contaminants), as discussed above, and directly affect physical habitat elements for the razorback sucker. Direct effects to physical habitat could include river runner access to side channels and backwaters that result in impacts to habitat components important spawning, rearing or feeding razorback suckers. While GRCA believes the likelihood of such impacts occurring is low, direct impacts are possible. For the above reasons, GRCA determines that Modified Preferred Alternatives H and 4 may effect, are likely to adversely affect the endangered razorback sucker or its designated critical habitat.

GRCA will implement the following conservation recommendation for the razorback sucker:

1) ***Contingent upon availability of funding***, GRCA will work cooperatively with Lake Mead NRA to conduct surveys of backwaters and side channels in the Lower Gorge-Lake Mead interface, and that portion of Lake Mead NRA where project activities extend, for spawning razorback suckers (use of light traps to catch larvae may be an appropriate means of surveying). Recreational use of areas found to be used by razorback suckers during the spawning period will be avoided.

***\* Water Quality mitigations for the preferred alternative 4 as described in Chapter 4 of the CRMP FEIS, would be implemented.***

#### **Kanab Ambersnail (*Oxyloma haydeni kanabensis*)**

The Kanab ambersnail was listed as endangered in 1992. This is a small terrestrial landsnail restricted to wetlands, springs, and seeps at the base of sandstone or limestone cliffs at elevations of approximately 2,900 feet. It requires either shallow or standing water or a perennially wet soil surface. Grass or sedge cover is also necessary. Currently, only three populations of Kanab ambersnail (KAS) are known to exist. Two KAS populations occur in southern Utah, and one population in Arizona near Vaseys Paradise, a large perennial spring within GRCA. In September 1998, Arizona Game and Fish Department translocated KAS from Vaseys Paradise to three other sites within GRCA in an attempt to establish a secondary population. Currently, only Upper Elves Chasm has shown positive results (successful recruitment, overwinter survival, and increasing density) (Sorensen and Nelson 2002). The Upper Elves Chasm site has approximately 23.5 meters<sup>2</sup> of occupied primary habitat within the release area, and more than 25 meters<sup>2</sup> of adjacent hanging garden habitat that is increasingly being colonized since April 2000 (Sorensen and Nelson 2001). The new population of KAS at Upper Elves Chasm has full protection under the Endangered Species Act.

KAS habitat at Vaseys Paradise is characterized by large patches of mixed vegetation composed primarily of native crimson monkeyflower (*Mimulus cardinalis*), non-native watercress (*Nasturtium officinale*), and native water sedge (*Carex aquatilis*). Within this habitat, KAS are often found in the dead and decaying monkeyflower litter, and on live watercress stems and leaves.

Threats to KAS include loss and/or adverse modification of wetland habitat. KAS habitat at Vaseys Paradise is threatened by high water discharges from Glen Canyon Dam. On a lesser scale, trampling by recreationists and flash floods from the talus slopes above Vaseys Paradise also contribute to habitat loss and direct KAS mortality. Potential and occupied habitat at Vaseys Paradise is estimated between 850 and 900 meters<sup>2</sup> (Stevens *et al.* 1997). Other threats at Vaseys Paradise include recreational visitation from river runners due to the availability of fresh drinking water at the site (USFWS 1995b). Sorensen and Nelson (2002) and Stevens *et al.* (1997) indicate that most river runners do not disturb occupied KAS habitat because of the presence of large amounts of poison ivy. Flash flooding at the springhead at Vaseys Paradise may also cause some damage to the habitat, as well as potential overland flow from the talus slope located directly above the spring. Bighorn sheep grazing may also affect KAS habitat at Vaseys Paradise (Sorensen and Nelson 2002).

Studies indicate that KAS live from between 12 and 15 months, with peak reproduction occurring in mid-summer (Sorensen and Nelson 2002). At Vaseys Paradise, winter dormancy for KAS begins in October and emergence from dormancy typically occurs in March. For winter dormancy, ambersnails adhere the aperture of their shells to a firm substrate such as host plant stems and leaves, as well as rock, sticks, and bark. If winter conditions are mild, KAS appear to continue their life cycle without dormancy, or may to in and out of dormancy several times throughout this period (Sorensen and Nelson 2002). Estimates of KAS population numbers at Vaseys Paradise has ranged from 18,476 individuals in March 1995 to 104,004 individuals in September 1995 (Stevens *et al.* 1997). Sorensen and Nelson (2002) indicate that these estimates are subject to possible error since various sampling methods were used and habitat area measurements were not refined. More recent data (1997-1998) using standardized techniques indicate that total Vaseys Paradise KAS population estimates range between 26,129 and 40,553 snails (Sorensen and Nelson 2002). Monitoring of KAS at Vaseys Paradise below the 100,000cfs stage height has taken place quarterly since March 1995 (bi-annually starting in 2001) (Sorensen and Nelson 2002).

The translocated population of KAS at Upper Elves Chasm is located at approximately RM 116.6. The habitat at this site is predominately composed of monkeyflower and maidenhair fern, and to a lesser extent sedges, rushes, cattails, watercress, helleborine orchids, and grasses. A perennial seep flows through the release area and drains into a large pool at the base of the vegetated bench (Sorensen *et al.* 2003). [REDACTED]

[REDACTED]. Sorensen *et al.* (2003) indicate that a lightly used visitor trail

passes by on the other side of the pool; the site is accessible only by the river corridor, and requires climbing to access it, greatly reducing the number of visitors.

Sorensen *et al.* (2003) indicate two seep/spring sites within GRCA's river corridor that provide habitat suitable for KAS: Stone Creek (upper drainage) and the spring at RM 148.1R. The ease of river runner accessibility to these areas is not know, but if translocation efforts continue in GRCA and include these areas in the future, a review of potential recreational impacts should take place at that time.

### Conclusion

Direct impacts to KAS and their habitat at Vaseys Paradise are possible due to ease of river runner access to the site, popularity of the site as an "attraction," and the accessibility of the occupied KAS habitat. GRCA believes adverse impacts to individual KAS and habitat is possible at Vaseys Paradise in the form of trampling and molestation. This may result in declines to this population. However, only the lower band of habitat at Vaseys is generally accessible by visitors as the remainder of habitat is surrounded by poison ivy. Information presented above indicates that river runner access to the Upper Elves Chasm site is possible, although the number of visitors is limited due to required climbing. GRCA strongly believes that the cause of reduced streamflow at Vaseys Paradise is caused by drought, not recreational use of the spring caves.

To address the potential for direct impacts to KAS and its habitat within the action area, GRCA will implement the following conservation measures:

- 1) GRCA will implement a program to educate recreational and commercial guides about protecting the Kanab ambersnails in Vaseys Paradise and Elves Chasm.
- 2) Upper Elves Chasm will be closed to recreational access each year during the peak season (March through October) of river runner use.
- 3) GRCA will provide logistical support (e.g., boat trips) to the Arizona Game and Fish Department's Kanab ambersnail monitoring program.
- 4) ***Contingent upon availability of funding, GRCA will implement a study to determine recreational impacts to Kanab Ambersnail at Vasey's paradise.***

GRCA believes that the implementation of these conservation measures as part of Modified Preferred Alternative H will greatly reduce negative effects to the KAS and its habitat at the two occupied sites. However, access to the Vaseys Paradise site will be possible throughout the year, although access to all but the lower band of habitat is extremely unlikely given the poison ivy. Upper Elves Chasm will be accessible during four months of the year. Thus, direct impacts to the KAS and its habitat are likely given river runner access. Therefore, GRCA determines that implementation of Modified Preferred Alternative H may effect, is likely to adversely affect the Kanab ambersnail.

Because KAS are not present in the Lower Gorge, implementation of Modified Preferred Alternative 4 will have no effect on KAS.

### **Desert Tortoise (*Gopherus agassizii*)**

The desert tortoise (Mohave population) was listed as threatened in 1990 and critical habitat was designated in 1994. The Mohave population occurs north and west of the Colorado River. The Sonoran population occurs to the south and east of the Colorado River and within the western edge of GRCA on the south side of the Colorado River; this population is not listed as endangered or threatened. Critical habitat for the Mohave desert tortoise was designated in 1994 and includes areas adjacent to GRCA in Lake Mead National Recreation Area.

This large herbivorous reptile occurs in the creosote shadscale, blackbush, and Joshua tree series of Mojave desert scrub, cactus, shadscale, and Joshua tree series of Mojave desert scrub. The Mojave population generally occupies desert scrub communities in basins and bajadas but is also found on rocky terrain and slopes. In Arizona, tortoises of the Mojave population are typically found below 1,220 m (4,000 ft). Desert tortoises are most active in the spring and early summer when annual plants are most common. Additional activity occurs during warmer fall months and after summer rain storms. The remainder of the year is spent in burrows. Fidelity to an overwintering cave or burrow is fairly common (USFWS 1994). Over its lifetime, each desert tortoise may require more than 1.5 square miles of habitat and may make forays of more than 7 miles at a time (USFWS 1994a citing Barry 1986). In drought years, desert tortoise forage over larger areas and thus have a greater probability of encountering potential sources of mortality (USFWS 1994a).

The desert tortoise was listed due to precipitous declines in numbers in many areas. Declines are mainly attributed to direct and indirect human-caused mortality coupled with the inadequacy of existing regulatory mechanisms to protect desert tortoise and their habitat. Threats to the species include roads, grazing, development, mining, and concentrated visitor use. Upper respiratory tract disease is an additional cause of desert tortoise mortality and population decline (USFWS 1994a).

The Desert Tortoise (Mohave Population) Recovery Plan describes six population segments or recovery units and prescribed the designation of Desert Wildlife Management Areas (DWMAs) in which recovery actions will be implemented to provide for the long-term persistence of viable desert tortoise populations and the ecosystems upon which they depend (USFWS 1994a). GRCA falls nearest to the Northeastern Mohave Recovery Unit. The Gold Butte-Pakoon Desert Wildlife Management Area is closest in proximity to GRCA. However, this DWMA is located far to the west of GRCA and the Park is not within what has been traditionally considered desert tortoise habitat.

The Mohave population of this species was not known or suspected in GRCA until very recently. In May 2004, biologists from Lake Mead National Recreation Area and GRCA discovered desert tortoise scat in GRCA, below the rim on the trail along Whitmore

Canyon on the north side of the River (approximately RM 188) (pers. comm. Elaine Leslie, wildlife biologist, GRCA). Follow-up surveys conducted on July 6-8, 2004 determined the presence of a desert tortoise burrow approximately 1.8 km from the GRCA boundary on Lake Mead National Recreation Area (Osborn and Kincaid 2004). Surveys of the rim area near the confluence of Whitmore Canyon and the Colorado River (trailhead area) found no sign of desert tortoise, however, in a small wash just east of the trailhead/camping area, desert tortoise scat was found in two locations (Osborn and Kincaid 2004). The scat was collected for analysis. The scat was located just above the rim, approximately 1,000-1,500 feet above the river (pers. comm.. Sophie Osborn). The trail up Whitmore Canyon from the River is well-established and the scat was located within 50-100 meters of the trail in a small wash (pers. comm. Sophie Osborn, July 21, 2004). In late August 2004, the University of Reno confirmed that the scat collected from the Whitmore wash area belongs to the Mohave population of the desert tortoise (electronic mail message from Elaine Leslie, GRCA, August 31, 2004).

The number of tortoise present in this area is not currently known, nor is it clear how they came to be in this area (e.g. naturally occurring and never previously located; or transplanted into the area from areas of known populations to the west). In addition to the trail in the area, a road is present in the adjacent Mohave National Recreation Area that provides access to vehicles to the rim and there is a large bare area where camping takes place. OHV use was observed in this area (pers. comm. Sophie Osborn).

The rim is fairly low at this point in the Canyon and access to the area where the scat was found is provided by the presence of a well-established and short trail (less than 1 mile in length). At this point in time, the Park does not have data on the amount of use the trail receives from river runners.

Potential threats to desert tortoise in this area from recreational use in the river corridor under the Modified Preferred Alternative H include the presence of humans using the well-established trail at Whitmore Canyon. While non-consumptive recreational use such as hiking, photography and bird watching are generally considered compatible with recovery of desert tortoise, human presence does bring threats to the tortoise (USFWS 1994a). These include harassment, shooting, and the eating of refuse or discarded items left by hikers. Tortoises are known to eat foreign objects, such as rocks, balloons, plastic, and other garbage (USFWS 1994a). Such objects can become lodged in the gastrointestinal tract or entangle heads and legs causing death. Burge (1989, cited in USFWS 1994a) has found metal foil and glass chips in scat of wild desert tortoise. She also discovered a desert tortoise entangled by a rubber band caught in the mouth and around the forelegs. Such refuse deposition can easily occur in remote areas and is likely, or at least possible, wherever humans are present, even on foot trails.

Modified Preferred Alternative H predicts that the probable number of passengers per year will be 24,727, of which 7,597 will be present in the winter and shoulder months. This alternative reduces the number of trips and persons at one time (from the existing condition), however, the user discretionary time (UDT) would be increased to approximately 498,000 hours. This will likely result in increased traffic on foot trails as

river runners will have more time to explore within the river corridor. In the case of the area around Whitmore Canyon, foot traffic may increase on this trail and river runners would easily be able to reach the area above the rim which is only a short hike. The Modified Preferred Alternative H does not allow motors during the month of March, thus limiting the number of passengers potentially in this area at that time. The peak periods of activity for desert tortoise are spring and early summer; this is a critical period for the tortoise because this is when the vegetation greens up. While the vast majority of recreational passengers will come in contact with the area around Whitmore Canyon in the summer months, there is potential for some of the 7,597 passengers to be present in the winter and shoulder months, those times of the year when desert tortoise are known to be most active. This may result in river runners coming into contact with tortoises or with tortoises coming into contact with refuse left by hikers into the area.

Helicopter exchanges are currently take place at Whitmore Wash and there are currently no limits on helicopter use for passenger exchanges in this area. Under Preferred Modified Alternative H, helicopter exchanges would be allowed *from April 1 through September 15 at current passenger exchange ratios (estimated at 5,715 out and up to 4,035 passengers in) and a time-of-day restriction will be imposed (i.e. all exchanges must be completed by 10:00 am local time each day). Trips launching during the mixed-use season would also be allowed to exchange passengers at Whitmore even if the exchange occurs during the nonmotorized season (e.g., commercial motorized trips launching September 15 could have their passengers exchange at Whitmore on September 25). Hiking exchanges would only be allowed during the mixed use season.* Helicopter flights in this area are under the control of the Hualapai Tribe and GRCA has no control over them. Public Law 100-91 states that “helicopter flights shall not be prohibited 1) which fly a direct route between a point on the north rim outside of Grand Canyon National Park and locations on the Hualapai Indian reservation; and 2) whose sole purpose is transporting individuals to or from boat trips on the Colorado River and any guide of such trip.” *However, GRCA is prescribing a limit on the number of passenger exchanges in and out of Whitmore Wash by allowing only companies currently exchanging at Whitmore to conduct helicopter exchanges at current passenger exchange rates.* Under the Modified Preferred Alternative H passengers have the option of hiking up Whitmore Wash to the rim on a 1.3 mile, 1,200 vertical feet trail. The hike up Whitmore Wash takes the average hiker less than an hour (and less than 30 minutes coming back down), but is generally hot because of the surrounding lava rock and little shade. GRCA will monitor the situation within Whitmore Wash and if commercial hiking exchanges in this area become more common, the situation will be reassessed. Helicopter flights in this area are under the control of the Hualapai Tribe and GRCA has no control over them. Public Law 100-91 states that “helicopter flights shall not be prohibited 1) which fly a direct route between a point on the north rim outside of Grand Canyon National Park and locations on the Hualapai Indian reservation; and 2) whose sole purpose is transporting individuals to or from boat trips on the Colorado River and any guide of such trip.”

For purposes of analysis, GRCA assumes the number of passengers exchanged at Whitmore will comply with the figures presented in the Modified Preferred Alternative

H. GRCA assumes 5 persons per helicopter trip at Whitmore. [REDACTED]

[REDACTED] Commercial hiking exchanges are not expected to take place, thus significantly limiting the number of hikers in Whitmore Canyon.

Wildlife responses to aircraft are influenced by many variables including aircraft size, color, proximity, flight profile, engine noise, and sonic booms (Knight and Cole 1995, citing Smith *et al.* 1988). Because rotary-winged aircraft fly more slowly and at lower altitudes than large commercial and military aircraft, they may be more likely to disturb wildlife (Knight and Cole 1995). The responses of animals to human-made noise that have been observed include increased movement after the exposure, avoiding or evacuating areas when noise is present, changes in eating or drinking patterns, and arousal of species-typical defensive behaviors (Bowles 1998). Most animals adapt to these disturbances and displacement from favored habitat is still the only well-documented negative effect. Some groups of animals have been studied extensively, however, many important groups of animals have received little or not attention to date, including large carnivorous mammals, reptiles, and amphibians (Bowles 1998).

One of the most important and least-studied effects of noise is masking which occurs when human-made noise obscures an important natural sound for a significant portion of time (Bowles 1998). Desert tortoises are one of several species of tortoises that have acoustic social signals and are known to react to meaningful sounds in their environments (Bowles *et al.* 1998b). Desert tortoises use 11 different classes of vocalizations in a variety of social encounters (USFWS 1994). The masking effect of human-induced sources of noise such as that created by helicopters and jets that correspond closely to the frequency bandwidth of tortoise vocalizations, may damage hearing or significantly alter an individual's ability to effectively communicate or respond in appropriate ways; this includes the awareness of incidental sounds made by approaching predators which may decrease the ability of tortoise to avoid capture by a predator (Bowles *et al.* 1998a; Bowles 1995; USFWS 1994). Species-typical defensive responses of tortoise to the approach of danger include startling, running, diving underwater, wedging the shell into a crevice, urinating and defecating on an attacker, producing threatening sounds, freezing, and withdrawing into the shell (Bowles *et al.* 1998b).

In a study that examined the effects of simulated sonic booms and low-altitude aircraft noise on desert tortoise, Bowles *et al.* (1998b) found that exposure to simulated jet overflights produced a typical reptilian defensive response – freezing. Freezing to initial exposures was abrupt, with head and appendages often left extended. During or after the exposures to the noise of jet overflights, tortoises frequently became quiescent (totally immobile) for periods of up to 113 minutes; tortoises investigating their habitat stopped walking and eating tortoises stopped eating (Bowles *et al.* 1998b). Recovery occurred within 2-4 hours of the exposure.

In a study examining the effects of low altitude aircraft noise on the hearing of the desert tortoise, Bowles *et al.* (1998a) found a range of hearing that varied by individual tortoise, but the most sensitive individuals heard as well as lizards and some birds. Bowles *et al.*



(1998a) points out that this sensitivity to hearing was measured at summer temperatures and that changes in temperature produced large changes in auditory sensitivity during the study, suggesting that the results cannot be extrapolated to very high and very low temperature conditions.

Loud noises and associated vibrations may damage the hearing apparatus of desert tortoise and ground vibrations can cause desert tortoise to emerge from their burrows (USFWS 1994a). Hearing losses are poorly studied in reptiles (Bowles 1995), however ORV noise and motorcycle noise are known to affect the Mohave fringed-toes lizard and desert iguana, resulting in hearing damage (USFWS 1994a). Repeated or continuous exposure to damaging noises is likely to cause an even greater reduction in auditory response of these lizards. It is not unreasonable to expect loud noises to similarly impact the auditory performance of desert tortoise (USFWS 1994a).

### Conclusion

The Desert Tortoise Recovery Plan stresses that in order to ensure the recovery of desert tortoise, mortality from human-related sources must be eliminated or reduced to very low levels; losses of even a few adults can delay or prevent recovery. GRCA believes that it is possible that desert tortoise in this area may be adversely affected by river runner use of the foot trail at Whitmore resulting in an increase in the probability of negative tortoise-human interactions (through direct contact and indirectly through ingestion of inadvertently discarded refuse), and tortoise may be negatively affected by the practice of passenger helicopter exchanges at Whitmore helipad which is located in close proximity to the recently discovered tortoise sign. For these reasons, we make a determination that the Modified Preferred Alternative H is likely to adversely affect the desert tortoise (Mohave population). Because desert tortoise are known to occur only in upland habitat in the Lower Gorge, and access to these area by river runners is extremely limited or non-existent, Modified Preferred Alternative 4 will not effect this species. Because designated critical habitat does not occur within GRCA nor within close proximity, both preferred alternatives will not affect desert tortoise critical habitat.

Conservation measure for the desert tortoise:

- 1) River recreationists using the Whitmore Canyon area will be educated to not handle or otherwise disturb any desert tortoises they may encounter. Recreationists will be required to pack their trash out of the area.

### **Relict Leopard Frog (*Rana onca*)**

The relict leopard frog was listed as a candidate species in July 2002 by the U.S. Fish and Wildlife Service (67 FR 40657). This medium-sized frog is 1.75 to 3.5 inches in length and is brown, gray, or greenish in color, with greenish-brown spots. The relict leopard frog is very similar in appearance and closely related to the lowland leopard frog (*Rana yavapaiensis*).

Adult frogs inhabit permanent streams, springs, and spring-fed wetlands below approximately 1,968 feet (USFWS 2004c). Adults prefer relatively open shorelines where dense vegetation does not dominate. Breeding habitat includes pools or slow-moving side areas of streams, with or without emergent vegetation (USFWS 2004c). Adults probably are mainly insectivorous, and larvae probably eat algae, organic debris, plant tissue, and minute organisms in water (AGFD 2003). Breeding has been documented in September, November, and late January through March (Bradford et al. in press). Eggs are deposited in clusters attached to stems of living or dead vegetation near the bottom of shallow, low-velocity pools 5-7 cm deep and it appears that sites with little to moderate cover seem to be preferred (RLFCT 2005a).

The relict leopard frog was previously thought to be extinct but was rediscovered in 1991. The historical distribution of this species is not well documented. The distribution has historically been characterized as streams, springs, and wetlands within the Virgin River drainage from the vicinity of Hurricane, Utah to the Overton Arm of what is now Lake Mead, Nevada, and along the Muddy River in Nevada (USFWS 2004c). The extent of this known range was relatively small, spanning only about 190 kilometers (Bradford et al. 2004). The species may have once been present on the Colorado River mainstem (USFWS 2004c). Populations in Utah appear to have been extinct since the 1950s (USFWS 2004c).

The causes for the population declines of this species are not entirely clear (NatureServe 2005), but suggested factors include elimination or dramatic alteration of aquatic habitat due to dams, agriculture, marsh draining, and water development, and the spread of predator and non-native bullfrogs, crayfish, and predaceous fishes (USFWS 2004c). Tamarisk invasion is a significant threat to relict leopard frog populations as this plant reduces habitat structure, eliminates open habitat and short “understory” plant species used by the frogs, and tamarisk roots substantially reduce pool size by growing directly in the water and trapping sediment (RLFCT 2005a). A fungal disease, chytridiomycosis, is an additional threat. New Zealand mudsnails (*Potamopyrgus antipodarum*) are an additional threat to the frog. New Zealand mudsnails are established at Lee’s Ferry within GRCA and have been collected as far downstream as Diamond Creek in the Lower Gorge (Montana State University 2004 as cited in RLFCT 2005a). Studies in Yellowstone National Park in Wyoming indicate New Zealand mudsnails reduce food availability to aquatic insects and larvae, reducing invertebrate species diversity and abundance (RLFCT 2005a). The relict leopard frog is further threatened by the low numbers of individuals within each population, some of which may not be viable (NatureServe 2005). Populations of amphibians that occur in isolated patches may be extirpated by stochastic events such that recolonization may not occur due to the distance of separation and absence of contiguous habitat (NatureServe 2005).

Recreational access to springs and streams is the proximate cause of a number of threats to the relict leopard frog (RLFCT 2005a). Recreational users deliberately introduce many non-native species. Recreational users may also, either through transfer of mud on their shoes, or by releasing aquatic fauna, introduce or spread disease. Other activities

such as bathing, where soap or detergents are used, could degrade habitat quality (RLFCT 2005a).

In the 1990s, populations were known from only seven sites in three relatively small areas and by 2001, populations had disappeared from two of these sites, leaving only two areas inhabited by these frogs (Bradford et al. 2004). The USFWS (2004c) reports that recent surveys have revealed extant populations at seven sites in four general areas: Surprise Canyon in the lower Grand Canyon, and Sycamore Spring, Arizona (Mohave County); springs near the Overton Arm of Lake Mead, Nevada; and springs in Black Canyon below Hoover Dam, Nevada. The population at the smallest known site, Corral Spring, went extinct in 1995; frogs were last seen at a wetland in Littlefield, Arizona in 1998 (USFWS 2004c). The Littlefield population is considered extirpated (RLFCT 2005a). The species was introduced to Sycamore Spring in 2003. All seven sites consisted of perennial springs and resultant stream habitat and, with the exception of the Reber Springs site, were under geothermal influence (Bradford et al. 2004). The relict leopard frog is currently known to occur only in two general areas (in six localities): near the Overton Arm of Lake Mead, Nevada, and in Black Canyon, Nevada, below Lake Mead (RLFCT 2005a). The worldwide population of this species of frog is presently found in approximately 5-6 very small springs, and probably numbers fewer than 1100 total individuals, with over half of this number in one population (RLFCT 2005a).

Extant relict leopard frogs populations are restricted to narrow habitat corridors (1-3 meters in most places), with a sharply defined boundary between riparian corridor and desert and movements are limited to along the course of springs (RLFCT 2005a). In a three-year mark-recapture study in the isolated upper reach of Blue Point Spring, the mean distance moved between captures averaged 18 meters, and the longest distance recorded between recaptures was 120 meters (Bradford et al. 2004). Connectivity among the extant populations has been dramatically reduced as a result of damming the Colorado River, and the presence of predatory game fish. Downstream movement within ephemeral drainages appears possible as suggested by the observations of individual relict leopard frogs at Willow Beach, 10 km downstream from the nearest known population (RLFCT 2005a).

Genetic analysis was recently completed on the leopard frogs at Surprise Canyon within Grand Canyon. Based on testing of 12 genetic samples taken from this population of leopard frogs, Jef Jaeger with the University of Nevada, Las Vegas indicates that the frogs in Surprise Canyon are more closely related to the lowland leopard frog (*Rana yavapaiensis*) than to the relict leopard frog (*Rana onca*) (RLFCT 2005b). Specifically, the genetic analysis results (% difference) between Surprise Canyon frogs to *R. yavapaiensis* (RAYA) and *R. onca* (RAON) are:

Surprise: RAYA = 0.007 (expected for an isolated population)

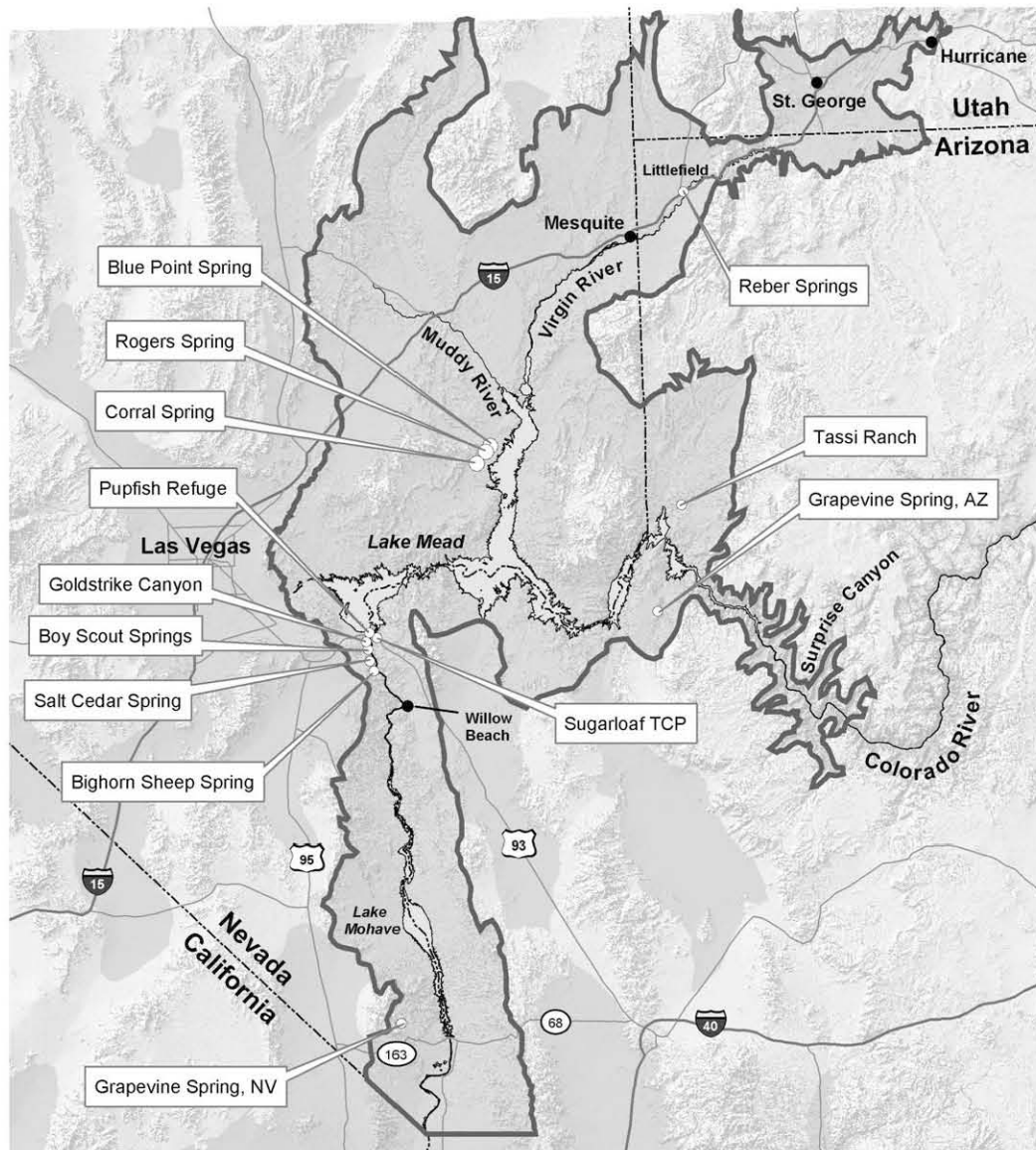
Surprise: RAON = 0.027

RAYA: RAON = 0.028 (expected for speciation)

There are no known populations of relict leopard frog within Grand Canyon at this time. However, the southern extent of relict leopard frogs along the Colorado River is not

currently known and further research is needed on the limits of the relict leopard frog along the Colorado River (RLFCT 2005a). Surveys directed at detecting amphibians within the Lower Gorge of GRCA have been extremely limited to date: Stevens Ecological Consulting searched over 150 sites in the lower Grand Canyon and Arizona Strip for leopard frogs in 2000-2001; one documented record (photo-voucher) for a leopard frog at Surprise Canyon from 1987 was found during this study (unpublished data; RLFCT 2005a). Blomquist et al. (2003) report the springs and stock tanks with permanent water were searched in and around the Virgin Mountains, Virgin River corridor, Grand Wash, lower Grand Canyon, and Lake Mead for leopard frogs; all surveys were conducted in Arizona and no leopard frog populations were detected (RLFCT 2005a).

The *Draft Conservation Agreement and Rangewide Conservation Assessment and Strategy for the Relict Leopard Frog (Rana onca) (Conservation Agreement)* (RLFCT 2005a) has identifies a Relict Leopard Frog Potential Management Zone (PMZ) that includes existing populations and known historical locations for the species derived from museum records and literature references (Figure 2). The PMZ is 3,392,658 acres in size but only a small portion of this area represents suitable aquatic/riparian habitats for the relict leopard frog. The southeastern boundary of the PMZ is roughly 8 miles upstream of Surprise Canyon on the Colorado River within GRCA. The purpose of the PMZ is to define a general region in which relict leopard frogs habitats and populations may have once existed (RLFCT 2005a). Historical records for this frog are limited, and likely biased, with records generally located at sites along river courses and major travel routes, thus providing only a minimum historical distribution for this species, thus the PMZ represents a feasible approximation of the frog's historical range, and contains sufficient potential habitat for conservation actions (RLFCT 2005a).



*Rana onca*  
Potential Management Zone



15 October 2004

Figure 2. Relict leopard frog Potential Management Zone (RLFCT 2005a).

The current lack of known populations of relict leopard frog within GRCA, the lack of systemic surveys for relict leopard frogs to date within the Lower Gorge, and the uncertain genetics of leopard frogs in the Lower Gorge (as evidenced by the recent

genetic results from frogs from Surprise Canyon) make it impossible to make site-specific determinations of effects of river runner recreational impacts on the species if found to be present within GRCA in the future. GRCA will implement the following conservation measure for the relict leopard frog:

- 1) Because additional information about this species is constantly generated, and because the draft Conservation Agreement includes a portion of the Lower Gorge within the boundaries of the *Potential Management Zone*, GRCA will implement the final Conservation Agreement. The portions of the Conservation Agreement that are most relevant to activities outlined in the Modified Preferred Alternative 4 for the Lower Gorge include the Management Strategies and Conservation Actions and the Mitigation Protocol (Appendix 3 of the Conservation Agreement). These include recommendations to minimize impacts of recreation within occupied sites, minimizing impacts of new construction within both occupied and potential sites, and the appropriate management of invasive and aggressive flora. If relict leopard frogs are located within GRCA and/or if a site or sites within GRCA are recommended as potential release sites by the *Relict Leopard Frog Conservation Team (RLFCT)*, GRCA will work closely with the U.S. Fish and Wildlife Service and the RLFCT to appropriately manage these sites.

Because the relict leopard frog is not known to currently occur within the Lower Gorge within GRCA, and because GRCA will implement the Conservation Agreement and appropriately manage potential habitat (and future occupied habitat if located) within the PMZ within the Lower Gorge, Modified Preferred Alternative 4 will not jeopardize the continued existence of the relict leopard frog.

#### **Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*)**

The future of the yellow-billed cuckoo (*Coccyzus americanus*), a neotropical migrant that breeds throughout northern Mexico, the United States, and southern Canada, is uncertain (Hughes 1999). Yellow-billed cuckoo populations have declined throughout the species' range (Hughes 1999); western populations, in particular, have decreased and suffered catastrophic range reductions in the twentieth century (Laymon and Halterman 1987; Hughes 1999; Corman and Magill 2000). Consequently, on July 25, 2001, the U.S. Fish and Wildlife Service found that listing the yellow-billed cuckoo western DPS (distinct population segment) was warranted, but precluded by higher priority listing actions and the species became a Candidate Species under the Endangered Species Act (ESA) (FR66, 143: 38611). Yet, despite concern over the fate of this species, few aspects of yellow-billed cuckoo life history have been adequately studied (Hughes 1999). Probable factors believed to be contributing to population declines are the loss, fragmentation, and alteration of native riparian breeding habitat, the possible loss of wintering habitat, and pesticide use on breeding and wintering grounds (Corman and Magill 2000).

The yellow-billed cuckoo is a late migrant associated with large tracts of riparian deciduous forest where willow, cottonwood, sycamore, or alder occur. Yellow-billed cuckoos arrive on the breeding grounds beginning in mid- to late May and initiate nesting activity in early to mid-June (southern California) through late August and frequently into September (southeastern Arizona), with the peak occurring in mid-July and early August (Corman and Magill 2000), and may be triggered by an abundance of the cicadas, katydids, caterpillars, or other large prey which form the bulk of the species' diet (USFWS 2001). Yellow-billed cuckoos in higher elevations may be found in mesquite and tamarisk. Arizona probably contains the largest remaining yellow-billed cuckoo population among the states west of the Rocky Mountains; 168 pairs and 80 single birds were located in Arizona in 1999, based on preliminary results from a State-wide survey which covered 427 km (265 miles) of river and creek bottom (USFWS 2001).

Loss and modification of southwestern riparian habitats have occurred from urban and agricultural development, water diversion and impoundment, channelization, livestock grazing, off-road vehicle use and other recreational uses, and hydrological changes resulting from these and other land uses (USFWS 2001). Losses of riparian habitats from historic levels have been substantial in Arizona and these losses have been greatest at lower elevations (below 3,000 feet) along the Lower Colorado River and its tributaries which have been strongly affected by upstream dams, flow alterations, channel modification, and clearing of land for agriculture (USFWS 2001). Another likely factor in the loss and modification of the habitat for the yellow-billed cuckoo is the invasion by the non-native tamarisk (USFWS 2001). In Utah, a potential threat to habitat was attributed to recreational impacts by river users (e.g., use of cottonwood stands for campsites and "lunch spots") (USFWS 2001).

The fact that yellow-billed cuckoos were once common and now are extremely rare and that riparian habitats have been severely impacted demonstrate that there is a clear need to elucidate the interrelationships of yellow-billed cuckoo ecology and riparian habitat conservation. After conducting surveys for yellow-billed cuckoos, Arizona Game and Fish Department concluded that: 1) The surveys should be expanded to encompass all major habitat types; 2) Additional presence/absence data was needed from areas within potentially suitable habitat that were not thoroughly surveyed; and, 3) Nest searching and monitoring should be initiated to gain a better understanding of productivity and nest site behavior (Corman and Magill 2000). The need to better understand the factors that are contributing to the decline of yellow-billed cuckoo populations within the state is reflected in the Arizona Game and Fish Department Heritage Program's selection of the yellow-billed cuckoo as a Sensitive Element in 2001 and 2002.

Corman and Magill (2000) report that yellow-billed cuckoos were detected prior to 1998 in the following general locations on the Colorado River above Lake Mead:



During surveys in 1998 and 1999, Corman and Magill (2000) report that yellow-billed cuckoos were detected on the Colorado River (above Lake Mead) at the Lake Mead Delta. However, it does not appear that surveys during those years (1998 and 1999) included habitat further upstream on the Colorado River.

In 2001, one individual yellow-billed cuckoo was observed in the vicinity of [REDACTED] [REDACTED] by San Bernardino College (pers. comm. San Bernardino College to Elaine Leslie, 2001).

Habitat is currently present, although limited, within the Lower Gorge of GRCA. Based upon detections prior to 1998, suitable nesting habitat may also be present within the upper portion of the project area. Surveys have been extremely limited to date within the Lower Gorge and non-existent in the upper river corridor, and their failure to detect nesting cuckoos does not indicate definitively that the species is not present within the project area. Clearing of suitable habitat (for the purposes of new construction or vegetative management of existing campsites, for instance) has the potential to directly impact this species unless presence/absence surveys are conducted. Impacts of recreation on nesting cuckoos and their habitat would be similar to those discussed in the southwestern willow flycatcher section of this BA. Because the range of the species overlaps to some extent with the southwestern willow flycatcher, protections for riparian habitats along the Colorado and tributaries also partially extend to the yellow-billed cuckoo.

GRCA will implement the following conservation measures as part of the implementation of modified preferred alternatives H and 4:

- 1) Contingent upon the availability of funding, GRCA will conduct surveys of any potential nesting habitat prior to new construction or vegetative management.
- 2) ***GRCA will place emergency closures on a case by case basis at all known nest sites encountered during surveys or unsurveyed, previously occupied yellow-billed cuckoo nest sites (with a 0.5-mile buffer) that will be impacted by river recreationists' activities.*** These restrictions would include closure to all visitor use, including hiking, camping, and river landings.

The implementation of these mitigation measures will prevent or limit disturbance to and destruction of nest sites, although direct and indirect impacts to habitat, and disturbance to nesting cuckoos are still possible due to recreational use. However, GRCA has determined that, with the implementation of the mitigation measures above, modified preferred alternatives H and 4 are not likely to jeopardize the continued existence of the yellow-billed cuckoo.



## VI. CONCLUSIONS

Table 5. Summary of Determinations of Effect Made in this Biological Assessment for Listed Species and Designated Critical Habitat (LAA: “may effect, likely to adversely affect”; NLAA: “may effect, not likely to adversely affect”; NE: “no effect”; NLJ: “not likely to jeopardize the continued existence of the species”; N/A: not applicable (critical habitat not designated)

Species	Effect to Species		Effect to Critical Habitat	
	Alternative H*	Alternative 4*	Alternative H*	Alternative 4*
Bald eagle	LAA	NLAA	N/A	N/A
California condor	LAA	LAA	N/A	N/A
Mexican spotted owl	LAA	LAA	NLAA	NLAA
Southwestern willow flycatcher	LAA	LAA	Will not result in adverse modification of proposed critical habitat	
Yuma clapper rail	NE	NLAA	N/A	N/A
California brown pelican	LAA	LAA	N/A	N/A
Humpback chub	LAA	NE	LAA	NE
Razorback sucker	LAA	LAA	NLAA	NLAA
Kanab ambersnail	LAA	NE	N/A	N/A
Desert tortoise	LAA	NE	NE	NE
Relict leopard frog	NLJ	NLJ	N/A	N/A
Yellow-billed cuckoo	NLJ	NLJ	N/A	N/A

\* as modified.

## VII. CONSULTATION

1. GRCA first contacted the U.S. Fish and Wildlife Service in June, 2003, with a scoping letter discussing the preparation of the of the CRMP.
2. On October 21, 2003 U.S. Fish and Wildlife Service responded, directing GRCA to the Service’s web site which contained a list of species potentially occurring in the project area.
3. GRCA contacted the U.S. Fish and Wildlife Service on March 23, 2004 requesting review of the CRMP Administrative Draft Environmental Impact Statement and requesting a list of species that should be included in a biological assessment of the proposed action.
4. On April 29, 2004, the U.S. Fish and Wildlife Service responded with a list of eight listed species and two candidate species that may be appropriate for consideration in the CRMP biological assessment.
5. On July 14, 2004, Michele James, wildlife biologist with GRCA contacted Bill Austin, FWS to review and discuss the species to be included in the biological assessment. At that time the recommendation was made to include the California brown pelican in the biological assessment analysis given the recent sightings of the species in the river corridor. Discussion also included the recent finding of possible desert tortoise habitat within or near GRCA. No recommendation was made regarding inclusion of this species pending additional information, however

- possible inclusion in the biological assessment was discussed as an option pending more site-specific information.
6. On July 19, 2004, Michele James, wildlife biologist with GRCA contacted Greg Beatty, FWS regarding the schedule for re-proposal of southwestern willow flycatcher habitat. It was unknown at the time if critical habitat would be proposed within GRCA in September 2004, but Beatty referred to the Southwestern Willow Flycatcher Recovery Plan for a good summary of what the recovery team thought was the most important habitat for the species in GRCA.
  7. On May 10, 2005, Michele James, wildlife biologist with GRCA contacted Bill Austin, FWS to discuss informal review of the Draft Biological Assessment prior to requesting formal consultation.
  8. On May 16, 2005, Michele James, wildlife biologist with GRCA provided Bill Austin, FWS a copy of the Draft Biological Assessment for informal review by the FWS.
  9. On June 9, 2005, Bill Austin, FWS provided Michele James, GRCA, with an informal comment letter on the May 16, 2005 draft Biological Assessment.
  10. On June 10, 2005, Michele James, GRCA, discussed the content of the June 9, 2005 informal comment letter with Bill Austin, FWS.
  11. On June 14, Jeff Cross, GRCA, discussed possible mitigation and monitoring measures for the humpback chub and its habitat with Glen Knowles, FWS.

The submission of this biological assessment to the FWS will constitute a request for formal consultation for the species and critical habitat for which a determination of “may effect, likely to adversely affect” was made; concurrence for species and critical habitat for which a determination of “may effect, not likely to adversely affect” was made; and, a request for a conference opinion for proposed critical habitat for the southwestern willow flycatcher.

GRCA will review the findings of this biological assessment and resulting biological opinion/conference opinion at least every three years during the life of the CRMP to review the effect findings, implementation of any reasonable and prudent measures that are issued by the FWS, and any new information about listed species and habitats within GRCA.

## VIII. CONTACTS AND CONTRIBUTORS

### **Grand Canyon National Park**

Elaine Leslie, Wildlife Biologist, Science Center  
Lenore Grover-Bullington, Natural Resource Specialist, Science Center  
RV Ward, Wildlife Biologist, Science Center  
Jeffrey Cross, Director, Science Center  
Tim Bowden, Biologist, Science Center  
Ken McMullen, Overflights and Natural Soundscape Program Manager  
Steve Meitz, GIS Specialist

**U.S. Fish and Wildlife Service**

Bill Austin, Arizona Ecological Services, Flagstaff Office  
Greg Beatty, Arizona Ecological Services, Phoenix Office  
Lesley Fitzpatrick, Arizona Ecological Services, Phoenix Office  
Shaula Hedwall, Arizona Ecological Services, Flagstaff Office  
Allen Taylor, Arizona Ecological Services, Flagstaff Office  
Glen Knowles, Arizona Ecological Services, Flagstaff Office

**PREPARED BY:**

/s/ Michele A. James

June 17, 2005

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Michele A. James, Wildlife Biologist

Date

**REVIEWED AND APPROVED BY:**

/s/ R.V. Ward

June 19, 2005

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R.V. Ward, Wildlife Biologist

Date

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H2623 (GRCA 8213)

FEB 17 2004

JGEllis  
LJoe  
JBalsom  
JCross  
LPowell  
KCannon  
JFAlston

Mr. James Garrison  
State Historic Preservation Officer  
Arizona State Parks  
1300 W. Washington  
Phoenix, Arizona 85007

Dear Mr. Garrison:

Grand Canyon National Park (the Park) is preparing an Environmental Impact Statement (EIS) to evaluate potential impacts of the implementation of the revised Colorado River Management Plan (CRMP). The plan, last revised in 1989, guides the management of visitor use on and along the Colorado River as it flows through the Grand Canyon National Park. The EIS will be prepared in accordance with the National Environmental Policy Act and NPS guidelines. We will be addressing requirements of Section 106 of the National Historic Preservation Act concurrently with preparation of the EIS. I am writing you at this time to provide information about the CRMP and to initiate formal consultation with your office.

#### **Project Description**

Grand Canyon initiated an update of the CRMP in 1997, conducting public scoping and meetings regarding concerns over the Park's management of the Colorado River. A decision made by my predecessor, former Superintendent Robert Arberger, discontinued the planning process in February 2000. Soon thereafter, the Park was sued by several organizations and individuals relative to our responsibility to complete a CRMP and associated EIS. We have entered the planning process again as part of a negotiated settlement with the plaintiffs in one of the lawsuits. Completion of the CRMP and the EIS will fulfill an agreement reached through a negotiated settlement between the plaintiffs and the federal government. The settlement requires the National Park Service (NPS) to complete the CRMP/EIS by December 31, 2004, a fairly short time frame given the vast resources and complexity of management issues at involved.

Every year approximately 22,000 people see the Grand Canyon via a boat trip on the Colorado River. Additionally, several thousand fishing enthusiasts also recreate along the banks of the Colorado within the Park. The EIS will focus on the development and evaluation of recreational use management alternatives that seek to achieve the Park purpose, as stated in the 1995 General Management Plan:

#### **Potential Effects to Cultural Resources**

The Park purpose seeks to provide the delicate balance between resource protection and visitor access. The Grand Canyon and its side canyons hold a wealth of cultural resources, including historic and prehistoric archaeological sites, traditional cultural places, and cultural landscapes. Previous impacts from visitation have been documented in archaeological sites both along the river and in the side canyons.

As part of the EIS studies, we will be evaluating several visitor use alternatives and their potential to impact to cultural resources. Additionally, we will be identifying management considerations that could

be used to mitigate potential impacts. We would appreciate any comments you may have regarding impacts or mitigations that should be considered.

#### **Area of Potential Effect and Inventory Strategy**

The Colorado River corridor, as it runs through the Park, is 277 miles long and is generally demarcated by the "old high water zone", generally recognized as the pre-dam river terraces. This area is most directly impacted by river use, since most recreational activities (camping, lunch, and visitation to attraction sites) take place close to the shore. However, because river trips often include hiking excursions outside of the river corridor, side canyons and areas outside of the river corridor that are known to have access routes have been included in the area of potential effect (APE) for archaeological resources, traditional cultural places and historic buildings and structures.

Our review of the Grand Canyon cultural resource files has yielded data on prior studies and recorded cultural resources within the APE; these data will provide background information for the EIS. Cultural resources along the river corridor have been inventoried and monitored by Park staff as part of the Glen Canyon Dam River Corridor Monitoring Program implemented in 1992. Several other sites have also been identified in the APE, but several of the side canyons have not been systematically surveyed. Given the strict deadline from the settlement agreement and the availability of comprehensive RCMP data, which serves to characterize cultural resources in the river corridor, we do not propose any intensive archaeological survey as part of the EIS. We anticipate that the analysis may conclude that archaeological survey and monitoring may be an appropriate strategy to refine the inventory during post-EIS phases of CRMP implementation.

#### **Determination of Effect**

In accordance with the National Park Service Servicewide Programmatic Agreement (#11) and the Grand Canyon General Management Plan Programmatic Agreement, both of which provide a framework for Section 106 compliance, NPS will conduct an assessment of effects for the preferred alternative for the CRMP. Although we have yet to conduct a thorough impact analysis, we anticipate that we may conclude that the plan will have an adverse effect on significant cultural resources and that we will need to develop a Memorandum of Agreement in accordance with 36 CFR 800.6. Your advice and cooperation in developing such an agreement or commitment document, if warranted, will be greatly appreciated.

#### **Consulting Parties**

We propose to identify any traditional cultural places and concerns through tribal consultation with the Navajo Nation, the Hopi Tribe, the Pueblo of Zuni, the Havasupai Tribe, the Southern Paiute Consortium, and the White Mountain Apache Tribe as well as the Hualapai Tribe, which is participating in the CRMP/EIS process as a cooperating agency.

#### **Conclusion**

Because we view coordination with your office and staff as crucial to the CRMP planning process, we would like to schedule a meeting with your staff specialists to discuss issues of mutual concern related to river management in the Grand Canyon. Please contact Janet Balsom,

Cultural Resources Program Manager at (928) 638-7758 or Grace Ellis, Cultural Resource Specialist at (928) 226-0159 to provide contact information. They will be happy to schedule a meeting with your office and answer any questions that you may have.

We appreciate your interest in the Grand Canyon and hope that this planning process will provide a model for the incorporation of the concerns and interests of the SHPO in the Park's management of the Colorado River through the Grand Canyon.

Sincerely,



Joseph F. Alston  
Superintendent

bcc:

Janet Balsom (GRCA-8213)

Rick Ermenwein (GRCA-8213)

Sara White (GRCA-8213)

Jill Beshears (GRCA-8213)

J. Grace Ellis (GRCA-8213)

**DRAFT**  
**PROGRAMMATIC AGREEMENT**  
**AMONG THE**  
**GRAND CANYON NATIONAL PARK, ADVISORY COUNCIL ON HISTORIC**  
**PRESERVATION, ARIZONA STATE HISTORIC PRESERVATION OFFICER,**  
**HUALAPAI TRIBE AND NAVAJO NATION**  
**CONCERNING IMPACTS FROM IMPLEMENTATION OF THE**  
**COLORADO RIVER MANAGEMENT PLAN FOR GRAND CANYON NATIONAL PARK**

**WHEREAS**, the National Park Service (NPS) has determined that implementation of the revised Colorado River Management Plan (CRMP) for Grand Canyon National Park (GRCA), which will regulate public and administrative use on the Colorado River within GRCA, may result in adverse effects on historic properties listed in, or eligible for listing in, the National Register of Historic Places (historic properties); and

**WHEREAS**, GRCA has determined that administrative, educational and research activities that occur along the Colorado River and its side canyons may result in adverse effects on historic properties listed in, or eligible for listing in, the National Register of Historic Places; and

**WHEREAS**, GRCA, as a unit of the National Park System, has responsibility for identification, management and preservation of historic properties under its jurisdictions pursuant Section 110 of the National Historic Preservation Act of 1966, as amended (NHPA); and

**WHEREAS**, the Navajo Nation and Hualapai Tribe are federally recognized Indian tribes whose reservations abut GRCA and contain historic properties that may be affected by the NPS's implementation of the revised CRMP; and

**WHEREAS**, the Hualapai Tribe has assumed Tribal Historic Preservation Officer (THPO) responsibilities and is responsible for the administration and management of historic properties within the boundaries of its reservation; and

**WHEREAS**, the Navajo Nation has assumed THPO responsibilities and is responsible for the administration and management of historic properties within the boundaries of the Navajo Nation pursuant to the Navajo Nation Cultural Resources Protection Act (CMY-19-88); and

**WHEREAS**, the Navajo Nation and Hualapai Tribe therefore have been invited to be signatories to this Programmatic Agreement (Agreement); and

**WHEREAS**, the Hopi Tribe, the Havasupai Tribe, the Kaibab Band of the Paiute Indians, the San Juan Southern Paiute Tribe, the Pueblo of Zuni, the Paiute Indian Tribe of Utah, Las Vegas Paiute Tribe, Moapa Band of Paiute Indians, and the Yavapai/Apache Nation, are federally recognized Indian tribes that attach religious or cultural significance to historic properties located within GRCA that may be affected by NPS implementation of the revised CRMP; and

**WHEREAS**, the Hopi Tribe, the Havasupai Tribe, the Kaibab Band of the Paiute Indians, the San Juan Southern Paiute Tribe, the Pueblo of Zuni, the Paiute Indian Tribe of Utah, Las Vegas Paiute Tribe, Moapa Band of Paiute Indians the Yavapai/Apache Nation therefore have been consulted and invited to participate in the development of this Agreement; and

**WHEREAS**, other interested parties (See Attachment A) have been consulted and invited by letter (dated June 23, 2005) to review and comment on this agreement;

**NOW, THEREFORE**, NPS, the Advisory Council on Historic Preservation (Council), Navajo Nation THPO, Hualapai Tribe THPO and the Arizona State Historic Preservation Officer (SHPO) agree to the following stipulations, which satisfy the NPS's Section 106 responsibilities for public and administrative use associated with the implementation of NPS's final CRMP.

## STIPULATIONS

This project applies to all cultural resources that are vulnerable to impacts from implementation of the Colorado River Management Plan. The area of potential effect (APE) includes the Colorado River corridor from Lees Ferry to Lake Mead National Recreation Area (River Mile 277), as well as areas readily accessible to river runners hiking off the river. These areas are generally within a two-mile hike up any of the side canyons. Some areas over 2 miles from the river are also included if they are known to be visited by river runners (according to river guides, publications, and park staff). The APE falls primarily within Grand Canyon National Park; however, impacts are possible to occur to historic properties on lands adjacent to the Colorado River within the Navajo Nation, and Havasupai and Hualapai Indian reservations. (See Map, Attachment B).

The NPS shall ensure that the following stipulations are carried out:

### 1. IDENTIFICATION AND EVALUATION

Numerous cultural resources located along the Colorado River and its side canyons are subject to visitation and associated impacts by commercial, noncommercial, and administrative boaters in the Grand Canyon. Examples of applicable resources include:

- Prehistoric archaeological sites, features, and isolated artifacts;
- Historic structures, features, and isolated artifacts; and
- Traditional Cultural Properties.

a. To date, the NPS has identified 674 historic properties within the Colorado River corridor and adjacent side canyons that contribute to either the “*Grand Canyon River Corridor District*” or the “*Archaeological Resources of Grand Canyon National Park (Multiple Resources, Partial Inventory: Prehistoric and Historic Archaeological Sites, Historic and Architectural Properties)*” National Register determinations of eligibility. As future archaeological and ethnographical research identifies prehistoric and historic sites and Native American resource locations, these sites or features will be considered as elements within the eligible districts until the Park completes further evaluation pursuant to 36 CFR 800.4.

b. In consultation with the Tribes and based upon specific tribal requests, the NPS shall evaluate properties of religious and cultural significance vulnerable to impacts from visitor use (recreational, research, educational, and administrative) within the recreational use area of the Colorado River. These consultations not only serve to further the goals of NHPA, but also the NPS’s commitments to American Indian tribes as described in the April 29, 1994 Executive Memorandum on Government-to-Government Relations with Native American Tribal Governments; Executive Order 13007; Executive Order 13175; 512 Department of the Interior [DM] 2; NPS Management Policies 2001; and NPS Director’s Order #71: Relationships with Indian Tribes.

c. The NPS is committed to an on-going program of inventory and assessment as part of the overall management of resources at GRCA. To date, slightly over 3% of the land area of the Park has been inventoried. As time and funding allow, additional land will be surveyed and archaeological properties added to the Park archaeological site files. This inventory is a primary component of the Park’s §110 responsibilities under NHPA and constitutes a significant component of the larger cultural resource effort for GRCA.

### 2. REVIEW OF ADMINISTRATIVE ACTIVITIES AFFECTING HISTORIC PROPERTIES

All administrative activities, including research and education, that occur in the Park are subject to review and approval by NPS. The Park conducts or permits a variety of administrative activities along the Colorado River including work being conducted by the Glen Canyon Dam Adaptive Management Program (AMP) that have the potential to affect historic properties. The AMP, along with routine



Park patrols, resource monitoring and trails maintenance, are components of NPS management of human use of the river corridor that have the potential to affect historic properties. In addition to NPS management functions, NPS permits educational and research activities within the Park along the river corridor. Tribal permits are required for research and educational activities that cross onto tribal lands. The NPS, in consultation with the signatories to this agreement, will provide the opportunity to review and comment on the types, scope and frequency of administrative, educational and research activities that may affect National Register eligible properties. The NPS will consider and incorporate signatory comments and concerns, as appropriate and feasible, into all NPS permitted activities that may affect historic properties.

### 3. MONITORING AND TREATMENT PROGRAM

a. Under any recreational and administrative use scenario, it is anticipated that impacts will occur to historic properties along the Colorado River and side canyons accessible from the river. To address these impacts, the NPS will develop and implement monitoring and treatment programs to assess impacts to site condition and integrity from visitor use and to treat sites to avoid, minimize, or mitigate these effects. This plan will be developed and implemented in consultation with all of the signatories and concurring parties to this agreement, as appropriate, and will provide a link to the on-going Glen Canyon Dam monitoring and mitigation program.

Integration of the Glen Canyon Dam § 106 program (GCD) is key to the successful management of historic properties in GRCA. The GCD program routinely monitors approximately 200 historic properties, some of which experience impacts from visitor, educational and administrative use. The NPS will integrate site assessment data from both the GCD program and the CRMP program into a single site assessment approach, so that information from both programs will contribute information for appropriate site management. The NPS ASMIS (Archaeological Sites Management Information System) program will be the repository for site condition information, coupled with the GRCA database for all other site information. For all properties within NPS jurisdiction, the NPS will integrate results from all monitoring programs and use these results in making and implementing mitigation recommendations.

b. The Park will maintain a current record or inventory of monitoring results and remedial actions for historic properties affected by the implementation of the CRMP. This inventory shall include information pertaining to modifications of existing features, replacement of missing or ruined features, stabilization of features or their adjacent landscape, trail enhancement or obliteration, and identification/evaluation of any previously undiscovered features. Documentation shall include written descriptions as well as drawings and photographs, as appropriate. The Park shall prepare a report detailing the NPS's activities and recommendations and shall submit it to all signatories and the concurring parties annually for review and comment. This report will be provided to the GCD program for incorporation into their discourse concerning condition and treatment of historic properties affected by Glen Canyon Dam

c. All work affecting historic properties in the Grand Canyon will be consistent with guidance provided in federal law and NPS policy including:

1. *Secretary of the Interior's Standards for the Treatment of Archaeological and Historic Properties* U.S. Department of the Interior, NPS, 1995.
2. *NPS Management Policies(2001)*
3. *DO- 28, Cultural Resource Management Guidelines*, NPS, 1998
4. *Recommended Approach for Consultation on Recovery of Significant Information from Archaeological Sites*. Advisory Council on Historic Preservation, 1999.

d. Once the signatories have reviewed and agreed upon the monitoring and treatment plan and its process of consultation for implementation, NPS staff will not be required to consult on specific treatment actions. Monitoring and treatment protocols will be prepared as part of the implementation

of the CRMP, and will include baseline monitoring data collection (per NPS ASMIS standards), and treatments such as minor trail work, revegetation, public interpretation, site closure, stabilization of landscape or structures, artifact collection, and nature and extent testing. All site treatments performed under this agreement or the GCD program will be incorporated into management information by the NPS. This information will be provided to the AMP program, as appropriate, to facilitate coordinated approaches to preservation of historic properties along the river corridor.

#### 4. LONG-TERM MANAGEMENT

Long-term management of historic properties will be a component of the implementation of the Colorado River Management Plan. The NPS is charged with preserving the resources “unimpaired” for the enjoyment of present and future generations. To that end, long-term management of cultural resources affected by the implementation of the CRMP will involve a program of *research*, to identify, evaluate, document, register and establish other basic information about cultural resources; *planning*, to ensure that this information is well integrated into management processes for making decisions and setting priorities; and *stewardship*, under which planning decisions are carried out and resources preserved, protected and interpreted to the public (Directors Order 28).

Ongoing inventory and monitoring of cultural resources (and historic properties) is central to a long-term management strategy. They form the core of a research program that provides basic information concerning cultural resources within the areas potentially affected by implementation of the CRMP. This information is used to ensure management of these resources in light of their intrinsic values. Information from all sources, be they internal (e.g. NPS) or external (e.g. AMP) will be integrated into one database for NPS managed resources. Incorporation of this information into the planning process is essential for decision-making, priority-setting, and consulting with the signatories to this agreement and other interested entities. Planning provides an efficient way to gather and synthesize information and present that information in both management and public interpretive contexts. Planning also allows informed decision making relative to final treatment (preservation, rehabilitation, restoration, etc...).

Ultimately, long-term management of cultural resources at Grand Canyon is a stewardship program, whereby research and planning assist in the stewardship of the resources. NPS *Management Policies* requires that “pending planning decisions, all cultural resources will be protected and preserved in their existing conditions.” Preservation is the ultimate goal and the first consideration for any property. “Better to preserve than repair; better to repair than restore; better to restore than [re]construct.” The ultimate long-term management goal for the cultural resources potentially affected by implementation of the CRMP is preservation.

#### 5. REPORTING

By January 31<sup>st</sup> of each year this agreement is in effect, NPS will provide a written report detailing the results of on-going identification and evaluation efforts and monitoring and treatment recommendations and results from activities of the previous year (See Stipulation 3b). These reports will be provided to the signatories and concurring parties to this agreement, subject to confidentiality protocols. NPS will incorporate comments and concerns into long-term management decisions and actions.

#### 6. CONFIDENTIALITY

Confidentiality of the nature and location of archaeological resource information is protected under the provisions of the Archaeological Resources Protection Act (ARPA) and the National Historic Preservation Act (NHPA). To the extent permitted by law, all information gathered through implementation of this agreement will be treated as confidential

## 7. DISPUTE RESOLUTION

a. Should any signatory or concurring party to this agreement object within 30 days to any plans, specifications, or actions proposed pursuant to this agreement, the NPS shall consult with the objecting party to resolve the objection. NPS shall notify SHPO and forward documentation related to the dispute to the Council. If any party involved in the dispute determines that the dispute cannot be resolved, NPS shall forward all documentation relevant to the dispute to the Council. Within 30 days after receipt of all pertinent documentation, the Council will either:

(1) Provide the NPS with recommendations, which the NPS will take into account in reaching a final decision regarding the dispute; or

(2) Notify the NPS that it will comment pursuant to 36 CFR § 800.5(c)(2) with reference to the subject of the dispute.

Any recommendation or comment provided by the Council will be understood to pertain only to the subject of the dispute; the NPS's responsibility to carry out all actions under this agreement that is not the subjects of the dispute shall remain unchanged.

b. At any time during implementation of the measures stipulated in this agreement should an objection to any such measure or its manner of implementation be raised by a member of the public, the NPS shall take the objection into account and consult as needed with the signatories and concurring parties to resolve the objection.

## 8. REVIEW OF THE AGREEMENT

a. The signatories may review activities carried out pursuant to this Programmatic Agreement.

b. NPS anticipates this agreement will be in effect for the life of the Colorado River Management Plan, and any versions that supercede it.

c. Meetings will be held annually among the signatories to review the agreement and the results of the monitoring and remedial actions. The timing and interval of these meetings will be established by the signatories.

## 9. AMENDMENT

Any party to this Programmatic Agreement may request that it be amended, whereupon the parties will consult in accordance with 36 CFR § 800.6 to consider such amendment. Amendments to this agreement could include changes in recommended protocols or reporting timeframes or changes to agreed upon meetings

## 10. TERMINATION

Any signatory to this Programmatic Agreement may terminate its participation in this agreement by providing 30 days written notice to the other parties, provided that the parties will consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. If the entire agreement is terminated, then the NPS will comply with 36 CFR § 800.4 through 800.6 with regard to individual undertakings covered by this Programmatic Agreement.

## 11. FAILURE TO CARRY OUT TERMS

In the event the NPS does not carry out the terms of this Programmatic Agreement, the NPS will comply with 36 CFR § 800.3 through 800.6 with regard to individual undertakings covered by this Programmatic Agreement.