

**Draft Environmental Assessment:
Release of California Condors at the Vermilion Cliffs
(Coconino County, Arizona)**



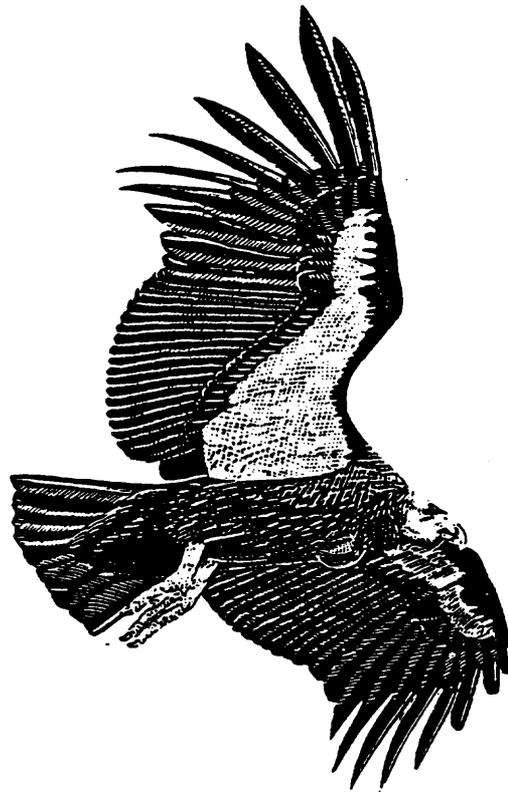
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**Prepared by The Peregrine Fund
for
The U.S. Fish and Wildlife Service
(3 August 1995)**

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Fish and Wildlife Service

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(Other federal and tribal agencies involved in the development of the proposed project are listed in Appendix F.)

ABSTRACT:

The U.S. Fish and Wildlife Service (USFWS) proposes a long-term program to release captive-reared California condors (*Gymnogyps californianus*) at the Vermilion Cliffs, Coconino County, Arizona. The release would occur on the southwestern portion of the Paria Plateau on federal land administered by the Bureau of Land Management (BLM; Arizona Strip District, Vermillion Resource Area). The first release is scheduled for fall/winter of 1995-96 with subsequent releases planned annually. Locations of subsequent releases may occur at other sites on the Vermilion

Cliffs or possibly at other sites in northern Arizona. If other sites are selected, the proposed action will be reviewed under amendments tiered to this document.

The proposed action will be conducted under provisions of Section 10-J of the 1982 amendments to the Endangered Species Act (16 USC 1531-1543; 50 CFR 17). Therefore, the condor population established through this release will be managed as an experimental, non-essential population. This designation permits greater flexibility in the management strategies developed for the condors than would be possible under provisions for a fully protected population. The 10(j) status also assures that all actions undertaken pursuant to the proposed action will be compatible with existing land uses. Terms of cooperation among the participating agencies will be developed through an interagency Memorandum of Understanding. Management provisions for the introduced condor population will proceed by regulation and be published in the Federal Register as required by the 1982 amendments.

The proposed release of California condors at the Vermilion Cliffs is consistent with provisions of the California Condor Recovery Plan (USFWS 1994). The Plan specifies that the minimum criteria for reclassification to threatened is the maintenance of at least two spatially-disjunct, non-captive populations, each reproductively self-sustaining and numbering at least 150 individuals, including at least 15 breeding pairs. The Plan specifically calls for the release of California condors in northern Arizona. The proposed release is also consistent with the wildlife management goals outlined in the BLM's Resource Management Plan for the Arizona Strip District and the Arizona Game and Fish Department's (AGFD) Wildlife 2000 Strategic Plan.

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CHAPTER 1: PURPOSE AND NEED FOR ACTION

A. THE PROPOSED ACTION

The U.S. Fish and Wildlife Service (USFWS) proposes a long-term program to release captive-reared California condors (*Gymnogyps californianus*) in northern Arizona. The release would occur at the Vermilion Cliffs (Coconino County) on the southwestern portion of the Paria Plateau on federal land administered by the Bureau of Land Management (BLM; Arizona Strip District, Vermilion Resource Area). The first release is scheduled for fall/winter of 1995-96 with subsequent releases planned approximately annually. Locations of subsequent releases may be conducted at other sites at the Vermilion Cliffs or elsewhere in northern Arizona. If other sites are selected, the proposed action will be reviewed under amendments tiered to this document.

The proposed release(s) will help achieve the recovery goals for the condor as outlined in the recovery plan for the species (USFWS 1994). The Plan specifically specifies that the minimum criteria for reclassification to threatened are the maintenance of at least two spatially-disjunct, non-captive populations, each reproductively self-sustaining and numbering at least 150 individuals with a minimum of 15 breeding pairs. The Plan specifically calls for the release of California condors in northern Arizona and/or New Mexico.

The release is also consistent with the wildlife management programs for the other cooperating agencies. The Arizona Game and Fish Department's (AGFD) *Wildlife 2000 Strategic Plan* (Public Review Draft, March 1995, page 73) identifies the need to:

(d) develop and implement guidelines for reintroduction, translocation, and reestablishment of nongame and endangered wildlife" and "reestablish populations of extirpated nongame species that are sufficient to warrant delisting or preclude listing because recovery has been affected.

Pursuant to this goal, AGFD developed *Procedures for Nongame Wildlife and Endangered Species Re-establishment Projects*, a 12-step process specifying the protocol for a nongame reintroduction to take place. That process culminates in the preparation of a re-establishment proposal detailing the provisions of the reintroduction plan (AGFD, manuscript in preparation).

The proposed action is also consistent with the mission and wildlife management programs of the BLM. The final *Resource Management Plan and Environmental Impact Statement* for the BLM's Arizona Strip District (BLM 1990: p. II-25) provides the following management guidance:

Restoration of native wildlife into historic range by transplanting is recognized as a highly desirable practice and a central component of the district's wildlife program ... (C)onsistent with requirements of the Endangered Species Act, the district is involved in an active program to benefit endangered species...

The Plan (p. II-16) also provides specific direction pertaining to the California condor:

(T)he district is working with other agencies and the California condor recovery team to evaluate the possibility of establishing this endangered bird into this region.

B. BACKGROUND

The endangered California condor is a member of the Cathartidae (New World vultures), a family of seven species characterized by unfeathered heads, strong hooked beaks, and great soaring abilities. Like other carthartids, condors eat only carrion, and their feet lack the strength for grasping or attacking live prey. An adult condor may weigh as much as 22 pounds and have a wingspan of 9.5 feet.

The California condor ranged over much of the United States until the end of the Pleistocene Epoch (about 11,000 years ago), but then retreated to the Pacific coast region from British Columbia south to northern Baja California, possibly in response to the extinction of the assemblage of large mammals that characterized the Pleistocene (Kiff 1990). Abundant condor remains have been found in various caves in the Grand Canyon, and the species clearly nested there until the late Pleistocene (Emslie 1987). Although no modern specimens were collected in Arizona, there is reason to believe that at least a few individuals of the species persisted in the State into the early 20th century, judging from several sight records summarized by Snyder and Snyder (in press).

Throughout its recorded history (dating back to 1792), the California Condor has been one of the rarest birds in the world, and it was included on the first Federal Endangered Species List (11 March 1967). The condor's historic decline can be attributed entirely to human-induced factors, primarily shooting, although there have been documented losses from several types of poisoning and other factors (Wilbur 1978; Snyder and Snyder 1989). Deaths of condors from natural causes are virtually unknown. The inherently slow reproductive rate of the species, usually resulting in only a single offspring every two years, was insufficient for the unnaturally high rate of mortality experienced by the species during the past two centuries.

Despite increasingly intensive management efforts to arrest the steady decline of condor numbers between the mid-1960s to the mid-1980s, the total world population was reduced to as few as 21 or 22 individuals by 1982 (Snyder and Johnson 1985). At this point plans were approved to initiate a captive breeding program at the San Diego Wild Animal Park and Los Angeles Zoo. Viable condor eggs and several juvenile and adult condors were brought into captivity between 1982 and 1986 to form the nucleus of a captive flock. By 1986, the population of wild condors had declined to only nine individuals, and a decision was made to bring all remaining free-flying condors into captivity, where it was hoped that they could be induced to breed at an accelerated rate in secure captive conditions. The last wild condor was captured on Easter Sunday, 11 March 1987. At this time there were 28 California Condors in existence, and all were housed at the San Diego Wild Animal Park and the Los Angeles Zoo (Kiff 1990).

The first successful captive breeding of California Condors occurred in 1988 at the San Diego Wild Animal Park, and the number of offspring produced by the captive flock has increased annually since then. There are presently 104 California Condors in the world population. Six of these birds are now in the wild within the historic California range. The captive birds are housed at propagation facilities at the San Diego Wild Animal Park, Los Angeles Zoo, and the World Center for Birds of Prey in Boise, Idaho.

During the period from 1988 to 1991, biologists conducted a release experiment in the historic range of the California Condor in Ventura County, California, using juvenile females of the closely related Andean Condor as surrogates to refine release and recapture techniques, identify potential

problems in the release area, train a field team in release methods, and provide answers to various other questions (Wallace and Temple 1987; Wallace 1990). Eventually, 13 Andean Condors were released and recaptured. Only one of the birds died during the course of the release experiment, which was judged to be highly successful. Among other findings, it was shown that the risk of condor losses from the two main factors, shooting and lead poisoning, thought to be responsible for the precipitous decline of the original wild condor population, could be greatly minimized by public education (to reduce the likelihood of shooting incidents) and by providing all of the food (contaminant-free, stillborn dairy calves) used by the birds. The birds' total dependence on supplemental food sites also greatly facilitated their recapture, as necessary.

Owing to the early success of the captive breeding of California Condors and the encouraging results of the Andean Condor release experiment, it was possible to conduct the first release of the former species on 14 January 1992, when two California Condors and two Andean condors were released simultaneously in the Sespe Condor Sanctuary, Ventura County, California. The Andean Condors were recaptured in September 1992, marking the end of the four-year surrogate experiment with that species. One of the two California Condors died from ingesting ethylene glycol (a common ingredient in antifreeze) in October 1992. An additional six California Condors were released in the Sespe area in December 1992, but those birds proved to be behaviorally unsatisfactory because of their tendency to frequent zones of heavy human activity. Eventually, three of them died from collisions with powerlines and the others were recaptured.

Because of the observed tendency for the released condors to be attracted to the vicinity of man-made obstacles, the two subsequent releases have been conducted at Lion Canyon, a remote site in Santa Barbara County, California. Of these additional birds, a group of five released in December 1993 also proved to be irresistibly attracted to areas of human activity, and one of them died from a powerline collision. The others were recaptured, because they could not be discouraged from frequenting the same areas where the other bird was killed. In contrast, six more condors released in February 1995 were subjected to aversion training designed to discourage their use of power poles as perches and to make them more wary of humans prior to their release. Their behavior has so far been more like that of the original condors in regard to their response to humans and human features in the environment. Recently (20 May 1995), all six birds fed on a dead sheep near their original release site, the first instance of released condors feeding on a food item not provided by condor field biologists.

At this point, the captive breeding program is becoming increasingly routine and an ever larger number of releasable birds is expected to be produced in the next few years. The behavioral problems encountered with the earliest California Condors are apparently being solved, based on the results of the most recent release. Therefore, the USFWS intends to release California Condors on at least an annual basis and at multiple sites until the recovery goals for the species have been met.

The primary recovery objective for the California Condor, according to the California Condor Recovery Plan, is reclassification to threatened status. The minimum criterion for reclassification is the maintenance of at least two non-captive populations and one captive population. These populations (1) must each number at least 150 individuals, (2) must each contain at least 15 breeding pairs and (3) be reproductively self-sustaining and have a positive rate of population growth. In addition, the non-captive population (4) must be spatially disjunct and non-interacting, and (5) must contain individuals descended from each of the 14 founders of the captive flock.

Pursuant to the population goals listed above, The Recovery Plan specifies that releases of California Condors should be undertaken outside of California, specifically in northern Arizona and New Mexico. The USFWS began investigating potential condor release sites in these states in the late 1980s. Early reconnaissance identified the Vermilion Cliffs in northern Arizona as one of the most promising potential release sites. The rugged terrain, remoteness and abundance of caves and potholes for nesting appeared suitable for a successful release. The cliffs were inspected from the air by Condor Recovery Team members and agency personnel in 1991 and 1995 and from the ground in 1994. A second ground visit to the site in spring 1995 by Team members and other condor biologists confirmed that the Vermilion Cliffs would provide a suitable setting for the initial release in northern Arizona.

C. PURPOSE OF THE PROPOSED ACTION

The overall goal of the proposed action is to achieve the recovery of the California condor. The specific goal is to attain a condor population size sufficient to reclassify the species as *threatened*. The framework for accomplishing this goal is provided in the Recovery Plan for the California condor (USFWS 1994), hereafter referred to as the Plan.

D. NEED FOR THE PROPOSED ACTION

The criteria for reclassification of the California condor to threatened status (p 3) were formulated to be consistent with the species' reproductive biology and the genetics of small populations. DNA fingerprinting has shown that the current condor population is descended from 14 individual founders, representing three genetic groups or "clans." Additional loss of genetic variation is expected until the total population reaches 200 to 300 individuals. The requirement that the two wild populations be spatially disjunct and non-interacting is intended to minimize the chance of a single catastrophic episode eliminating all birds in the wild. The vulnerability of the species to disease or other factors is lessened significantly by maintaining multiple populations.

In accordance with item (4) above, the Condor Recovery Team recommended in 1991 that California releases be conducted in northern Arizona. USFWS then initiated a review of potential release sites and identified for further review the alternative sites discussed herein (Chapter 2).

As of April 1995, 19 captive-reared California Condors have been released to the wild in four separate releases in California. Of those 19 birds, five died and eight were recaptured and relocated to captive breeding facilities, leaving six condors remaining in the wild. There have been no releases (or movements of released birds) outside of California.

E. DECISIONS NEEDED

1. U.S. Fish and Wildlife Service (USFWS): USFWS must determine whether or not California condors will be released in northern Arizona at this time and, if so, whether or not the Vermilion Cliffs/Paria Plateau site meets all of the criteria for a successful reintroduction.
2. Arizona Game and Fish Department (AGFD): The Department must determine whether or not the proposed release of captive-reared California condors meets the established criteria for re-

establishment of an endangered species. Procedures for this action are prescribed in the document *Procedures for Nongame Wildlife and Endangered Species Re-establishment Projects in Arizona* (AGFD 1987).

3. Bureau of Land Management (BLM): The decision to be made by the BLM is whether or not to make land use authorizations needed for activities (for example, erection of temporary structures, supplemental feeding) to support the release of California condors on BLM land in the Vermilion Cliffs/Paria Plateau area. The 1990 Final Resource Management Plan and Environmental Impact Statement for the BLM's Arizona Strip District is the principle guiding document in making this determination.

Terms of cooperation among these and other agencies to be involved in the proposed action are being developed through an interagency Memorandum of Understanding (MOU). This MOU defines the agency roles and responsibilities including such activities as public information and media contact points. Rules developed for the proposed 10(j) reintroduction will be published in the Federal Register.

F. SCOPING THE ISSUES AND CONCERNS

The USFWS, in cooperation with the AGFD, the BLM and the other participating agencies, has made a concerted effort to inform the public of the proposed action, to solicit input from all interested parties, and to adequately address their concerns. Pursuant to this effort, the USFWS actively solicited input from the general public, local communities, the scientific community, representatives of Indian tribes with lands near potential release sites, public land users, private landowners in the release area, and other state and federal agencies. The primary means of scoping were public meetings, direct contacts, and scoping letters sent to those individuals/entities with an expressed interest in the proposed action. A complete schedule of the public meetings, agency contacts, and other coordination efforts is provided in Appendix G.

G. ISSUES AND CONCERNS

The following issues and concerns were identified based on a preliminary analysis of responses received during the scoping process described above. These issues will be addressed in greater detail in Chapter 4, as they pertain to the preferred alternative.

1. Effect of condor releases and associated activities on existing land uses and human activities:
 - a. Livestock grazing
 - b. Sport hunting and other recreational activities
 - c. Wildlife management (effects on management of other wildlife species)
2. Effect of the release on listed or special status species (state or federal candidate, threatened or endangered species; Forest Service sensitive species)
3. Effects on cultural resources

CHAPTER 2. ALTERNATIVES

A. IDENTIFICATION OF THE ALTERNATIVES

The National Environmental Policy Act (NEPA) requires that all reasonable alternatives for a proposed action be rigorously explored and objectively evaluated. The alternatives described below were identified jointly by the USFWS, members of the Condor Recovery Team (CRT; Appendix E), a scientific advisory body to the USFWS, and by representatives of The Peregrine Fund (TPF), a non-profit, non-governmental organization with expertise in the propagation and release of captive-reared raptors. Ongoing dialogue with the various state, federal and tribal agencies in northern Arizona (Appendix F) helped to identify and refine these alternatives.

Potential release sites were evaluated through aerial reconnaissance, site visits, and discussions with agency personnel familiar with the sites. The Condor Release Site Evaluation system developed by the CRT (Appendix B) was used to assess the suitability of the preferred alternative for condor release.

B. ALTERNATIVES CONSIDERED

Five alternatives received serious consideration for the proposed project. Four of these alternatives represented possible release sites in northern Arizona (Figure 1); the fifth is a "no action" alternative that would prescribe no release of California condors in northern Arizona at this time.

Alternative 1. Release of California condors at Echo Cliffs, Navajo Indian Reservation (Coconino County, Arizona)

The Echo Cliffs are an extensive cliff system running north-south through the western portion of the Navajo Reservation in northeastern Arizona. The cliffs were surveyed from the air (dates: 20 August 1991 and 9 May 1995) by CRT members and agency biologists to determine their suitability for condor releases. Although the height, structure and exposure of the cliffs are acceptable, the evaluation team felt that Echo Cliffs were not ideal for early releases. The major disadvantage of Echo Cliffs is the extensive network of high tension power lines which bisects the cliffs at the "Gap," (approximately 26 miles south of the intersection of Highways 89 and 89A). Another extensive system of high tension power lines originates at the power generating facility at Glen Canyon Dam, approximately 6 miles from the northern reach of Echo Cliffs. Electrocution from collisions with power lines has been a major source of mortality for several young condors released in California, and the evaluation team felt that the power lines on Echo Cliffs constituted a high mortality risk. Aversive conditioning to power poles is now a standard pre-release procedure for captive-bred condors being held for release. As these techniques are perfected and their efficacy verified, Echo Cliffs may receive additional consideration as a viable release site option.

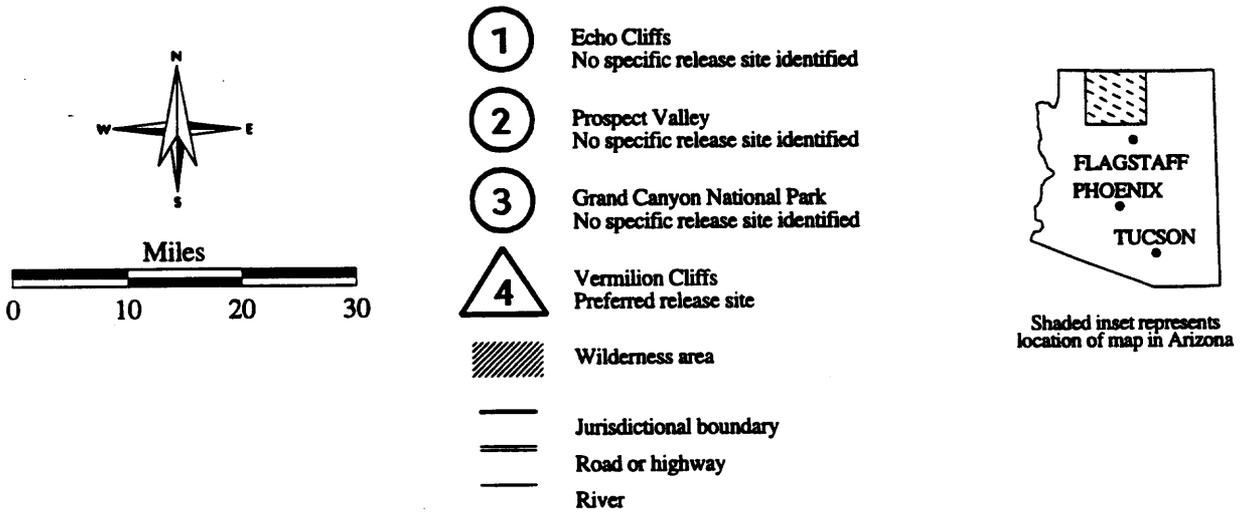
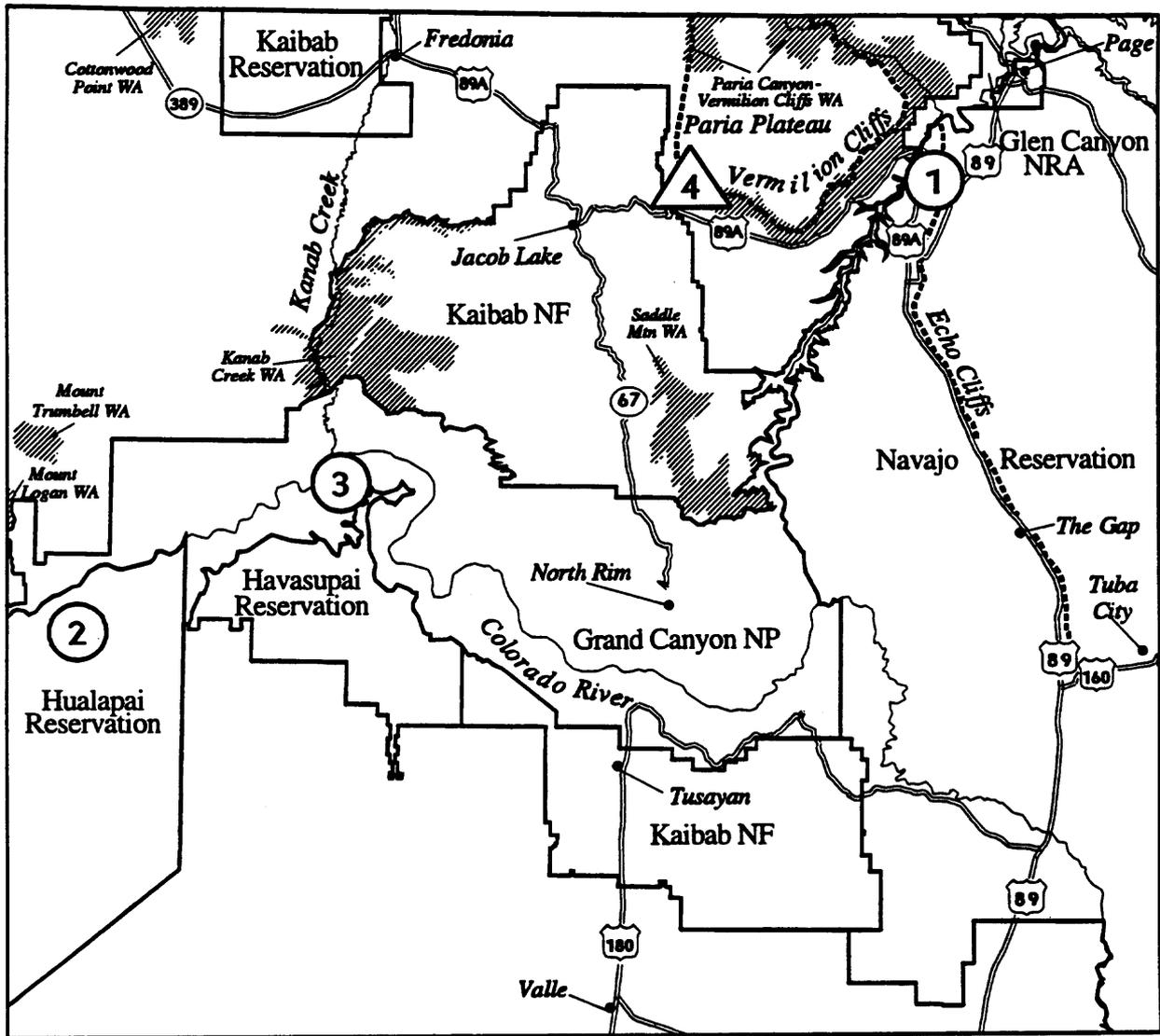


Figure 1: Alternative Sites for the Release of California Condors in Northern Arizona

Alternative 2. Release of California condors in Prospect Valley (Hualapai Indian Reservation, Coconino County, Arizona)

The Hualapai Indian Reservation lies in the western portion of Coconino County, south of Grand Canyon National Park. Prospect Valley runs north-south through the central part of the reservation, terminating on the north at the confluence with the Colorado River. It is bordered on the east side by Aubrey Cliffs, the best potential location for a condor release in this area. Prospect Valley was inspected from the air by Recovery Team members and agency personnel on 20 August 1991 (Appendix G). The USFWS has also maintained an ongoing dialogue with tribal biologists to further assess the potential of the site for condor releases.

The physiognomy (height, exposure, availability of roosts) of the cliff system appears suitable for a condor release site. Elk (*Cervus elaphus*), desert bighorns (*Ovis canadensis*), mule deer (*Odocoileus hemionus*) and approximately 300-400 feral burros (*Equus asinus*) occur in and around Prospect Valley, providing a source of carrion for condors (C. Bravo, pers. comm.). However, the logistical difficulties, owing to the remoteness of the cliffs, would be a major disadvantage. Radiotracking, recovery of sick or injured birds, carcass storage and carcass delivery would be problematic at this release site. The evaluation team felt that Prospect Valley might be considered for future releases, but that it was not ideal for the initial release.

Alternative 3: Release of California condors in Grand Canyon National Park, Arizona

The prospect of reestablishing California condors within Grand Canyon National Park is among the most compelling reasons for undertaking a release in northern Arizona. Abundant condor remains have been found in various caves in the Grand Canyon, and the species clearly nested there in the late Pleistocene. Aerial reconnaissance of the Grand Canyon was conducted in September 1990 and August 1991 (Appendix G). CRT members and other condor biologists believe that a successful release in northern Arizona will eventually lead to re-occupation of the Grand Canyon by condors. The National Park Service (NPS) is receptive to the concept of condors repopulating the Park (J. Ray, pers. comm.). However, the inaccessibility of much of the canyon argues against a release within the National Park itself. Monitoring, feeding and emergency care of the birds would be logistically difficult in the Park. Restrictions on the types of structures or activities permitted in national parks might also conflict with the release operation. For example, airspace restrictions (aircraft confined to certain flight corridors and limited to flying above the average elevation of the north and south rims) would hinder the ability of field personnel to locate missing birds by aerial telemetry.

Alternative 4: Release of California condors at the Vermilion Cliffs, BLM Arizona Strip District (Coconino County)

After careful consideration of all four potential release sites in northern Arizona, the USFWS selected the Vermilion Cliffs as the preferred alternative. Aerial reconnaissance of the Vermilion Cliffs by members of the CRT and other project cooperators was conducted in August 1991 and May 1995; and preliminary ground reconnaissance was conducted on 15-16 February 1994 (Appendix G). On 9 May 1995, the USFWS's Region 1 Condor Program Coordinator, the CRT

Leader and representatives from other cooperating agencies visited the Vermilion Cliffs to select the best site for the release. They verified the suitability of the Cliffs and identified an area near the northwestern corner of the wilderness boundary as the optimal location for condor releases. The release site is indicated on Figure 2.

Advantages of the the Vermilion Cliffs alternative include:

- 1) Cliff physiognomy (height, conformation and exposure) at the proposed release site is ideal, providing a suitable location and substrate for erection of the release pen, abundant perches for roosts and natural feeding platforms, and small pinnacles and rock outcrops for early post-fledging flights. Prevailing wind direction and speed are also ideal (p. 28).
- 2) An extensive network of unmaintained, four-wheel drive roads on the Paria Plateau above the cliffs provides access for field crews to feed and monitor the birds. The primitive nature of the roads discourages human ingress to the site. To the south, Highway 89A parallels the cliff system, providing a convenient route for direct observation and radio-telemetry of condors.
- 3) Carcass availability is greater than at the alternative sites, owing to the proximity of the release site to the Kaibab Plateau and deer winter ranges along the western edge of House Rock Valley.
- 4) Land management and human uses near the release site are compatible with condor release. Land ownership at and near the release site is predominantly federal, ensuring long-term tenure and relative stability in management emphasis. The release site is well-removed from power lines and other features which might be sources of mortality. Human activity near the release site is minimal. No land use conflicts are anticipated at the release site.
- 5) A designated BLM administrative site on the Paria Plateau may provide a suitable location for a base station to conduct field operations.

A detailed evaluation of the Vermilion Cliffs release site, using the CRT's Site Evaluation Criteria, is provided in Appendix B. Site characteristics which directly influence the probability of a successful introduction at Vermilion Cliffs are discussed in greater detail in Chapter 4 (pp. 27-29).

Table 1: Comparison of the four alternative release sites for California condors in northern Arizona.

	Alternative 1: Echo Cliffs	Alternative 2: Prospect V.	Alternative 3: GCNP	Alternative 4: Vermilion Cliffs
Cliff structure	good at north end	good	good	excellent
Logistical constraints	minor	major	major	none
Power lines	major corridor	no major corridors	no major corridors	no major corridors
Land use conflicts	minor	minor	high human use in some areas	minor
Carriion availability	low	acceptable	low in most areas	acceptable

Alternative 5: No Action Alternative

The no-action (or status quo) alternative would preclude the release of California condors in northern Arizona at this time. This alternative is not consistent with the Plan's goal to establish a second wild condor population outside of California, nor would it achieve the overall goal of downlisting the condor. If this alternative is approved, the USFWS could proceed with consideration of condor releases in other states or could defer releases pending identification and review of other sites in Arizona.

A comparison of the four alternative release sites, according to site suitability, logistics and potential conflicts, is provided in Table 1. After consideration of all of the alternatives, the USFWS eliminated Alternatives 1 through 3 from further consideration. Alternatives 4 and 5 (Vermilion Cliffs release and No Action) were retained for detailed analyses.

CHAPTER 3: AFFECTED ENVIRONMENT

This chapter reviews the environmental resources and human uses that could be affected by the preferred alternative, release of California condors at the Vermilion Cliffs. For purposes of this section, the project area is not rigorously delineated. This allows for a more realistic treatment of how the proposed action would affect environmental resources. That is, the scale of the treatment is adjusted to reflect the potential for impacts on a particular resource. For example, the discussions of sensitive plants and cultural resources focus on those resources found in the immediate area of the release since that is the area most susceptible to direct physical impacts. The discussion of ungulate populations covers a much broader area (all of House Rock Valley and the North Kaibab) in accordance with what is biologically meaningful for the wide-ranging condor.

A. CALIFORNIA CONDOR

The endangered California condor is a member of the Cathartidae (New World vultures), a family of seven species characterized by unfeathered heads, strong hooked beaks, and great soaring abilities. Like other carthartids, condors eat only carrion, and their feet lack the strength for grasping or attacking live prey. An adult condor may weigh as much as 22 pounds and have a wingspan of 9.5 feet.

Throughout its recorded history (dating back to 1792), the California Condor has been one of the rarest birds in the world, and it was included on the first Federal Endangered Species List (11 March 1967). The condor's historic decline can be attributed entirely to human-induced factors, primarily shooting, although there have been documented losses from several types of poisoning and other factors. Deaths of condors from natural causes are virtually unknown. The inherently slow reproductive rate of the species, usually resulting in only a single offspring every two years, was insufficient for the unnaturally high rate of mortality experienced by the species during the past two centuries.

Despite increasingly intensive management efforts to arrest the steady decline of condor numbers between the mid-1960s to the mid-1980s, the total world population was reduced to as few as 21 or 22 individuals by 1982. At this point plans were approved to begin a captive breeding program and by 1987, all living condors were held in captive breeding facilities in two locations in California. The captive breeding program has been highly successful, producing over 100 California Condors since its inception. As of April 1995, 19 of these captive-reared birds had been released to the wild in four separate releases in California. Of those 19 birds, five died and eight were recaptured and relocated to captive breeding facilities, leaving six condors remaining in the wild. There have been no releases (or movements of released birds) outside of California.

B. LISTED, PROPOSED, AND SPECIAL STATUS SPECIES

1. Introduction

This section discusses those species whose ranges (current or historic) are known to encompass the general area of the release, and which are protected under one or more of the following programs:

- 1) Federally listed by the USFWS pursuant to the Endangered Species Act of 1973 (ESA) according to one of the following designations:
 - a. Endangered: Species which are in imminent jeopardy of becoming extinct in all or a significant portion of its range
 - b. Threatened: Species which are in imminent jeopardy of becoming endangered in all or a significant portion of its range
 - c. Category 1 Candidate (C1): Species determined to be appropriate for listing but precluded due to other listing priorities
 - d. Category 2 Candidate (C2): Species being considered for listing as threatened or endangered pending additional information

- 2) State listed (endangered, threatened or candidate) in the AGFD's Threatened Native Wildlife (TNW) in Arizona (1988):
 - a. Endangered: Taxa extirpated from Arizona since the mid-1800s and/or for which extinction or extirpation is highly probable without conservation efforts
 - b. Threatened: Those taxa whose continued presence in Arizona could be in jeopardy in the near future; serious threats have been identified and populations are lower than they were historically or extremely local or small
 - c. Candidate: Those taxa for which threats are known or suspected but for which substantial population declines from historical levels have not been documented

- 3) U.S. Forest Service (USFS) designation as a sensitive species on national forests in northern Arizona (USFS, Region 3)

The following sources were consulted to develop an inclusive species list for the release area (Appendix D) and to identify special status species which might be present in the general area of the proposed release:

- House Rock Management Plan (Darr 1995: draft)
- AGFD Heritage Data Management System (N. Olson, pers. comm.; query completed in June 1995). The query examined data for three areas: 1) within 2-miles of the release site, 2) the Paria Canyon-Vermilion Cliffs Wilderness Area and 3) all of the Paria Plateau, the Wilderness Area and House Rock Valley.
- Species lists for Grand Canyon National Park
- Consultation with BLM plant ecologist (L. Hughes, pers. comm.)
- Final Wilderness Management Plan: Paria Canyon-Vermilion Cliffs, Arizona-Utah (BLM 1986)
- Paria-Kanab Creek Habitat Management Plan (BLM and AGFD 1983)

In aggregate, the species lists cited above cover a vast area of northern Arizona. Incorporation of these lists into this Environmental Assessment is intended to provide an inclusive overview of the flora and fauna known to occur regionally. The inclusion of a species does not necessarily indicate that it occurs in the habitats or in the immediate vicinity of the proposed release site.

2. Special Status Animals

a. Mammals

Houserock Valley Chisel-toothed Kangaroo Rat (*Dipodomys microps leucotis*)

This subspecies is known only from House Rock Valley. It is a C2 candidate for federal listing and a state candidate for listing in Arizona. The BLM and the AGFD Heritage Fund initiated a study in 1994 to gain more information on the ecology and distribution of this subspecies (M. O'Farrell 1995: Distribution of the House Rock Valley Chisel-toothed Kangaroo Rat). Trapping studies indicated that the subspecies' range in House Rock Valley extends to within 8 miles of the proposed release site, but it is not known to occur on the Paria Plateau (M. O'Farrell pers. comm.). Although the Paria Plateau has not been inventoried for the presence of this kangaroo rat, the subspecies' preferred habitat does not exist on the Paria Plateau and it has not been documented in the types of soils or mixed shrub communities found on the plateau (M. O'Farrell, pers. comm.). The Vermilion Cliffs also constitute a geographical barrier to range expansion by this subspecies.

Coconino (Navajo) Arizona pocket mouse (*Perognathus amplus ammodytes*)

This subspecies is a C2 candidate for federal listing and is classified as sensitive by the USFS. The AGFD Heritage Data System includes no records of this subspecies for the Paria Canyon-Vermilion Cliffs Wilderness or within two miles of the release site. However, records did exist when the query was expanded to encompass House Rock Valley and the Paria Plateau.

Spotted Bat (*Euderma maculatum*)

The spotted bat is listed as a C2 candidate for federal listing, a state candidate species and a USFS sensitive species. This species uses riparian areas for foraging and roosting and is associated with caverns and rock crevices surrounding House Rock Valley. It may also occur in the Paria Canyon. The AGFD Heritage Data System includes no records of this species for the Paria Canyon-Vermilion Cliffs Wilderness or within two miles of the release site. Spotted bats were documented at Lee's Ferry (on the Colorado River approximately 25 miles east of the release site) in June 1995 (M. O'Farrell, pers. comm.) and were also found on the North Kaibab Ranger District during 1995 trapping investigations (J. Petterson, pers. comm.).

b. Birds

Bald Eagle (*Haliaeetus leucocephalus*):

The bald eagle was downlisted from federally endangered to threatened on 12 July 1995 [CFR 60(133):36000-36010], except within a small area along the Arizona/California border which does not include the project area. The species is also listed as state endangered in Arizona and as a sensitive species by the USFS. Bald eagles migrate through the House Rock Valley. They have been documented using riparian habitats along the Colorado River and on the Kaibab Plateau. They have also been observed in the Paria Canyon-Vermilion Cliffs Wilderness Area during winter and, rarely, in summer, but are believed to be only transient there (BLM 1986).

Ferruginous Hawk (*Buteo regalis*):

The ferruginous hawk is classified as a federal candidate species, a state threatened species and a USFS sensitive species. It is known to occur in the Grand Canyon and may nest in open habitats in the House Rock Valley. The AGFD Heritage Data System includes no records of this species for the Paria Canyon-Vermilion Cliffs Wilderness or within two miles of the release site.

Mexican Spotted Owl (*Strix occidentalis lucida*)

This subspecies is listed as threatened (federal and state) and as sensitive by the USFS. They have been found nesting on sandstone cliffs in Zion National Park in southern Utah. The higher elevation habitats of the Kaibab National Forest and Grand Canyon National Park (near House Rock Valley) may provide suitable spotted owl nesting habitat. Although recent inventories ("hooting surveys") have failed to document nesting owls in these areas, reliable records of spotted owls exist for the North Kaibab area and south rim of the Grand Canyon (J. Goodwin, pers. comm.; J. Petterson, pers. comm.). They may also use lower elevation pinyon-juniper habitats in House Rock Valley in the winter. The Paria Canyon-Vermilion Cliffs Wilderness Management Plan notes that "localized conditions such as occur at Wrather Canyon may provide suitable habitat for the spotted owl..." The AGFD Heritage Data System revealed no records of this subspecies in the Paria Canyon-Vermilion Wilderness or within two miles of the release site.

Northern Goshawk (*Accipiter gentilis*)

The goshawk is listed as a federal (C2) candidate species, a state candidate species and as a sensitive species by the USFS. Nesting habitat is found on the USFS and NPS lands near House Rock Valley. The goshawk is also found at lower elevations in House Rock Valley (pinyon-juniper and ponderosa pine habitats) during the winter. The AGFD Heritage Data System indicated that records of this species exist for the Paria Canyon/Vermilion Cliffs/House Rock Valley area, but there were no records within two miles of the release site.

Peregrine Falcon (*Falco peregrinus*)

The peregrine is listed as an endangered species federally, as a state candidate species in Arizona and as a sensitive species by the USFS. On 30 June 1995, the USFWS released a notice of intent to delist the peregrine [CFR 60(126): 34406-34409]; further action is pending, following closure of the public comment period. Peregrines nest in Paria Canyon, Vermilion Cliffs, Marble Canyon, and in Grand Canyon National Park. Up to six occupied territories have been identified on the Vermilion Cliffs in a single year (M. Small, pers. comm.). The closest known eyrie to the proposed release site is approximately 1.4 miles distant (R. Christofferson, pers. comm.).

Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

This flycatcher is listed as endangered both federally and by the state of Arizona. The subspecies may occur in riparian areas in the Grand Canyon. The southwestern willow flycatcher may also

occur in Paria Canyon but its presence has been questioned, based on limited riparian habitat and known distribution (L. Riley, AGFD, 10/17/90 correspondence). The AGFD Heritage Data System includes no records of this subspecies for the Paria Canyon-Vermilion Cliffs Wilderness or within two miles of the release site.

c. Amphibians

Northern Leopard Frog (*Rana pipiens*)

This frog is listed as a state candidate and USFS sensitive species. It is known to occur in aquatic habitats on the Kaibab National Forest and in Grand Canyon National Park and may occur in riparian areas in the House Rock Valley. Habitat for the leopard frog may also exist in the Paria Canyon, in association with spring areas tributary to the river (L. Riley, AGFD, 10/17/90 correspondence). The AGFD Heritage Data System includes no records of this species for the Paria Canyon-Vermilion Cliffs Wilderness or within two miles of the release site.

d. Fish

Razorback sucker (*Xyrauchen texanus*)

The razorback sucker was federally listed as an endangered species in 1991. It is also state listed as endangered and is a USFS sensitive species. It may occur incidentally in the Paria River. A specimen was last collected in the Paria River in 1978, 100 meters upstream from the confluence with the Colorado River.

Flannelmouth sucker (*Catostomus latipinnis*)

This species is a Candidate 2 species for federal listing. It is known from the Colorado River in Grand Canyon National Park and also occurs in the Paria River. The AGFD Heritage Data System includes no records of this species in the Paria Canyon-Vermilion Cliffs Wilderness or within two miles of the release site.

Humpback chub (*Gila cypha*)

The humpback chub is federally and state listed as endangered and is designated as sensitive by the USFS. It is found in the Colorado River within Grand Canyon National Park. A single record of this species exists from the Paria River in 1969. Subsequent efforts failed to document additional representatives.

e. Invertebrates

Kanab Ambersnail (*Oxyloma haydeni kanabensis*)

This federally endangered subspecies is known from only three locations on USFS and NPS lands near Kanab Creek west of the Kaibab Plateau. The AGFD Heritage Data System included no records of this subspecies in the Paria Canyon-Vermilion Cliffs Wilderness or within two miles of the release site.

3. Special Status Plants

The BLM reports that four special status plants occur in the general area of the proposed release (L. Hughes, pers. comm.):

- Brady pincushion cactus (*Pediocactus bradyi*): federal endangered, USFS sensitive, highly-safeguarded as defined by the Arizona Native Plant Law (ANPL)
- Welsh's milkweed (*Asclepias welshii*): federal threatened, protected by the ANPL
- Fickeisen plains cactus (*Pediocactus peeblesianus* var. *fickeiseniae*): federal C1, USFS sensitive, highly-safeguarded as defined by the ANPL
- Kaibab plains cactus (*Pediocactus paradinei*): federal C1, USFS sensitive, protected by ANPL

The AGFD Heritage Data System includes no records for these four species (or any other special status plants) within two miles of the proposed release site. However, the Brady pincushion cactus is known to occur in the Paria Canyon-Vermilion Cliffs Wilderness and in House Rock Valley. The Fickeisen plains cactus occurs in House Rock Valley (M. Small, pers. comm.).

The AGFD query indicated that records existed for four additional special status species in the Paria Canyon-Vermilion Cliffs Wilderness:

- Desert Valley fishhook cactus (*Sclerocactus spinosior*): salvage restricted by the ANPL
- Glen Canyon cactus (*Sclerocactus parviflorus*): salvage restricted by ANPL
- Navajo bridge cactus (*Opuntia nicholii*): salvage restricted by ANPL
- Roaring Springs prickly-poppy (*Argemone arizonica*): state candidate, USFS sensitive

The query revealed that records existed for one additional special status plant species within a larger encompassing House Rock Valley and the Paria Plateau:

- Yellow beavertail (*Opuntia basilaris aurea*): salvage restricted by ANPL

Vegetation surveys were conducted by the BLM in April 1995 on the Paria Plateau above Four Rock Springs and House Rock Springs, approximately 1.0 miles from the proposed release site (L. Hughes, pers. comm.). The species recorded in these surveys are believed to accurately represent the vegetation at the release site. No rare, endangered or special status plants were documented near the release site during the 1995 or earlier surveys. The release site and the area immediately surrounding the site, were not found to be suitable habitat for any special status plants. The

closest special status plant to the release area is the Kaibab plains cactus, but this species was not found in the area and the habitat was not deemed suitable.

Approximately 58 species of federally listed plant species have been documented in Grand Canyon National Park (AGFD Heritage Data Management System, Phoenix). These species are not discussed herein because they do not occur in the immediate vicinity of the proposed project and are not likely to be disturbed by any activities associated with the project.

C. UNGULATE POPULATIONS

None of the ungulate species present in the release area are special status species. However, because ungulate carrion is an important component of the condor's diet, these species are discussed in some detail below.

Ungulate densities in the immediate vicinity of the proposed release (Paria Plateau and House Rock Valley) are generally low (B. Lemmons, pers. comm.; F. Phillips, pers. comm.). However, mule deer occur in significant numbers near the proposed release site, and three other ungulate species (bighorn sheep, pronghorn antelope and bison) occur in lower densities. Numbers of domestic livestock in the release area are discussed in part E-2 (pp. 24-25) below.

1. Desert bighorn sheep (*Ovis canadensis nelsoni*)

Thirty-seven bighorn sheep were introduced to the Paria Canyon to two locations in the Paria Canyon in July 1984. An additional 15 bighorns were released the following year. This reintroduction has resulted in the fastest growth of any bighorn introduction in the state of Arizona. The current population estimate (fall 1994 survey) is approximately 160 sheep (F. Phillips, pers. comm.). Since 1986, five water developments (catchments) have been constructed on the Paria Plateau to benefit the bighorns (B. Lemmons, pers. comm.; M. Small, pers. comm.). AGFD awards a limited number of bighorn sheep hunting permits annually. In 1994, four permits were awarded for the October hunt with a total of 20 hunter days spent in the field.

Another bighorn sheep herd is found on the west side of the Kaibab Plateau (near the Mohave/Coconino County line). The population estimate for this herd is 224 sheep. Bighorns are also found within Grand Canyon National Park.

2. Mule Deer (*Odocoileus hemionus*)

A small resident deer population is found on and to the west of the Paria Plateau. Resident deer are observed during the annual bighorn sheep survey on the Paria Plateau and Vermilion Cliffs. Traditionally, there is limited hunting pressure on this resident herd. Hunting activity on the Paria Plateau near the proposed release site is light (M. Small, pers. comm.; F. Phillips, pers. comm.).

To the west of the proposed release site is the Kaibab Plateau, home to a much larger deer herd. The range of the Kaibab deer herd is divided into two hunting units: 12A and 12B. Unit 12A includes the Kaibab Plateau (including all of the Kaibab National Forest north of Grand Canyon National Park). Unit 12B includes the Paria Plateau, the Vermilion Cliffs, the area north of the Kaibab National Forest to the state boundary (including Buckskin Mountain) and a western

segment between the Kaibab National Forest and the town of Fredonia. Mule deer population estimates for Unit 12A (pre-hunt adults; corrected survey counts) over the last 12 years ranged from 9150 animals in 1983 to 18,228 in 1986 (F. Phillips, pers. comm.). The 1995 estimate was 9476 animals. Modeling based on pellet count surveys yielded an estimate of 12,025 for 1994. The Kaibab population has not yet recovered from severe drought conditions in 1988-90, as reflected by the declining fawn survival since that time (mean fawn survival for 1989-1994=61.3% versus mean fawn survival for 1979-88= 74.3%). The AGFD issued 2100 permits for Unit 12A in 1994 (4 separate hunts, 9 days each) with 769 deer killed. In 1995, 1600 permits will be awarded. Some illegal harvest of deer also occurs in Unit 12A, especially near the Fredonia and Kanab areas (M. Small, pers. comm.).

Seasonal movements and mortality estimates for the Kaibab deer herd are important as a potential index of carcass availability for condors. Annual mortality of radioed mule deer ranged from 18-20% (Phillips, pers. comm.). For population modeling, AGFD has used 15-30% winter mortality for this herd, depending on drought conditions and winter severity (Phillips, pers. comm.). Some mule deer are killed on Highway 89A between House Rock and Jacob Lake and on Highway 67 south from Jacob Lake to the north rim of the Grand Canyon. Another segment of highway with high numbers of roadkills is Highway 89 east of Kanab, Utah. Over 20 deer were killed in a single night on this stretch of highway during the return migration from winter range near the Buckskin Mountains (north of the Kaibab Plateau) to summer ranges in Utah. (F. Coles, pers. comm.). The Utah Division of Wildlife Resources recently initiated a study of mule deer mortality along this portion of highway.

Herd movements have been determined using radio-telemetry and aerial surveys. Deer summering on the Kaibab Plateau disperse to winter ranges around the plateau, with approximately 65% wintering to the west, 25% east (toward House Rock Valley) and 10% to the north (the Buckskins; F. Phillips, pers. comm.). On the northern winter range, deer from the Kaibab herd intermingle with deer migrating south from Utah. The Utah portion of this winter herd move to summer ranges as far north as Bryce Canyon, Utah (F. Coles, pers. comm.). Separate population estimates for these different winter segments are not available, but may inferred from the total population figures given above.

Fewer number of deer are found in Unit 12B. Population modeling for the period 1986-1995 yielded a mean of 2,337 deer for this unit. Two separate hunts are conducted annually in Unit 12B (Oct. 27-Nov. 5 and Nov 10-19) with a total of 600 permits awarded in 1994 (260 deer killed) and 500 permits allotted for 1995. A number of the deer taken during the hunting season in Unit 12B are killed in the area between the Kaibab National Forest and the Utah state line as they move to lower elevation winter ranges from summer range in southern Utah (M. Small, pers. comm.).

3. Bison (*Bison bison*)

The House Rock Wildlife Area (formerly known as the House Rock Buffalo Ranch) is situated on USFS land at the south end of House Rock Valley. It is managed by the AGFD under a Memorandum of Understanding between the two agencies. The 65,000-acre ranch has been designated as a Wildlife Viewing Area by the state. A herd of bison was introduced to the area in 1905 as a private venture. The State of Arizona assumed management of the herd in 1927. The herd now numbers approximately 130 animals (pre-hunt, including calves). The AGFD's population goal is to maintain a post-hunt population of 90 adult animals. Four separate hunts are

conducted from late-September to mid-November. A total of 62 permits are allocated for 1995. The herd generally remains in the southern portion of House Rock Valley. Incidental mortality in the ranch's bison herd may provide an additional source of carcasses for supplemental feeding of California condors (V. Supplee, pers. comm).

4. Pronghorn (*Antilocapra americana*)

The House Rock pronghorn population was estimated at 112 animals in fall 1994. The AGFD maintains a hunting season with 5 archery hunters awarded permits in late August/early September and a four-day rifle hunt (10 hunters) in late September/early October. Hunting success for the rifle hunters is typically very high, often 100%. Individuals from the House Rock herd range as far north as the northwestern end of the Vermilion Cliffs (along the House Rock road) but the primary range lies within the main part of House Rock Valley south of Vermilion Cliffs (F. Phillips, pers. comm.).

D. HABITAT

The proposed release site is situated on the southwestern corner of the Paria Plateau approximately 100 meters from the edge of the Vermilion Cliffs (Figure 2). The Plateau is characterized by relatively flat, undulating topography with shrub/grass and pinyon/juniper communities. To the south and east of the Plateau lies the steep precipice of the Vermilion Cliffs, rising over 1000 feet from the floor of House Rock Valley. The rich colors and textures of the Navajo Sandstone formation that form the cliffs are one of the outstanding natural attractions in northern Arizona. Uplifting and differential erosion have created complex geologic structures and a diverse variety of habitats in a small geographic area (BLM and AGFD 1983). The cliffs are sharply dissected by canyons and arroyos and the lower slopes are littered with enormous boulders, some etched with petroglyphs. Numerous springs, some developed for domestic or livestock use, emerge from the sides of the cliffs. Soils are formed mainly from Mesozoic sandstones (BLM and AGFD 1983).

Vegetation surveys were conducted by the BLM in April 1995 on the Paria Plateau above Four Rock Springs and House Rock Springs, approximately 1.0 miles from the proposed release site (L. Hughes, pers. comm.). The species recorded in these surveys are believed to accurately represent the vegetation at the release site. The Plateau is dominated by pinyon-juniper/blue grama (*Pinus edulis-Juniperus osteosperma/Bouteloua gracilis*) communities and mixed shrub communities dominated by sagebrush (*Artemisia spp.*) on sandy upland soils.

Total tree cover (trees greater than 5" diameter) was 17%, with 82% of the canopy consisting of pinyon pine and 18% of the canopy being Utah juniper. The understory vegetation was: blue grama (*Bouteloua gracilis*; 44%), Indian ricegrass (*Oryzopsis hymenoides*; 1%), big sagebrush (*Artemisia tridentata*; 54%), and broom snakeweed (*Gutierrezia sarothrae*; 1%). Several other species were recorded in insignificant amounts. A more complete species list may be found in the Paria-Kanab Creek Habitat Management Plan (BLM and AGFD 1983).

E. HUMAN USES

The primary land uses in the release area are recreation (developed and non-developed areas) and livestock grazing. Other land uses include non-commercial firewood gathering, ongoing wildlife management activities, and other land management activities. Timber management is an important human use on the Kaibab National Forest west of the proposed release site. Mineral exploration and development occurred historically in various places near the Vermilion Cliffs.

1. Recreation

Recreational use in the release area includes sightseeing from developed roads (paved and unpaved), motorized travel on undeveloped roads (including ATVs), resort/developed area recreation, camping, non-motorized backcountry travel (foot, horse and pack animals), sport hunting, nature viewing, interpretive activities (including biological, geological and cultural resources), and fuelwood/pine nut gathering (M. DeMillion, pers. comm.; T. Folks, pers. comm.).

The Arizona State Comprehensive Outdoor Recreation Plan (SCORP) states that the outdoor activities with the highest public demand are "... visiting outstanding scenic areas, visiting historical areas, and visiting archaeological sites." All of these activities are available in the Marble Canyon/Vermilion Cliffs area. The Vermilion Cliffs, Paria Plateau, and Paria Canyon attract significant numbers of recreation-oriented visitors from both in and out-of-state. A cooperative venture to promote the area as a destination for travellers was recently initiated. Partners in the project include the BLM, NPS, USFS, the State of Arizona, the State of Utah, county and local governments, and private interests. A prospectus has been developed for a comprehensive interpretive project (Vermilion Cliffs Highways) to include 21 sites along 277 miles of state highways in northern Arizona and southern Utah. Should this project be funded and proceed as planned, visitation to the Vermilion Cliffs area may increase.

a. Motorized/Developed Area Recreation

U.S. Highway 89A parallels the Vermilion Cliffs for approximately 29 miles. The cliffs are famed for their rich colors and rugged beauty, and provide an impressive backdrop for travellers along this route. Highway 89A is also one of the primary access routes for visitors to the North Rim of the Grand Canyon. Between Navajo Bridge (over the Colorado River at Marble Canyon) and Jacob Lake (junction of Highways 89A and 67), are four developed lodges: Marble Canyon, Lees Ferry Lodge (Vermilion Cliffs Bar and Grille), Cliff Dwellers Lodge and Jacob Lake Inn. Another development, the Kaibab Lodge, lies along Highway 67 between Jacob Lake and the entrance to Grand Canyon National Park. Each of these facilities provides food and lodging with some permanent housing for residents and employees. Lodge business tends to vary seasonally, with peaks during the primary tourist and fishing seasons.

Three interpretative sites are located along Highway 89A: Navajo Bridge Visitor Information Center at Marble Canyon (new facility under construction; to be administered and staffed by the NPS, Glen Canyon National Recreation Area); the Dominguez-Escalante interpretive pullout (administered by the BLM; not staffed), and the Kaibab Interpretive Center at Jacob Lake (administered and staffed by the USFS). The Dominguez-Escalante site currently includes five panels on the Dominguez-Escalante expedition, wilderness, cultural history and geology. The House Rock Overlook, approximately two miles west of the junction of Highway 89A and the

House Rock Road (BLM Route 1065), is another popular stopping point. Vehicle counters have been installed on Highway 89A, at the Dominguez-Escalante interpretive pullout (Table 3).

The traffic counts provided in Table 2 for House Rock Road (BLM Route 1065) are based on a traffic counter north of the Paria Plateau access road and hence do not accurately reflect traffic volumes on the southern portion of the road. However, the road is not well maintained for use by passenger vehicles and, although it extends north to Highway 89 (between Page, Arizona and Kanab, Utah), most visitors prefer to travel the paved routes. Recreationists use the road to access the USFS and BLM trailheads. Over the next several years, the BLM plans to improve the House Rock Road, and use is expected to increase (T. Folks, pers. comm.).

Vehicular use of the Paria Plateau is light: road conditions limit both the type and numbers of vehicles on the Plateau. The extensive road network on the Plateau is limited to four-wheel drive travel during all seasons. Travel is risky for all vehicles during the drier summer months when deep sand creates a hazard (D. Darr, pers. comm.). Direct observations of vehicle use on the Plateau (Table 2) indicate that up to 80% of the vehicle counts are local ranchers and BLM/AGFD personnel (T. Folks, pers. comm.). Other motorists using the Plateau include firewood gatherers, artifact hunters, sport hunters, and livestock producers (M. Small, pers. comm.; D. Christensen, pers. comm.; F. Phillips, pers. comm.). The entire Paria Plateau from the wilderness area north to the Utah state line is designated as "no off-road travel" by the BLM (T. Folks, pers. comm.).

Table 2: Vehicle counts for major roads near the proposed release site. Data are based on automated traffic counters except Paria Plateau values which are based on direct observation. Data provided courtesy of T. Folks (BLM), M. DeMillion (BLM) and D. Kiefer (Ariz. Dept. of Transportation).

	Vehicle Counts (Total/Average Daily)				
	1990	1991	1992	1993	1994
House Rock Road	1684/5	1385/4	1545/4	1706/5	1993/5
Paria Plateau	2990/8	2162/6	2488/7	3532/10	5527/15
Hwy. 89A: Marble Canyon to Jacob Lake	251850/690	193450/530	317550/870	369015/1011	----
Hwy 89A: Jacob Lake to Ryan Road (FS 422)	288350/790	244550/670	365000/100	401500/1,100	487640/1336
Highway 67	*/1600	*/1300	*/1400	----	----

* Total traffic volumes not available for Highway 67

b. Non-motorized recreation

The proposed release site is at the southwestern corner of the Paria Canyon/Vermilion Cliffs Wilderness Area. The Wilderness surrounds the Paria Plateau on all sides except the west, and is dominated by the Vermilion Cliffs on the south and east and the Paria Canyon on the north. The unique geologic features, interesting plants and wildlife, and pristine conditions occurring in the area attract significant numbers of visitors. Backcountry travel in the Wilderness and elsewhere around the proposed release site has increased in recent years, owing primarily to feature articles in national publications, word-of-mouth, and hiking guides (M. DeMillion, pers. comm.; T. Folks, pers. comm.). Visitation to the area nearly doubled during the 1971-1984 period (BLM 1986), and has continued to increase since that time. Peak seasons for backcountry use are typically spring and fall, with the least use during winter (T. Folks, pers. comm.).

Most of the major hiking trails lie wholly or partially within the wilderness area. These include: the Honeymoon Historic Trail and the Dominguez Historic Trail (both paralleling the base of the Vermilion Cliffs for most of their length); the Signature Rock Trail and the Paria Canyon Trail. Primary trailheads providing access to the Paria Plateau and the Wilderness Area are: Wire Pass Trailhead, Buckskin Trailhead, White House Trailhead, Lee's Ferry Trailhead and Soap Creek Trailhead. Trailhead counts for the major trailheads accessing BLM land on the Paria Plateau/Buckskin Gulch area are given in Table 3. Two trailheads provide access to USFS land on the Kaibab Plateau: the Arizona Trailhead (on Highway 89A, 3 miles east of Jacob Lake) and the Navajo Trailhead (on House Rock Road, 6 miles north of Highway 89A). Both of these trailheads receive very light use (S. Spear, pers. comm.).

Table 3: Recreational use of backcountry trailheads and interpretive sites near the proposed release area. Data provided courtesy of T. Folks (BLM).

	Recreation Site Visits/Visitor Hours				
	1990	1991	1992	1993	1994
Paria Canyon/Buckskin Gulch (4 trailheads)	4306/10334 4	4983/119592	5063/121512	5132/123168	6656/15974 4
Dominguez-Escalante Interpretive Site*	----	13000/3200	17000/4250	18000/4500	37000/9250

* Pre-1994 data based on visitor registration sheets; 1994 data based on traffic counter using correction factor of 2.6 people per vehicle

Other forms of non-motorized recreation include observation of archeological resources, photography and wildlife viewing. Accurate estimates for numbers of persons participating in these activities on the Paria Plateau, Vermilion Cliffs and House Rock Valley are not available.

c. Sport Hunting

Most of the recreational hunting in the release area is for ungulates. Numbers of permits/hunters were presented in the preceding section on ungulate species discussions (pp. 18-20). There is also a small population of chukar (*Alectoris chukar*) in the Paria Canyon between Wilson Spring and Bush Head Canyon which provides some hunter opportunity. In general, hunting activity in the

immediate area of the proposed release is very light, as ungulate numbers are low and access is difficult. Some predator hunting (e.g., coyote calling) and incidental harvesting of small mammals (primarily lagomorphs and squirrels) also occurs on the Paria Plateau (M. Small, pers. comm.).

2. Domestic Livestock Grazing

Livestock grazing is the dominant use for much of the land, both public and private, surrounding the proposed release site. Table 4 gives allotment names, general location and livestock numbers for all BLM and USFS allotments on the Paria Plateau, eastern Kaibab Plateau, and in House Rock Valley (sources: D. Curtis, BLM, pers. comm.; G. Holsten, USFS, pers. comm.). The House Rock Wildlife Area (pp. 19-20) is also a USFS grazing allotment, managed for bison by AGFD.

In addition to these public land grazing allotments, cattle are grazed on private and state-owned inholdings in House Rock Valley and the Paria Plateau. Activities associated with livestock management in the release area include herding and maintenance of range improvements (fences and water developments).

3. Other land uses

Mining activity has occurred in the past on and near the Vermilion Cliffs (BLM 1986). Most of this activity has been uranium mining in the Chinle formation of the cliffs, with the largest being the Sun Valley mine southwest of Cliff Dwellers Lodge. Other prospects are located in Paria Canyon and in the northern portion of House Rock Valley. Past prospecting for gold and mercury has occurred in the mudstone unit of the Chinle Formation. The entire Paria Canyon-Vermilion Cliffs Wilderness was closed to mineral location and mining in 1984 and all pre-existing claims have been dropped in the Wilderness. There are no ongoing mining operations occurring near the release area (M. Small, pers. comm.).

Timber management has historically been an important activity on the Kaibab National Forest. From the mid-1980s through the early 1990s, an average of 60 million board feet was harvested annually from the North Kaibab Ranger District. Harvests have declined since 1991. During the next several years, one to two sales are planned per year, with a total volume of approximately 10-20 million board feet per year expected (D. Harris, pers. comm.).

Wildlife management is another important activity near the release site. The AGFD (Region 2) and the BLM (Arizona Strip, Vermillion District) cooperatively manage wildlife resources in the area. Ongoing activities include annual deer surveys, bighorn sheep helicopter surveys and maintenance of water catchments to benefit wildlife, especially bighorns. BLM and AGFD have conducted annual peregrine falcon surveys along the Vermilion Cliffs.

Table 4: Livestock grazing allotments on public land near the proposed release site at Vermilion Cliffs. All allotments are cattle allotments unless otherwise noted. Note that in some cases animals are moved between allotments and may be counted in duplicate.

Allotment Name	Livestock No.	Use Dates	Administering Agency
Badger Creek	8	03/01-02/28	BLM
Beanhole	129	03/01-02/28	BLM
Coyote	202	03/01-02/28	BLM
Ferry Swale	333	11/01-04/15	BLM
House Rock (BLM)	203 66	04/01-11/30 12/01-03/31	BLM
Sandhills	1390 1337	10/16-05/15 05/16-10/15	BLM
Signature Rock	155	10/01-12/31	BLM
Soap Creek	981	10/15-05/31	BLM
Burro	200	07/16-09/30	USFS
Central Summer*	536 171 7 horse 558 15	06/08-10/07 10/08-11/30 06/08-11/30 06/01-09/30 06/08-10/07	USFS
Central Winter*	104 74 117	12/01-05/31 12/01-05/31 10/01-05/31	USFS
House Rock (USFS)*	105 32	12/01-03/31 12/01-03/31	USFS
Kane	441 424	10/01-10/07 10/08-11/30	USFS
Ryan	65 116	year-round 04/05-12/03	USFS
Willis*	111 64 69	11/16-04/30 11/16-04/30 11/16-04/30	USFS

* Redundant use dates indicate multiple permittees using one allotment

F. CULTURAL RESOURCES

Several surveys have documented the cultural resources in and near the release site. Forty-three archaeological sites have been documented in the Paria Canyon-Vermilion Cliffs Wilderness area. The Bureau of Land Management has conducted archaeological inventories near the release area, but the release area itself has not been formally inventoried. Many other sites that have not been surveyed are believed to lie in or near the wilderness area boundary (BLM 1986; D. Christensen pers. comm.). As stated in the final wilderness plan (BLM 1986):

Virtually the entire spectrum of site types and features known to occur in the northern Southwest are represented in the Wilderness: pithouses, surface masonry features, habitation structures, granaries, storage cists, hearths, lithic scatters, open campsites, rock art, rock shelters and trails. Surveys indicate that the majority of sites can be assigned to the Pueblo II and III period of Anasazi cultures.

In 1976, the Secretary of Interior determined that the Paria Plateau Archaeological District was eligible to be placed on the National Register of Historic Places, but a formal nomination was never advanced. The proposed district included 416 sites on 70,000 acres. Because of the rich collection of archaeological artifacts found on the Paria Plateau and around the Vermilion Cliffs, illegal artifact hunting ("pot hunting") has occurred in the past (D. Christensen, pers. comm.).

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

This chapter discusses the potential consequences, impacts or effects of implementing the two alternatives which were retained for further analysis: Alternative 4 (release of California condors at Vermilion Cliffs) and Alternative 5 (No Action). The issues and concerns treated in this chapter were identified through the scoping process described in Chapter 1.

A. OVERVIEW OF THE ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

Implementation of the proposed action would have no long-term negative impacts on the natural resources or land uses described in Chapter 3. No serious impacts are anticipated to other endangered, threatened or special status species in the release area. Cultural resources will be protected by minimizing ground disturbing activities and through consultation with the BLM's cultural resource specialist. Compatibility with existing land uses will be achieved through designation of the re-established condor population as a non-essential, experimental population, under the terms of Section 10(j) of the 1982 amendments to the ESA. This designation will also ensure that the release does not conflict with existing wildlife management activities, livestock grazing or sport hunting in the release area. The proposed release may result in a moderate increase in recreational visitation to the release area. It is expected that most of the additional activity will occur along the paved highways. This increase is compatible with ongoing efforts to develop a comprehensive interpretive and promotional campaign for the area (Vermilion Cliffs Highways Project).

B. EFFECT OF THE ALTERNATIVES ON THE CALIFORNIA CONDOR

1. Alternative 4: Release of California condors at the Vermilion Cliffs

The proposed release will be beneficial to the recovery efforts for the endangered California condor. It is consistent with the recommendations of the California Condor Recovery Plan. Specifically, the Plan specifies that the minimum criteria for reclassification to threatened include the maintenance of at least two spatially-disjunct, non-captive populations, each reproductively self-sustaining and numbering at least 150 individuals and having a minimum of 15 breeding pairs each.

The success of the re-introduction effort will depend in large part on the suitability of the Vermilion Cliffs/House Rock Valley/Kaibab Plateau habitat complex for condors. The following section provides a narrative overview of habitat features in the release area; Appendix B provides a more systematic evaluation using the CRT's Site Evaluation Criteria.

The proposed release site on the Vermilion Cliffs is well suited for the first release of California condors in northern Arizona. Cliff height, exposure, and physiognomy are similar to the characteristics of habitat favored by condors in California (M. Wallace, pers. comm.; R. Mesta, pers. comm.). In California, condors have nested in a wide range of rock formations including crevices, overhung ledges, potholes and simply under boulders (Snyder et al. 1986). The area immediately around the release site and the cliff system in general, provide abundant cavities, potholes, ledges and caves for nesting, and rock outcrops for roosts. The release site lies within a

large natural bowl above the cliffs and is surrounded by numerous boulders and outcrops. These features will provide a suitable setting for short practice flights by newly released condors before they attempt to launch from the main cliffs. The release site lies within a small depression and is sheltered on three sides, affording some protection from inclement weather and concealment for the release pen.

Wind speed and direction are important determinants of condor flight patterns and habitat selection. Winds must blow consistently and be of sufficient speed that they provide enough lift for soaring year-round (Koford 1953). Wind data for the northwestern Vermilion Cliffs are available from a Remote Automated Weather Station (RAWS) approximately 1.1 miles north/northwest of the release site. The station is operated by the National Interagency Fire Center (Boise, Idaho); weather data are compiled and distributed by the Western Regional Climate Center (Reno, Nevada). On an annual basis, 56.8% of the hourly wind readings were from the south or west (including S, SSW, SW, WSW and W). Mean wind speed for these directions was 6.7 miles per hour. For September (the month of the planned release), the winds were from the south or west 59.7% of the time with a mean velocity of 6.5 miles per hour. The release site faces southwest, so that these winds provide ideal conditions for early post-fledging flights (M. Wallace, pers. comm.).

Condor studies in California have shown that although condors will forage wherever carrion is available, they are probably better able to locate carrion in open habitats, such as grasslands and oak savannahs (see Koford 1953, p. 57). Vegetation on the Paria Plateau is open shrub (*Artemesia*, *Chrysothamnus*, *Gutierrezia*, and other shrub species) and open stands (<17% overstory cover) of pinyon/juniper. House Rock Valley, below the release site, is dominated by open shrub/forb and grass/shrub communities. These habitats are structurally similar to habitats used by condors in California.

Most condor nests in California have been relatively near water. However, some nesting condors have not been observed to drink near their nests, and it does not appear that lack of water is necessarily a limiting factor (Koford 1953). Water availability on the Vermilion Cliffs is sufficient for condors: approximately 18 springs and water improvements lie within three miles of the proposed release site. Many more are located throughout the Paria Plateau and below the cliffs in House Rock Valley. For bighorn sheep, the AGFD and BLM maintain five water catchments on the Paria which may provide additional sources of water for California condors.

Protection (or minimal exposure to) known mortality sources is an important attribute for the release site. Electrocution and/or collisions with power lines has caused four deaths of released condors in California (J. Gibson 1995: California condor release summary). Even though all condors to be released in northern Arizona will be aversively conditioned to avoid power poles, this mortality source remains a concern. The nearest major powerline corridor lies 21 miles north of the release site, running west from Glen Canyon Dam and north of the Paria Plateau. Although this powerline is within a short flight distance of the Vermilion Cliffs, it is well removed from the major cliff system. Topography and associated thermal weather patterns strongly influence California condor flight patterns. Condor observations in California suggest that the young released condors would follow the cliff lines rather than pass over large areas of flatter terrain. This behavioral trait should help the released California condors avoid the powerline north of the Paria Plateau.

Another system of powerlines runs south from Glen Canyon Dam along the east side of Echo Cliffs. This corridor crosses the Echo Cliffs at the "Gap" (approximately 26 miles south of the

junction of Highways 89 and 89A). The Echo Cliffs and Vermilion Cliff systems are separated by less than five miles at the eastern edge of the Vermilion Cliffs. Thus, the greatest risk from powerlines would be near the Glen Canyon power generating facility and at the Gap, if condors move from Vermilion Cliffs to Echo Cliffs.

The released condors will receive supplemental feeding for an indefinite, but probably extended, period of time following their release. Whether or not the condors will eventually be weaned (wholly or partially) from supplemental feeding is contingent on their success in finding natural carrion. Carcasses will be available from several sources: 1) livestock losses on public land grazing allotments on the Paria Plateau, Kaibab Plateau, and House Rock Valley, 2) winter mortality of ungulates (primarily deer) on the east Kaibab winter range and north of the Kaibab Plateau (see pp. 18-19). The abundance of deer on the Kaibab is significant as condors have demonstrated a clear preference for deer over cattle (Koford 1953, Wilbur 1972, Meretsky and Snyder 1992). Numbers of carcasses available from the above sources will vary both seasonally and annually. Winter mortality of the Kaibab deer herd, for example, may vary from 10 to 30% of the herd, depending on summer moisture and winter severity (F. Phillips, pers. comm.). Biologists cannot predict whether or not these sources of natural carrion will be sufficient to sustain a purely "wild" condor population.

During the scoping process, several respondents expressed concern about the possibility of condors feeding on roadkills and being struck by automobiles (see p. 19 for a discussion of deer mortalities on highways). There are no reports in the literature of California condors feeding on roadkills (Koford 1953; Wilbur 1972; Wilbur 1978), and none of the birds recently released have been observed doing so. However, should the condors discover and concentrate their feeding on roadkilled animals, some mitigation may be necessary to lessen the chances of condor mortalities on highways. For example, carcasses could be moved into clearings some distance from the roadway. It should be noted that the "taking" provisions which apply to the intentional or accidental death of a protected species (Section 9 of the ESA), are less restrictive for a 10(j) reintroduction than for a fully-protected population (Appendix C). Should a motorist accidentally strike a condor, prosecution would occur only if other state or federal laws were violated.

2. Alternative 5: No Action Alternative

The no action alternative would provide no benefits to the recovery effort for the California condor and would not help achieve the recovery goals specified in the Plan. The USFWS could proceed with the release of California condors in the two release areas already established in California (Sespe Condor Sanctuary and Lion Canyon) or elsewhere in California and either 1) defer releases outside of California indefinitely or 2) continue to investigate the release potential of other sites outside of California. The first option would run counter to the Plan's stated objective of establishing a second non-captive population outside of California.

C. EFFECT OF THE ALTERNATIVES ON EXISTING LAND USES AND HUMAN ACTIVITIES IN THE RELEASE AREA

1. Alternative 4: Release of California condors at the Vermilion Cliffs

The release of condors at the Vermilion Cliffs will not cause any significant changes in livestock grazing practices, recreation (including sport hunting), or ongoing wildlife management activities.

Compatibility with these existing land uses will be achieved through designation of the re-established condor population as a non-essential, experimental population, under the terms of Section 10(j) of the 1982 amendments to the ESA. This designation was created by Congress specifically to enable releases in situations where release of a fully protected endangered species might conflict with existing land uses.

a. Effect of the Proposed Action on Livestock Grazing

Livestock presence generally benefits condors. In his landmark study of the condor in California, Koford (1953) reported that over half of the condors he observed feeding were scavenging on beef cattle carcasses, primarily calves. Miller et al. (1965) and Wilbur (1972, 1978) also reported that most of the California condors' diet consisted of dead livestock. Livestock producers could voluntarily leave carcasses in the field where they would be accessible to condors, provided that the carcasses were situated away from all conflict zones, and did not pose a health risk to condors or other livestock (i.e., from diseases). No other changes in livestock grazing practices would be required for the proposed action. Administration of the public land grazing allotments (including the allotment adjoining the release area) would not be affected by the release. Water developments on the Paria Plateau and in House Rock Valley might also benefit condors, although one condor death in California was attributed to drowning in a water trough (Koford 1953, p. 74). If a sufficient number of carcasses for supplemental feeding is not available, animals could potentially be purchased from area ranches, providing a direct economic benefit to livestock producers.

During the scoping process, one livestock producer in the release area voiced concern that the sense of solitude on the Paria Plateau would be diminished by the proposed release. He was concerned about additional traffic on the roads around the Vermilion Cliffs and the increased numbers of people (project personnel and visitors attracted to the area to view condors) that would accompany the release. Following is a brief discussion of the effects of the project on numbers of people and vehicles in the release area (also see section c, below):

The release would require a minimum of two crews (two to three persons each) working in rotating shifts (see operational plan, Appendix A). One field station would be located on the Paria Plateau. Two freezers and a work/housing facility would be located at developed areas within a one-hour drive of the release site. Depending on the condors' location, the season, and the work detail, one to three daily trips would be necessary to and from the Paria Plateau field station to collect carcasses, monitor the condors and accomplish other project tasks. This would cause a minor, but negligible, increase in vehicular traffic on the House Rock Road (BLM Route 1065) and the state highways.

On the Paria Plateau, project biologists would utilize the existing unimproved road network to conduct the daily operations of feeding and monitoring the condors. The crews would be equipped with four-wheel drive vehicles and all-terrain vehicles. In most cases, the nature of the work would confine biologists' activities to a narrow breadth of land immediately above the cliffs and the road network necessary to access the cliffs. The effect of these activities on existing livestock grazing would be minimal.

b. Effect of the Proposed Action on Sport Hunting

During the scoping process, some respondents expressed concern that release of condors on the Vermilion Cliffs would lead to hunting closures or restrictions on the use of lead ammunition for

big game hunting. This concern was voiced by members of the hunting public and by some agency personnel.

In California, three condor deaths have been attributed to lead poisoning since 1983 (Janssen et al. 1986, Wiemeyer et al. 1988). Determining the origin of the lead is difficult because lead poisoning is a slow process and the site of death may be far removed from the source both spatially and temporally. However, unrecovered carcasses and offal (gut piles) associated with ungulate hunting are probable sources (Pattee et al. 1990).

Several factors will serve to mitigate the risks from lead poisoning for the proposed release. First, the condors will receive supplemental food for at least one year after the release. A steady supply of available uncontaminated carrion will minimize the chance that released birds will ingest lead-contaminated carcasses. Secondly, hunter activity on the Paria Plateau is minimal (see Chapter 3, pp. 18-19 and 23-24) so that opportunity for condors to encounter unrecovered hunter kills is low. Finally, the non-essential, experimental population status that would apply to the condors effectively means that no existing activities, including sport hunting, will be disrupted by the release. If lead poisoning becomes a significant source of mortality for the California condors released in the proposed action, expanded hunter education programs and/or voluntary conversion to non-toxic ammunition would be appropriate options. Encouraging hunters to bury gut piles would lessen the chances of condors ingesting contaminated meat. Intensifying efforts to make the birds eat only the supplied food would also help to alleviate the problem. Area closures or mandatory use of non-lead bullets would not be mandated under the provisions of the 10(j) reintroduction.

Additional studies are planned to determine more precisely the susceptibility of condors to lead poisoning (D. Clendenen, pers. comm; R. Risebrough, pers. comm.).

c. Effects of the Proposed Action on Other Recreational Activities

The proposed release may create an increase in recreational activity in the release area. The principal effect would be the attraction of birdwatchers and other visitors to the area to view wild California condors soaring above the Vermilion Cliffs.

Interest in nonconsumptive uses of wildlife has expanded nationwide (USFWS and U.S. Dept of Commerce 1991). The AGFD's Wildlife 2000, Strategic Plan (AGFD 1995) includes the following statement:

The most conspicuous demand for nongame wildlife is for viewing opportunities. Foremost among the users are resident birdfeeders and birdwatchers. Each year, thousands of nonresidents also search for nongame birds in Arizona, especially rare species that occur nowhere else in the United States. Not surprisingly, guest ranches and a few private nature preserves cater to birdwatchers and other nature enthusiasts. Commercial tours also target Arizona for natural history and birdwatching tours every year. Most of the tours are to southeastern Arizona, but towns throughout the state benefit economically from birdwatchers.

Highway 89A parallels the Vermilion Cliffs for approximately 28 miles, affording excellent opportunities for condor observation. The House Rock Road (BLM 1065) parallels the western Vermilion Cliffs for approximately 5 miles. However, this unpaved road is not suitable for travel

by most passenger vehicles, and it is probable that most wildlife viewing will occur from the paved highway. It is not expected that the proposed release would stimulate any significant increase in backcountry travel on the primitive roads or trails of the Paria Plateau or Paria Canyon as condor viewing opportunities would be poor in those areas. Some increase in use of the wilderness trails below Vermilion Cliffs (Dominguez-Escalante Trail and Honeymoon Trail) is possible by persons interested in viewing or photographing condors.

A number of opportunities exist for integrating condor interpretive activities into planned or existing interpretive programs. The interpretive centers at Navajo Bridge (NPS) and Jacob Lake (USFS) would be supplied with interpretive material on the natural history and status of the California condor to incorporate into their programs. Additional interpretive sites or activities are possible through the auspices of the Vermilion Cliffs Highways project (p. 21). The Dominguez-Escalante interpretive pullout and House Rock Overlook provide excellent panoramic views of the western Vermilion Cliffs and would be logical choices for interpretive signs or condor observation.

Lodges, guides and recreational interests operating in the Vermilion Cliffs area may experience some growth in business from the proposed release. Lodge owners report that business in the Marble Canyon area tends to be seasonal (M. Saccher, pers. comm.). The presence of condors on the Vermilion Cliffs could attract visitors to the area during the customary "off-season."

d. Effect of the Proposed Action on Existing Wildlife Management Activities

The proposed action would not cause any significant changes in ongoing wildlife management activities. The release of California condors to the Vermilion Cliffs would be compatible with ungulate management in the release area.

Flights for locating California condors using telemetry techniques would be coordinated with wildlife biologists from other agencies for reasons of safety (in uncontrolled airspace) and to aid other projects where possible and desired. AGFD's annual low-level helicopter surveys for big game on the Paria Plateau and along the Vermilion Cliffs would not conflict with the proposed release. However, it would be advisable to convey up-to-date information on condor locations to the biologists conducting those surveys prior to and during the flights.

Some AGFD biologists expressed concern that the supplemental feeding of California condors would attract mammalian predators or scavengers, especially coyotes (*Canis latrans*), to the release area. These biologists were concerned that: 1) the feeding program would increase predator numbers to artificially high levels and 2) control actions aimed at checking the increase might lead to condor mortalities. A referendum passed by Arizona voters in November 1994 (Proposition #201, AZ revised statute 17-301D) limits the types of control activities which may be undertaken on public land. The law bans the use of leghold traps, poisons and certain other devices, but ground and aerial gunning may still be used.

Protocols for the supplemental feeding of condors will be designed to minimize the attraction of mammalian predators and scavengers. To date, supplemental feeding of condors in California has not resulted in any predator problems. Natural rock structures (ledges, pinnacles, and outcrops) will be used for feeding stations wherever possible. If project biologists observe evidence of mammalian predators appropriating carcasses intended for California condors, the feeding stations will be relocated or artificial platforms (of sufficient height and design to deter predator use) will be erected. If possible, these platforms would be self-standing or secured to natural features (trees

or rock structures). Should excavation be required to erect feeding platforms on BLM land, project biologists will first consult with the BLM'S Cultural Resource Specialist to obtain clearance for archaeological resources.

e. Effect of the proposed action on other land uses in the release area

As a 10(j) project, the proposed action would not affect other land uses, including timber management, mineral exploration or development. No mineral exploration or development is presently occurring near the release site or elsewhere on the Vermilion Cliffs (M. Small, pers. comm.).

The release of condors would not affect timber management on the Kaibab National Forest. Condors do not utilize dense timber for foraging and trees of the size classes found on the Kaibab Plateau are not suitable for roosting or nesting by condors.

2. Alternative 5: No Action Alternative

The No-Action alternative would not affect livestock grazing practices, recreational activities, wildlife management or other land uses in the release area.

D. EFFECT OF THE ALTERNATIVES ON SPECIAL STATUS SPECIES IN THE RELEASE AREA

1. Alternative 4: Release of California condors on the Vermilion Cliffs

The proposed action would not cause any adverse effects to special status species in the release area. The release area has been surveyed by the BLM's Arizona Strip District plant ecologist for the presence of listed and special status plants. No special status plants were identified and no suitable habitat was present in the release area (L. Hughes, pers. comm.). Because project biologists will be working over a broad area during the course of the project, they will be provided with materials (and training, if necessary) to help them recognize all special status plants occurring in the project area. This will enable the project biologists to recognize and avoid any activities which might be deleterious to rare plants, and may also provide ecologists with additional information on the distribution of these species.

Two special status vertebrate species could potentially occur near the release site: the House Rock chisel-toothed kangaroo rat and the peregrine falcon. The Service has consulted with Dr. M.J. O'Farrell, who recently completed a study of the distribution of the House Rock Valley chisel-toothed kangaroo rat. He reported that the range of the subspecies does not include the Paria Plateau (owing to topographic and vegetative range restrictions) and that the species does not occur in habitats similar to those near the release site.

The AGFD's Heritage Data Management System was queried to determine what special status species might occur in the vicinity of the proposed release. The endangered peregrine falcon, now proposed for delisting [CFR 60(126):34400-34409], was the only species identified within two miles of the proposed release site. Peregrines have historically nested in several locations on the Vermilion Cliffs and have been observed in the immediate vicinity of the proposed release (M.

Small, pers. comm.). The closest known eyrie to the release site is 1.4 miles distant. The topographic isolation of the release site and the fact that the release is planned for fall/winter (after peregrine chicks are fledged) ensures that nesting peregrines will not be disturbed by the release. Observations of California condors nesting in California have demonstrated that the presence of prairie falcons near condor nests may be beneficial to the condors. The falcons attacked and repelled other avian intruders (ravens and golden eagles) which might prey on condor chicks (Snyder and Snyder, in press). Koford (1953) reported possibly beneficial territorial defense by peregrine falcons near condor nests in the Sespe Condor Sanctuary in California.

The proposed project would involve no disturbance of riparian or aquatic habitats and hence no adverse effects on special status fish species or aquatic invertebrates would occur.

2. Alternative 5: No Action

The No Action alternative would not affect any special status species in the release area.

E. EFFECT OF THE ALTERNATIVES ON CULTURAL RESOURCES

1. Alternative 4: Release of California condors on the Vermilion Cliffs

The proposed release will not adversely affect cultural resources in the project area. Cultural resources will be protected by: 1) minimizing ground disturbing activities and 2) through advance consultation with the BLM's cultural resource specialist. The cultural resource specialist will visit, inspect and "clear" the proposed sites for placement of the release pen, aversive conditioning poles and other facilities to ensure that no archaeological resources are disturbed. Should the resource specialist determine that cultural resources are at risk, the structure(s) will be relocated or the design modified to eliminate the risk.

The cultural resource specialist will provide a brief training session for project personnel to familiarize them with the types of archaeological resources they are likely to encounter. Also, because artifact hunters are sometimes attracted to an area when they see signs of recent human activity, the crews will be instructed to avoid repeated use of the same route to prevent establishing new trails into the release area that might encourage ingress by other persons. All motorized travel for the project would be confined to established roads.

2. Alternative 5: No Action

The No Action alternative would not affect cultural resources in the project area.

CHAPTER 5: PUBLIC INVOLVEMENT

The Service, in cooperation with the AGFD, the BLM and the other participating agencies, has made a concerted effort to inform the public of the proposed action, to solicit input from all interested parties, and to adequately address their concerns (see Chapter 1, p. 5: *Scoping the Issues and Concerns* and Appendix G). An extensive list of interested individuals and groups was developed through the public scoping process, and will be utilized for the distribution of this document. Anyone else desiring to review the Environmental Assessment may obtain a copy by contacting any of the following sources:

U.S. Fish and Wildlife Service
Ventura Field Office
2493 Portola Rd., Ste. B
Ventura, CA 93003
Contact: Robert Mesta, Condor Program Coordinator.
805/644-1766

USDI Bureau of Land Management
Arizona Strip District, Vermillion Resource Area
345 E. Riverside Drive
St. George, UT 84770
Contact: Michael W. Small, Wildlife Biologist
801/673-5729

The Peregrine Fund
World Center for Birds of Prey
5666 Flying Hawk Lane
Boise, Idaho 83709
Contact: Lloyd Kiff, Science Director
208/362-3716

CHAPTER 6: LIST OF PREPARERS

The following individuals participated in the formulation and analysis of Alternatives and the subsequent preparation of the environmental document.

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APPENDIX A

Operational Plan for the Release of California Condors at Vermilion Cliffs, Arizona

This section provides details on the operational plan, timetable and logistics for the release of condors at Vermilion Cliffs. The protocol described herein applies specifically to the first year of the project. Subsequent releases should follow a similar protocol but may be modified somewhat according to information acquired during the previous year(s).

A. Implementation Schedule

The target date for the first release of California condors at Vermilion Cliffs is late November/early December 1995. In order to meet this target, the following timeline is proposed:

15 July- 15 October:

- complete NEPA process and MOU among the cooperating agencies

15 October-15 November:

- complete construction of release pen and all ancillary facilities.
- acquire walk-in freezers and small trailer (or similar unit) to use as the base station for field operations; begin collecting and storing carcasses (or making arrangements to purchase carcasses from area ranchers)
- transport release pen, base station, aversive conditioning poles and other field equipment to the release area
- complete consultation with the cultural resource specialist to obtain clearance for placement of facilities
- assemble release pen and erect poles
- identify suitable locations for feeding stations

15 November-30 November:

- transfer condor chicks from captive rearing facilities to the release pen at Vermilion Cliffs

Late November to early December (6-12 days after arrival at release site):

- release California condors

B. Project Overview

The principal activities associated with the condor release project are: erection of the release facility and associated facilities (aversive conditioning poles and temporary housing for the caretakers), care of the birds while they are in the release facility for 1-2 weeks, release of the birds, and feeding and daily monitoring of the condors in the wild.

C. Construction of Release Pen and Other Facilities

Physical structures which will be necessary to support the release include the following:

1. Release pen
2. Power poles for aversive conditioning
3. Temporary quarters (tent or other small, portable shelter) at the release site
4. Base camp (small trailer, wall tent, or other structure) on the Paria Plateau
5. Feeding platforms (natural rock formations or wooden platforms)
6. Trap sites
7. Freezers (at locations remote from the release operation)

All of these structures/ facilities will be temporary and will be moved or dismantled as each phase of the release is completed. All facilities will be constructed to be as unobtrusive as possible to maintain the wilderness character of the Paria Plateau/Vermilion Cliffs. Colors will be chosen to blend with the natural landscape and whenever possible, facilities will be situated so as to be visually concealed. A detailed description of the release facilities follows.

1. Release facility

One to several days prior to bringing the birds to the site, a release pen will be erected to temporarily house the birds. This stud and plywood structure will be approximately 16 feet by 8 feet and 6 feet high. Netting will cover the front of the pen, allowing the condors to become accustomed to the surrounding area. The pen will rest on blocks (either cinder blocks carried to the site or natural materials if available and allowed). The structure will be pre-fabricated and will be brought to the site by helicopter. Alternatively, it may be carried by foot from the nearest 4WD road as separate panels.

2. Power poles for aversive conditioning training

One or two "dummy" power poles will be erected near the release pen to aversively condition the young condors prior to their dispersal away from the release area. (Power line collisions have been a source of mortality for the condor population in California). Normally, holes would be dug to erect these poles. However, to minimize ground disturbance, the release team may elect to secure the poles to existing trees of suitable size using brackets or a similar method. Selection of sites for the power poles will be done in consultation with the cultural resource specialist.

3. Temporary quarters at the release site

The condors will remain in the release pen for approximately one to two weeks. During that time, one to two biologists will stay in a tent near the pen to observe the birds' behavior, feed them and guard against any predator problems.

4. Base camp

The temporary quarters at the release site will be used only while the condors remain in the release pen and during the early post-release period when the birds are most vulnerable to trauma and disturbance. A more substantial facility will be necessary to serve as the primary quarters for the field crew, for equipment storage, and other project support. This facility will be located at the BLM's administration site on the main Paria Plateau access road (BLM Route 1017), approximately 5.5 miles north of the release site (Figure 2). Long term plans call for the BLM to develop this site and install permanent bunkhouses, storage buildings and other facilities to support its land management activities on the Paria Plateau. The BLM has had a trailer at the site in previous years. A small trailer or other portable structure will be brought to this site two to three weeks prior to the release date. The facility will be self-contained, with energy supplied by a propane tank and/or solar panels. A small propane-powered freezer may be kept at the site for temporary storage of one to three carcasses.

5. Feeding sites

A system of feeding sites will be established near the release site. Natural rock structures (ledges, pinnacles, and outcrops) will be used for feeding stations wherever possible. If project biologists observe signs of mammalian predators appropriating carcasses intended for California condors, the feeding stations will be relocated or surrounded by portable electric fencing. If those measures fail to correct the problem, artificial platforms (of sufficient height and design to deter predator use) will be erected. If possible, these platforms will be self-standing or secured to natural features (trees or rock structures). Should excavation be required to erect feeding platforms, project biologists will first consult with the BLM'S Cultural Resource Specialist to obtain clearance for archaeological resources.

6. Trap sites

At various times during the project it may be necessary to re-trap the condors either for emergency medical care or to replace telemetry transmitters. The trapping operations will use cannon nets or modified "pit" traps built on a platform above ground. No excavation will be necessary for these trapping operations. More than one trap site will be necessary as birds become wary after a negative experience at one site.

7. Freezers

Carcasses will be collected from a number of sources to be used as supplemental food for the condors. Roadkills and livestock losses are the most abundant and contaminant-free sources of carrion in the release area. Because carcass availability varies greatly by season (for example, roadkills on Highway 67 on the Kaibab Plateau are most abundant in the summer), it will be necessary to collect and store carcasses for use during the leaner periods. The field biologists will coordinate with the Arizona Department of Transportation (ADOT), with the Utah Department of Transportation, and with personnel of the cooperating agencies to receive notification of roadkilled deer, elk or other animals suitable for condor food. Personnel with these agencies will be asked to move carcasses from the roadway, mark the location with flagging and relay information to the condor field biologists. The carcasses will then be collected and transported to walk-in freezers. Suitable sites for the freezers are limited by the lack of electrical service between Cliffdwellers Lodge and Jacob Lake Inn. Possible locations for the freezers are Lee's Ferry Lodge (Vermilion Cliffs Bar and Grille), near Cliff Dwellers Lodge, and the USFS administrative site at Jacob Lake.

D. Operation

This section provides additional details on the protocol and logistics for condor release, feeding and monitoring at Vermilion Cliffs.

1. Work Center:

In addition to the base camp another site must be identified to serve as a work center. This site will receive intermittent use as required to construct or repair equipment. This site must have electricity, work space and accommodations for storing tools and some equipment. Ideally, this will be the same site as is used for freezer storage (item C-7 above), but another location may also be used. Possible locations include USFS facilities at Jacob Lake or Fredonia. A privately-owned site may also be used.

2. Work shifts

The released condors will be monitored daily. Two crews of 2-3 persons each will rotate feeding and monitoring duties in approximately five-day work shifts (adjusted according to work demands). Three-person teams would allow one person to collect carcasses (for transport to the freezers or to the field station) while the other two members attend to the daily radiotracking and feeding operations.

3. Transportation

The logistics of getting to and from the release site, transporting and delivering carcasses, and monitoring the condors will present formidable challenges. The roads on the Paria Plateau are renowned for being difficult to negotiate in the best of conditions. During the drier months, deep loose sand makes travel hazardous for even the heftiest four-wheel drive vehicle.

The field crews will be equipped with two light-duty four-wheel drive trucks (one for each crew) and one or two four-wheel drive all-terrain vehicles (ATVs). The trucks will be used for transportation to and from the base camp and work site (paved and maintained gravel roads). The ATVs will be used on the primitive roads on the Paria Plateau to transport carcasses to the feeding stations, to monitor condors, and for other project support. The BLM has designated the entire Paria Plateau from the wilderness area

boundary north to the state line as "no off-road travel." Consistent with this designation, all motorized travel for this project will be confined to established roads.

4. Operating scenario for condor release

Project design calls for the release of a group of captive-reared condors once each year, beginning in fall 1995 or early winter 1996. Three captive rearing facilities currently exist: at the Los Angeles Zoo, the San Diego Zoo and at the World Center for Birds of Prey (The Peregrine Fund: Boise, Idaho). Each release group will consist of up to 10 young-of-the-year birds produced during the late winter to early spring of that year. These birds will be hatched in captivity and raised either by a condor look-alike hand puppet, or by their parents, until they are approximately four months of age. They will then be placed together in a single large pen at the captive rearing facility so that the young condors will form social bonds. Sometime between September 1995 (when the birds are a minimum of four to five months of age) and February 1996, the young condors will be transported by helicopter to the release site at Vermilion Cliffs. They will be placed in the release pen and will remain there for an acclimation period, expected to be one to two weeks. Biologists will remain near the release pen 24 hours a day, observing the birds' behavior and guarding against predators or other disturbance.

After the initial adjustment period, and when it is apparent that all of the birds in the group are capable of flight, the release will occur. Release is accomplished by opening the net at the front of the pen allowing the birds to exit. Based on previous releases, the condors are expected to remain in the immediate area of the pen for some time before beginning exploratory forays along the cliffs.

5. Closure

A small area immediately around the release site (approximately 10 acres) will be temporarily closed to recreational activity and only essential project personnel will be permitted to approach the release pen. This closure will remain in effect until the birds have dispersed from the release area.

6. Supplemental feeding of the condors

Condors are strictly scavengers and must be fed until they learn to locate carcasses independently. The diet provided to the condors will consist primarily of livestock carcasses (donated or purchased from area ranchers) and roadkilled animals. (Procedures for obtaining and storing these carcasses were described previously in the discussion of freezers). The field crew will deliver carcasses to the condors (generally every four to seven days) by carrying food to the edge of the cliffs on foot. A network of feeding stations on prominent points will be identified in the general area of the release. Carcasses will be set on the ground or, if predators become a problem, elevated off the ground by placing them atop natural rock outcrops less accessible to ground predators. If mammalian predator problems persist, wooden feeding platforms may be constructed. If it is necessary to dig holes to erect these platforms, clearance for archaeological resources will be obtained through consultation with the BLM. Alternatively, poles for the platforms may be attached to existing trees or natural structures.

As the birds mature and become skilled flyers, they will move further from the release site. This is expected to happen approximately one to four months after release. It will then be necessary to deliver carcasses to other locations nearer the condors' roost locations which will probably change regularly over time. This will ensure that the inexperienced young birds are able to locate the food. The field crews will use ATV's on existing roads to get as close as possible to the birds and will then deliver the food on foot. No off-road motorized travel will be permitted.

7. Radiotracking of the released condors

Initially, all of the condors released for the project will be equipped with two radio transmitters. The second transmitter provides a backup in the event one is lost or malfunctions. These radios may be either conventional transmitters or satellite transmitters. The movements and behavior of each bird will be monitored for at least the first two to three years of its life. Ground triangulation will be the primary

means of radiotracking. The road network above and below the cliffs is ideally suited for telemetry studies. No off-road motorized travel will be permitted but it is expected that considerable hiking will be necessary. Aerial tracking will be used to find lost birds or when more accurate locations are desired. Telemetry flights will be coordinated with other agencies whenever possible.

E. Relationship of the project to cultural resources in the release area

The many archaeological sites and artifacts that exist near the release site will be protected from damage. The proposed action will entail no ground breaking activities, no new road construction and no off-road travel by motorized vehicles. All proposed facilities will be placed off of any archeological resources found at the site. The BLM Cultural Resource Specialist for the Vermillion District will clear all locations before use, and if conflicts exist with unrecorded archaeological sites, the facilities will be moved. The Cultural Resource Specialist will also coordinate the consultation with the Arizona Historical Preservation Office for compliance with Section 106 of the National Historic Preservation Act.

The field crews will receive special training to ensure they are able to recognize significant cultural resources and minimize their potential impacts on these resources. They will be given an orientation by a BLM cultural resource specialist familiar with the Paria Plateau/Vermilion Cliffs area to familiarize them with the types of resources they are likely to encounter. Artifact hunters are sometimes attracted to an area when they see signs of previous human activity. The crews will be instructed to avoid repeated use of the same route to prevent establishing new trails into the release area that might encourage ingress by other persons.

F. Other training for project biologists

The protection of all special status species occurring in the vicinity of the proposed release is of paramount concern. No special status plants or animals are known to occur in the immediate area of the release. However, because project biologists will be working over a broad area during the course of the project, they will be provided with materials (and training, if necessary) to help them recognize all special status species occurring in the project area. This will enable the project biologists to recognize and avoid any activities which might be deleterious to those species and may provide agency ecologists with additional information on the distribution of rare plants or animals.

APPENDIX B

Condor Release Site Evaluation

I. Overview of Condor Release Site Evaluation System

This section describes the evaluation system and working criteria used to assess site suitability for the release of California Condors. This system was originally developed to evaluate potential release sites in California and hence certain of the criteria are more applicable to that state than to releases in other states. As noted in Chapter 2, three of the four potential release sites in northern Arizona were eliminated from further analysis due to fundamental logistical constraints or the presence of known mortality sources. Therefore, only the preferred site (Vermilion Cliffs) was evaluated in detail using this system. This exercise was undertaken primarily to identify criteria for which the preferred site might be deficient.

The Release Site Evaluation System includes 25 criteria (some with sub-categories) which are divided into three priority classes:

Priority 1 criteria: Features which are assumed at this time to be critical to releasing and establishing condors in the wild. A significant lack or uncorrectable problem among any of these criteria would result in a site being rejected.

Priority 2 criteria: Features that are necessary to consider but are not assumed to be critical to release objectives. Excessive problems in this category could, however, result in rejection of a site.

Priority 3 criteria: Features which would add to or detract from the suitability of a site but are not critical to site selection.

Each of the working criteria is assigned a quantitative value (see below) and weighted according to the priority class in which they belong (three points for Priority 1 criteria; two points for Priority 2 criteria; one point for Priority 3 criteria). The sum from the three priority classes gives the total value for a site.

II. Working Criteria List

Priority 1 Criteria

Site Suitability

1. Presence of safe, sheltered release station
2. Limitations of public access to immediate area
3. Roost site availability
4. Presence of favorable wind conditions
5. Availability of year-round water supply
6. Density of golden eagles (feeding competitors)
7. Access to topographic flight corridors

8. Access to foraging areas
9. Availability of suitable feeding stations
10. Orientation landmarks

Logistics

11. Access to release station by research staff
12. Access to general release area by research staff
13. Access to adjacent lands by research staff

Priority 2 Criteria

Site Suitability

14. Distance to historic or potential nest sites
15. Presence of pilot species (except golden eagles; e.g., vultures, ravens)

Logistics

16. Visibility of birds to observers
17. Proximity of support facilities (housing, equipment storage)
18. Proximity of freezer for carcass storage

Man-made Threats/Hazards

19. Hunting and shooting levels in the area
20. Animal damage control programs in the area
21. Presence of collision hazards and other structural hazards

Suitability of Adjacent Lands (for population expansion)

22. Current land use on adjacent areas
23. Expected long-term land use on adjacent areas

Priority 3 Criteria

24. Availability and type of natural carcasses in release area
25. Traditional use of site by wild condors

III. Evaluation Form Instructions

The evaluation form establishes a point rating system for the evaluation of potential California condor release sites. The Working Criteria List (see above) presents and categorizes the criteria by which potential condor release site will be evaluated, as determined by the CRT. The Evaluation Form itself is self explanatory. The observer(s) should fill out the form in full, making appropriate entries for each criteria. When the evaluation is completed, all entries within each of the Priority 1, 2, and 3 Criteria sections should be added to get a total point value for each section. Priority 1, 2, and 3 Criteria are then individually weighted by multiplying each section point value by 3, 2, and 1, respectively, for a total priority section rating. Finally, the total rating for each of the three priority sections are added to get a Total Site Rating. This number is entered on the bottom line of

the front page. Comments regarding Site Suitability, Logistics, etc. may also be included on the front page.

Evaluation of a proposed release area will require both field work at the site and in adjacent areas, and office work (consulting maps, aerial photos, cooperating agencies, etc.). Proposed release areas should be visited on at least 2 to 3 occasions, and, to the extent possible, at varying times of day and year. The time elapsed between the first and last visit to a site should be one month at a minimum.

Some criteria listed in the Evaluation Form require special instructions. These instructions are given below. All criteria with special instructions are marked by an asterisk in the Evaluation Form. For all criteria in the Evaluation Form with radius limits described, the observer should draw circles with the specified radius on maps, the proposed release station forming the center point. Such maps can be used both in the field and in the office to determine site characteristics within the specified area.

- 3a, 3b: A roost site is defined as a structure which can contain one or more birds, e.g., a single snag, a closely-spaced group of snags, or a more or less contiguous rock formation. Determining number of roosts in an area to some extent will require the discretion of the observer.
- 4a, 15: Will vary with the season and time of day. Try to make observations during all or most daylight hours and at several times of year. Avoid counting soaring raptors during migration seasons.
- 4b: Will vary with the season and time of day. Try to take readings during all or most daylight hours and at several times of year.
- 7, 8: Historic data will need to be consulted. Computer generated maps showing historic condor occurrences should be available.
- 9: A suitable feeding station should comprise at least one acre of open relatively flat ground, with access routes for research staff.
- 10a: Select one of a through c and/or d. if appropriate.
- 12a, 13b: Winter access problems, such as snow and muddy roads, should be discussed in the comments section on the front page under Logistics.
- 14: Consult computer generated maps showing historic condor nesting occurrences, if available.
- 19a: Consult with the local agency biologists for information on hunting and shooting activities, including opening weekend car counts and deer spot kill maps, for an area within a five-mile radius of a proposed release station. Also consult the managing agency on whose land a proposed release station occurs for pertinent information.
- 20: Consult with agency biologists for information regarding current and projected programs within a five mile radius of a proposed release station, poisons used, etc.

21: Count all potential collision or other hazards present in the release site vicinity from the following list and make the appropriate entry.

- Electrical towers w/ power lines
- Telephone poles w/ powerless
- Oil drilling rigs
- Wind turbines
- Low-flying military aircraft
- Low flying private or agency aircraft
- Radio and/or T.V. transmission towers
- Microwave relay towers
- Any tower w/ guy wires
- Oil sumps
- Liquid waste disposal ponds
- Other

23a: Estimate the percent of lands expected to remain in current use for the next approximate 25-50 years.

22b, 23b: Types of developments include residential, commercial, energy, and recreational. The C.R.C. Habitat Specialist may need to be consulted.

IV. CONDOR RELEASE SITE EVALUATION FORM

The following form gives the site rating for the proposed release site at the Vermilion Cliffs (as identified on Figures 1 and 2).

CRITERION	ASSIGNED VALUE	SITE RATING
PRIORITY 1 CRITERIA		
<i>Site Suitability</i>		
1. Presence of safe release station (select all applicable)		
a. Shaded at least 3 hours per day between 10:00-17:00.....	1	<u>1</u>
b. Inaccessible to mammalian predators.....	2	<u> </u>
c. Human disturbance unlikely	2	<u>2</u>
2. Public access to immediate area (select one)		
a. Closed within 1 mile radius of release station	4	<u> </u>
b. Restricted, or combination of closed and restricted.....	3	<u> </u>
c. Could be restricted or closed, or partially open.....	2	<u>2</u>
d. Open	1	<u> </u>
3a. Distance to suitable roost sites (select one)		
a. Within 1/2 mile of release station	4	<u>4</u>
b. 1/2 - 1 mile.....	3	<u> </u>
c. 1 - 2 miles	2	<u> </u>
d. Greater than 2 miles	1	<u> </u>
3b. Number of roost sites within 1/2 mile radius		
a. Greater than 10.....	4	<u>4</u>
b. 7-10.....	3	<u> </u>
c. 3-6	2	<u> </u>
d. 1-2	1	<u> </u>
4a. Presence of favorable wind conditions (select one)*		
a. Soaring raptors present.....	2	<u>2</u>
b. Soaring raptors absent	0	<u> </u>
4b. Average wind speed (use Beaufort wind speed scale)*		
a. Beaufort scale average of 2-3	3	<u>3</u>
b. Beaufort scale average of 1 or 4	2	<u> </u>
c. Beaufort scale average of 0 or greater than 5.....	1	<u> </u>
5. Availability of year-round water supply (select one)		
a. Natural supply available within 1.5 miles	4	<u> </u>
b. Manipulated supply available within 1.5 miles.....	3	<u>3</u>
c. Intermittent supply available within 1.5 miles.....	2	<u> </u>
d. No natural supply (water hauled to site).....	1	<u> </u>
6. Density of golden eagles		
a. Low (present, but no large feeding aggregations)	2	<u>2</u>
b. High (feeding aggregations of 5-10 birds may occur)	0	<u> </u>
7. Distance to topographic flight corridors (select one)*		
a. Less than 2 miles.....	4	<u>4</u>
b. 2-4 miles	3	<u> </u>
c. 4-5 miles	2	<u> </u>
d. Greater than 5 miles	1	<u> </u>

8.	Distance to historical or potential foraging areas*		
a.	Less than 5 miles.....	4	<u>4</u>
b.	5-10 miles	3	<u> </u>
c.	10-20 miles.....	2	<u> </u>
d.	Greater than 20 miles	1	<u> </u>
9.	Availability of suitable feeding stations (select one)*		
a.	Greater than 10 suitable stations within 3 miles.....	3	<u>3</u>
b.	6-10 suitable stations within 3 miles	2	<u> </u>
c.	1-5 suitable stations within 3 miles.....	1	<u> </u>
10a.	View of habitat types from release station*		
a.	Nesting habitat w/ foraging habitat in background.....	3	<u>3</u>
b.	Nesting habitat only.....	2	<u> </u>
c.	Foraging habitat only.....	1	<u> </u>
10b.	Orientation landmarks visible (select all applicable)		
a.	Mountain or ridge line.....	2	<u>1</u>
b.	Cliffs or other rock formations.....	2	<u>2</u>
c.	Lakes or large rivers	2	<u> </u>
d.	Other (2 pts/landmark)	2	<u>2</u>

Logistics

11a.	Access to release station by research staff (select one)		
a.	Truck or ORV from nearest 2WD access road.....	4	<u> </u>
b.	Truck and hike from nearest 2WD access road	3	<u>3</u>
c.	ORV and hike from nearest 2WD access road.....	2	<u> </u>
d.	Hiking only from nearest 2WD access road.....	1	<u> </u>
11b.	Hiking distance to release station (from ORV or truck)		
a.	No hiking	4	<u> </u>
b.	Less than 1/4 mile	3	<u> </u>
c.	1/4 - 1/2 mile.....	2	<u>2</u>
d.	Greater than 1/2 mile.....	1	<u> </u>
12a.	Access corridors within 1 mile radius of release station*		
a.	Roads and trails.....	3	<u>3</u>
b.	Roads only.....	2	<u> </u>
c.	Trails only.....	1	<u> </u>
12b.	Estimated % of lands accessible within 1 mile radius*		
a.	Greater than 70.....	4	<u>4</u>
b.	40-70.....	3	<u> </u>
c.	20-39.....	2	<u> </u>
d.	Less than 20	1	<u> </u>
13a.	Access corridors on adjacent lands (1-5 mile radius)*		
a.	Roads and trails.....	3	<u>3</u>
b.	Roads only.....	2	<u> </u>
c.	Trails only.....	1	<u> </u>
13b.	Estimated % of lands accessible within 1-5 mile radius*		
a.	Greater than 70.....	4	<u>4</u>
b.	40-70.....	3	<u> </u>
c.	20-39.....	2	<u> </u>
d.	Less than 20	1	<u> </u>

Total Priority 1 Criteria Points	61
Total Priority 1 Criteria Rating (added points X 3)	183

PRIORITY 2 CRITERIA

Site Suitability

14. Distance to historical or potential nest sites*		
a. Less than 5 miles	4	<u>4</u>
b. 5-10 miles	3	_____
c. 10-15 miles	2	_____
d. Greater than 15 miles	1	_____
15. Presence of pilot species (turkey vultures, ravens)*		
a. Present	2	<u>2</u>
b. Absent	0	_____

Logistics

16. Visibility of birds to observers (select one)		
a. 5 or more observation points of release area	3	<u>3</u>
b. 3-4 suitable observation points	2	_____
c. 1-2 suitable observation points	1	_____
17. Distance to support facilities (housing, storage)		
a. Less than 5 driving miles	4	_____
b. 5-10 driving miles	3	<u>3</u>
c. 10-15 driving miles	2	_____
d. Greater than 15 driving miles	1	_____
18. Distance to freezer for carcass storage (select one)		
a. Less than 10 driving miles	4	<u>4</u>
b. 10-20 driving miles	3	_____
c. 20-30 driving miles	2	_____
d. Greater than 30 driving miles	1	_____

Man-made Threats and Hazards

19a. Estimated hunting and shooting levels in area*		
a. None	4	_____
b. Low	3	_____
c. Moderate	2	<u>2</u>
d. High	1	_____
19b. Enforcement rating (select one)		
a. Enforcement unnecessary or already adequate	3	<u>3</u>
b. Activities easily monitored and controlled	2	_____
c. Activities monitored and controlled with difficulty	1	_____
20. Estimated incidence of animal damage control programs in area*		
a. None	4	<u>4</u>
b. Low	3	_____
c. Moderate	2	_____
d. High	1	_____
21a. Distance to nearest collision or other hazard*		
a. Greater than 5 miles	4	<u>4</u>
b. 2.5- 4 miles	3	_____
c. 1- 2.5 miles	2	_____
d. Less than 1 mile	1	_____

21b. Types of collision or other hazards within 2-mile radius*		
a. 0	4	<u> </u>
b. 1 (agency aircraft).....	3	<u> 3 </u>
c. 2	2	<u> </u>
d. 3 or more.....	1	<u> </u>
(List them: _____)		

Suitability of Adjacent Lands (1-5 mile radius from station)

22a. Current public access on adjacent lands (select one)		
a. Closed	4	<u> </u>
b. Restricted, or combination of closed and restricted.....	3	<u> </u>
c. Could be restricted or closed, or partially open.....	2	<u> </u>
d. Open	1	<u> 1 </u>
22b. Est. % of land use on adj. areas (select all applicable)*		
a. > 50% ranching and/or non-motorized recreation	4	<u> 4 </u>
b. < 50% ranching and/or non-motorized recreation	1	<u> </u>
c. > 50% agriculture and/or motorized recreation	-5	<u> </u>
d. > 25% development areas	-10	<u> </u>
23. Est. % of adj. lands expected to remain in current use*		
a. Greater than 75.....	4	<u> 4 </u>
b. 50-75.....	3	<u> </u>
c. 25-50.....	2	<u> </u>
d. Less than 25	-4	<u> </u>

Total Priority 2 Criteria Points		<u> 41 </u>
Total Priority 2 Criteria Rating (added points X 2)		<u> 82 </u>

PRIORITY 3 CRITERIA

24. Type of natural carcasses (select all applicable)		
a. Livestock related.....	4	<u> 4 </u>
b. Non-man-caused mortality.....	4	<u> 4 </u>
c. Hunter-killed	-15	<u> -15 </u>
d. Poisoned.....	-15	<u> </u>
25. Recorded historical occurrences of wild condors in area		
a. Greater than 15.....	4	<u> </u>
b. 10-15.....	3	<u> </u>
c. 5-9	2	<u> </u>
d. Less than 5	1	<u> 1 </u>

Total Priority 3 Criteria Points		<u> -6 </u>
Total Priority 3 Criteria Rating (added points X 1)		<u> -6 </u>

TOTAL SITE RATING (add Priority 1, 2, and 3 Rating)		<u> 259 </u>
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APPENDIX C

Experimental Populations and the Proposed Condor Release in Northern Arizona

The U.S. Fish and Wildlife Service is proposing a long-term program to release young captive-hatched California Condors in northern Arizona. This proposal is part of an interagency effort to re-establish condors within their historic range and is consistent with the recovery goals written in the California Condor Recovery Plan.

The California condors to be released in northern Arizona would be managed as a *nonessential, experimental population* under Section 10(j) of the Endangered Species Act (ESA). The 10(j) status is ideally suited for this condor release as it provides a flexible framework for establishing a new population without excessive disruption of existing activities in the release area.

Because the experimental population designation has thus far been applied to less than a dozen species, its advantages are not well understood by the general public. Many people presume that, in practice, any introduction of an endangered species carries the full weight of the ESA. There are, however, a number of very significant differences in how experimental populations are managed.

The experimental designation was established through Section 10(j) of the 1982 amendments to the ESA and is defined as:

"Any population (including any offspring arising solely therefrom) authorized by the Secretary for release under paragraph (2), but only when, and at such times as, the population is wholly separate geographically from nonexperimental populations of the same species."

The intent of this new designation was to promote introduction, where it would aid in the conservation of listed species, by giving the Secretary of the Interior greater flexibility in the treatment of experimental populations. The amendment relaxes certain restrictions otherwise applicable to listed species and provides a means to relax additional restrictions as necessary (see below). This encourages cooperation between those likely to be affected by the release and may allow a proposed release to proceed in cases which might otherwise be too controversial to gain approval.

The 1982 ESA amendments included several stipulations that limit how and where experimental populations can be established. The experimental population must be wholly separated geographically from "non-experimental populations" of the same species (Section 10(j)[1] and [2][A]; Parker and Phillips 1991). While this stipulation has been the source of some controversy with regard to certain other introductions (most notably the release of wolves into Yellowstone Park), it is not a problem in the case of the condors where the release site is far removed from the only other wild population in California. Paragraph (2) of Section 10(j) authorizes the release of experimental populations outside the current range of the species, as is the case with the condors whose current range does not include Arizona.

Another important provision of Section 10(j) is that prior to the release, the Secretary is required to designate the population as either "essential" or "non-essential" for the conservation of the species (Section 10[j][2][B]). In making this determination, the Secretary:

"shall consider whether the loss of the experimental population would be likely to appreciably reduce the likelihood of survival of that species in the wild. If the Secretary determines that it would, the population will be considered essential to the continued existence of the species. The level of reduction necessary to constitute 'essentiality' is expected to vary among listed species and, in most cases, experimental populations will not be essential."

The distinction between essential and non-essential experimental populations is important as to whether, and how, certain portions of the ESA are applied. In particular, *critical habitat can only be designated for essential populations*. Also, Section 7 of the Act, which deals with interagency cooperation and mandates formal consultation with the U.S. Fish and Wildlife Service for actions which may affect a listed species, is relaxed for non-essential populations. Individuals in these populations are afforded the full protection of Section 7 only within National Wildlife Refuges and National Parks. Outside those areas, non-essential populations are treated as members of a species *proposed* for listing (rather than as threatened or endangered). This means that only *informal* consultation with the FWS is required when another federal agency proposes an action which may affect the species. Furthermore, should the FWS determine that the action might have a deleterious effect on the species, the consulting agency still retains the option of proceeding with the action.

Another important part of the ESA is Section 9 which pertains to the "taking" of a listed species and places prohibitions on activities which might affect its welfare. It is these prohibitions that most concern private citizens and may lead to fervent political opposition to introduction of endangered species into new areas. But all experimental populations, whether threatened or endangered, essential or non-essential, are treated as *threatened* with regards to Section 9. For threatened species, the specific acts which are to be prohibited are identified by regulation (published in the Federal Register) and may be specifically tailored to each population. Again, this allows greater flexibility and special consideration for local concerns. As stated in the Senate Committee report accompanying the amendments, "(T)he purpose of requiring the Secretary to proceed by regulation is to provide a vehicle for the development of special regulations for each experimental population that will address the particular needs of that population. The Secretary is granted broad flexibility in promulgating regulations to protect threatened species."

As described above, the non-essential, experimental designation provides increased opportunities for assuring that the release and the management of the condors do not disrupt or conflict with other activities. The specific provisions for management of the condor population will be developed through a Memorandum of Understanding (MOU) among all of the agencies involved in the introduction. As information is gathered through public meetings and other contacts, the FWS will identify the concerns of all interested parties and be able to address those concerns in the MOU. Only when all of the cooperating agencies are satisfied will the MOU be signed and the introduction move forward.

References Relating to Experimental Populations

- Herke, J. 1994. Reintroduction of wolves into the wild: a reasonable application of section 10(j) of the Endangered Species Act? Unpublished manuscript. 31 pp.
- Parker, W.T., and M.K. Phillips. 1991. Application of the experimental population designation to recovery of endangered red wolves. *Wildl. Soc. Bull.* 19(1): 73-79.
- U.S. House of Representatives. 1982. Conference report on the Endangered Species Act amendments of 1982. Report No. 97-835.
- U.S. Senate. 1982. Endangered Species Act amendments of 1982: report of the Committee on the Environment and Public Works to accompany S. 2309.
- Wolf Management Technical Committee. 1991. Question and answers about experimental populations under section 10(j) of the Endangered Species Act. 11 pp.

APPENDIX D

Species Lists

The following tables provide lists of terrestrial vertebrates occurring in the vicinity of the proposed release. Listed plant species are discussed in Chapter 3. As noted in Chapter 3, species lists covering a large area of northern Arizona have been incorporated in order to provide an inclusive overview of the fauna known to occur regionally. The inclusion of a species does not necessarily indicate that it occurs in the same habitats or in the immediate vicinity of the proposed release site.

Data included in the tables were derived from the following documents:

- Paria-Kanab Creek Habitat Management Plan (BLM and AGFD 1983)
- Final Wilderness Management Plan, Paria Canyon-Vermilion Cliffs (BLM 1986)
- Species lists for Grand Canyon National Park (Brown et al. 1993; Butterfield et al. 1981; Miller and Young 1981)
- House Rock Management Plan (Darr 1995: draft)
- Checklists of mammal, reptile and amphibians species for the Kaibab National Forest (USFS, no date)
- Query of Arizona Game and Fish Heritage Data Management System (June 1995)

Note that species lists for each area may not be exhaustive. For example, the *House Rock Management Plan* (Darr 1995) and the *Paria-Kanab Creek Habitat Management Plan* (BLM and AGFD 1983) do not list waterfowl species. The *Final Wilderness Management Plan, Paria Canyon-Vermilion Cliffs* (BLM 1986) provides avian occurrence data for birds of prey only.

I. BIRD SPECIES LIST

Species sequence and scientific names follow American Ornithologists' Union (AOU) *Check-list of North American Birds*, 6th Edition (AOU 1983), as amended through 39th Supplement to the AOU Checklist (1985-1993).

Grand Canyon National Park status codes: C = Common, Ca = Casual, U = Uncommon, R = Rare,
A = Accidental, I=Irregular
All other areas: x = present

Common Name	Scientific Name	Paria-Kanab Cr.	Paria Canyon/Vermilion Cliffs	House Rock Wildlife Area	Grand Canyon NP
Common loon	<i>Gavia immer</i>				Ca
Pacific loon	<i>Gavia pacifica</i>				Ca
Pied-billed grebe	<i>Podilymbus podiceps</i>				R
Horned grebe	<i>Podiceps auritus</i>				Ca
Eared grebe	<i>Podiceps nigricollis</i>				U
Western grebe	<i>Aechmophorus occidentalis</i>				?
Brown pelican	<i>Pelecanus occidentalis</i>				Ca
Double-crested cormorant	<i>Phalacrocorax auritus</i>				C
Magnificent frigatebird	<i>Fregata magnificens</i>				A
American bittern	<i>Botarus lentiginosus</i>				Ca
Great blue heron	<i>Ardea herodias</i>			x	C
Great egret	<i>Casmerodius albus</i>				R
Snowy egret	<i>Egretta thula</i>				U
Cattle egret	<i>Bubulcus ibis</i>				Ca

Common Name	Scientific Name	Paria-Kanab Cr.	Paria Canyon/Vermilion Cliffs	House Rock Wildlife Area	Grand Canyon NP
Green heron	<i>Butorides virescens</i>				R
Black-crowned night-heron	<i>Nycticorax nycticorax</i>				U
White-faced ibis	<i>Plegadis chihi</i>				U
Wood stork	<i>Mycteria americana</i>				Ca
Tundra swan	<i>Cygnus columbianus</i>				Ca
Snow goose	<i>Chen caerulescens</i>				I
Canada goose	<i>Branta canadensis</i>				C
Wood duck	<i>Aix sponsa</i>				Ca
Green-winged teal	<i>Anas crecca</i>				U
Mallard	<i>Anas platyrhynchos</i>				C
Northern pintail	<i>Anas acuta</i>				U
Blue-winged teal	<i>Anas discors</i>				C
Cinammon teal	<i>Anas cyanoptera</i>				U
Northern shoveler	<i>Anas clypeata</i>				R
Gadwall	<i>Anas strepera</i>				C
Eurasian wigeon	<i>Anas penelope</i>				A
American wigeon	<i>Anas americana</i>				C
Canvasback	<i>Aythya valisineria</i>				R
Redhead	<i>Aythya americana</i>				C
Ring-necked duck	<i>Aythya collaris</i>				R
Lesser scaup	<i>Aythya affinis</i>				C
Oldsquaw	<i>Clangula hyemalis</i>				A
White-winged scoter	<i>Melanitta fusca</i>				A
Common goldeneye	<i>Bucephala clangula</i>				C
Barrow's goldeneye	<i>Bucephala islandica</i>				Ca
Bufflehead	<i>Bucephala albeola</i>				C
Hooded merganser	<i>Lophodytes cucullatus</i>				R
Common merganser	<i>Mergus merganser</i>				C
Red-breasted merganser	<i>Mergus serrator</i>				Ca
Ruddy duck	<i>Oxyura jamaicensis</i>				R
Turkey vulture	<i>Cathartes aura</i>	x	x	x	C
Osprey	<i>Pandion haliaetus</i>				U
Bald eagle	<i>Haliaeetus leucocephalus</i>	x	p	x	C
Northern harrier	<i>Circus cyaneus</i>		p	x	U
Sharp-shinned hawk	<i>Accipiter striatus</i>	x	x	x	U
Cooper's hawk	<i>Accipiter cooperii</i>	x	x	x	U
Northern goshawk	<i>Accipiter gentilis</i>		p	x	U
Common black-hawk	<i>Buteogallus anthracinus</i>		p		Ca
Swainson's hawk	<i>Buteo swainsoni</i>			x	U
Zone-tailed hawk	<i>Buteo albonotatus</i>		p		Ca
Red-tailed hawk	<i>Buteo jamaicensis</i>	x	x	x	C
Ferruginous hawk	<i>Buteo regalis</i>		p	x	U
Rough-legged hawk	<i>Buteo lagopus</i>	x	x		U
Golden eagle	<i>Aquila chrysaetos</i>	x	x	x	U
American kestrel	<i>Falco sparverius</i>	x	x	x	C
Merlin	<i>Falco columbarius</i>			x	I
Peregrine falcon	<i>Falco peregrinus</i>	x	x	x	C
Prairie falcon	<i>Falco mexicanus</i>	x	x	x	R
Chukar	<i>Alectoris chukar</i>	x		x	U
Blue grouse	<i>Dendragapus obscurus</i>			x	U

Common Name	Scientific Name	Paria-Kanab Cr.	Paria Canyon/Vermilion Cliffs	House Rock Wildlife Area	Grand Canyon NP
Sage grouse	<i>Centrocercus urophasianus</i>				Ca
Wild turkey	<i>Meleagris gallopavo</i>			x	C
Gambel's quail	<i>Callipepla gambelii</i>			x	C
Virginia rail	<i>Rallus limicola</i>				R
Sora	<i>Porzana carolina</i>				Ca
Common moorhen	<i>Gallinula chloropus</i>				Ca
American coot	<i>Fulica americana</i>				C
Sandhill crane	<i>Grus canadensis</i>				Ca
Snowy plover	<i>Charadrius alexandrinus</i>				Ca
Semipalmated plover	<i>Charadrius semipalmatus</i>				Ca
Kildeer	<i>Charadrius vociferus</i>	x			U
Black-necked stilt	<i>Himantopus mexicanus</i>				U
American avocet	<i>Recurvirostra americana</i>				U
Greater yellowlegs	<i>Tringa melanoleuca</i>				R
Lesser yellowlegs	<i>Tringa flavipes</i>				Ca
Solitary sandpiper	<i>Tringa solitaria</i>				U
Willet	<i>Catoptrophorus semipalmatus</i>				U
Spotted sandpiper	<i>Actitis macularia</i>				C
Long-billed curlew	<i>Numenius americanus</i>				I
Marbled godwit	<i>Limosa fedoa</i>				Ca
Semipalmated sandpiper	<i>Calidris pusilla</i>				A
Western sandpiper	<i>Calidris mauri</i>				R
Least sandpiper	<i>Calidris minutilla</i>				I
Pectoral sandpiper	<i>Calidris melanotos</i>				Ca
Dunlin	<i>Calidris alpina</i>				Ca
Long-billed dowitcher	<i>Limnodromus scolopaceus</i>				I
Common snipe	<i>Gallinago gallinago</i>	x			U
Wilson's phalarope	<i>Phalaropus tricolor</i>				R
Bonaparte's gull	<i>Larus philadelphia</i>				Ca
Ring-billed gull	<i>Larus delawarensis</i>				U
California gull	<i>Larus californicus</i>				U
Herring gull	<i>Larus argentatus</i>				Ca
Sabine's gull	<i>Xema sabini</i>				Ca
Common tern	<i>Sterna hirundo</i>				Ca
Forster's tern	<i>Sterna forsteri</i>				Ca
Black tern	<i>Chlidonias niger</i>				Ca
Rock dove	<i>Columba livia</i>				I
Band-tailed pigeon	<i>Columba fasciata</i>			x	U
Mourning dove	<i>Zenaida macroura</i>	x		x	C
Inca dove	<i>Columbina inca</i>				Ca
Common ground dove	<i>Columba passerina</i>				Ca
Yellow-billed cuckoo	<i>Coccyzus americanus</i>				?
Greater roadrunner	<i>Geococcyx californianus</i>			x	U
Barn owl	<i>Tyto alba</i>				?
Flammulated owl	<i>Otus flammeolus</i>		p	x	C
Western screech-owl	<i>Otus kennicotti</i>	x	p	x	U
Great horned owl	<i>Bubo virginianus</i>	x	x	x	C
Northern pygmy owl	<i>Glaucidium gnoma</i>	x		x	R
Burrowing owl	<i>Speotyto cunicularia</i>	x	p	x	?
(Mexican) spotted owl	<i>Strix occidentalis (lucida)</i>		p	x	R

Common Name	Scientific Name	Paria-Kanab Cr.	Paria Canyon/ Vermilion Cliffs	House Rock Wildlife Area	Grand Canyon NP
Long-eared owl	<i>Asio otus</i>	x	p	x	U
Short-eared owl	<i>Asio flammeus</i>			x	
Northern saw-whet owl	<i>Aegolius acadicus</i>		p	x	I
Lesser nighthawk	<i>Chordeiles acutipennis</i>				R
Common nighthawk	<i>Chordeiles minor</i>			x	C
Common poorwill	<i>Phalaenoptilus nuttallii</i>			x	C
Whip-poor-will	<i>Caprimulgus vociferus</i>				Ca
Vaux's swift	<i>Chaetura vauxi</i>			x	I
White-throated swift	<i>Aeronautes saxatalis</i>			x	C
Magnificent hummingbird	<i>Eugenes fulgens</i>				R
Black-chinned hummingbird	<i>Archilochus alexandri</i>	x		x	C
Anna's hummingbird	<i>Calypte anna</i>				Ca
Costa's hummingbird	<i>Calypte costae</i>	x			C
Calliope hummingbird	<i>Stellula calliope</i>			x	U
Broad-tailed hummingbird	<i>Selasphorus platycercus</i>	x		x	C
Rufous hummingbird	<i>Selasphorus rufus</i>			x	C
Belted kingfisher	<i>Ceryle alcyon</i>	x			C
Lewis' woodpecker	<i>Melanerpes lewis</i>			x	U
Acorn woodpecker	<i>Melanerpes formicivorus</i>			x	U
Gila woodpecker	<i>Melanerpes uropygialis</i>				Ca
Red-naped sapsucker	<i>Sphyrapicus nuchalis</i>			x	C
Williamson's sapsucker	<i>Sphyrapicus thyroideus</i>				U
Ladder-backed woodpecker	<i>Picoides scalaris</i>			x	R
Downy woodpecker	<i>Picoides pubescens</i>			x	R
Hairy woodpecker	<i>Picoides villosus</i>			x	C
Three-toed woodpecker	<i>Picoides tridactylus</i>				R
Northern flicker	<i>Colaptes auratus</i>	x		x	C
Pileated woodpecker	<i>Dryocopus pileatus</i>				A
Olive-sided flycatcher	<i>Contopus borealis</i>			x	U
Western wood peewee	<i>Contopus sordidulus</i>			x	C
(Southwestern) willow flycatcher	<i>Empidonax traillii (extimus)</i>			x	R
Hammond's flycatcher	<i>Empidonax hammondii</i>				?
Dusky flycatcher	<i>Empidonax oberholseri</i>				?
Gray flycatcher	<i>Empidonax wrightii</i>	x			C
Cordilleran flycatcher	<i>Empidonax occidentalis</i>			x	R
Black phoebe	<i>Sayornis nigricans</i>	x		x	C
Say's phoebe	<i>Sayornis saya</i>	x		x	C
Vermilion flycatcher	<i>Pyrocephalus rubinus</i>				R
Ash-throated flycatcher	<i>Myiarchus cinerascens</i>	x		x	C
Brown-crested flycatcher	<i>Myiarchus tyrannulus</i>				I
Cassin's kingbird	<i>Tyrannus vociferans</i>	x		x	C
Western kingbird	<i>Tyrannus verticalis</i>	x		x	U
Eastern kingbird	<i>Tyrannus tyrannus</i>				Ca
Horned lark	<i>Eremophila alpestris</i>	x		x	C
Tree swallow	<i>Tachycineta bicolor</i>			x	R
Violet-green swallow	<i>Tachycineta thalassina</i>			x	C
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>			x	C
Bank swallow	<i>Riparia riparia</i>			x	R

Common Name	Scientific Name	Paria-Kanab Cr.	Paria Canyon/ Vermilion Cliffs	House Rock Wildlife Area	Grand Canyon NP
Cliff swallow	<i>Hirundo pyrrhonota</i>			x	R
Barn swallow	<i>Hirundo rustica</i>			x	R
Purple martin	<i>Progne subis</i>			x	U
Steller's jay	<i>Cyanocitta stelleri</i>			x	C
Scrub jay	<i>Aphelocoma ultramarina</i>	x		x	C
Pinyon jay	<i>Gymnorhinus cyanocephalus</i>	x		x	C
Clark's nutcracker	<i>Nucifraga columbiana</i>			x	C
Black-billed magpie	<i>Pica pica</i>				I
American crow	<i>Corvus brachyrhynchos</i>			x	I
Common raven	<i>Corvus corax</i>			x	C
Mountain chickadee	<i>Parus gambeli</i>	x		x	C
Bridled titmouse	<i>Parus wolweberi</i>				Ca
Plain titmouse	<i>Parus inornatus</i>	x		x	C
Verdin	<i>Auriparus flaviceps</i>				?
Bushtit	<i>Psaltriparus minimus</i>	x		x	C
Red-breasted nuthatch	<i>Sitta canadensis</i>				U
White-breasted nuthatch	<i>Sitta carolinensis</i>	x		x	C
Pygmy nuthatch	<i>Sitta pygmaea</i>			x	C
Brown creeper	<i>Certhia americana</i>			x	C
Cactus wren	<i>Campylorhynchus brunneicapillus</i>			x	U
Rock wren	<i>Salpinctes obsoletus</i>			x	C
Canyon wren	<i>Catherpes mexicanus</i>			x	C
Bewick's wren	<i>Thryomanes bewickii</i>			x	C
House wren	<i>Troglodytes aedon</i>	x		x	C
Winter wren	<i>Troglodytes troglodytes</i>			x	R
Marsh wren	<i>Cistothorus palustris</i>				U
American dipper	<i>Cinclus mexicanus</i>			x	C
Golden-crowned kinglet	<i>Regulus satrapa</i>				U
Ruby-crowned kinglet	<i>Regulus calendula</i>			x	C
Blue-gray gnatcatcher	<i>Polioptila caerulea</i>	x		x	C
Black-tailed gnatcatcher	<i>Polioptila melanura</i>				R
Western bluebird	<i>Sialia mexicana</i>			x	C
Mountain bluebird	<i>Sialia currucoides</i>			x	C
Townsend's solitaire	<i>Myadestes townsendi</i>			x	C
Hermit thrush	<i>Catharus guttatus</i>			x	C
Rufous-backed robin	<i>Turdus rufopalliatus</i>				A
American robin	<i>Turdus migratorius</i>			x	C
Catbird	<i>Dumetella carolinensis</i>				Ca
Northern mockingbird	<i>Mimus polyglottos</i>	x		x	U
Le Conte's Thrasher	<i>Toxostoma lecontei</i>				Ca
Crissal Thrasher	<i>Toxostoma crissale</i>				R
Sage thrasher	<i>Oreoscoptes montanus</i>			x	U
American pipit	<i>Anthus rubescens</i>				R
Bohemian waxwing	<i>Bombycilla garrulus</i>				I
Cedar waxwing	<i>Bombycilla cedrorum</i>			x	U
Phainopepla	<i>Phainopepla nitens</i>			x	U
Northern shrike	<i>Lanius excubitor</i>				Ca
Loggerhead shrike	<i>Lanius ludovicianus</i>	x		x	U
European starling	<i>Sturnus vulgaris</i>			x	U

Common Name	Scientific Name	Paria-Kanab Cr.	Paria Canyon/ Vermilion Cliffs	House Rock Wildlife Area	Grand Canyon NP
Bell's vireo	<i>Vireo bellii</i>			x	C
Gray vireo	<i>Vireo vicinior</i>	x		x	R
Solitary vireo	<i>Vireo solitarius</i>			x	C
Warbling vireo	<i>Vireo gilvus</i>			x	U
Philadelphia vireo	<i>Vireo philadelphicus</i>				A
Red-eyed vireo	<i>Vireo olivaceus</i>				A
Tennessee warbler	<i>Vermivora peregrina</i>				A
Orange-crowned warbler	<i>Vermivora celata</i>			x	U
Nashville warbler	<i>Vermivora ruficapilla</i>				U
Virginia's warbler	<i>Vermivora virginiae</i>			x	C
Lucy's warbler	<i>Vermivora luciae</i>			x	C
Yellow warbler	<i>Dendroica petechia</i>			x	C
Chestnut-sided warbler	<i>Dendroica pensylvanica</i>				Ca
Magnolia warbler	<i>Dendroica magnolia</i>				Ca
Black-throated blue warbler	<i>Dendroica caerulescens</i>				A
Yellow-rumped warbler	<i>Dendroica coronata</i>			x	C
Black-throated gray warbler	<i>Dendroica nigrescens</i>	x		x	C
Townsend's warbler	<i>Dendroica townsendi</i>			x	U
Hermit warbler	<i>Dendroica occidentalis</i>				U
Black-throated green warbler	<i>Dendroica virens</i>				A
Yellow-throated warbler	<i>Dendroica dominica</i>				A
Grace's warbler	<i>Dendroica graciae</i>				C
Palm warbler	<i>Dendroica palmarum</i>				A
Bay-breasted warbler	<i>Dendroica castanea</i>				A
American redstart	<i>Setophaga ruticilla</i>				Ca
Worm-eating warbler	<i>Helmitheros vermivorus</i>				A
Ovenbird	<i>Seiurus aurocapillus</i>				A
Northern waterthrush	<i>Seirus noveboracensis</i>				I
Kentucky warbler	<i>Oporornis formosus</i>				A
MacGillivray's warbler	<i>Oporonis tolmiei</i>			x	U
Common yellowthroat	<i>Geothlypis trichas</i>			x	C
Wilson's warbler	<i>Wilsonia pusilla</i>			x	C
Red-faced warbler	<i>Cardellina rubrifrons</i>				R
Painted redstart	<i>Myioborus pictus</i>			x	Ca
Yellow-breasted chat	<i>Icteria virens</i>			x	C
Hepatic tanager	<i>Piranga flava</i>			x	Ca
Summer tanager	<i>Piranga rubra</i>				R
Scarlet tanager	<i>Piranga olivacea</i>				A
Western tanager	<i>Piranga ludoviciana</i>			x	C
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>			x	I
Black-headed grosbeak	<i>Pheucticus melanocephalus</i>			x	C
Blue grosbeak	<i>Guiraca caerulea</i>				C
Indigo bunting	<i>Passerina cyanea</i>				U
Lazuli bunting	<i>Passerina amoena</i>				C
Painted bunting	<i>Passerina ciris</i>				A
Dickcissel	<i>Spiza americana</i>				A
Green-tailed towhee	<i>Pipilo chlorurus</i>			x	C
Rufous-sided towhee	<i>Pipilo erythrophthalmus</i>			x	C
Canyon towhee	<i>Pipilo fuscus</i>			x	?
Rufous-crowned sparrow	<i>Aimophila ruficeps</i>			x	U

Common Name	Scientific Name	Paria-Kanab Cr.	Paria Canyon/Vermilion Cliffs	House Rock Wildlife Area	Grand Canyon NP
American tree sparrow	<i>Spizella arborea</i>				Ca
Chipping sparrow	<i>Spizella passerina</i>	x		x	C
Brewer's sparrow	<i>Spizella breweri</i>	x		x	U
Black-chinned sparrow	<i>Spizella atrogularis</i>			x	R
Vesper sparrow	<i>Pooecetes gramineus</i>			x	U
Lark sparrow	<i>Chondestes grammacus</i>	x		x	C
Black-throated sparrow	<i>Amphispiza bilineata</i>	x		x	C
Sage sparrow	<i>Amphispiza belli</i>			x	R
Lark bunting	<i>Calamospiza melanocorys</i>			x	I
Savannah sparrow	<i>Passerculus sandwichensis</i>			x	R
Grasshopper sparrow	<i>Ammodramus savannarum</i>				Ca
Fox sparrow	<i>Passerella iliaca</i>				R
Song sparrow	<i>Melospiza melodia</i>			x	C
Lincoln's sparrow	<i>Melospiza lincolnii</i>			x	U
Swamp sparrow	<i>Melospiza georgiana</i>				Ca
White-throated sparrow	<i>Zonotrichia albicollis</i>				Ca
Golden-crowned sparrow	<i>Zonotrichia atricapilla</i>				Ca
White-crowned sparrow	<i>Zonotrichia leucophrys</i>			x	C
Harris' sparrow	<i>Zonotrichia querula</i>				Ca
Dark-eyed junco	<i>Junco hyemalis</i>	x		x	C
Red-winged blackbird	<i>Agelaius phoeniceus</i>			x	C
Eastern meadowlark	<i>Sturnella magna</i>				U
Western meadowlark	<i>Sturnella neglecta</i>	x		x	C
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>			x	U
Rusty blackbird	<i>Euphagus carolinus</i>				Ca
Brewer's blackbird	<i>Euphagus cyanocephalus</i>			x	C
Great-tailed grackle	<i>Quiscalus mexicanus</i>				C
Bronzed cowbird	<i>Molothrus aeneus</i>			x	Ca
Brown-headed cowbird	<i>Molothrus ater</i>			x	C
Hooded oriole	<i>Icterus cucullatus</i>			x	C
Northern oriole	<i>Icterus galbula</i>			x	C
Scott's oriole	<i>Icterus parisorum</i>			x	C
Gray-crowned rosy finch	<i>Leucosticte tephrocotis</i>				I
Pine grosbeak	<i>Pinicola enucleator</i>				I
Purple finch	<i>Carpodacus purpureus</i>				?
Cassin's finch	<i>Carpodacus cassinii</i>			x	C
House finch	<i>Carpodacus mexicanus</i>			x	C
Red crossbill	<i>Loxia curvirostra</i>			x	U
Pine siskin	<i>Carduelis pinus</i>			x	C
Lesser goldfinch	<i>Carduelis psaltria</i>			x	C
American goldfinch	<i>Carduelis tristis</i>			x	R
Evening grosbeak	<i>Coccothraustes vespertinus</i>			x	I
House sparrow	<i>Passer domesticus</i>			x	C

II. MAMMAL SPECIES LIST

Kaibab Natl Forest status codes: C = Common; F = Fairly Common; U = Uncommon; R = Rare; E = Extirpated

Grand Canyon NP status codes: C = Common; Ca = Casual; U = Uncommon; R = Rare; ? = Status Uncertain

Other areas: x = present

Common Name	Scientific Name	Paria-Kanab Cr.	House Rock WA	Kaibab NF	GCNP
Shrews					
Merriam's shrew	<i>Sorex merriami</i>		x		R
Dwarf shrew	<i>Sorex nanus</i>		x	U	R
Vagrant shrew	<i>Sorex vagrans</i>			U	
Gray (desert) shrew	<i>Notiosorex crawfordi</i>		x	C	R
Bats					
California leaf-nosed bat	<i>Macrotuss californicus</i>				?
Little brown myotis	<i>Myotis lucifugus</i>			C	
Yuma myotis	<i>Myotis yumanensis</i>			C	C
Long-eared myotis	<i>Myotis evotis</i>			C	U
Fringed myotis	<i>Myotis thysanodes</i>			C	U
Long-legged myotis	<i>Myotis volans</i>			C	C
Cave myotis	<i>Myotis velifer</i>			C	
California myotis	<i>Myotis californicus</i>			C	C
Small-footed myotis	<i>Myotis leibii</i>			C	U
Silver-haired bat	<i>Lasionycteris noctivagans</i>			C	R
Western pipistrelle	<i>Pipistrellus hesperus</i>			F	C
Big brown bat	<i>Eptesicus fuscus</i>			C	C
Red bat	<i>Lasiurus borealis</i>			R	R
Hoary bat	<i>Lasiurus cinereus</i>			C	R
Spotted bat	<i>Euderma maculatum</i>	x	x	R	?
Townsend's big-eared bat	<i>Plecotus townsendii</i>			C	U
Allen's or Mexican big-eared bat	<i>Idionycteris phyllotis</i>				Ca
Pallid bat	<i>Antrozous pallidus</i>	x		C	C
Mexican free-tailed bat	<i>Tadarida brasiliensis</i>			?	U
Big free-tailed bat	<i>Tadarida macrotis</i>			R	R
Lagomorphs					
Black-tailed jackrabbit	<i>Lepus californicus</i>	x	x	C	U
Eastern cottontail	<i>Sylvilagus floridanus</i>			F	?
Mountain or Nuttall's cottontail	<i>Sylvilagus nuttallii</i>			U	U
Desert cottontail	<i>Sylvilagus audubonii</i>	x	x	C	C
Squirrels, Chipmunks and Prairie Dogs					
Whitetail prairie dog	<i>Cynomys gunnisoni</i>			F	R
Spotted ground squirrel	<i>Spermophilus spilosoma</i>				R
Rock squirrel	<i>Spermophilus variegatus</i>	x	x	C	C
Golden-mantled ground squirrel	<i>Spermophilus lateralis</i>		x	C	C
Spotted ground squirrel	<i>Spermophilus spilosoma</i>			F	
Harris' antelope ground squirrel	<i>Amnospermophilus harrisii</i>			C	R
White-tailed antelope squirrel	<i>Amnospermophilus leucurus</i>	x	x	F	C
Least chipmunk	<i>Eutamias minimus</i>		x	R	C
Gray-necked (collared) chipmunk	<i>Eutamias cinereicolis</i>			U	
Colorado chipmunk	<i>Eutamias quadrivittatus</i>				?
Uinta chipmunk	<i>Eutamias umbrinus</i>		x	U	C

Common Name	Scientific Name	Paria-Kanab Cr.	House Rock WA	Kaibab NF	GCNP
Cliff chipmunk	<i>Eutamias dorsalis</i>		x	C	C
Abert squirrel	<i>Sciurus aberti</i>			C	C
Kaibab squirrel	<i>Sciurus kaibensis</i>		x	R	U
Red or spruce squirrel	<i>Tamiasciurus hudsonicus</i>			R	C
Pocket Gophers					
Pocket gopher	<i>Thomomys sp.</i>		x		
Common or valley pocket gopher	<i>Thomomys bottae</i>			C	C
Northern pocket gopher	<i>Thomomys talpoides</i>			C	C
Pocket Mice and Kangaroo Rats					
Pocket mouse	<i>Perognathus sp.</i>	x	x		
Silky pocket mouse	<i>Perognathus flavus</i>			U	U
Bailey's pocket mouse	<i>Perognathus baileyi</i>			F	
Desert pocket mouse	<i>Perognathus penicillatus</i>			F	
Great basin pocket mouse	<i>Perognathus parvus</i>			F	
Little pocket mouse	<i>Perognathus longimembris</i>			F	
Long-tailed pocket mouse	<i>Perognathus formosus</i>			F	U
Rock pocket mouse	<i>Perognathus intermedius</i>			F	C
Plains pocket mouse	<i>Perognathus flavescens</i>			F	
Coconino (Navajo) pocket mouse	<i>Perognathus amplus ammodytes</i>				x
Merriam's kangaroo rat	<i>Dipodomys ordii</i>			F	R
Ord's kangaroo rat	<i>Dipodomys ordii</i>	x	x	R	R
Desert kangaroo rat	<i>Dipodomys deserti</i>			R	
Chisel-toothed kangaroo rat	<i>Dipodomys microps</i>	x		F	?
House Rock Valley chisel-toothed kangaroo rat	<i>Dipodomys microps leucotis</i>		x	F	?
Beavers					
Beaver	<i>Castor canadensis</i>	x		R	U
New World Rats and Mice					
Western harvest mouse	<i>Reithrodontomys megalotis</i>		x	C	C
Canyon mouse	<i>Peromyscus crinitus</i>	x	x	F	C
Cactus mouse	<i>Peromyscus eremicus</i>		x	C	C
Deer mouse	<i>Peromyscus maniculatus</i>	x	x	C	C
Brush mouse	<i>Peromyscus boylii</i>		x	F	C
Pinyon mouse	<i>Peromyscus truei</i>	x	x	C	C
Northern grasshopper mouse	<i>Onychomys leucogaster</i>	x	x	U	U
Southern grasshopper mouse	<i>Onychomys torridus</i>			C	?
Wood rat	<i>Neotoma sp.</i>	x	x		
White-throated wood rat	<i>Neotoma albigula</i>			C	C
Desert wood rat	<i>Neotoma lepida</i>			F	C
Stephen's wood rat	<i>Neotoma stephensi</i>			F	C
Mexican wood rat	<i>Neotoma mexicana</i>			F	C
Bushy-tailed wood rat	<i>Neotoma cinerea</i>			F	C
Long-tailed vole	<i>Microtus longicaudus</i>		x	F	C
Mexican vole	<i>Microtus mexicanus</i>			U	C
Montane vole		x			
Muskrat	<i>Ondatra zibethicus</i>				?
Old World Mice and Rats					
House mouse	<i>Mus musculus</i>		x	C	U
American Porcupines					
Porcupine	<i>Erethizon dorsatum</i>	x	x	F	C
Dogs and Allies					

Common Name	Scientific Name	Paria-Kanab Cr.	House Rock WA	Kaibab NF	GCNP
Coyote	<i>Canis latrans</i>	x	x	C	C
Red fox	<i>Vulpes fulva</i>			U	?
Kit fox	<i>Vulpes macrotis</i>				?
Gray fox	<i>Urocyon cinereoargenteus</i>	x	x	F	U
Bears					
Black bear	<i>Ursus americana</i>			F	R
Raccoons and Allies					
Ringtail	<i>Bassariscus astutus</i>	x	x	U	C
Raccoon	<i>Procyon lotor</i>	x		F	R
Weasels and Allies					
Long-tailed weasel	<i>Mustela frenata</i>		x	U	U
American badger	<i>Taxidea taxus</i>	x	x	U	U
Western spotted skunk	<i>Spilogale gracilis</i>	x	x	U	C
Hog-nosed skunk	<i>Conepatus mesoleucus</i>			U	
Hooded skunk	<i>Mephitis macroura</i>			U	
Striped skunk	<i>Mephitis mephitis</i>	x	x	F	C
River otter	<i>Lutra canadensis</i>				R
Cats					
Mountain lion	<i>Felis concolor</i>	x	x	U	R
Bobcat	<i>Lynx rufus</i>	x	x	F	C
Peccaries					
Javelina (collared peccary)	<i>Dicotyles tajacu</i>			F	
Artiodactyls					
Elk	<i>Cervus elaphus</i>			C	R
Mule deer	<i>Odocoileus hemionus</i>	x	x	C	C
White-tailed deer	<i>Odocoileus virginianus</i>			U	
Pronghorn antelope	<i>Antilocapra americana</i>	x	x	U	R
Desert bighorn sheep	<i>Ovis canadensis</i>	x	x	R	U
Bison	<i>Bison bison</i>		x	U	

III. REPTILES AND AMPHIBIANS

Grand Canyon NP status codes: C = Common; U = Uncommon; R = Rare; A = Accidental; L = Local

Kaibab Natl. Forest status codes: C = Common; F = Fairly Common; U = Uncommon; R = Rare; E = Extirpated

Other areas: x = present

Common Name	Scientific Name	Paria-Kanab Cr.	House Rock WA	Grand Canyon NP	Kaibab NF
Amphibians					
Tiger salamander	<i>Ambystoma tigrinum</i>		x		U
Utah tiger salamander	<i>Ambystoma tigrinum utahensis</i>			L	
Arizona tiger salamander	<i>Ambystoma tigrinum nebulosum</i>			R	
Woodhouse's toad	<i>Bufo woodhousei</i>	x	x		C
Rocky mountain toad	<i>Bufo woodhousei woodhousei</i>			C	
Great Plains toad	<i>Bufo cognatus</i>	x		R	C
Red spotted toad	<i>Bufo punctatus</i>	x	x	C	C
Great Basin spadefoot	<i>Scaphiopus intermontanus</i>	x	x	L	C
Western spadefoot	<i>Scaphiopus hammondi</i>				C
Striped chorus frog	<i>Pseudacris triseriata</i>				U
Canyon tree frog	<i>Hyla arenicolor</i>	x	x	C	U
Northern leopard frog	<i>Rana pipiens</i>	x	x	R	R
Bullfrog	<i>Rana catesbeiana</i>				C
Reptiles					
Gopher tortoise	<i>Gopherus agassizii</i>			R	
Western box turtle	<i>Terrapene ornata</i>			A	
Desert banded gecko	<i>Coleonyx variegatus variegatus</i>			U	
Utah banded gecko	<i>Coleonyx variegatus utahensis</i>			R	
Desert night lizard	<i>Xantusia vigilis vigilis</i>			R	
Arizona night lizard	<i>Xantusia vigilis arizonae</i>			R	
Western chuckwalla	<i>Sauromalus obesus obesus</i>	x		U	U
Lesser earless lizard	<i>Holbrookia maculata</i>				U
Desert iguana	<i>Dipsosaurus dorsalis dorsalis</i>			R	
Zebra tailed lizard	<i>Callisaurus draconoides</i>			U	
Long nosed leopard lizard	<i>Gambelia wislizenii</i>			R	U
Collared lizard	<i>Crotaphytus collaris baileyi</i>	x	x	C	F
Desert collared lizard	<i>Crotaphytus insularis</i>		x		
Black-collared lizard	<i>Crotaphytus insularis bicinctores</i>			C	
Desert spiny lizard	<i>Sceloporus magister</i>	x	x		F
Yellow-backed spiny lizard	<i>Sceloporus magister uniformis</i>			C	
Eastern fence lizard	<i>Sceloporus undulatus</i>		x		C
Northern plateau lizard	<i>Sceloporus undulatus elongatus</i>			C	
Southern plateau lizard	<i>Sceloporus undulatus tristichus</i>			C	
Sagebrush lizard	<i>Sceloporus graciosus</i>		x		U
Northern sagebrush lizard	<i>Sceloporus graciosus graciosus</i>			C	
Tree lizard	<i>Urosaurus ornatus</i>		x	C	C
Western brush lizard	<i>Urosaurus graciosus graciosus</i>			R	
Side-blotched lizard	<i>Uta stansburiana</i>	x	x		F
Northern side-blotched lizard	<i>Uta stansburiana stansburiana</i>			C	
Desert side-blotched lizard	<i>Uta stansburiana stejnegeri</i>			C	
Short-horned lizard	<i>Phrynosoma douglassi</i>		x		C

Common Name	Scientific Name	Paria-Kanab Cr.	House Rock WA	Grand Canyon NP	Kaibab NF
Mountain short-horned lizard	<i>Phrynosoma douglassi hernandesi</i>			C	
Desert horned lizard	<i>Phrynosoma platyrhinos</i>				C
Southern desert horned lizard	<i>Phrynosoma platyrhinos calidiarum</i>			R	
Plateau striped whiptail	<i>Cnemidophorus velox</i>		x		C
Western whiptail	<i>Cnemidophorus tigris</i>		x		C
Northern whiptail	<i>Cnemidophorus tigris septentrionalis</i>			C	
Arizona (Madrean) alligator lizard	<i>Gerrhonotus kingii</i>				F
Many-lined skink	<i>Eumeces multivirgatus</i>				U
Southern many-lined skink	<i>Eumeces multivirgatus epipleurotus</i>		x	R	
Great Plains skink	<i>Eumeces obsoletus</i>				U
Western skink	<i>Eumeces skiltonianus</i>		x		U
Great Basin skink	<i>Eumeces skiltonianus utahensis</i>			R	
Banded gila monster	<i>Heloderma suspectum cinctum</i>			R	
Western blind snake	<i>Leptotyphlops humilis humilis</i>			R	
Ringneck snake	<i>Diadophis punctatus</i>				U
Red racer snake	<i>Masticophis flagellum piceus</i>	x	x	U	
Striped whipsnake	<i>Masticophis taeniatus</i>	x	x		F
Desert striped whipsnake	<i>Masticophis taeniatus taeniatus</i>			C	
Graham (mountain) patch-nosed snake	<i>Salvadora grahamiae</i>				U
Western patch-nosed snake	<i>Salvadora hexalepis</i>		x		C
Mojave patch-nosed snake	<i>Salvadora hexalepis mojavensis</i>	x		U	
Sonoran lyre snake	<i>Trimorphodon biscutatus lambda</i>			R	
Arizona glossy snake	<i>Arizona elegans noctivaga</i>			R	
Desert glossy snake	<i>Arizona elegans eburnata</i>			R	
Gopher snake	<i>Pituophis melanoleucus</i>		x		C
Sonoran gopher snake	<i>Pituophis melanoleucus affinis</i>	x		C	
Great Basin gopher snake	<i>Pituophis melanoleucus deserticola</i>	x		C	
Sonoran mountain kingsnake	<i>Lampropeltis pyromelana</i>		x		U
Utah mountain kingsnake	<i>Lampropeltis pyromelana infralabialis</i>			R	
Common kingsnake	<i>Lampropeltis getulus</i>		x		U
California kingsnake	<i>Lampropeltis getulus californica</i>			C	
Milksnake	<i>Lampropeltis triangulum</i>				F
Western long-nosed snake	<i>Rhinocheilus lecontei lecontei</i>			R	
Western terrestrial garter snake	<i>Thamnophis elegans</i>		x		C
Wandering garter snake	<i>Thamnophis elegans vagrans</i>			U	
Long-nosed garter snake	<i>Thamnophis angustirostris</i>			R	
Western ground snake	<i>Sonora semiannulata gloydi</i>			U	F
Western shovel-nosed snake	<i>Chionactis occipitalis</i>				F
Night snake	<i>Hypsiglena torquata</i>				C
Desert night snake	<i>Hypsiglena torquata deserticola</i>			R	
Spotted night snake	<i>Hypsiglena ochrorhyncha</i>		x	R	
Utah black-headed snake	<i>Tantilla planiceps utahensis</i>			R	

Common Name	Scientific Name	Paria-Kanab Cr.	House Rock WA	Grand Canyon NP	Kaibab NF
Southwestern black-headed snake	<i>Tantilla hobartsmithi</i>		x		U
Southwestern speckled rattlesnake	<i>Crotalus mitchelli pyrrhus</i>			R	
Black-tailed rattlesnake	<i>Crotalus molossus</i>				C
Northern black-tailed rattlesnake	<i>Crotalus molossus molossus</i>	x	x	R	
Western rattlesnake	<i>Crotalus viridis</i>		x		C
Arizona black rattlesnake	<i>Crotalus viridis cerberus</i>				F
Grand Canyon rattlesnake	<i>Crotalus viridis abyssus</i>			x	
Great Basin rattlesnake	<i>Crotalus viridis lutosus</i>	x		x	C
Hopi rattlesnake	<i>Crotalus viridis nuntius</i>			x	
Mojave rattlesnake	<i>Crotalus scutulatus scutulatus</i>			x	

APPENDIX E

California Condor Recovery Team (July 1995)

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Ventura, California

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St. Paul, Minnesota

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Los Angeles, California

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The Peregrine Fund
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APPENDIX F

State, Federal and Tribal Participants and Reviewers

The following agencies and organizations have been consulted and/or have participated in the development phase of the proposed action. Terms of cooperation among the tribal and governmental organizations which will be directly involved in the release and management of the condors are being developed through an interagency Memorandum of Understanding (MOU).

Arizona Game and Fish Department
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Phoenix, Arizona
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Region 2 Headquarters
Flagstaff, Arizona
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Navajo Natural Heritage Program
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The Peregrine Fund
World Center for Birds of Prey
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USDA Forest Service
Kaibab National Forest, Supervisor's Office
Williams, Arizona
Contact: Keith Menasco, Forest Wildl. Staff
Officer
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USDA Forest Service
Kaibab National Forest, North Kaibab Ranger
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Fredonia, Arizona
Contact: Dan Garcia, District Wildlife Staff Officer
520/643-8125

USDI Bureau of Land Management
Arizona Strip District, Vermillion Resource Area
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USDI Fish and Wildlife Service
Region 1: Ventura Field Office
Ventura, California
Contact: Robert Mesta, Condor Program Coord.
805/644-1766

USDI Fish and Wildlife Service
Region 2: Arizona State Office
Phoenix, Arizona
Contact: Rob Marshall, Ornithologist
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USDI National Park Service
Glen Canyon National Recreation Area
Page, Arizona
Contact: Clive Pinnock, Resource Mgmt. Specialist
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USDI National Park Service
Grand Canyon National Park
Grand Canyon, Arizona
Contact: John Ray, Wildlife Biologist
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APPENDIX G

Schedule of Coordination and Scoping Meetings for the Proposed Release of California Condors in Arizona

- September, 1989:** California Condor Recovery Team (CRT) members met with Arizona Game and Fish Department (AGFD) biologists to evaluate the Grand Canyon area as a potential release site for California condors. This meeting included a flight over the Grand Canyon.
- 13 November 1990:** First scoping meeting to discuss the possible reintroduction of California condors in northern Arizona is coordinated by the U.S. Fish and Wildlife Service (USFWS). Presentations included updates on the California Condor Recovery Program by the CRT and a discussion by the AGFD on their 12-Step Reintroduction Evaluation Protocols. Over 20 agencies and organizations attended the meeting.
- 20 August 1991:** USFWS coordinated a reconnaissance flight of the northern Arizona area to survey potential California condor reintroduction areas. Participating were the Bureau of Land Management (BLM), The Peregrine Fund (TPF), AGFD, CRT and the Hualapai Indian Reservation.
- 21 August 1991:** USFWS conducted a coordination meeting on the proposal to reintroduce condors in northern Arizona. In attendance were representatives from the Coconino National Forest, TPF, BLM, Grand Canyon National Park, AGFD, CRT, and Hualapai Indian Reservation.
- 5 December 1991:** Condor Program Coordinator (USFWS Region-1) briefed Regional Director (USFWS Region-2) and Endangered Species staff on proposal to introduce condors into Arizona; meeting took place at the regional office, Albuquerque, New Mexico. USFWS Arizona State Office representative was present.
- 12 August 1992:** Coordination meeting was held at the AGFD's state office (Phoenix) to discuss proposed California condor reintroduction in Arizona. In attendance were the USFWS, AGFD, and the CRT.
- 2 November 1992:** Condor Program Coordinator (R-1) briefed Region 2 Endangered Species staff on proposal to introduce condors into Arizona; meeting took place at the regional office, Albuquerque, New Mexico. USFWS Arizona State Office representative was present..
- 16 June 1993:** Condor Program Coordinator (R-1) met with AGFD and USFWS Arizona State Office (Phoenix) to discuss proposed California condor reintroduction in Arizona.
- 14 February 1994:** The USFWS Arizona State Office conducted a public informational meeting on the proposal to reintroduce California condors in Arizona at the BLM office in Phoenix, Arizona. Presentations were made by USFWS, AGFD and the CRT. The meeting was attended by a variety of federal and state agencies and the public.

- 15-16 February 1994:** USFWS's Arizona State Office conducted a ground reconnaissance of Paria Plateau/Vermilion Cliffs area to evaluate its potential as a release site for condors. Participants included the BLM, AGFD, CRT, and TPF.
- 9 August 1994:** USFWS Arizona State Office conducted a public informational meeting in Kanab, Utah on the proposal to release California condors in northern Arizona. Meeting included presentations by AGFD, CRT, and the USFWS.
- 24 April 1995:** Condor Program Coordinator met with TPF in Boise, Idaho to discuss development of environmental assessment for proposed condor release in Arizona.
- 27 April 1995:** Meeting to discuss Arizona condor release proposal is conducted at the USFWS Regional Office in Albuquerque, New Mexico. In attendance were the Regional Director (R-1), Acting Regional Director (R-2), Condor Program Coordinator, and the USFWS Arizona State Office representative.
- 28 April 1995:** Condor Program Coordinator met with the AGFD and the USFWS's Arizona State Office to update them on proposal to reintroduce condors in Arizona.
- 7 May 1995:** Meeting was held at the AGFD's State Office (Phoenix) to discuss the latest developments in the proposal to reintroduce condors in Arizona. In attendance were the AGFD, USFWS, and the BLM.
- 8 May 1995:** Meeting was held at the AGFD's Region 2 Office (Flagstaff) to discuss the latest developments in the proposal to reintroduce condors in Arizona. In attendance were the USFWS, AGFD, TPF, CRT, BLM, The Navajo Nation, and Grand Canyon National Park.
- 9 May 1995:** Reconnaissance flight was conducted to review previously inspected potential release sites. Participants included TPF, CRT, and the AGFD.
- 9 May 1995:** USFWS Condor Program Coordinator met with representatives of the Hualapai Indian Reservation in Flagstaff to inform them of the latest developments in the proposal to release condors in Arizona.
- 28 May-1 June 1995:** TPF's Environmental Assessment Biologist began data compilation and agency coordination pursuant to preparation of the environmental assessment on the proposed release of California condors in northern Arizona. Contacted and/or met with agency representatives from AGFD, BLM, USFS, Navajo Heritage Program, Utah Division of Wildlife Resources, and NPS offices in northern Arizona and southern Utah. (Major meetings are listed separately below).
- 10 May 1995:** Conducted a field inspection of possible release sites at the Vermilion Cliffs. Participants included the AGFD, BLM, USFWS, CRT, and TPF.
- 1 June 1995:** Condor Program Coordinator met with the Hualapai Indian Nation and presented an informational slide show on the condor recovery effort and the proposal to release condors in the northern Arizona area.

- 2 June 1995:** Condor Program Coordinator met with the AGFD State Office and the USFWS Arizona State Office to update them on proposal to reintroduce condors in Arizona.
- 2 June 1995:** Condor Program Coordinator met with the Kaibab National Forest and the AGFD's Region 2 Supervisor (Flagstaff) to provide update on condor reintroduction proposal in Arizona.
- 8-9 June 1995:** TPF's Environmental Assessment Biologist met with AGFD representatives in Phoenix office to coordinate work on the environmental assessment with AGFD's 12-Step Reintroduction Evaluation Program.
- 12 June 1995:** TPF's Environmental Assessment Biologist met with AGFD Region 2 office in Flagstaff to update them on the NEPA process and obtain data necessary for preparation of the EA.
- 13-14 June 1995:** TPF's Environmental Assessment Biologist and AGFD Condor Program Coordinator visited the proposed release site at Vermilion Cliffs. They also met with several local landowners, livestock producers, and resort operators to discuss the proposed release. Additional contacts were made with local landowners and businesses on 16-18 June 1995.
- 14-15 June 1995:** TPF's Environmental Assessment Biologist met with BLM representatives at the BLM's Arizona Strip District Office in St. George, Utah to update them on the proposed condor reintroduction and assemble data for the EA.
- 19 June 1995:** TPF's Environmental Assessment Biologist met with AGFD representatives at Flagstaff and Phoenix offices to collect additional information for the EA and coordinate work on the NEPA and 12-Step processes.
- 20 June 1995:** AGFD sent out a California Condor Update on progress to date on the proposal to reintroduce condors in Arizona. This update has a statewide distribution.
- 5 July 1995:** Public scoping meeting held at Marble Canyon Lodge to discuss the proposed release of California condors. Slide presentation is given by Condor Program Coordinator. In attendance are representatives from most of the cooperating agencies.
- 30 June 1995:** TPF completed preliminary review draft of the EA and copies distributed to BLM, AGFD and CRT.
- 10-11 July 1995:** CRT Meeting was held at the Los Angeles Zoo. Agenda included discussion of the northern Arizona release led by the USFWS Condor Program Coordinator and TPF's Environmental Assessment Biologist.