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United States Department of the Interior

FISH AND WILDLIFE SERVICE
P.O. Box 1306
Albuquerque, New Mexico 87103

In Reply Refer To:
R2/ES-TE

March 8, 2004

02-02-04-F-0001
02-21-04-F-0077

Memorandum

To: Area Manager, Phoenix Area Office, Bureau of Reclamation, Phoenix, Arizona

From: Assistant Regional Director, Ecological Services, U.S. Fish and Wildlife Service, Albuquerque, New Mexico /s/Bryan Arroyo

Subject: Biological Opinion on the Bureau of Reclamation's Approval of Water Exchange by the San Carlos Apache Tribe for Retention in San Carlos Reservoir

This biological opinion responds to your request for consultation with the U.S. Fish and Wildlife Service (Service) in accordance with the requirements of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act). Your request of October 24, 2003, was accompanied by your October 2003 Biological Assessment (BA) titled; *Biological Assessment, Proposed Water Exchange by San Carlos Apache Tribe to Maintain Minimum Pool in San Carlos Reservoir, Gila and Pinal Counties, Arizona*, received in our office on October 27, 2003. We, the Service, consider formal consultation initiated on October 27, 2003, the date we received your request and BA.

At issue are effects that may result from the Bureau of Reclamation's (Reclamation) sale of Central Arizona Project (CAP) water to the San Carlos Apache Tribe (Tribe) for exchange with the Gila River Indian Community (GRIC). The exchange of CAP water would allow the retention of up to 20,000 acre-feet behind Coolidge Dam on the Gila River in Pinal, Gila, and Graham counties, Arizona (proposed action). This action, as described herein, would adversely affect, but not jeopardize the continued existence of the threatened bald eagle (*Haliaeetus leucocephalus*), the endangered southwestern willow flycatcher (*Empidonax traillii extimus*), and the threatened spikedace (*Meda fulgida*). The proposed action will not affect loach minnow (*Tiaroga cobitis*) or razorback sucker (*Xyrauchen texanus*). The proposed action will not destroy or adversely modify critical habitat designated for the spikedace or loach minnow. The proposed action may affect,

but is not likely to adversely affect the endangered cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*). Critical habitat has been proposed for the pygmy-owl outside of the project area, therefore none will be adversely modified or destroyed.

This biological opinion is based upon the following information: (1) your October 24, 2003, memorandum, which transmitted both your October 2003 BA, and September 23, 2003, letter from Sparks, Tehan and Ryley, P.C., special counsel for the Tribe, in part requesting that the proposed action proceed; (2) information presented during a November 6, 2003, meeting and a November 13, 2003, conference call between our respective staffs and the Tribe's special counsel; (3) information gained during electronic mail exchanges and telephone conversations between our respective staffs during the course of consultation; and (4) the contents of published and unpublished sources of information. A complete administrative record is on file at the Regional Office in Albuquerque, New Mexico.

BIOLOGICAL OPINION

Consultation History

October 27, 2003: We received your October 24, 2003, memorandum requesting formal interagency consultation on the proposed action.

November 6, 2003: Meeting in Phoenix between staff of the Service's Southwestern Regional Office, the Arizona Ecological Services Field Office (AESFO), the AESFO Tucson Sub-office, Arizona Fisheries Resources Office in Pinetop; the Office of the Regional Solicitor; and your staff met with Joe Sparks, Susan Montgomery, and Robyn Kline of Sparks, Tehan and Ryley, P.C., to discuss the proposed action.

November 13, 2003: Conference call between Service's Southwestern Regional Office, the AESFO, and the AESFO Tucson Sub-office; your staff; and Sparks, Tehan and Ryley, P.C., staff to further discuss the proposed action.

November 19, 2003: Reclamation provided the AESFO Tucson Sub-office with copies of the Gila Water Commissioner's 2000, 2001, and 2003 editions of the *Annual Report - Distribution of Waters of The Gila River*.

November 24, 2003: Meeting between the AESFO Tucson Sub-office staff and Reclamation staff to discuss the effects of the proposed action under alternate scenarios.

November 26, 2003: Your staff transmitted a revision to the BA to the AESFO Tucson Sub-office via electronic mail.

December 2, 2003: Meeting between Reclamation, Service, and the Tribe's special counsel to discuss the analysis of the project's effects.

December 12, 2003: We transmitted a draft Description of the Proposed Action section to Reclamation for review.

December 23, 2003: We received your updated information regarding effects on razorback sucker.

December 30, 2003: We transmitted a draft Biological Opinion to your office via Federal Express.

January 15-16, 2004: Meeting between Reclamation and Service to review draft and Reasonable and Prudent Measures.

January 21, 2004: We transmitted a second draft Biological Opinion to your office via electronic mail with deletions in red-line/strike-out and additions highlighted.

Description of the Proposed Action

The Tribe has requested up to 20,000 acre feet (af) of CAP water to be exchanged for waters of the Gila River to maintain a minimum pool in San Carlos Reservoir to prevent the likelihood of a significant fish kill in 2004. This is water that would normally be stored for the purposes of release to the San Carlos Irrigation Project (SCIP) users as demand for the water is realized. The proposal calls for a lump sum exchange of any water stored in the Reservoir on January 1, 2004, up to 20,000 af. If 20,000 af are not available on January 1 for the lump sum exchange, any water that comes into storage between January 1, 2004, and December 31, 2004, would then be exchanged until a total of 20,000 af is obtained in the Tribe's minimum pool behind Coolidge Dam.

The following are the relevant assumptions pursuant to the BA that we relied on for the purposes of this analysis:

1. The Tribe will enter into an exchange agreement with the SCIP water users to deliver as much as 20,000 af of CAP water beginning January 1, 2004. This equates with a hypothetical exchange rate of 3,334 af per month, which is proposed to begin on March 1, 2004 and conclude no later than August 31, 2004. This rate of exchange equates with a reduction in flow of 55 cubic feet per second (cfs) per day for the aforementioned time period. However, the actual timing and amount of water exchanged is currently unknown.
2. It is not possible to accurately predict at his time how much water will be available for storage and exchange during 2004. It is assumed that a maximum of 20,000 af will be available for exchange. In a drought year, this amount could be significantly less.

3. Natural flow calls on the river occur under the Globe Equity Decree, and these calls/flows will not be impacted by this proposed exchange.

4. If only 20,000 af of storage water was available for exchange, releases of stored water below Coolidge Dam would essentially cease. On the other hand, storage above this 20,000 af amount would be available for release based on water demand of the many downstream users.

Project Area/Action Area

Coolidge Dam and San Carlos Reservoir are located on the San Carlos Apache Indian Reservation approximately 90 miles southeast of Phoenix, Arizona. The Reservoir is located within Pinal, Gila, and Graham Counties. Major inflows into the Reservoir are from the Gila and San Carlos Rivers. Water released from Coolidge Dam flows approximately 68 miles down the Gila River where it is diverted at the Ashurst-Hayden Diversion Dam (AHDD) into the Florence-Casa Grande Canal which ultimately delivers irrigation water to both GRIC and San Carlos Irrigation and Drainage District (SCIDD) lands through a series of lateral and sub-lateral canals. This is the southernmost end of the project location. Coolidge Dam is a multiple dome dam 249 feet in height and 920 feet in length. The outlet works on the dam can release 5,000 cfs downstream via two penstocks. The maximum release capacity during spill events is 120,000 cfs. Due to potential cavitation problems, the minimum release is 70 cfs. The dam is owned and operated by the Bureau of Indian Affairs (BIA).

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR §402.02). The action area for the proposed action is centered upon Coolidge Dam. Upstream from the dam, the action area includes San Carlos Reservoir and all lands, inundated or dry, up to its full-pool elevation as well as all riparian vegetation established in the alluvial deltas present where the Gila River, the San Carlos River, and all other tributaries enter the lake. The action area includes the mainstem Gila River and its 100-year floodplain from San Carlos Reservoir's full-pool elevation upstream to the most-distant San Carlos Apache Tribal farm (Six Mile Farm) diversion. The action area also includes the Gila River from Coolidge Dam downstream to the AHDD, the area of the San Pedro River subject to backwater effects from the Gila River, and all riparian vegetation adjacent to these areas. The action area also includes all past and currently occupied bald eagle nest sites along the Gila River and San Carlos Reservoir, as those waters are defined above.

Hydrologic and Legal Constraints

Coolidge Dam was constructed in 1929 and is operated by the BIA as part of the San Carlos Irrigation Project (SCIP), which provides water from the San Carlos Reservoir to the GRIC and SCIDD. The San Carlos Reservoir was originally created for the purpose of storing water to be used for agricultural irrigation of lands in the Casa Grande Valley in central Arizona for the Pima and Maricopa Indians living in the GRIC and the non-Indian farmers living in the SCIDD. These water rights were established under a Federal Court Decree entitled the 1935 Globe Equity Decree (Gookin and Gookin 2002). The Federal Court granted the San Carlos Apache Tribe an annual allocation of 6,000 af from the Gila River upstream of the Reservoir for irrigation

purposes. Water availability in San Carlos Reservoir is dependent upon inflows from the Gila and San Carlos rivers, which in turn are dependent upon precipitation and water quantities in the Gila River drainage basin (SWCA 1998). Annual precipitation is bimodal, occurring in the winter during regional, cyclonic storms and again during the summer monsoon season from smaller, but often intense, convective storms (Young 1967). Reservoir water is released to downstream users year-round, depending on water availability and need, with the highest use occurring during summer months. Water from the Gila River drainage released from Coolidge Dam flows approximately 68 miles through the Gila River where it is diverted at the AHDD. Depending on the amount of time needed, water is not released for several weeks between October and the end of December to allow for maintenance and repairs of downstream structures.

River flows in the southwest are typically appropriated, meaning that individuals, corporations, and government entities own, within the aegis of State and/or Federal law, the rights to withdraw and use the water within a specific set of allocations and priorities. These rights may be bought and sold pursuant to State and/or Federal law. Such sales or exchanges are typically related to the use of water for municipal, industrial, or agricultural use, but there are certain instances wherein water may be purchased or exchanged for the benefit of fish and wildlife resources.

The 1935 Globe Equity Decree, also referred to as the Globe Equity 59 Consent Decree (herein: Decree), was the end result of litigation between the Gila Valley Irrigation District *et al*. and the United States. The Decree quantified and established priority to the beneficial use of water from the Gila River, including the rights of the Pima and Apache tribal entities. It established the position of the Gila River Commissioner to impartially manage the distribution of water to the parties to the Decree. The terms of the Decree, in part, guide the manner in which Coolidge Dam is operated, and any agreements entered into by the Tribe for the exchange of CAP water for waters of the Gila River must be approved by the U.S. District Court after consultation with other parties to the Decree. The Decree appears in its full-text form at http://www.gilawater.org/decree.html, and is incorporated herein by reference.

Discussion of the Analyses

We are unable to make specific predictions regarding calendar year 2004 climatic and hydrologic conditions, water demands, and reservoir operations at this time; there are infinite numbers of potential climatic and operational scenarios. Concurrently, the regulations that implement the Act require that a *single* proposed action be analyzed. These infinitely variable scenarios have an equally variable level of effect on the environment. We have elected to analyze the proposed actions' maximum adverse effect (i.e., the "worst case" scenario) so that the proponent may proceed with the least amount of uncertainty regarding unforseen circumstances. To this end, we have developed a series of assumptions regarding the proposed action. These assumptions reiterate and/or refine the assumptions that initially appeared in the September 23, 2003, letter from the Tribe's special counsel and which were carried forth in your subsequent BA. Our assumptions regarding the proposed action are as follows:

1. The Gila River watershed will yield the entire 20,000 af of requested water, which will subsequently be stored and exchanged to become a conservation pool for the Tribe. This is water that would have otherwise been released downstream to the SCIP water users based on their respective irrigation demand.

2. The SCIP water users will satisfy (call upon) the maximum extent of their irrigation demand with the natural flow of the river based upon availability. The GRIC can call up to 219 cfs and SCIDD can call up to 192 cfs (i.e., releases from Coolidge Dam) based on its availability. This quantifies the degree to which SCIP water users will make natural flow calls on the river under the Globe Equity Decree and reiterates that these calls/flows will not be impacted by this proposed exchange nor subject to exchange themselves. Further, any deductions to satisfy up to 1.56 cfs of water unavailable under the Tribe's natural flow right for the San Carlos Apache Tribal Farms will be deducted from the requested 20,000 af of new exchange water stored for the benefit of the Tribe in San Carlos Reservoir during 2004.

3. The monthly median of daily mean discharges from the U.S. Geological Survey (USGS) "Gila River near Calva" and "San Carlos River near Peridot" stream gages are an accurate depiction of the majority of the inflow to San Carlos Reservoir (see Table 1 in this biological opinion. Please note that we have elected to use the median (typical) discharge rather than the mean (average) discharge to minimize the skew inherent in examining hydrologic data sets exhibiting infrequent yet large flows. In this regard, we have diverged from the discharge values published in Table II in the BA.

4. The regional drought is likely to continue relatively unabated. A review of the National Weather Service (NWS) U.S. Drought Monitor Map (NWA 2003b) indicates that the Gila River's watershed is experiencing conditions ranging from "abnormally dry," through "moderate," "severe," "extreme," and "exceptional," drought. The NWS Seasonal Outlook (NWS 2003c) indicates that these conditions will persist through at least February 2004. NWS Monthly and Seasonal Color Outlook Maps (NWS 2003a) state precipitation will be below normal in the southwest on many occasions in 2004.

5. The Gila River inflow noted in calendar year 2002 will prevail in 2004 (see Table 1 in this biological opinion and Table II in the BA). We have selected the 2002 calendar year data set (as our model) because it involves the earliest and longest-duration of low inflows to San Carlos Reservoir (i.e., the "worst-case" scenario). In addition, it also includes an exchange in which 37,000 af of water was withheld behind the Coolidge Dam.

Table 1. 2002 median monthly inflows (cfs) to San Carlos Reservoir at Peridot and Calva gages.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Assumed Baseline (2002)	168	74	66	45.5	13.2	0.1	0	24	29.5	18	11.5	47.9

These assumptions, and the environmental consequences derived from them, are based upon hypothetical situations about which there are varying degrees of uncertainty. Uncertainty equates with risk, and we must therefore evaluate the risk that the worst-case scenario will actually occur as the proposed action is implemented in 2004.

We are aware that Assumption 1, which presupposes that the 20,000 af of water will be stored and Assumptions 4 and 5, which relate to continued drought in 2004 and the drought conditions noted in 2002, appear incongruous. We are relatively confident in the assertion that the chronic drought that has manifested in the southwest since 1996 will continue. Regardless, long-term climate projections indicate that there are neither strong El Niño or La Niña conditions prevalent in the central Pacific Ocean; the climate of early 2004 remains unpredictable. There is, therefore, a finite possibility that some amount of water will be stored, thus depriving the Gila River from Coolidge Dam to the AHDD of a certain amount of flow. Indeed, a single period of elevated runoff from March 7 to March 25, 2001, resulted in a calculated potential yield of approximately 22,000 af[1] to San Carlos Reservoir. Our assumption that conditions prevalent in 2002 will again occur in 2004 indicates this single-event yield of the entire requested amount is unlikely to actually occur.

The following sections contain analyses of the assumption-driven effects of the proposed action. The Status of the Species, Environmental Baseline, Effects of the Proposed Action, Cumulative Effects, and Conclusion sections appear in a species-by-species progression.

Status of the Species - Southwestern Willow Flycatcher

The southwestern willow flycatcher was listed as endangered, without critical habitat on February 27, 1995 (USFWS 1995a). Critical habitat was later designated on July 22, 1997 (USFWS 1997a). A correction notice was published on August 20, 1997, in the Federal Register to clarify the lateral extent of the designation (Federal Register Vol. 62, no. 161).

On May 17, 2001, the 10th Circuit Court of Appeals set aside the critical habitat designation and instructed the Service to issue a new critical habitat designation in compliance with the court's ruling. The Service is currently in the process of re-proposing critical habitat for the

[1]This was calculated from the combined inflow noted at the stream gages on the Gila River at Calva and the San Carlos River near Peridot. It presumed that the USGS's published daily mean of instantaneous flows prevailed throughout each day. These cfs/day flows were then converted to acre feet per day and totaled to yield the 22,000 af value.

southwestern willow flycatcher. A detailed description of the biology, life history, and threats to the willow flycatcher are contained in the Southwestern Willow Flycatcher Recovery Plan (USFWS 2002).

The southwestern willow flycatcher was determined to be endangered by numerous threats causing extensive loss of habitat, lack of adequate protective regulations, and brood parasitism by the brown-headed cowbird (USFWS 1995a). The major mechanisms resulting in loss and modification of habitat involve water management and land use practices. The primary cause of the flycatcher's decline is loss and modification of habitat. Its riparian nesting habitat tends to be uncommon, isolated, and widely dispersed. Most of the major and many of the minor southwestern streams that likely supported southwestern willow flycatcher habitat are now dammed. Operation of dams modifies, reduces, destroys, or increases riparian habitats both downstream and upstream of the dam site. Below dams, natural hydrological cycles are modified. Surface water diversions and groundwater pumping for agricultural, industrial, and municipal uses are major factors in the deterioration of southwestern willow flycatcher habitats (Briggs 1996).

Life History

The southwestern willow flycatcher is a small grayish-green passerine bird (Family Tyrannidae) measuring approximately 5.75 inches. The southwestern willow flycatcher is one of four currently recognized willow flycatcher subspecies (Phillips 1948, Unitt 1987, Browning 1993). It is a neotropical migrant that breeds in the southwestern U.S. and migrates to Mexico, Central America, and possibly northern South America during the non-breeding season (Phillips 1948, Stiles and Skutch 1989, Peterson 1990, Ridgely and Tudor 1994, Howell and Webb 1995). The historic breeding range of the southwestern willow flycatcher included southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Utah, extreme southern Nevada, and extreme northwestern Mexico (Sonora and Baja) (Unitt 1987).

Habitat

The southwestern willow flycatcher breeds in riparian habitats along rivers, streams, or other wetlands, where relatively dense growths of trees and shrubs are established, near or adjacent to surface water or underlain by saturated soil (USFWS 2002). In almost all cases, slow-moving or still surface water and/or saturated soil is present at or near breeding sites during wet or non-drought years (USFWS 2002). The dense understory commonly consists of willow (*Salix* spp.), seep-willow (*Baccharis salicifolia*), arrowweed (*Pluchea purpurascens*), saltcedar (*Tamarix* sp.), Russian olive (*Elaeagnus angustifolio*), and/or live oak (*Quercus agrifolia*) for nesting. Flycatchers are most abundant in these habitats when they are located adjacent to slack water (i.e., lentic or quiet, slow-moving, swampy, or still). These riparian habitats were once much more common and spatially continuous, but human intervention in the southwestern river systems has now produced a geography of willow flycatcher habitat that is widely scattered, with small linear patches separated by dryland conditions. It is important to note that tamarisk is (i.e., has become) an important component of the flycatchers' nesting and foraging habitat in Arizona.

For instance, in 2000, 270 of the 303 known southwestern willow flycatcher nests built were placed in tamarisk (Paradzick *et al*. 2001).

In many cases, flycatcher nest plants are rooted in or overhang standing water (Whitfield and Enos 1996, Sferra *et al*. 1997). Occupied sites are typically located along slow-moving stream reaches; at river backwaters; in swampy abandoned channels and oxbows; marshes; and at the margins of impounded water (e.g., beaver ponds, inflows of streams into reservoirs). Where flycatchers occur along moving streams, those streams tend to be of relatively low gradient, i.e., slow-moving with few (or widely spaced) riffles. The flycatcher's riparian habitats are dependent on hydrological events such as scouring floods, sediment deposition, periodic inundation, and groundwater recharge for them to become established, develop, be maintained, and ultimately to be recycled through disturbance (USFWS 2002).

Open water, cienegas, marshy seeps, or saturated soil are typically in the vicinity of flycatcher nests (Maynard 1995, Sferra *et al*. 1995, 1997). However, hydrological conditions at a particular site can vary remarkably in the arid southwest within a season and between years. At some locations, particularly during drier years, water or saturated soil is only present early in the breeding season (i.e., May and part of June). However, the total absence of water or visibly saturated soil has been documented at several sites where the river channel has been modified (e.g., creation of pilot channels), where modification of subsurface flows has occurred (e.g., agricultural runoff), or as a result of changes in river channel configuration after flood events (Spencer *et al*. 1996).

Breeding Biology

Throughout its range the southwestern willow flycatcher arrives on breeding grounds in late April and May (USFWS 2002). Nesting begins in late May and early June and young fledge from late June through mid-August (USFWS 2002). Southwestern willow flycatchers typically lay three to four eggs per clutch (range: 2 to 5). Eggs are laid at one-day intervals and are incubated by the female for approximately 12 days (Bent 1960; McCabe 1991). Young fledge approximately 12 to 13 days after hatching (King 1955, Harrison 1979). Typically one brood is raised per year, but birds have been documented raising two broods during one season and renesting after a failure (USFWS 2002). The entire breeding cycle, from egg laying to fledging, is approximately 28 days.

Southwestern willow flycatcher territory size likely fluctuates with population density, habitat quality, and nesting stage. Estimated territory sizes are 0.59 to 3.21 acres for monogamous males and 2.72 to 5.68 acres for polygynous males at the Kern River (Whitfield and Enos 1996), 0.15 to 0.49 acres for birds in a 1.48 to 2.22 acre patch on the Colorado River (Sogge 1995c), and 0.49 to 1.24 acres in a 3.71 acre patch on the Verde River (Sogge 1995a). On the middle Gila and lower San Pedro rivers, flycatchers occupy patches in a large and complex matrix of riparian habitat 60 miles long. This population, known as the Gila/San Pedro population, extends from Catalina Wash, south of Mammoth, on the San Pedro River downstream to Kelvin on the Gila River. Territories are established within a larger patch of appropriate habitat

sufficient to contain several nesting pairs of flycatchers. These birds appear to be semi-colonial nesters.

Evidence gathered during multi-year studies of color-banded populations shows that although most southwestern willow flycatchers return to former breeding areas, flycatchers regularly move among sites within and between years (Netter et al. 1998, Kenwood and Paxton 2001, Newell et al. 2003, M. Whitfield unpubl. data).

Flycatcher movement between sites within drainages is not uncommon and this data indicate the Gila/San Pedro confluence area is one population. Movement between drainages is less common, but does occur. Two flycatchers detected at Kearny on the Gila River in 2002 moved to the San Pedro River in 2003. One flycatcher last detected at GIGN10 in 2000 moved to GIGS07 on the Gila River in 2003. Three flycatchers last detected from Roosevelt Lake in 2001 or 2002 moved to the lower San Pedro River in 2003. The remaining 12 flycatchers previously detected between 1999 and 2002 moved between sites along the lower San Pedro River in 2003 (AGFD unpubl. data).

Reproductive Success

In 2001, a total of 426 nesting attempts were documented in Arizona at 40 sites (Smith et al. 2002). Of these, the outcome of 305 nests was known. Results indicated that 63% (n=191) were successful and 37% (n=114) failed. Causes of nest failure included predation (n=82), nest desertion (n=10), brood parasitism (n=6), infertile clutches (n=12), weather (n=2), and unknown causes (n=2) (Smith et al. 2002). Cowbirds may have contributed to other abandoned nests, but no direct evidence was detected. Three parasitized nests fledged willow flycatchers along with cowbird young. Nine sites had cowbird trapping in 2001 (Alamo Lake, Greer/Alpine [Alpine Horse pasture and Greer River Reservoir], Roosevelt [Salt River inflow], and Winkelman [CB Crossing, Cook's lake, Dudleyville Crossing, Indian Hills, and Kearny] (Smith et al. 2002).

In 2002, the most unsuccessful nesting season on record, a total of 286 nesting attempts were documented in Arizona at 37 sites (Smith et al. 2003). Of these, the outcome of 173 nests was known. Results indicated that 27% (n=46) were successful and 71% (n=127) failed. Causes of nest failure included predation (n=101), nest desertion (n=11), brood parasitism (n=6), weather (n=1), and other causes (n=8) (Smith et al. 2002). Compared with previous years, in 2002 fewer birds attempted nesting, fewer birds renested after nest failure (n=12), and no birds renested after nest success (Smith et al. 2003). Nest success for the Gila/San Pedro population, calculated using the Mayfield method (1961, 1975), was only 33% in 2002.

In 2003, a total of 382 nesting attempts were documented in Arizona at 33 sites (AGFD unpubl. data). Of these, the outcome of 311 nests was known. Results indicated that 66% (n=206) were successful and 34% (n=105) failed. Causes of nest failure included predation (n=79), nest desertion (n=20), brood parasitism (n=1), weather (n=1), and infertile clutches (n=5) (AGFD unpubl. data). It appears that the statewide nest productivity in 2003 recovered from 2002, with the highest nest success ever recorded for the Gila/San Pedro population (67%). Nest success for

this area, calculated using the Mayfield method (1961, 1975), surpassed the previous high record of 64% in 2001(AGFD unpubl. data.).

Rangewide Distribution and Abundance

Unitt (1987) documented the loss of more than 70 southwestern willow flycatcher breeding locations rangewide (peripheral and core drainages within its range) estimating the rangewide population at 500 to 1000 pairs. Given sampling errors that may bias population estimates positively or negatively (e.g., incomplete survey effort, double-counting males/females, composite tabulation methodology), natural population fluctuation, and random events, it is likely that the total breeding population of southwestern willow flycatchers fluctuates. Following the 2002 breeding season, 1,153 territories at 243 sites were known throughout the bird's range (Sogge *et al.* 2003).

About half of the known flycatcher pairs throughout the sub-species range occur at three locations; U-Bar Ranch and Cliff/Gila Valley in New Mexico, Roosevelt Lake in Arizona, and the Gila/San Pedro River breeding area in Arizona (Sogge et al. 2003). Roosevelt Lake and Gila/San Pedro breeding areas supported 318 of the 430 territories known in the state (74%) in 2002 (Smith et al. 2003) and 299 of the 409 territories known in the state (75%) in 2003 (AGFD unpubl. data).

Just after listing in 1996, 151 territories were known to exist in Arizona (Paradzick et al. 2001, Sferra et al. 1997). The greatest number of flycatcher territories detected in Arizona occurred in 2002. The increase from 75 territories in 1996 to 318 territories in 2002 at Roosevelt Lake and the Gila/San Pedro populations (Smith et al. 2003) represent an increase from 50% to 74% of the statewide population. Although increased survey effort was the main factor contributing to increasing flycatcher numbers in the early to mid 1990s in Arizona when surveys were initiated, both the Gila/San Pedro rivers confluence and the Roosevelt Lake populations have grown significantly as habitat developed. Distribution has also shifted as patches become decadent or dry (e.g., GIGN20 on the Gila River, Indian Hills on the San Pedro River, Old Salt at Roosevelt Lake) and as new habitat is created (e.g., Aravaipa Creek inflow on the San Pedro River, North Shore at Roosevelt Lake, Horseshoe Reservoir on the Verde River).

Unitt (1987) concluded that "probably the steepest decline in the population level of *E.t. extimus* has occurred in Arizona...". Historic records for Arizona indicate the former range of the southwestern willow flycatcher included portions of all major river systems (Colorado, Salt, Verde, Gila, Santa Cruz, and San Pedro) and major tributaries, such as the Little Colorado River and its headwaters, and the White River. In 2003, 409 flycatcher territories were known from 44 sites and 339 paired flycatchers at 36 sites along 11 drainages statewide (AGFD unpubl data). In 2002, 430 flycatcher territories were known from 47 sites and 343 paired flycatchers at 43 sites along 11 drainages statewide (Smith *et al.* 2003). Major concentrations in low elevation sites (<1115 m) where territorial pairs were detected include the Gila/San Pedro river area, Roosevelt Lake, Alamo Lake, Gila River (near Pima), Big Sandy River, Topock Marsh, and the lower Grand Canyon (river miles 246 to 272). Two high elevation sites (>2400 m) were found; one on

the Little Colorado River (Greer River Reservoir), and one on the San Francisco River (Alpine Horse Pasture). In 2001, of the 46 sites where flycatchers have been documented, 30% (n=14) contained 5 or fewer territorial flycatchers (Smith et al. 2002).

Recovery Needs

According to the Recovery Plan (USFWS 2002), the current distribution of flycatcher breeding populations includes public, private, and Tribal lands in at least six of the seven States comprising its historical range. Given the dynamic nature of southwestern riverine systems, where ecological processes vary both spatially and temporally, coupled with the complex nature of land management and ownership along river corridors, a recovery strategy that relies solely on public lands is impractical and improbable. To achieve and maintain recovery of this bird, it is likely that a network of conservation areas on Federal, State, Tribal, and other public and private lands will be necessary. To ensure that the population and habitat enhancement achieved for downlisting persist over the long-term, and to preclude the need for future re-listing of the flycatcher under the ESA, the following must be addressed:

1. Minimize the major stressors to the flycatcher and its habitat (including but not limited to floodplain and watershed management, groundwater and surface water management, and livestock management);

2. Ensure that natural ecological processes and/or active human manipulation needed to develop and maintain suitable habitat prevail in areas critical to achieving metapopulation[2] stability; and,

3. The amount of suitable breeding habitat available within each Management Unit, pursuant to the Recovery Plan, is at least double the amount required to support the target number of flycatchers described under reclassification to threatened.

Environmental Baseline - Southwestern Willow Flycatcher

The environmental baseline includes past and present impacts of all Federal, state, or private actions in the action area; the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation; and the impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline also includes the effects of past and ongoing natural factors, latent and persistent effects of past, present, or continuing actions, the future effects of continuing actions, and the effects caused by factors outside the action area.

[2]A metapopulation is a group of spatially disjunct local willow flycatcher populations connected to each other by immigration and emigration.

The narrative contained within this environmental baseline section facilitates the following:

1. Describes the conservation status of the listed resources within the action area;
2. Serves as the basis from which the effects of the action are discerned; and
3. Provides the link between the effects at the project level and the range-wide scale.

Status of the Species within the Action Area

For the purpose of this section of the consultation, the action area has been divided into three distinct parts with regards to flycatcher distribution; (1) flycatcher sites at the head of the Reservoir on the San Carlos Apache Indian Reservation, (2) flycatcher sites in the segment of the Gila from Coolidge Dam to the confluence of the San Pedro and Gila rivers (Winkelman) and, (3) flycatcher sites in the segment from Winkelman, Arizona to AHDD. Appendix A includes the number of territories at flycatcher sites per year, and the Recovery Plan Site Code on the Gila River below Coolidge Dam.

Flycatchers at San Carlos Reservoir: The southwestern willow flycatcher on the San Carlos Apache Indian Reservation inhabits areas on both the Gila River upstream of San Carlos Reservoir and at the inflow of the Gila River with San Carlos Reservoir. Although population size and territory information is the proprietary information of the Tribe, surveys conducted by the San Carlos Apache Recreation and Wildlife Department annually since 2000 in selected stream reaches have documented an upward trend in territories of flycatchers on the Gila River upstream of the Lake, and, to a lesser extent, on the San Carlos River upstream of the Lake.

Flycatchers between Coolidge Dam and Winkelman: Currently, 1 site (Dripping Springs Wash) occurs between Coolidge Dam and Winkelman. Survey data from 1998 to 2003 indicated that the only time this site was occupied was once during 1998. However, it remains a site as noted in the Recovery Plan (Site Code GISPRG) and thus, could be re-occupied in the future. Limited surveys have been conducted from Dripping Springs Wash to the confluence of the San Pedro River. In 1995 and 1996, San Carlos Recreation and Wildlife, in conjunction with officials from the Bureau of Land Management, conducted surveys for flycatchers near the confluence of Ash Creek; however, no flycatcher territories were documented.

Flycatchers from Winkelman to AHDD: In 1994, flycatcher surveys coordinated by the Arizona Game and Fish Department (AGFD) conducted on the Gila River (as well as on the lower San Pedro) documented one territory at Kearny (Paradzick et al. 2001). Surveys conducted by AGFD in 1996 documented eight territories between Winkelman and Kelvin. Surveys conducted from 1995 to 2000 between Kelvin and AHDD documented only two territories in 1996 (Paradzick et al. 2001). As a result of increased survey effort and possible population increases, the number of flycatchers increased to 68 territories in 1999. However, the number of territories has declined since then to 26 in 2003. Overall, the number of territories on the Gila River shows a declining trend since 1999.

In the reach of the Gila River between Winkelman and AHDD, the flycatcher breeds in patchy to dense riparian habitat near surface water in the lower floodplain or on elevated benches. Nests have been found in salt cedar and willow. According to Reclamation, only three sites in the project area are classified as native-species dominated, the remaining sites are salt cedar dominated. Also, according to Reclamation, the habitat occupied by the flycatchers within this area is considered "post 1993 flood," thus, 10 years old and possibly is mature and declining (i.e., senescent) in suitability. This phenomena has been speculated as occurring in older habitat at Roosevelt Lake. Reclamation and Service biologists conducted aerial flights of the Gila River downstream of Winkelman in 2002 and 2003. Overall, the salt cedar dominated vegetation appeared vigorous from the air. However, AGFD crews observed less foliage on saltcedar, as well as a lack of herbaceous cover and saturated soils at known flycatcher sites (C.Paradzick, P. Dockens, pers. comm.). A scientifically rigorous testing for a correlation between vegetation parameters and nest success and/or territory status has not been done.

The surveys documented areas where saltcedar, cottonwoods, and willows were stressed and/or have died. According to Reclamation, this is likely the result of the regionwide drought exacerbated by diminished or no flows within the Gila and San Pedro rivers, particularly during the summer months. One such area is near Kearny, which has been occupied by the greatest number of flycatchers. However, the Kearny site has declined from 25 territories in 1998 to just 9 in 2003. This site used to be maintained by leakage from adjacent sewage treatment ponds. When these ponds were deactivated in 1999, a pipe was installed by the City of Kearny to help sustain the vegetation. Despite these efforts, the dead and stressed vegetation is readily visible at this site (see page 30, photo 5 in the BA). This situation is further complicated by the lack of information on the impacts of ground water pumping in the Kearny area and the effects to phenology and vigor from plant maturation.

Factors Affecting the Species' Environment within the Action Area

Flycatchers at San Carlos Reservoir: The population size and territory data within the action area cannot be articulated because it is the proprietary information of the San Carlos Apache Tribe.

Flycatchers between Coolidge Dam and Winkelman: According to the BA, the construction of Coolidge Dam has affected the natural hydrograph and vegetation community in the reach of the Gila River. The Dam has reduced the magnitude and variability of annual peak flows, resulting in major changes in downstream geomorphology and in the riparian vegetation. Further, while the affects of annual low flows from the dam were found to be statistically insignificant (USFWS 2002), annual peak flows were affected. Thus, according to the BA, the decrease in variability resulted in a simplified channel and much less spatial diversity in the riparian vegetation.

Flycatchers from Winkelman to AHDD: According to the BA, the number of flycatcher territories on this reach of the Gila River have declined during the recent period of drought (see page 27 of the BA). At many sites, the number of flycatchers have declined significantly or are no longer inhabited (e.g., GIGS12, GIGN20, GIKRNY). The Kearny site, which was occupied

by the most flycatchers, has declined from 25 territories in 1998, to just 9 in 2003. This site used to be supplemented by leakage from adjacent sewage treatment ponds. When the ponds were deactivated, a pipe was installed by the City of Kearny to help sustain the vegetation. Despite these efforts, the dead and stressed vegetation is readily visible at this site.

Recovery

The proposed action is within the Middle Gila-San Pedro Management Unit of the Gila Recovery Unit described in the Southwestern Willow Flycatcher Recovery Plan (USFWS 2002). The recovery plan established the minimum number of territories needed for reclassification to threatened status for each Management Unit. At the time the Recovery Plan was prepared, 120 territories were documented within this Management Unit; this Management Unit has a goal of 150 territories (USFWS 2002). This is one of the most important and largest populations of flycatchers in the southwest (USFWS 2002). Although most flycatchers within this Management Unit are concentrated along the lower San Pedro River, the Gila and San Pedro River flycatchers are considered one contiguous population. The number of flycatchers in the Middle Gila/San Pedro Management Unit continues to increase, with at least 165 territories documented in 2003 (AGFD, unpubl. data). This increase can be attributed to habitat improvement along the lower San Pedro through natural regeneration following the 1993 flood, livestock and off-highway vehicle control, and a reduction in agriculture.

Effects of the Action - Southwestern Willow Flycatcher

The Effects of the Proposed Action - Southwestern Willow Flycatcher section includes an analysis of the direct and indirect effects of the proposed action on the species and/or critical habitat and its interrelated and interdependent activities. Direct effects are the immediate effects of the project on the species or its habitat. Future Federal actions that are not a direct effect of the action under consideration (and not included in the environmental baseline or treated as indirect effects) are not considered in this biological opinion. Indirect effects are caused by, or result from the proposed action, are later in time, and are reasonably certain to occur. With regards to this proposed action, no interrelated and interdependent activities have been identified.

This analysis is made difficult because of the complex conceptual nature of the proposed action, which is the purchase of CAP water by San Carlos Apache Tribe to maintain a minimum pool in San Carlos Reservoir in lieu of releasing water out of San Carlos Reservoir. This includes analyzing the effects of a defined amount of water (i.e., 20,000 af) being held behind the dam instead of that same amount of water flowing down the Gila River. As stated in the BA, this translates to a reduction in flow equating to 55 cfs per day. Our effects section discusses the effects of reduced flows on the flycatcher. We used gage data from 2002 as a model for 2004 as stated above (see Assumptions 3 and 5 in the Discussion of the Analyses subsection, above) in order to look at a “worst case scenario.” In addition, we opined that 2002 was a good representation for 2004 because 37,000 af of water was withheld behind the Dam pursuant to an exchange.

We articulated the effects of the action in terms of the action being the "stressor" and then the species "response" to the action. In this case, the primary stressor is the reduction of water flowing from Coolidge Dam in the Gila River, which is likely to cause a reduction in the flycatcher's forage base (i.e., insect production). Decreasing flows could also further degrade the flycatchers' habitat in the long-term, which is considered an indirect effect. The species' responses to these stressors are discussed below in general terms first, then site specifically.

Reduction in Food

Southwestern willow flycatcher nestlings and fledglings require a consistent source of food. Diminished stream flows result in reduced instream flow levels in the watercourse, which further results in a lower water table and watertable depth below the adjacent flood plain. When the watertable depth decreases below the alluvial soils,[3] the soils become drier and insects which require moist soil fail to hatch. A reduced insect foraging base for flycatcher nestlings and fledglings can result in starvation (Ohmart 2002). Thus, the direct effect on southwestern willow flycatchers on the Gila River is the possible decline in the foraging resource for these birds during the breeding season and, ultimately, potential nest failure.

Perhaps as important as a reduction in moist soils that support insects, is a reduction in herbaceous vegetation that supports other insects. Very little data has been collected on the foraging behavior and foods eaten by adult, nestling, and fledgling southwestern willow flycatchers. Drost *et al.* (1998) analyzed diets through fecal samples and found 56% of the samples contained Diptera (true flies), 71% Hymenoptera (bees and wasps), and 47% Hemiptera (true bugs). Southwestern willow flycatcher prey base may be strongly influenced by habitats and land uses adjacent to riparian breeding sites (Drost et al. 2003).

Reduction in Breeding Habitat

The indirect effects on the southwestern willow flycatcher from the proposed project is the loss of suitable breeding habitat and subsequent reduction in productivity and recruitment of young birds to the population. Sogge *et al.* (2000) reported that in some instances where sites have

dried out, the riparian vegetation and nesting flycatchers may persist for a short time; however, after one or two breeding seasons the flycatchers will eventually be lost.
There are several examples (e.g., San Pedro, Gila, Santa Margarita, Virgin, and Colorado rivers and Roosevelt Lake) where known southwestern willow flycatcher breeding sites have dried out, resulting in a decline of the local population or complete abandonment of territories (Sogge, pers. comm.). Johnson et al. (1999) suggest that the presence of water in the Rio Grande channel (New Mexico) could be a minimal requirement for nesting. Further, presence of water in the river (i.e., Rio Grande) during May and June may be most crucial (Johnson et al. 1999:230).

[3]Alluvial: composed of soil and sand deposited by flowing water.

Thus, lack of water around southwestern willow flycatcher breeding sites is likely to have a detrimental effect to the species.

According to Reclamation, the number of southwestern willow flycatcher territories on the Gila River between Coolidge Dam and AHDD declined from 1999 to 2003 from 68 to 26. During this time, Coolidge Dam releases during the breeding season were substantially reduced as compared to mean monthly releases, with the exception of 2001. Loss of suitable habitat has had and continues to have the most significant impact on the recovery of the southwestern willow flycatcher rangewide (USFWS 2002). Based on this information, it is important to protect existing suitable habitat and restore the plant communities which support this species.

Depth to groundwater can exert a strong influence on the composition of arid region floodplain vegetation (Stromberg *et al.* 1996). According to the BA, diminished flows down the Gila River during the breeding season can result in a decrease in groundwater depth upon which vegetation relies. Because the Gila River has already endured several years of stress due to drought and reduced flows, maintaining greater than the minimum depth to groundwater may be necessary to sustain the vegetation (Stromberg, pers. comm.). After several years with significantly less streamflow and a subsequent drop in groundwater depths, recovery of the watertable and vegetation may not occur until significantly greater flows are delivered downstream. In a system that has already been stressed due to past drought and reduced flows, any further reduction in flows could result in the loss of vigor and/or mortality of vegetation (habitat) used by flycatchers. We will discuss the effects of the action on the flycatcher pursuant to the three distinct segments as stated above. The effects of the proposed action on flycatcher reproduction, numbers, and distribution within each of these segments are analyzed and discussed below.

Flycatchers at San Carlos Reservoir: Information regarding southwestern willow flycatchers on the San Carlos Apache Indian Reservation is proprietary information of the San Carlos Apache Tribe, thus, these birds will be discussed in general terms only. These birds were not included in the Recovery Plan because of proprietary nature of the information. Because the water levels are so low in the Reservoir, and assuming drought conditions will continue, it is unlikely that water levels of the Reservoir would be in proximity to these birds during 2004. Thus, the proposed action will probably not impact the reproduction, numbers, or distribution of these flycatchers occupying the areas on San Carlos Apache Indian Reservation within the action area. Further, we do not anticipate that take will occur within this segment of the action area.

Flycatchers between Coolidge Dam and Winkelman: There is one known site (Site Code GISPRG) between Coolidge Dam and Winkelman. This site is made up of one territory detected in 1999. Subsequent surveys from 2001-2003 have not detected occupancy of this territory since 1999. Because this site at Dripping Springs has not been occupied since 1999, we do not anticipate that flycatchers will be affected at this site, and thus, we do not anticipate take will occur at this site from the proposed action because birds have not been detected in this reach since 1999. Thus, birds in this reach will not be effected by this water exchange (i.e., the proposed action) this year.

According to Reclamation, only limited surveys have been conducted from Coolidge Dam to Winkelman and, there appears to be suitable flycatcher habitat in this reach that may need to be more intensively surveyed. While it is unknown how many territories the Dripping Springs site could potentially support, it could be an important future site within the Gila Recovery Unit.

Pursuant to the flycatcher recovery plan, a "site" may encompass a discrete breeding location, or several territories within a larger patch of appropriate habitat. Sites are important because increasing the number of flycatcher "sites" forms a fundamental basis for flycatcher recovery. Results from an analysis (see USFWS 2002:72), which estimated population persistence over time showed that while the status of the flycatcher varies geographically, metapopulations are most stable where many connected sites and/or large populations exist (Coastal California, Gila, Rio Grande Recovery Units). The model predicts greatest stability when sites can be established <15 km apart, each with 10 - 25 territories. Sites <15 km apart assures a high likelihood of connectivity. Once a threshold of about 25 territories/site is reached, the benefit of increasing the number of birds diminishes (USFWS 2002). We consider the Dripping Springs site to be important, but realize it may not be able to support this number of territories.

Flycatchers from Winkelman to AHDD: In 2002, there were 46 flycatcher territories, and in 2003, there were 26 flycatcher territories within this reach of the Gila River. Nest success in 2002 at monitored sites within this reach was 39% in 2002, and 75% in 2003 (AGFD unpubl. data). Nest success was monitored at 4 out of the 17 known, but not necessarily active, sites. However, we believe that the higher nesting success that occurred in 2003, despite a lower number of territories, may be due to the occurrence of late winter rainfall and downstream flows which provided resources (i.e., invertebrate prey) to nesting pairs (Sferra, pers. comm.). The 2002 nesting season was negatively impacted by the lack of winter rainfall (Sferra, pers. comm.).

Flycatchers within this reach of the Gila River from Winkelman to AHDD will be impacted the most by the proposed action. This reach of the Gila River is already stressed due to past drought and reduced flows, and the proposed action will likely further reduce flows, which could result in the loss of vigor and/or mortality of vegetation in the habitat used by nesting flycatchers. However, as stated previously, the degree to which the habitat could be affected would depend in part on the multitude of release scenarios based on the amount of water available for release as well as the amount of precipitation. In 2002, gage data at Kelvin indicated very little water was flowing down the Gila River between May and July (within the flycatcher breeding season). According to the BA, gage data in 2002 at Kelvin indicated average streamflow in May was 6 af, in June streamflow was 0.3 af, and in July streamflow was 2 af. Using our assumption that 2004 will resemble climatic factors in 2002, we can expect similar streamflow output.

The continued drought is likely central to the decline in numbers of flycatcher territories within this reach of the Gila River. However, the effect of withholding 20,000 af of water from flowing down to this stretch of the Gila River exacerbates the impacts to the flycatcher. The reliance of flycatchers on free-flowing and standing water or moist soil conditions is well established (USFWS 2000), as discussed above. It is also impossible to predict how much influence streamflows from the San Pedro River will have on this stretch; available water from the San

Pedro will depend on regional climatic factors. The direct effect on these flycatchers from the proposed action (up to 20,000 af of stored water that otherwise would have flowed downstream of Coolidge Dam during 2004) will be the subsequent reduction of 1) water flow and 2) the pooling of water. These reductions may cause a decline in the foraging resource for these birds during the breeding season, and ultimately nest failure. Therefore, the effects of the stress of decreased water in this stretch of the Gila River range from reduced feeding success to reproductive failure. We are reasonably certain that take (in the form of harm) will occur within this reach of the Gila River from the proposed action because, as stated above, drying of breeding sites due to the absence of water causes nest abandonment and ultimately, local population declines.

According to the flycatcher Recovery Plan, this reach of the Gila River was cited as one of several specific river reaches where recovery efforts should be focused and that substantial recovery value exists (USFWS 2002:91). In addition, the Recovery Plan includes measures to minimize take and offset impacts (see USFWS 2002:82). Thus, we relied heavily on the Recovery Plan for reasoning for minimizing take of flycatchers in this reach and to offset impacts for the conservation of the species.

Cumulative Effects - Southwestern Willow Flycatcher

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Diversion of stream flow for agriculture and pumping of groundwater occurs along all major stream courses within the action area, usually on private and Tribal lands. Ranching and farming activities occurring downstream of the confluence of the Gila and San Pedro rivers may impact habitat for flycatchers.

Conclusion - Southwestern Willow Flycatcher

Section 7(a)(2) of the ESA states that Federal agencies must ensure that their activities are not likely to jeopardize the continued existence of any listed species. “Jeopardize” means to reduce appreciably the likelihood of both survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species. After reviewing the current status of the southwestern willow flycatcher, the environmental baseline for the action area, the effects of the proposed action (approval by Reclamation for the purchase of CAP water by the Tribe in lieu of releasing water in San Carlos Reservoir), and the cumulative effects, it is our biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the southwestern willow flycatcher. Based on our analysis above, we do not believe this project rises to the level of jeopardy because of the following reasons: (1) flycatchers will be

affected for only one breeding season, (2) under the assumption that ecological conditions in 2004 will resemble those of 2002, flycatchers had 39 percent breeding success at monitored sites even though flows at the Kelvin gage were between 0.3 and 6.0 cfs in June and July (i.e., within the flycatcher breeding season), and (3) at least some flycatchers can be expected to disperse to suitable habitat on the San Pedro River or in other drainages.

Status of the Species - Bald Eagle

The bald eagle south of the 40th parallel was listed as endangered under the Endangered Species Preservation Act of 1966, on March 11, 1967 (USFWS 1967), and was reclassified to threatened status on July 12, 1995 (USFWS 1995b). No critical habitat has been designated for this species. The bald eagle was proposed for delisting on July 6, 1999 (USFWS 1999).

The bald eagle is a large bird of prey that historically ranged and nested throughout North America except extreme northern Alaska and Canada, and central and southern Mexico. It occurs in association with aquatic ecosystems, frequenting estuaries, lakes, reservoirs, major river systems, and some seacoast habitats. Generally, suitable habitat for bald eagles includes those areas which provide an adequate food base of fish, waterfowl, and/or carrion, with large trees for perches and nest sites. In winter, bald eagles often congregate at specific wintering sites that are generally close to open water and offer good perch trees and night roosts (USFWS 1995b).

Initial eagle population declines probably began in the late 1800s and coincided with declines in the number of waterfowl, shorebirds, and other prey species. The widespread use of dichloro-diphenyl-trichloroethane (DDT) and other persistent organochlorine compounds in the 1940s for mosquito control and as a general insecticide caused considerable declines in bald eagle populations. DDT breaks down into dichlorophenyl-dichloroethylene and accumulates in the fatty tissues of adult females, leading to impaired calcium release necessary for egg shell formation. Thinner egg shells led to reproductive failure, which is considered a primary cause of declines in the bald eagle population. DDT was banned in the United States in 1972 (USFWS 1995b). Bald eagles have increased in number and expanded in range due to banning of DDT and other persistent organochlorine compounds, habitat protection, and additional recovery efforts (USFWS 1999).

<u>Status of Bald Eagles in the Southwestern United States, including Arizona</u>

Most breeding areas in Arizona are located in close proximity to a variety of aquatic habitats including reservoirs, regulated river systems, and free-flowing rivers and creeks (Hunt *el al.* 1992, AGFD 1999). The alteration of natural river systems has had both beneficial and detrimental affects to the bald eagle. While large portions of riparian forests were inundated or otherwise destroyed following construction of dams and other water developments, the reservoirs

created by these structures enhance habitat for the waterfowl and fish species (often nonnative species) on which bald eagles prey. In addition to breeding bald eagles, Arizona provides habitat for wintering bald eagles, which migrate through the state between October and April each year. A high number of bald eagles winter throughout Arizona and on San Carlos Reservoir (Beatty and Driscoll 1999).

Although not considered a separate subspecies, bald eagles in the southwestern United States have been considered as a distinct population for the purposes of consultation and recovery efforts under the Act. A recovery plan was developed in 1982 for bald eagles in the southwest recovery region. However, new information has indicated that the bald eagles in Arizona and the southwest recovery region are not a distinct, reproductively isolated population as was previously believed. In 1994, a male bald eagle that originated from eastern Texas was discovered nesting at Luna Lake in east-central Arizona. The origin of the unbanded female was not determinable. We have determined that bald eagles in the southwest recovery region are part of the same bald eagle population found in the remaining lower 48 states (USFWS 1995b). We have proposed delisting of the bald eagle in the lower 48 states, including Arizona, stating that the number of breeding pairs in the Southwestern Recovery Unit has more than doubled in the last 15 years (USFWS 1999).

However, the AGFD (1999) concluded that "evidence from the banding and identification of breeding adults defends the theory that Arizona's breeding population is not supported or maintained by immigration from other states or regions. Because adults return to the vicinity of their natal origin to breed, the large distance between small populations in the southwest decreases the chance for movement between neighboring populations. Probably most convincing are the results from banding 256 nestlings over 20 years and identifying 372 breeding adults over 8 years. Only one individual from out-of-state entered the breeding population and one left. Additionally, the proportion of breeding adults with color bands (placed on as nestlings in Arizona) has steadily increased, while the presence of unmarked eagles has decreased. Thus, continued attention to the survivorship of all Arizona bald eagles is vital to the maintenance of our breeding population. We can not depend on immigration to Arizona from nearby states to make up for poor management in Arizona."

Arizona bald eagles demonstrate unique behavioral characteristics in contrast to bald eagles in the remaining lower 48 states. Eagles in Arizona frequently construct nests on cliffs. By 1992, of the 111 nest sites known within the southwest, 46 were in live trees, 36 on cliffs, 17 on pinnacles, 11 in snags, and one on an artificial platform. However, while there were more nests in trees, one study found that cliff nests were selected 73 percent of the time, while tree nests were selected 27 percent of the time. Additionally, eagles nesting on cliffs were found to be slightly more successful in raising young to fledgling though the difference was not significant. Young eagles will remain in the vicinity of the nest and depend on their adults for about a month after fledging (Hunt *et al.* 1992).

<u>Bald Eagle Diets in Arizona</u>

While eagles will eat mammals, amphibians, invertebrates, and birds, fish are their primary food item (Stalmaster 1987, Hunt *et al.* 1992). Fish are generally consumed twice as often as birds, and four times as often as mammals. Bald eagles are known to catch live prey, steal prey from other predators (especially osprey), and use carrion. Carrion constitutes a higher proportion of the diet for juveniles and subadults than it does for adult eagles. Diet varies depending on what species are available locally. This can be affected by the type of water system on which the breeding area is based (Hunt *et al*. 1992).

Eagles will defend territories, including foraging areas, primarily from other bald eagles (Stalmaster 1987). Eagles will scavenge, steal, or actively hunt to acquire food. Eagles primarily perch and wait in order to detect carrion or passively detect available live prey. Birds will actively search out live prey or carrion, but energetically, this method is the most costly (Stalmaster 1987).

Productivity of Arizona Bald Eagles

From 1970 to 1990, 226 known eaglets fledged in Arizona, for an average of 10.8 young produced per year. Successful nests contained an average of 1.6 young per year (Hunt *et al*. 1992). In 2000, there were 41 known breeding areas, 37 of which were occupied. Within those breeding areas, 27 nests were active, and 10 nests failed. Thirteen of the 27 nests were successful in producing young, and a total of 36+ young hatched. Twenty-two of these young survived to fledge (Driscoll and Koloszar 2001). In 1999, 40 breeding areas were known in Arizona (AGFD 1999). In 2002, 47 breeding areas were known, and 41 were occupied by pairs of birds. The 2002 breeding season produced the most fledglings ever recorded in one year (n=37) (J. Driscoll, AGFD, pers. comm.).

Productivity rates are lower in Arizona as compared to other parts of the United States. There were 0.92 average young per occupied breeding area in Arizona before 1984 when there were less than 20 breeding areas, and 0.78 average young per occupied breeding area since 1984, as opposed to 0.96 average young per breeding in Alaska, Florida, and Wisconsin (AGFD 1999, Sprunt *et al.* 1973, McAllister *et al.* 1986, Kozie and Anderson 1991). However, productivity in raptor populations frequently is density-dependent and as the population of nesting pairs increases, brood size and nest success commonly decrease (Newton 1979).

Threats

Even though the bald eagle has been reclassified to threatened, and the status of the birds in the southwest is on an upward trend, the Arizona population remains small and under threat from a variety of factors. Human disturbance of bald eagles is a continuing threat which may increase as numbers of bald eagles increase and human development continues to expand into rural areas (USFWS 1999). The bald eagle population in Arizona is exposed to increasing hazards from the regionally increasing human population (Hunt *et al.* 1992). These include extensive loss and modification of riparian breeding and foraging habitat through clearing of vegetation, changes in

groundwater levels, and changes in water quality (Hunt *et al.* 1992). Threats persist in Arizona largely due to the proximity of bald eagle breeding areas to major human population centers and recreation areas. Additionally, because water is a scarce resource in the southwest, recreation is concentrated along available water courses. Some of the continuing threats and disturbances to bald eagles include entanglement in monofilament fish line and fish tackle; overgrazing and related degradation of riparian vegetation; malicious and accidental harassment, including shooting, off-road vehicles, recreational activities (especially watercraft), and low-level aircraft overflights; alteration of aquatic and riparian systems for water distribution systems and maintenance of existing water development features such as dams or diversion structures; collisions with transmission lines; poisoning; and electrocution (Beatty *et al.* 1999; Stalmaster 1987). In Arizona, the use of breeding area closures and close monitoring of nest sites through the Arizona Bald Eagle Nest Watch Program (ABENWP) has been and will continue to be essential to the recovery of the species (AGFD 1999). Ensuring the longevity of the ABENWP is of primary concern to the Service (USFWS 1999).

It is not known if the population of bald eagles in Arizona declined as a result of DDT contamination because records were not consistently kept during that time period. However, the possibility for contamination was present as DDT was used in Arizona and Mexico. Use of DDT in Mexico could potentially have contaminated waterfowl that then migrated through Arizona in addition to directly affecting juvenile and subadult eagles that traveled into Mexico. Many of the nest sites in Arizona are in rugged terrain not suitable for agricultural development, and may therefore have avoided the direct effects of DDT (Hunt *et al*. 1992). Concentrations of heavy metals in bald eagle eggs are a concern in Arizona. Thirteen Arizona bald eagle eggs collected from 1994 to 1997 contained from 1.01 to 8.02 ppm dry weight mercury (Beatty *et al.* unpubl. data). Concentrations in the egg are highly correlated with risk to reproduction. Adverse effects of mercury on bald eagle reproduction might be expected when eggs contain about 2.2 ppm mercury or more (Newton 1979). Five of 10 eggs approached or exceeded the 2.2 ppm threshold concentration. Mercury concentrations in addled eggs appears to be increasing over time. Addled bald eagle eggs collected in Arizona in 1995-97 contained more than two- to six-times higher concentrations of mercury than eggs collected in 1982-84 (appx. 0.39-1.26 ppm) (King pers. comm.).

Management in the Southwest

The establishment of the Southwestern Bald Eagle Management Committee (SWBEMC) and Arizona Bald Eagle Nestwatch Program (ABENWP) has been essential to the success of recovery efforts for eagles in the southwest (AGFD 1999). The SWBEMC includes a number of Federal, State, Tribal, and quasi-governmental agencies and partners, and has been effective at implementing breeding area closures to reduce the threat of harassment to nesting eagles. The ABENWP documents disturbances at nest sites, provides on-site protection, and intervenes as necessary to reduce harassment or as otherwise needed for the benefit of the eagles (AGFD 1999). This intervention has proven to be very effective in maintaining the southwestern bald eagle population. The ABENWP has “rescued” up to 50 percent of the fledglings produced in a year. These rescue operations include removing fishline and tackle from nestlings and adults,

and returning nestlings to their nests after they fell or jumped out of the nest in response to disturbance or to escape extreme heat. Since the 1980's, the ABENWP has rescued 48 eagles and eggs, and documented 52 cases of fishing line or tackle posing a threat to the nesting eagles and eaglets (AGFD 1999). At least 15 percent of the bald eagle production is due to assistance provided by the Nestwatch program (USFWS 1999).

Environmental Baseline - Bald Eagle

Status of the Species within the Action Area

Five bald eagle breeding areas are located in the project area including the Suicide, Coolidge Dam, San Carlos, Granite Basin, and Winkelman breeding areas (Appendix B). The Suicide breeding area contains a cliff nest which is located approximately 0.8 km (½ mile) upstream of San Carlos Reservoir. The foraging activity of the Suicide bald eagles is not thoroughly known; however, due to their nest's proximity at and above the lake, these eagles are believed to primarily forage at the lake. The Coolidge nest area is located approximately 3.1 km (5 miles) downstream from Coolidge Dam at the confluence of Hawk Canyon. The eagles consistently nest in one of two locations within the cottonwood stand at Hawk Canyon and infrequently nest along a cliff just south of the confluence of Hawk Canyon. The cottonwood nest trees are becoming senescent and there is no noticeable recruitment of cottonwood trees in this riparian forest stand. Limited data are available regarding the foraging ecology of the Coolidge bald eagles; however, they are known to forage on the Gila River below Coolidge Dam and on San Carlos Reservoir (Hunt *et al.* 1992). The San Carlos nest area is situated at the San Carlos River inflow to San Carlos Reservoir in the vicinity of the town of Peridot. The foraging activity of the San Carlos bald eagles at San Carlos Reservoir has been repeatedly observed by members of the San Carlos Recreation and Wildlife Department. These eagles depend on the resources at San Carlos Lake, and to a lesser extent, the San Carlos River. The Granite Basin nest area is located approximately 6.2 km (10 miles) downstream of Coolidge Dam. The nest is positioned on a pinnacle cliff adjacent to the Gila River. The Winkelman breeding area is located approximately 18.6 km (30 miles) downstream of Coolidge Dam at the confluence of the San Pedro and Gila rivers.

San Carlos Reservoir Bald Eagle Breeding Areas: Three of the five bald eagle breeding areas (Coolidge, San Carlos, and Suicide) surround and use San Carlos Reservoir. The Coolidge Breeding Area was first discovered in 1985, has successfully fledged 14 young and failed to fledge young on 9 occasions (5 instances from 1998 - 2002). One young was fledged in 2003. The San Carlos Breeding Area was discovered in 1995. From 1995 to 2003, the San Carlos bald eagles successfully fledged young from 1995 to 1998, but have failed to fledge young since 1999. The Suicide Breeding Area was discovered in 1999 and fledged 2 young in 1999, 3 young fledged in 2000, and 2 young fledged in 2001; however, it failed (i.e., 3 eaglets ready to fledge died of unknown reasons) in 2002. The Suicide pair fledged 3 young in 2003.

Middle Gila River Bald Eagle Breeding Areas: The Granite Basin and Winkelman breeding areas are downstream of Coolidge Dam along the Gila River and near Gila/San Pedro

confluence. The Granite Basin Breeding Area was discovered in 1999, and is believed to be dependent solely on the Gila River. The eagles failed to hatch eggs in 1999 and 2001, and were present but did not lay eggs in 2000, 2002, 2003. The Winkelman Breeding Area was discovered in 1995, and failed to hatch eggs in their only nesting attempts in 1996 and 1997. The Winkelman Breeding Area has been unoccupied since 1999.

Factors Affecting the Species' Environment within the Action Area

The primary factor affecting bald eagle habitat in the project area is the already degraded aquatic habitat conditions of the middle Gila River Watershed. Coolidge Dam has been in place for 73 years and water levels flowing through the Gila River have fluctuated from year to year depending on general climatic conditions and agricultural needs of the downstream water users as discussed in the Proposed Action section of this document. This altered water flow has been further compromised by several factors. Human activities, particularly adjacent to and downstream of the community of Winkelman, have resulted in lowering of the groundwater levels, decreases in surface flows, changes to floodplain and channel dynamics, and changes in the extent and composition of riparian vegetation. The river channel has changed from narrow, deep, and meandering to wide, shallow, and braided. Changes to channel morphology have been and continue to be a function of watershed conditions, flood events, clearing of lands within the floodplain for agricultural and other uses, direct modification of the stream channel, and the extent and stability of floodplain vegetation. Livestock grazing may also be responsible for the long-term changes that have occurred in the Gila River watershed. There are numerous livestock grazing allotments adjacent to the middle Gila River in the project area.

Increases in human populations and agricultural activity have resulted in increased groundwater pumping and reduced surface flows in the middle Gila River during the last 60 years (Lilburn and Associates 1984). In the Safford Valley, groundwater use increased from 20,000 af/year in the last half of the 1930's to 116,000 af/year during the last half of the 1960's resulting in a lowering of the water table of up to 82 m (25ft) (Lilburn and Associates 1984). Surface water flows have also declined steadily as a result of diversions for agriculture (USFWS 2002). These activities have restricted floodplain development and the maintenance of native riparian vegetation communities.

The real extent of riparian habitat and species composition have changed substantially over the last 100 years. Flooding events, clearing for agricultural and other land uses such as mining, modifications to the floodplain for flood control, and the invasion of exotic salt cedar have reduced the functional capacity of riparian habitats to dampen flood damage and provide wildlife habitat. Between 1881 and 1905, the Gila River in the Safford Valley was a meandering stream lined by cottonwoods, willows, and mesquite (*Prosopis spp.*) (Graf 1982). Ground photos of the Gila River in the Safford Valley in the 1880's indicate the riverbottom was dominated by 'fairly dense cover of cottonwoods and willows, with undergrowth beneath these trees....very dense and ...almost impenetrable in places (Graf 1982). Salt cedar was not present in the photos, and was documented on the Gila River in the Phoenix area in the 1890's and first observed in the Safford Valley sometime between 1910 and 1920. Graf (1982) also noted that by 1930, salt cedar had

become the dominant bottomland vegetation on the upper Gila River. Riparian vegetation reached its maximum areal extent between 1944 and 1945 and has fluctuated considerably since that time due to dynamic flooding events, agricultural clearing and phreatophyte control. One factor that has remained constant; however, is the predominance of salt cedar within existing riparian habitats.

Additional factors present in the project area that affect the environment of the bald eagle include human disturbance, particularly during the breeding season, and intentional killings of bald eagles. Data collected from the ABENWP has documented the types of disturbances occurring at nest sites on the San Carlos Apache Indian Reservation. One such example includes disturbances to the San Carlos nest site documented in 1998 which indicated that there were 16 disturbances to eagles from aircraft, 11 disturbances from vehicles, 4 from recreationists, 3 from nest watchers, 2 from gunshots, and 1 from a train (AGFD 1999). Reaction to the disturbance can range from none to flushing off the nest which could endanger the eggs or small eaglets. Disturbance is also associated with recreational fishing at San Carlos Reservoir which provides a premier sport fishing destination in Arizona. One important impact to bald eagles from recreational fishing is the entanglement of eagles and eaglets in discarded fishing line (Ohmart 2002). Disturbance to bald eagles from recreational activities is expected to increase with the addition of the forthcoming proposal by the Bureau of Land Management (BLM) to allow rafting and kayaking outfitters to begin to operate their businesses on the Gila River below Coolidge Dam (USFWS 2003).

The prey base of the bald eagle in the middle Gila River Watershed has also been affected by the decline in the Gila River basin native fish community which has resulted primarily from impoundment, diversion, channelization, and other manipulations of this watershed (USFWS 1994b). Impoundments such as San Carlos Reservoir all directly removed habitat for most native fish species and modified or dried flows in long stretches downstream. Major portions of the Gila River system now flow only intermittently; e.g., the San Pedro, lower Salt, and Gila River near Virden, New Mexico, near Safford, Arizona, and below AHDD. These alterations have created habitats more favorable to non-native fish species than to native species (Minkley 1973, Bestgen 1986, Bestgen and Propst 1989, Rinne 1991). Conversely, dams create habitat for water fowl and exotic fishes which eagles now exploit (Hunt *et al.* 1992).

Ohmart (2002) reported that there are many factors that can affect nesting success, but the availability and reliability of a food source during nesting and young rearing is the most important. The eaglets require a stable food supply while in the nest and just after fledging, and are almost solely dependent on the adults until they depart from the nest area about a month after they fledge. Ohmart (2002) further states that the historically-fluctuating water levels in San Carlos Reservoir during the breeding season of the bald eagle may have affected the nesting success of this species and may continue to affect nesting success. The Service noted the same relationship in its February 21, 2003 Intra-Service Biological and Conference Opinion – Issuance of a Section 10(a)(1)(B) permit to Salt River Project for Operation of Roosevelt Lake. However, Glinski (2002) analyzed the relationship between San Carlos Reservoir volumes and bald eagle productivity from 1985 through 2000 and found no relationship between productivity and

reservoir levels. Further, Glinski (2002) believed that density-dependent factors (i.e., competition) were likely the cause for poor performance of San Carlos and Coolidge breeding areas after establishment of the Suicide breeding area. We note that the relationship between water levels at San Carlos Reservoir and eagle productivity were argued in San Carlos Apache Tribe v. United States, 272 F. Supp.2d 860 (D. Ariz.), appeal pending, 9th Circuit Court of Appeals, No. 03-16874. The Court found productivity to be related to density, not reservoir levels, and that fluctuating reservoir levels do not result in the take of bald eagles. Id. at 880.

The encouraging aspect of what was observed at San Carlos Reservoir is the flexibility of the bald eagle as a predator. Even with the considerable drop in lake size, occupancy of territories was still relatively high. So while reproduction was hampered, adult eagles were still persisting in these territories ready to breed successfully when conditions became more favorable. Also, there was no indication of an unusually high mortality and replacement rate of adults holding territories at San Carlos, indicating that breeding birds are surviving.

While observing and describing long-term and subtle declines in bald eagle productivity, there may be periodic seasons where eagles are more successful than the overall trend. Occurrences at San Carlos Reservoirs in 2002 and 2003 may provide some evidence of how seasonal or within season increases in food abundance, availability, or continuity may affect eagle productivity. Having six eaglets produced and then suddenly die at San Carlos Reservoir in 2002 suggests that adequate resources were available to create the eaglets, but later in the season may have been interrupted, not adequate, or unavailable. Also, after not fledging young from 1998 to 2002, the Coolidge eagles were able to fledge one young in 2003. Changes in the fish population and/or fish availability to foraging eagles are expected to occur as the lake or river changes. As the lake continued to drop in size, it is possible that eagles were able to partition and/or exploit a previously unavailable food source. Or possibly, a short-term increased supply in food on the reservoir or in the Gila River was made available to eagles.

Effects of the Action - Bald Eagle

To analyze the effects of the proposed approval of the sale of CAP water by Reclamation to the San Carlos Apache Tribe on the bald eagle, the major factors which must be considered include the effects to the bald eagle from retention of 20,000 af of water in San Carlos Reservoir during the 2004 bald eagle breeding season, and a reduced flow in the middle Gila River downstream of Coolidge Dam of 55 cfs/day from the 2002 USGS Stream Flow Data measured at the Calva stream gage. Impacts to bald eagles from the proposed action are evaluated separately for the bald eagles at San Carlos Reservoir (Suicide, Coolidge Dam, and San Carlos eagles) and bald eagles occupying the middle Gila River (Granite Basin and Winkelman eagles).

San Carlos Reservoir Bald Eagle Breeding Areas: The San Carlos Reservoir bald eagle breeding area includes the San Carlos, Coolidge and Suicide territories. The total amount of water currently available in San Carlos Reservoir is only 27,000 af, or approximately 3 percent of its

867,400 af capacity. Prior to the proposed action of storing up to 20,000 af, San Carlos Reservoir is expected to be nearly empty at about 3 percent full.

If the 20,000 af of water is retained in San Carlos Reservoir during the nesting and young rearing period, the eaglets may have a better chance at survival than if the 20,000 af of water is drawn down during this crucial time. Retention of the 20,000 af of water, while not a very significant amount of water, should reduce impacts to bald eagles from the current severe drought conditions which can produce stressful conditions for nesting bald eagles by further reducing local fish populations.

Middle Gila River Bald Eagle Breeding Areas: The breeding areas within the Middle Gila River include Granite Basin, Coolidge,[4] and Winkelman. The proposed retention of 20,000 af of water in San Carlos Reservoir and the subsequent reduction of river flow releases into the middle Gila River below Coolidge Dam is expected to have a direct effect on the foraging resources of the Coolidge and Granite Basin eagles, and impact nesting success in 2004.

The Winkelman Breeding Area is not currently occupied by bald eagles, and because it has been unoccupied since 1999, is not expected to suddenly be re-occupied in 2004. The reduced flow in the middle Gila River will continue to make the Winkelman Breeding Area unsuitable for eagles to re-occupy the site.

As mentioned above, the volume of water in San Carlos Reservoir is currently approximately 27,000 af. Inflows up to the volume of the SCIP water users' natural flow call water rights would continue to be released from Coolidge Dam into the middle Gila River. Using the 2002 hydrologic data from the U.S. Geological Survey gage station at Calva, Arizona, we analyzed the 2002 median monthly inflows and subtracted the proposed 55 cfs reductions in natural flow-based calls for 2004 on the Gila River below Coolidge Dam (Table 1). Our results indicate that the flow in March is only 11 cfs, and it remains at 0 cfs from April through August. Additionally, only about 1 cfs would continue to flow from the Coolidge Dam into the middle Gila River due to seepage and a spring located immediately downstream of the dam.

The expected adverse effect to the Coolidge and Granite Basin bald eagles due to the proposed action is the loss of reproduction in 2004 by reducing the access and availability of food by eliminating critical shallow, fast moving riffles necessary for foraging. Riverine foraging Arizona bald eagles rely on the temporal sequencing of food throughout the breeding season (Hunt et al. 1992). As a result, the absence of a significant component in their foraging sequence can be expected to adversely affect reproduction. Shallow, fast moving riffles are expected to be the first riverine habitat lost as a result of the cessation of flows. On rivers in Arizona, eagles primarily trap their food against the river bottom in shallow riffles and runs (Hunt et al. 1992).

[4]The Coolidge eagles forage on both San Carlos Reservoir and the Gila River below Coolidge Dam.

Shallow riffles are a high-oxygenated location needed by reproducing suckers and critical for riverine foraging eagles (Hunt et al. 1992). Suckers move into the riffle habitat to spawn providing an easy food source when an eagle's foraging time is restricted due to incubation (AGFD 1999). Newton (1979) reported that raptors respond to impacts to seasonal availability of food by foregoing breeding attempts in order to increase their own survival. Thus, we anticipate that take will occur at the Coolidge and Granite Basin territories. It is doubtful that either the Coolidge or Granite Basin eagles will find sufficient resources during the 2004 breeding season to successfully rear young because of reduced flows in the Gila River. The take will be in the form of harm because of insufficient resources being available to rear young.

Cumulative Effects - Bald Eagle

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Ranching and farming activities occur at the southernmost portion of the Gila River, particularly downstream of the confluence of the Gila and San Pedro rivers. Diversion of stream flow for agriculture and pumping of groundwater occurs along all major stream courses within the action area, usually on private and Tribal lands. These types of activities can result in lower stream flows or complete drying of the stream course for all or part of the year. The result is reduced survival of native cottonwood and willow stands, which must have water available to their root zones throughout the year. Dewatering[5] riparian habitats can further reduce the quality and availability of riparian vegetation and the quality and quantity of water necessary for the survival of fish inhabiting the middle Gila River which impacts bald eagles.

Commercial development, recreation, and mining activities, and associated habitat loss, also occur on private lands in the Winkelman, Kearny, and Kelvin communities within the project area. Activities such as recreation are increasing. In particular, the area just northeast of Florence along the Gila River is a popular off-road-vehicle use area. The area between Winkelman downstream to the Kelvin community is privately owned, and there is always the potential for future commercial and residential use to increase. Increasing recreational, residential, or commercial use of the private lands along the middle Gila River would likely result in greater cumulative adverse effects on the bald eagle through increased use of riparian areas which may degrade suitable habitat. As previously mentioned, these recreational uses may disturb the breeding and foraging activities of eagles, particularly the Suicide, San Carlos, and Coolidge eagles; and the most serious impact is the entanglement of eagles in discarded fishing line.

[5]Dewatering: Reduce the rate or volume of stream flow, and/or lower the water table in the flood plain aquifer.

Conclusion - Bald Eagle

After reviewing the current status, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the bald eagle. No critical habitat has been designated for the bald eagle, thus none will be affected. Our conclusion of non-jeopardy is based on the following:

1. The San Carlos, Suicide, and to a lesser extent, the Coolidge bald eagles have access to food at San Carlos Reservoir, and the result of this action is not expected to cause territory abandonment. Although we are reasonably certain that take will occur during 2004 at the Coolidge territory in the form of harm (i.e., failure to produce eggs or young from the lack of flow in the Gila River), it does not rise to the level of jeopardy.

2. The Granite Basin bald eagles have access to food along the Gila River below Coolidge Dam, and the result of this action is not expected to cause territory abandonment. Although we are reasonably certain that take will occur during 2004 at the Granite territory in the form of harm (i.e., failure to produce eggs or young from the lack of flow in the Gila River), it does not rise to the level of jeopardy.

3. The Winkelman Breeding Area has been unoccupied since 1999 and no eagles are expected to be affected by the proposed action.

Status of the Species - Spikedace

Spikedace was listed as a threatened species on July 1, 1986 (USFWS 1986a). Critical habitat was designated on April 25, 2000 (USFWS 2000). Critical habitat includes portions of the Verde, middle Gila, San Pedro, San Francisco, Blue, and upper Gila rivers and Eagle, Bonita, Tonto, and Aravaipa creeks and several tributaries of those streams. Critical habitat exists within the action area. The Spikedace Recovery Plan (USFWS 1990b) was approved in September 1991.

Spikedace is a small silvery fish whose common name alludes to the well-developed spine in the dorsal fin (Minckley 1973). Spikedace historically occurred throughout the mid-elevations of the Gila River drainage, but is currently known only from the middle and upper Gila rivers, and Aravaipa and Eagle creeks (Barber and Minckley 1966, Minckley 1973, Anderson 1978, Marsh *et al*. 1990, Sublette *et al*. 1990, Jakle 1992, Knowles 1994, Rinne 1999). The species also occurs in the upper Verde River, but appears to be declining in numbers. It has not been documented in the Verde River since 1999 despite annual surveys, and additional survey work is needed to determine its current status. Habitat destruction along with competition and predation

from introduced nonnative species are the primary causes of the species' decline (Miller 1961, Williams *et al*. 1985, Douglas *et al*. 1994).

Spikedace live in flowing water with slow to moderate velocities over sand, gravel, and cobble substrates (Propst *et al*. 1986, Rinne and Kroeger 1988). Specific habitat for this species consists of shear zones where rapid flow borders slower flow, areas of sheet flow at the upper ends of mid-channel sand/gravel bars, and eddies at the downstream riffle edges (Propst *et al*. 1986). Spikedace spawn from March through May with some yearly and geographic variation (Barber *et al*. 1970, Anderson 1978, Propst *et al*. 1986). Actual spawning has not been observed in the wild, but spawning behavior and captive studies indicate eggs are laid over gravel and cobble where they adhere to the substrate. Spikedace lives about two years with reproduction occurring primarily in one-year old fish (Barber *et al*. 1970, Anderson 1978, Propst *et al*. 1986). Spikedace feeds primarily on aquatic and terrestrial insects (Schreiber 1978, Barber and Minckley 1983, Marsh *et al*. 1989).

The status of spikedace is declining rangewide. It is now restricted to approximately 289 miles of streams, and its present range is only 10 to 15 percent of its historical range. Within occupied areas, it is common to very rare, but is presently common only in Aravaipa Creek and some parts of the upper Gila River in New Mexico (USFWS 2000). Although it is currently listed as threatened, we have found that a petition to uplist the species to endangered status is warranted. A reclassification proposal is pending; however, work on it is precluded due to work on other higher priority listing actions (USFWS 1994).

When critical habitat was designated, we determined the primary constituent elements (PCEs) to be those habitat features required for the physiological, behavioral, and ecological needs of the species. For spikedace, these include permanent, flowing, unpolluted water; living areas for adult spikedace with slow to swift flow velocities in shallow water with shear zones where rapid flow borders slower flow, areas of sheet flow at the upper ends of mid-channel sand/gravel bars, and eddies at downstream riffle edges; living areas for juvenile spikedace with slow to moderate flow velocities in shallow water with moderate amounts of instream cover; living areas for larval spikedace with slow to moderate flow velocities in shallow water with abundant instream cover; sand, gravel, and cobble substrates with low to moderate amounts of fine sediment and substrate embeddedness; pool, riffle, run, and backwater components present in the aquatic habitat; low stream gradient; water temperatures in the approximate range of 35 to 65° Fahrenheit (F); abundant aquatic insect food base; periodic natural flooding; a natural, unregulated hydrograph or, if the flows are modified or regulated, then a hydrograph that demonstrates an ability to support a native fish community, and; habitat devoid of nonnative aquatic species detrimental to spikedace or habitat in which detrimental nonnative species are at levels that allow the persistence of spikedace.

The PCEs are generalized descriptions and ranges of selected habitat factors that are critical for the survival and recovery of spikedace. The appropriate and desirable level of these factors may vary seasonally and is highly influenced by site-specific circumstances. Therefore, assessment of the presence/absence, level, or value of the constituent elements must include consideration of

the season of concern and the characteristics of the specific location. The PCEs are not independent of each other and must be assessed holistically, as a functioning system, rather than individually. In addition, the constituent elements need to be assessed in relation to larger habitat factors, such as watershed, floodplain, and streambank conditions, stream channel geomorphology, riparian vegetation, hydrologic patterns, and overall aquatic faunal community structure.

Recent taxonomic and genetic work on spikedace indicate there are substantial differences in morphology and genetic makeup between remnant spikedace populations. Remnant populations occupy isolated fragments of the Gila basin and are isolated from each other. Anderson and Hendrickson (1994) found that spikedace from Aravaipa Creek are morphologically distinguishable from spikedace from the Verde River, while spikedace from the upper Gila River and Eagle Creek have intermediate measurements and partially overlap the Aravaipa and Verde populations. Mitochondrial DNA and allozyme analyses have found similar patterns of geographic variation within the species (Tibbets 1992, Tibbets 1993).

Environmental Baseline - Spikedace

Surveys for the spikedace were conducted by Reclamation at 11 locations on the Gila River between Coolidge Dam and AHDD, and at 8 locations on the San Pedro River between 1991 and 2002. The most recent record of a spikedace located in the Gila and San Pedro rivers includes the 1991 October observation of one spikedace from the middle Gila River upstream from the AHDD near Cochran, Arizona (Reclamation records 1991, unpubl.). No further observations of spikedace in the Gila or San Pedro rivers have been made since Reclamation began surveys in 1991; however, it is important to note that the surveys were conducted at only 3 of the 11 Gila River sites from 1991 - 1994. Surveys at the 11 locations on the Gila River began in 1995 after we made these surveys a requirement in the reasonable and prudent alternative in both the 1994 and 2001 Final Biological Opinions on the Transportation and Delivery of CAP Water to the Gila River Basin in Arizona and New Mexico (USFWS 1994b). The 1996 survey at the 11 locations was not conducted; therefore, the surveys have been conducted annually since 1997. It is also important to note that the reaches within each of the 11 locations are not entirely sampled; only 2-3 stations within each reach were surveyed.

It is unclear whether the spikedace found in 1991 was washed downstream from the extant population on Aravaipa Creek or is indicative that a population occurs in the Gila River. However, in the year preceding the October sampling, there was only one marginally-significant flood, which occurred in March, according to USGS discharge records. It is unlikely that such a relatively minor flood would displace a single spikedace 50 miles downstream to survive for 6 months. In addition, it is even more unlikely that, at the precise time of the only sampling conducted that year, the displaced fish would be present at one of the 7 sites sampled, totaling less that 1 mile of the 50-mile reach. Given the sparse sampling in the middle Gila River, it is far more likely that the 1991 spikedace represents a small population of spikedace either permanently resident in that area or which occupy the area in a periodically fluctuating pattern

dependent upon conditions. Furthermore, documentation of such small populations is very difficult and often results in false declarations of extirpation (Mayden and Kuhajda 1996).

Spikedace exhibit what is likely an *apparent* absence from the upper Verde River as well, where the lack of spikedace detections may be related to the lack of recent search effort. Comprehensive surveys for spikedace for the entire upper Verde River are lacking (R. Bettaso, AGFD, pers. comm.). The most consistent and recent surveys that have regularly and systematically targeted spikedace over the last seven years have occurred over a 1.3 mile stretch (separated into seven 980-foot sections) on the upper-most reach of the Verde River by the U.S. Forest Service. Because of this species' small size, it is difficult to detect small populations with existing methodologies such as backpack shocking and seining, which are not as effective when fish are more rare. Native fish biologists from the AGFD (R. Bettaso, pers. comm.), the Service (S. Leon, pers. comm.), and Forest Service (J. Rinne, pers. comm.) believe that spikedace, while rare, still persist in the upper-most reach of the Verde River. This scenario is at least as likely in the Gila River below Coolidge Dam.

While recent detections of spikedace have been rare, that does not ensure or necessarily indicate that the species is extirpated or will be rare in the future. Spikedace distribution and abundance go through dramatic fluctuations as a result of natural and regional conditions such as flood events (USFWS 1991). As a result, it would not be unexpected for small mobile fish populations to naturally expand and contract within the action area.

With the exception of longfin dace (*Agosia chrysogaster*), native fish in the action area of the middle Gila River are faring poorly. Decline of native suckers such as the endangered razorback sucker and non-listed desert sucker (*Pantosteus clarki*) and Sonora sucker (*Catostomus insignis*) has occurred. The only other native fish collected was spikedace, currently represented by only one individual since 1991. In October and December of 1999, AGFD, Reclamation, and Arizona State University (ASU) conducted stream surveys in the Gila River for the CAP. These surveys further indicate that non-native fish abundance outweighed native fish numbers. One of the sampling sites in the middle Gila River consists of four reaches. Reach 1 includes Coolidge Dam to Needles Eye. Bluegill (*Lepomis macrochirus*) were captured for the first time in this location since 1995. No desert sucker were taken in 1999; however, 10 individuals were captured in 1998. Reach 2 includes Little Ash Creek to AHDD. Bluegill were taken during this first monitoring effort of Reach 2. Reach 3 includes AHDD to Mineral Creek. Sonoran sucker were not located in Reach 3. Reach 4 includes Mineral Creek to AHDD. Longfin dace were captured within this reach and the 1999 capture of this species is the last recorded presence of the longfin dace in this location. CAP monitoring also was conducted in the Gila River from September 2000 to January 2001. It is interesting to note that no native fish (including desert sucker (*Pantosteus clarki*) were taken in the Gila River during the 2000 CAP surveys. Sonora and desert sucker were taken in Reach 3 from 1995 through 1999. In contrast, green sunfish (*Lepomis cyanellus*) were captured within Reach 1, as well as a large number of red shiner (*Cyprinella lutrensis*) (5,588 in 2000, 1,296+ in 1999, and 925 in 1998), and a large number of bluegill (103 in 2000 compared to 17 and 16 in 1999 and 1998 respectively).

The presence of widespread numbers of non-natives in the Gila River may exclude large populations of native fish within this watershed; however, they may still be present in small numbers. When spikedace populations are at low levels, they can be very difficult to locate. Fish sampling data from the lower San Pedro and Middle Gila rivers is limited and localized. The existence of perennial flows in the Gila River and perennial and ephemeral flows that connect reaches of the San Pedro River with the Gila River and Aravaipa Creek, and the occurrence of a spikedace at Cochran crossing suggest that a small number of spikedace may be present in the lower San Pedro River from the Aravaipa confluence to Dudleyville, and possibly downstream in the project area in the middle Gila River. Based on these findings for other native fish in these reaches, numbers of spikedace may increase temporarily in this area following flood events.

The historical and ongoing degradation of the uplands and riparian zones of the middle Gila River has helped to increase the abundance of nonnative fish species in the action area, primarily by the loss and degradation of physical processes (periodic flooding) and habitat types (i.e. backwaters, clean sand and gravel substrates, non-embedded cobbles, etc) required by native fishes. Moreover, unnatural hydrographs also serve to decrease the competitive advantage southwestern native fishes hold over fishes that evolved in the mesic basins of eastern North America (Minckley and Meffe1987). Coolidge Dam has reduced the magnitude and frequency of both spring and monsoonal summer flood flows, thus reducing the tendency for floods to remove nonnative fishes. Further, agricultural, municipal, and industrial water use upstream in the Safford (Arizona), and Duncan (Arizona)/Virden (New Mexico) valleys results in the diversion and/or pumping of thousands of acre feet of water which would otherwise flow downstream. These water withdrawals are in addition to the reductions in sediment supply and changes in riparian vegetation recruitment and community structure which cause adverse changes in the fluvial geomorphology of channels downstream of dams (USFWS 2002).

The existence and past and present operation of Coolidge Dam and water withdrawals in the Safford and Duncan/Virden valleys thus represent a direct and indirect baseline-level impediment to the recovery of the spikedace. A detailed analysis of pre- vs. post-Coolidge Dam hydrologic conditions in the Gila River appears in the final Southwestern Willow Flycatcher Recovery Plan (USFWS 2002).

The watershed of the middle Gila River is naturally fragile due to erosive soils, arid climate, and a naturally flashy hydrograph. Superimposed on this natural fragility are a number of human uses that have exacerbated current threats by denuding vegetation, severely increasing erosion, altering channel morphology, and substantially increasing the flashiness of the hydrograph in tributary streams. This spate-driven hydrograph is not otherwise adverse to native fishes except when acting upon degraded systems; long-term degradation can result from the passage of bulked flood flows through unstable streams. These human activities have historically included, and continue to include, copper mining, water diversions for agriculture, groundwater pumping, some road building, and off-highway vehicle (OHV) travel. The ASARCO mining company owns the largest proportion of private lands in the action area, and their land and water uses for mining and leased-land agriculture contribute to reduced baseline habitat conditions. OHV

travel is occurring throughout the project area, and is associated with increased runoff and adverse impacts on water quality.

Though desert fishes are adapted to the flashy, high sediment load conditions prevalent in hot desert streams, the presence of sediments in excessive quantities and/or at critical periods (i.e., early juvenile rearing) can occlude gills, cause embedded substrate conditions adverse to spawning and foraging, and increase vulnerability to predation by introduced fishes. Water from the Gila River is diverted and/or pumped from the Gila River at several locations; such diversion is immediately adverse to fish as water is the basic resource upon which they depend. Too, water withdrawal allows a given amount of solar radiation to act upon a lesser quantity of water, thus increasing temperatures.

Within the action area, the 39-mile reach of the Gila River from the San Pedro River confluence to the AHDD is designated as critical habitat for the spikedace. This reach is identified as the Gila River critical habitat unit of the Middle Gila/Lower San Pedro/Aravaipa Creek Complex. The mainstem Gila River habitat below the confluence with the San Pedro is influenced by the San Pedro River's relatively less-affected hydrograph, a primary constituent element (PCE) of the critical habitat and one that makes the presence of the other PCEs possible. Existing habitat conditions for spikedace within the critical habitat are a subset of those within the greater action area and are similarly degraded.

Recovery Plans are intended to guide the actions that will lead to downlisting or recovery of listed species. Though these documents are non-regulatory in nature, they do provide a prioritized list of potential recovery actions. Should natural or anthropomorphic conditions preclude or delay the implementation of recovery actions, those conditions can be construed as impeding recovery. The Spikedace Recovery Plan (USFWS 1990b) lists the following measures directly relevant to the action area and proposed action in its Stepdown Outline: (1) discourage detrimental land and water use practices (Item 1.5) and (2) insure perennial flows with natural hydrographs (Item 1.6). The manner in which the proposed action affects attainment of these recovery objectives in the action area will be evaluated in the Effects of the Proposed Action section, below.

Effects of the Action - Spikedace

Effects of the Proposed Action on the Species: The proposed action will incrementally worsen hydrologic conditions during those times when the stored water would have been released. Specifically, the major assumption-driven effect of the proposed action is the reduction of stream discharges by 55 cfs per day from March 1 to August 31, 2004 (see above). The reduction of flow from the Gila River downstream from Coolidge Dam interferes with the attainment of the Spikedace Recovery Plan stepdown outline objectives 1.5 and 1.6, which refer to the goals of discouraging detrimental land and water use practices and insuring perennial flows with natural hydrographs, respectively.

Spikedace have been detected in the action area albeit in extremely low quanity; the BA discloses that a single record exists from 1991. The nearest source for any possible repopulation

is Aravaipa Creek, which remains a strong source population. A small, cyclical population could occur in the action area (USFWS 2000:24329). While we did not agree that the proposed action would not affect the spikedace because of the uncertainty of their presence, we also do not anticipate take of spikedace will occur.

Effects of the Proposed Action on Critical Habitat: The proposed action exerts an adverse influence on the critical habitat's PCEs. The loss of water reduces the attainment of PCEs identified for the critical habitat, specifically: (1) permanent, flowing, unpolluted water (PCE 1); (2) periodic natural flooding (PCE 9); (3) a natural, unregulated hydrograph or, in regulated reaches, a hydrograph that demonstrates an ability to support a native fish community (PCE 11).

Reductions in flow through the Gila River below Coolidge Dam also exert an indirect influence on various PCEs. The association between modified hydrographs (i.e., reductions in the magnitude and frequency of flood flows) and maintenance of conditions favorable to native fish (Minckley and Meffe 1987) indicates that the proposed action exerts an adverse influence on PCE 12, which pertains to keeping critical habitat devoid of detrimental nonnative species or keeping those nonnatives at levels which allow spikedace to persist. Reductions in flow may also reduce aquatic insect food base (PCE 9). Reduced through-flow, as it relates to settling of suspended sediments, can be expected to allow for increased embeddedness of the substrate (PCE 5), though this may be offset somewhat by the increased sediment carrying capacity of the clean water released from the dam. Coolidge Dam releases cooler-than-ambient water from outlets and thus likely exerts an influence on PCE 8, which relates to water temperature and its diurnal and seasonal variation. Conversely, dewatering of the Gila River such that predatory, nonnative fish are reduced in number may exert a positive, immediate short-term influence on PCE 12.

We are concerned that the proposed action incrementally and detrimentally influences the riparian health of an already-affected reach of the Gila River (see Effects of the Proposed Action - Southwestern Willow Flycatcher, above). Should riparian conditions decline to the point that the channel geometry of the Gila River within the critical habitat becomes unsuitable for any or all life stages of the spikedace (PCEs 2-6), adverse modification of the habitat could result. Of particular concern is the potential of riparian mortality to lead to increased width-depth ratios, straighter channels, and the loss of backwater habitat. We feel that geomorphic adjustments of the river channel, an indirect effect of riparian degradation, itself a potential indirect effect of the action, are unlikely to occur and/or difficult to measure over the course of a project with 7 months of impact on the downstream environment.

The proposed action is to occur in calendar year 2004; the hypothetical maximum duration of effects is short. The assumption-driven proposed action will reduce, but not eliminate, flows from March through August of that year and is therefore likely to have minimal effects on the longer-term (2-season or greater) condition of the spikedace critical habitat unit. We do expect the proposed action to incrementally hasten mortality of some riparian vegetation, and to contribute to minor reductions in vigor on the vegetation that does survive. Riparian condition (i.e., density, stability) is directly associated with the geomorphology of the stream channel,

particularly in low-gradient streams such as the Gila River below Coolidge Dam (Rosgen 1994, 1996). Larger, woody riparian vegetation is expected to make the largest contributions to channel stability. These older age-classes are most well represented on higher flood terraces within the critical habitat unit. Minor losses in these areas will have little effect on the lower-elevation channel, within which both the with- and without-project summer baseflows are contained. The contribution of the difficult-to-measure increases in mortality and reductions in vigor to adverse changes in the form and function of the channel is thus expected to be minimal. Any such changes, should they occur, would likely be within the scope of the Gila River's current state of drought-influenced equilibrium and are not expected to contribute appreciably to longer-term loss of PCEs in the spikedace critical habitat. Thus, based on the analysis above, the proposed action will not result in the destruction or adverse modification of designated critical habitat for the spikedace.

Cumulative Effects - Spikedace

As stated previously, cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The most adverse of cumulative effects within or influencing the action area result from private (SCIDD and others) and tribal (GRIC and others) influence on the operation of Coolidge Dam for agricultural use. Together, SCIDD and GRIC irrigated approximately 43,900 acres in 2002, based on the summary of audits for acres "then being irrigated" (Gila Water Commissioner 2002). Past attenuation of the hydrograph that resulted from storage of water for irrigation was considered a baseline effect. These irrigation operations, however, guide the 2004 and future operation of San Carlos Reservoir and thus, the effects of those operations are cumulative to the proposed action.

Conclusion - Spikedace

After reviewing the current status of the species for the spikedace, the environmental baseline for the action area, the hypothetical, maximum possible effects of the proposed action, and the cumulative effects, it is our biological opinion that Reclamation's approval of the exchange of 20,000 af of CAP for retention of a water in San Carlos Reservoir, the associated partial dewatering in March 2004, and dewatering from April through August 2004 of the Gila River from Coolidge Dam to the San Pedro River confluence, and the March through August partial dewatering of the spikedace critical habitat unit from the San Pedro River confluence to the AHDD is not likely to jeopardize the continued existence of the spikedace or adversely modify or destroy designated critical habitat.

Rationale for our Conclusion: The proposed action is not likely to jeopardize the continued existence of the spikedace because an extremely low quantity of spikedace were detected within the action area; again, the BA discloses that a single record exists from 1991. In addition,

although the proposed action will affect PCEs 1, 8, 9, 11, and 12 of the critical habitat, these effects are expected to be temporary and returned to near-baseline conditions at the conclusion of the project in December 2004. The short duration of the reduced flows is also not expected to result in the scale of riparian vegetation mortality that would lead to adverse changes in the fluvial geomorphology, and thus the associated PCEs (2-6) of the Gila River between Coolidge Dam and the AHDD. Thus, the proposed action does not rise to the level of destruction or adverse modification of designated critical habitat for the spikedace.

Status of the Species - Loach Minnow

Loach minnow was listed as a threatened species on October 28, 1986 (USFWS 1986b). Critical habitat was designated for loach minnow on April 25, 2000 (USFWS 1994a). Critical habitat includes portions of the Verde, Black, middle Gila, San Pedro, San Francisco, Tularosa, Blue, and upper Gila rivers and Eagle, Bonita, Tonto, and Aravaipa creeks, and several tributaries of those streams. The Loach Minnow Recovery Plan (USFWS 1990a) was approved in September 1991.

Loach minnow is a small, slender, elongate fish with markedly upwardly-directed eyes (Minckley 1973). Historical range of loach minnow included the basins of the Verde, Salt, San Pedro, San Francisco, and Gila rivers (Minckley 1973, Sublette *et al.* 1990). Habitat destruction plus competition and predation by nonnative species have reduced the range of the species by about 85 percent (Miller 1961, Williams *et al*. 1985, Marsh *et al*. 1989). Loach minnow remains in limited portions of the upper Gila, San Francisco, Blue, Black, Tularosa, and White rivers and Aravaipa, Turkey, Deer, Eagle, Campbell Blue, Dry Blue, Pace, Frieborn, Negrito, Whitewater and Coyote creeks in Arizona and New Mexico (Barber and Minckley 1966, Silvey and Thompson 1978, Propst *et al*. 1986, Propst *et al*. 1988, Marsh *et al*. 1990, Bagley *et al*. 1995, Bagley *et al*. 1996).

Loach minnow is a bottom-dwelling inhabitant of shallow, swift water over gravel, cobble, and rubble substrates (Rinne 1989, Propst and Bestgen 1991). Loach minnow uses the spaces between, and in the lee of, larger substrate for resting and spawning (Propst *et al*. 1988; Rinne 1989). It is rare or absent from habitats where fine sediments fill the interstitial spaces (Propst and Bestgen 1991). Some studies have indicated that the presence of filamentous algae may be an important component of loach minnow habitat (Barber and Minckley 1966). Loach minnow feeds exclusively on aquatic insects (Schrieber 1978, Abarca 1987). Loach minnow live between two and three years with reproduction occurring primarily in the second summer of life (Minckley 1973, Sublette *et al*. 1990). Spawning occurs in March through May (Britt 1982, Propst *et al*. 1988); however, under certain circumstances loach minnow also spawn in the autumn (Vives and Minckley 1990). The eggs of loach minnow are attached to the underside of a rock that forms the roof of a small cavity in the substrate on the downstream side. Limited data indicate that the male loach minnow may guard the nest during incubation (Propst *et al*. 1988, Vives and Minckley 1990).

Pursuant to the final rule designation of critical habitat, the PCEs for loach minnow include permanent, flowing, unpolluted water; living areas for loach minnow adults, juveniles, and larvae with appropriate flow regimes and substrates; spawning areas; low amounts of fine sediment and substrate embeddedness; riffle, run, and backwater components; low to moderate stream gradients; appropriate water temperatures; periodic natural flooding; an unregulated hydrograph, or, if flows are modified, a hydrograph that demonstrates an ability to support a native fish community; and, habitat devoid of non-native aquatic species detrimental to loach minnow, or habitat where such nonnative species are at levels which allow persistence of loach minnow. These PCEs are generalized descriptions and ranges of selected habitat factors that are critical for the survival and recovery of loach minnow.

As noted above with regards to the spikedace, the appropriate and desirable level of these factors may vary seasonally and is highly influenced by site-specific circumstances. Therefore, assessment of the presence/absence, level, or value of the PCEs must include consideration of the season of concern and the characteristics of the specific location. The PCEs are not independent of each other and must be assessed holistically, as a functioning system, rather than individually. In addition, the PCEs need to be assessed in relation to larger habitat factors, such as watershed, floodplain, and streambank conditions, stream channel geomorphology, riparian vegetation, hydrologic patterns, and overall aquatic faunal community structure.

Recent biochemical genetic work on loach minnow indicate that there are substantial differences in genetic makeup between remnant loach minnow populations (Tibbets 1993). Remnant populations occupy isolated fragments of the Gila River basin and are isolated from each other. Based upon her work, Tibbets (1992, 1993) recommended that the genetically distinctive units of loach minnow should be managed as separate units to preserve the existing genetic variation.

The status of loach minnow is declining rangewide. As noted in the Final Rule designating critical habitat, loach minnow are restricted to 419 miles of streams, and their current range represents only 15 to 20 percent of their historical range. In occupied areas, loach minnow may be common to very rare. Loach minnow are common only in Aravaipa Creek, the Blue River, and limited portions of the San Francisco, upper Gila, and Tularosa rivers in New Mexico (USFWS 2000). Although it is currently listed as threatened, the Service has found that a petition to uplist the species to endangered status is warranted. A reclassification proposal is pending; however, work on it is precluded due to work on other higher priority listing actions (USFWS 1994).

Environmental Baseline - Loach Minnow

No historical records exist in the middle Gila River. However, the species remains present in Aravaipa Creek (i.e., the nearest tributary to the San Pedro River upstream from the action area). The most recent fish surveys in the action area were conducted as a result of the Biological Opinion for the Central Arizona Project during 1999-2003. No loach minnow were found during those surveys.

While microhabitat use for the loach minnow differs somewhat from the spikedace, the environmental baseline can be characterized similarly. We therefore incorporate the respective Environmental Baseline sections for the southwestern willow flycatcher and the spikedace by reference.

Effects of the Action - Loach Minnow Critical Habitat

The proposed action will incrementally worsen hydrologic conditions during those times when the stored water would have been released. This reduction of flow from the Gila River downstream from Coolidge Dam, and from the Gila River critical habitat unit below the San Pedro River confluence in particular, interferes with the attainment of the Loach Minnow Recovery Plan stepdown outline objectives 1.5 and 1.6, which refer to the goals of discouraging detrimental land and water use practices and insuring perennial flows with natural hydrographs, respectively.

The proposed action will result in impacts to the PCEs identified for loach minnow critical habitat. The loss of water reduces the attainment of PCEs for loach minnow critical habitat, specifically: (1) permanent, flowing, unpolluted water (PCE 1); (2) periodic natural flooding (PCE 12); (3) a natural, unregulated hydrograph or, in regulated reaches, a hydrograph that demonstrates an ability to support a native fish community (PCE 13).

Reductions in flow through the Gila River below Coolidge Dam also exert an indirect influence on various PCEs. The association between modified hydrographs (i.e., reductions in the magnitude and frequency of flood flows) and maintenance of conditions favorable to native fish (Minckley and Meffe 1987) indicates that the proposed action exerts an adverse influence on PCE 14, which pertains to keeping critical habitat devoid of detrimental nonnative species or keeping those nonnatives at levels which allow loach minnow to persist. Reductions in flow may also reduce aquatic insect food base (PCE 11). Reduced through-flow, as it relates to settling of suspended sediments, can be expected to allow for increased embeddedness of the substrate (PCE 6), though this may be offset somewhat by the increased sediment carrying capacity of the clean water released from the dam. Coolidge Dam releases cooler-than-ambient water from outlets and thus likely exerts an influence on PCE 8, which relates to water temperature and its diurnal and seasonal variation. Conversely, dewatering of the Gila River such that predatory, nonnative fish are reduced in number may exert a positive, immediate short-term influence on PCE 14.

We are also concerned that the proposed action incrementally and detrimentally influences the riparian health of an already-affected reach of the Gila River (see Effects of the Proposed Action - Southwestern Willow Flycatcher, above). Should riparian conditions decline to the point that the channel geometry of the Gila River within the critical habitat becomes unsuitable for any or all life stages of the loach minnow (PCEs 2-7), adverse modification of the habitat could result. Of particular concern is the potential of riparian mortality to lead to increased width-depth ratios, straighter channels, and the loss of backwater habitat. We feel that geomorphic adjustments of

the river channel, an indirect effect of riparian degradation, itself a potential indirect effect of the action, are unlikely to occur and/or difficult to measure over the course of a project with 7 months of impact on the downstream environment.

The proposed action is to occur in calendar year 2004; the hypothetical maximum duration of effects is short. The assumption-driven proposed action will reduce, but not eliminate, flows from March through August of that year and is therefore likely to have minimal effects on the longer-term (2-season or greater) condition of the loach minnow critical habitat unit. We do expect the proposed action to incrementally hasten mortality of some riparian vegetation, and to contribute to minor reductions in vigor on the vegetation that does survive. Riparian condition (density, stability, etc) is directly associated with the geomorphology of the stream channel, particularly in low-gradient streams such as the Gila River below Coolidge Dam (Rosgen 1994, 1996). Larger, woody riparian vegetation is expected to make the largest contributions to channel stability. These older age-classes are most well represented on higher flood terraces within the critical habitat unit. Minor losses in these areas will have little effect on the lower-elevation channel, within which both the with- and without-project summer baseflows are contained. The contribution of the difficult-to-measure increases in mortality and reductions in vigor to adverse changes in the form and function of the channel is thus expected to be minimal. Any such changes, should they occur, would likely be within the scope of the Gila River's current state of drought-influenced equilibrium and are not expected to contribute appreciably to longer-term loss of PCEs in the loach minnow critical habitat.

Cumulative Effects - Loach Minnow

The effects considered cumulative to the proposed action for loach minnow are the same as described above for spikedace and are incorporated herein by reference.

Conclusion - Loach Minnow

After reviewing the current status of the species for the loach minnow, the environmental baseline for the action area, the hypothetical, maximum possible effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that Reclamation's approval of the exchange of 20,000 af of CAP for retention of a conservation pool in San Carlos Reservoir, the associated partial dewatering in March 2004 and total dewatering from April through August 2004 of the Gila River from Coolidge Dam to the San Pedro River confluence, and the March through August partial dewatering of the loach minnow critical habitat unit from the San Pedro River confluence to the AHDD will not be adversely modified or destroyed.

Rationale for our Conclusion: The proposed action will not adversely modify or destroy critical habitat for the loach minnow because the effects of the action are expected to be temporary and returned to near-baseline conditions at the conclusion of the project in December 2004. The short duration of the reduced flows is also not expected to result in the scale of riparian vegetation mortality that would lead to adverse changes in the fluvial geomorphology, and thus the associated PCEs (2-7) of the Gila River between Coolidge Dam and the AHDD.

INCIDENTAL TAKE STATEMENT

Sections 4(d) and 9 of the ESA, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. "Harm" is defined (50 CFR 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. "Harass" is defined (CFR 17.3) as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. "Incidental take" is take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be implemented by the agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. Reclamation has a continuing duty to regulate the activity covered by this incidental take statement. If Reclamation (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Take - Southwestern Willow Flycatcher

We anticipate that the proposed action will result in incidental take of southwestern willow flycatcher. Due to the difficulty in quantifying the number of southwestern willow flycatchers that will be taken as a result of the proposed action, we are employing percent southwest willow flycatcher nest failure as an estimate for take. Based on nest monitoring data from 2002 and 2003 (see below), we believe that flycatcher nest success in 2004 will be 57 percent (the mean of 39 and 75 percent). Thus, we anticipate that 43 percent of flycatcher nests will fail in 2004 within the stretch of the Gila River from Winkelman (i.e., at the confluence of the Gila and San Pedro rivers) downstream to AHDD from. Take will be exceeded if more then 43 percent of nests fail, as determined by nest monitoring during the period of June 15 to July 15, 2004. Pursuant to the definition of take above, the incidental take is expected to be in the form of harm. The below data (Table 2) were used to calculate percent nest failure as an estimate for take. These data are from nests monitored at GIKRNY and GIGS07 sites in 2002, and at GIKRNY, GIGS07, GIGS18, and GIGN18 sites in 2003 (AGFD, unpubl. data).

Table 2. Incidental taking of southwestern willow flycatcher expressed as percent nest success.		
Gila River (from Winkelman to AHDD)	Year 2002	Year 2003
Number of Territories	46	26
Nest Success[6]	0.39	0.75
Nest Failure	0.61	0.25

Nests failing early in the breeding cycle are less likely to be located because they are in existence for a shorter period of time. Absence of these nests from simple success calculations tends to inflate traditional estimates. The Mayfield method accounts for this by calculating a daily nest mortality rate, determined by the number of failed nests divided by the total number of exposure days. Exposure days are the total number of days the nest was observed to be active. Success rate was calculated for the egg laying, incubation, and nestling stages and then multiplied together to give total Mayfield-protocol nest success.

As stated above, we have selected the 2002 calendar year data set (as our model) because it involves the earliest and longest-duration of low inflows to San Carlos Reservoir (i.e., the "worst-case" scenario). However, we chose flycatcher data from 2002 *and* 2003 because in 2002 reproduction was low albeit there was a high number of territories reported and the converse was true in 2003 (low number of territories with relatively high reproduction success). Thus, we took the average of these two years.

This biological opinion does not authorize any form of take not incidental to the proposed action.

Amount or Extent of Take - Bald Eagle

We anticipate that the proposed action will result in incidental take, in the form of harm to the Coolidge Dam and Granite Basin bald eagles in 2004. Harm is expected due to the continued modification or degradation of river habitat and prevention of fish reproduction and availability to eagles as a result of an inadequate amount of water released downstream of Coolidge Dam into the middle Gila River. This harm will injure the Coolidge and Granite Basin bald eagles by significantly preventing feeding and breeding in 2004.

The effect of this action is expected to reduce, eliminate, and/or prevent access to the fishery prey base necessary to cause successful reproduction by the Coolidge and Granite Basin bald eagles. We anticipate that the Granite Basin bald eagles will be prevented from either laying or hatching eggs in 2004. We anticipate that the Coolidge bald eagles will lay and hatch fewer eggs, and as a result, hatch and fledge fewer young in 2004. We anticipate that up to 4 eaglets, in the

[6]The percent of nest success was calculated per Mayfield (1961, 1975).

form of eggs or nestlings (2 at each breeding area) will be taken as a result of the proposed project.

Amount or Extent of Take - Spikedace

We do not anticipate that the proposed action will result in any incidental take of spikedace.

Effect of the Take - Southwestern Willow Flycatcher

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species. While we anticipated that 43 percent of flycatcher nests will fail, it is our opinion that this is not an appreciable reduction in both survival and recovery of the flycatcher. This is because the metapopulation within the Middle Gila-San Pedro Management Unit remains stable, reduction in territories between Winkelman and AHDD have been offset by increases in the numbers of territories along the San Pedro River.

Effect of the Take - Bald Eagle

In this biological opinion, we find that the level of take anticipated is not likely to jeopardize the continued existence of the bald eagle. Although we are reasonably certain that take will occur at the Coolidge and Granite Basin territories in the form of harm (i.e., failure to produce eggs or young from the lack of flow in the Gila River), it does not rise to the level of jeopardy.

Migratory Bird Treaty Act

To the extent that this statement concludes that take of any threatened or endangered species of migratory bird (i.e., southwestern willow flycatcher and bald eagle) will result from the agency action for which consultation is being made, we will not refer the incidental take of any such migratory bird for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C.§§ 703-712) (MBTA), if such take is in compliance with the Terms and Conditions (including amount and/or number) specified herein. Such prosecutorial discretion is not waived for other avian species covered under the MBTA.

Bald and Golden Eagle Protection Act

To the extent that this statement concludes that take of any bald eagle will result from the agency action for which consultation is being made, we will not refer the incidental take of such eagle for prosecution under the Bald Eagle Protection Act of 1940 (16 U.S.C. 668-668d, 54 Stat. 250) as amended, if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

Reasonable and Prudent Measures - Southwestern Willow Flycatcher

The following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of the southwestern willow flycatcher due to the proposed action:

1. Take steps to maximize the success of the flycatcher territories in order to maintain "sites" that currently occur within the action area for metapopulation persistence (stability) during 2004. The rationale for this has been established in this biological opinion and in the species' recovery plan. As stated above, the flycatcher recovery plan considers sites within the Middle Gila-San Pedro Management Unit of the Gila Recovery Unit to be important because of the high number of territories. Keeping these sites viable is important to the survival and recovery of the flycatcher.

2. Investigate flow regimes appropriate to support southwestern willow flycatcher habitat from Coolidge Dam to Kelvin. The rationale for this has been established in this biological opinion. As stated above in this biological opinion, the reliance of flycatchers on free-flowing and standing water or moist soil conditions is well established (USFWS 2002). However, at this time, we cannot articulate a minimum flow (cfs) that is needed to maintain flycatcher sites and to provide for adequate forage base for reproduction.

Terms and Conditions - Southwestern Willow Flycatcher

The following Terms and Conditions implement Reasonable and Prudent Measure 1 above:

1.1 At Reclamation's discretion, use cowbird trapping[7] at sites on the Gila River to increase productivity.

1.2 After obtaining all necessary approvals, provide the infrastructure appropriate to maintain and/or enhance flycatcher habitat at the Kearny site. This includes, but is not limited to, working with the town of Kearny with regards to increasing water availability and/or determining if there is enough effluent to more optimally redistribute at the Kearny site.

1.3 Monitor flycatcher nesting success at key sites along the Gila River during 2004 in order to infer whether take is being exceeded. We suggest using similar subsets of nests with previous years, to infer inter-annual nesting success/failure.

1.4 Reclamation will provide the Service and BIA with a report at the end of the breeding season that documents flycatcher reproductive success and cowbird trapping activities.

In order to be exempt from the prohibitions of section 9 of the Act, Reclamation must comply with the following terms and conditions, which implement the reasonable and prudent measure described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary:

[7]Capture or control of cowbirds requires appropriate permits from AGFD and the USFWS.

2.1 Initiate studies to assess the feasibility of supplementing flows downstream of the confluence of the Gila and San Pedro rivers. This includes, but is not limited to, evaluation of potential benefits from forbearance agreements with agricultural water users along the San Pedro River.

2.2 After obtaining all necessary approvals, install additional piezometers/ground water monitoring stations within the Gila River downstream of Dripping Springs so that depth to ground water can be monitored at or adjacent to flycatcher nesting locations. Initiate studies to assess the relationship among surface water flows, ground water elevations, and flycatcher habitat quality.

Reasonable and Prudent Measure - Bald Eagle

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize impacts of incidental take of the bald eagle due to the proposed action:

1. Improve the foraging conditions during the 2004 bald eagle breeding season for Coolidge Dam and Granite Basin bald eagles.

Terms and Conditions - Bald Eagle

In order to be exempt from the prohibitions of section 9 of the Act, Reclamation must comply with the following terms and conditions, which implement the reasonable and prudent measure described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary:

3.1 After obtaining all necessary approvals, provide supplemental feeding for the Coolidge Dam eagles later in the bald eagle breeding season (in March). Supplemental feeding will be contingent upon the status of bald eagle nesting success. Specifically, provide food to adult eagles (i.e., fish) near the Coolidge Dam nest area to improve their foraging opportunities. If feasible, animal carcasses will be placed near the Granite Basin bald eagle nest area to also improve foraging opportunities for these eagles. Reclamation will coordinate with the Bald Eagle Nest Watch Program to determine the status of the foraging resource for the eagles.

3.2 Reclamation will provide the Service, San Carlos Recreation and Wildlife Department, and BIA with a monthly report during the 2004 bald eagle breeding season. This report will include information on the status of the Suicide, San Carlos, Coolidge Dam, and Granite Basin bald eagles pairs and eaglets.

Adjunct Terms and Conditions - Southwestern Willow Flycatcher *and* Bald Eagle

The following Terms and Conditions are necessary to track the implementation of the proposed action to ensure that it does not move outside of the scope of the five (5) assumptions appearing in the Discussion of the Analyses subsection of the Description of the Proposed Action section, above. It is also necessary to implement the southwestern willow flycatcher's and bald eagle's respective Reasonable and Prudent Measures. Adherence to these additional Terms and

Conditions is required in order for Reclamation to be exempt from the prohibitions of section 9 of the Act, and are necessary and appropriate to minimize take of threatened and endangered species due to the proposed action.

1. Reclamation shall monitor the proposed action's adherence to the five (5) assumptions appearing in the Discussion of the Analyses subsection of the Description of the Proposed Action section, above. This monitoring shall employ the following measures and any others that Reclamation determine necessary to the task. The following Terms and Conditions implement this RPM:

    11 Reclamation shall monitor regional climatic conditions using proper sources of information (i.e., NWS, National Aeronautic and Space Administration). This is to determine the degree of deviation from this biological opinion's Assumption 4 and, in part, Assumption 5 (see the Discussion of the Analyses subsection above).

    12 Reclamation shall monitor predictive water supply forecasts and snowpack data (i.e., NWS, Natural Resource Conservation Service) to determine the degree of deviation from this biological opinion's Assumptions 1 and 4 (see the Discussion of the Analyses subsection above)

    13 Reclamation shall monitor SCIP's ongoing water orders on BIA (Coolidge Dam operator) and the Central Arizona Water Conservation District (CAWCD) (CAP operator), to specifically determine if natural flow calls are being reduced via exchange, with the Tribe, for CAP water. This is to determine compliance with this biological opinion's Assumption 2 (see the Discussion of the Analyses subsection above and the Reinitiation - Closing Statement below).

    14 The schedule for this monitoring is monthly, or upon publication of each water supply forecast. Monthly conference calls with the Service will be conducted to report the status of the current environmental conditions and adherence to the stated assumptions (BIA will be invited to participate).

CONSERVATION RECOMMENDATIONS

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for the bald eagle and southwestern willow flycatcher. Also note that recommendations for the spikedace, loach minnow, razorback sucker, and cactus ferruginous pygmy owl are included to promote conservation of those species within and near the action area. In furtherance of the purposes of the Act, we recommend implementing the following actions:

<u>Southwestern Willow Flycatcher</u>

1. Reclamation should strive for the presence of flows, surface water, or saturated soil in/or adjacent to flycatcher nesting sites from Coolidge Dam to Kelvin from January - August 2004. Investigate flow regimes necessary to provide these ecological conditions.

2. Reclamation should work with irrigation districts, private landowners, municipalities, Tribal, and other water users to increase water availability and ultimately increase flows downstream of Coolidge Dam to maintain and/or enhance habitat for flycatchers in and outside of the breeding season.

3. Reclamation should work with irrigation districts, private landowners, municipalities, Tribal, and other water users to manage calls on the natural flows to maintain and/or enhance habitat for flycatchers in and outside of the breeding season.

4. Reclamation should conduct flycatcher surveys from Dripping Springs to Winkelman.

5. Reclamation should fund flycatcher surveys on San Carlos Apache Tribal lands.

Bald Eagle

1. Consult with the Tribe and BIA to develop a long-term monitoring study of the San Carlos Reservoir bald eagles (Suicide, San Carlos, and Coolidge Dam) and Granite Basin bald eagles. Eagles would be captured, fitted with radiotelemetry equipment, and radio-tracked in an effort to understand the relationship between Coolidge Dam operations at San Carlos Reservoir and river flow to determine how these factors influence the success of these eagles. The proposed monitoring study should include a study of how Coolidge Dam operations influence fish prey abundance and availability for eagles both at the San Carlos Reservoir and on the middle Gila River. Information from these studies is expected to provide future management decisions which should reduce and minimize take of bald eagles.

2. Consult with the Tribe and BIA to design and conduct an evaluation of the riparian habitat conditions in the Gila River below Coolidge Dam from immediately below the dam to Winkelman.

3. Consult with the Tribe, BIA, and the Arizona Fishery Resources Office to obtain fish samples to analyze fish based organochlorine and heavy metal content in the lake and in the middle Gila River near the Granite Basin bald eagle nest areas. The analysis should include the use of two fish species consumed by eagles and three specimens of each fish species in the appropriate size class that eagles are able to catch. The fish can be collected during Reclamation's annual fish surveys of the middle Gila River. Provide the fish samples and your report documenting the collection of the fish samples to the Arizona Ecological Services Field Office, Contaminants Program for analyses. Water quality should also be analyzed in the Coolidge Dam and Granite Basin breeding areas. Information from the fish analyses and water quality study will be used to learn how

Coolidge Dam operations may be impacting eagles and provide us with information for preventing future take of eagles.

Spikedace

1. Regularly monitor for spikedace within the action area and report results to the Service, AGFD, and BIA.

2. Coordinate and work with the Service and AGFD on planning for reestablishment of spikedace into suitable habitats in the San Pedro River.

3. Coordinate and work with the Service to develop actions that minimize or avoid adverse effects, and actions that benefit listed species or their habitats.

4. The Service recognizes that Reclamation is currently aiding in the recovery of spikedace through the CAP/Gila River Fund Transfer Program. The Service supports Reclamation's continued efforts to coordinate actions with us to implement the spikedace recovery plan.

5. Reclamation should engage the BIA to examine the feasibility of altering operations within current templates to enhance conditions for native fishes.

Loach Minnow

1. Regularly monitor for loach minnow within the action area and report results to the Service, AGFD, and BIA.

2. Coordinate and work with the Service and the AGFD on planning for further reestablishment of loach minnow into suitable habitats.

3. Coordinate and work with the Service to develop actions with us that minimize or avoid adverse effects, and actions that benefit listed species or their habitats.

4. The Service recognizes that Reclamation is currently aiding in the recovery of loach minnow through the CAP/Gila River Fund Transfer Program. The Service supports Reclamation's continued efforts to coordinate actions with us to implement the loach minnow recovery plan.

5. Reclamation should engage the BIA to examine the feasibility of altering operations within current templates to enhance conditions for native fishes.

In order that we be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, we request notification of the implementation of any conservation recommendations.

REINITIATION-CLOSING STATEMENT

This concludes formal consultation on Reclamation's proposed approval of a CAP water purchase and exchange by the Tribe to allow the retention of up to 20,000 af of water from calendar year 2004 in San Carlos Reservoir. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The preceding text is generalized, and the assumption-driven nature of the analyses in this biological opinion necessitates that additional clarification be provided. Specifically, we feel that deviation from Assumptions 1 through 4 in this biological opinion's Discussion of the Analyses subsection, above, is the mechanism most likely to trigger reinitiation of formal consultation. Such deviation would trigger reinitiation in accordance with Item 2 in the preceding paragraph.

We are particularly concerned that the BA's Assumption 3 and this biological opinion's Assumption 2 not be violated. Assumption 3 from the BA states that natural flow calls

would be unaffected by the exchange. This assumption originated in the Tribe's Special Counsel's September 23, 2003, letter, was reiterated in your BA, and was adopted by us. We refined the text into this biological opinion's Assumption 2, which specifies that the SCIP water users will, in 2004, meet their irrigation demand with the natural flow of the river to the maximum extent hydrologically and legally available. Should any or all SCIP users agree to begin immediate exchanges and take delivery of CAP water in lieu of their natural flow call, partial to total dewatering of the Gila River below Coolidge Dam could occur as early as January 1, 2004, rather than the March 1, 2004 date explicit in the assumptions. This is highly likely to result in effects on listed species and critical habitats not considered in this opinion, and may result in exceedence of authorized incidental take. This is also a concern relative to the hypothetical exchange schedule of March 1 through no-later-than August 31. The proposed CAP delivery start-date of March 1, 2004, also originated in the Tribe's special counsel's September 23, 2003, letter and was carried forth in your BA. It was this hypothetical start-date that framed the analysis of hydrologic effects. Should the CAP repayment begin earlier, it must be understood that storage will not affect the natural flow call by SCIP water users.

We appreciate your interest in furthering the conservation of these species. If we can be of further assistance, please contact Dr. Stuart C. Leon at (505) 248-6657. Please refer to consultation number 02-02-04-F-0001 in future correspondence concerning this consultation.

cc: Dr. Stuart C. Leon, Chief, Division of Threatened and Endangered Species, U.S. Fish and Wildlife Service, Albuquerque, New Mexico
Ms. Sarah E. Rinkevich, Regional Section 7 Coordinator, Division of Threatened and Endangered Species, U.S. Fish and Wildlife Service, Albuquerque, New Mexico
Ms. Mary Jo Stegman, Wildlife Biologist, U.S. Fish and Wildlife Service, Pinetop, Arizona
Mr. Steve Spangle, Field Supervisor, Arizona Ecological Services Field Office, U.S. Fish and Wildlife Service, Phoenix, Arizona
Ms. Sherry Barrett, Field Supervisor, Tucson-suboffice, Arizona Ecological Services Field Office, U.S. Fish and Wildlife Service, Tucson, Arizona
Regional Solicitor's Office, Southwest Region, Albuquerque, New Mexico

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Appendix A.

Appendix B.