2-21-98-F-329

BIOLOGICAL OPINION SUMMARY
Alamo Lake Re-operation and Ecosystem Restoration

Date of opinion: March 26, 1999

Action agency: U.S. Army Corps of Engineers

Project: Alamo Lake Re-operation and Ecosystem Restoration

Location: La Paz and Mohave counties, Arizona

Listed species affected: bald eagle, *Haliaeetus leucocephalus*, threatened, and southwestern willow flycatcher, *Empidonax traillii extimus,* endangered

Biological opinion: Not likely to jeopardize the bald eagle or southwestern willow flycatcher (page 32)

Incidental take statement:

Anticipated take: *Exceeding this level may require reinitiation of formal consultation* (page 33).

Bald eagle: Four eggs or fledglings every ten years

Southwestern willow flycatcher: two eggs or fledglings every twenty years

Reasonable and prudent measures: *Implementation of these measures through the terms and conditions is mandatory* (page 34).

Bald eagle:
1. Reduce likelihood of drowning of nestlings and/or eggs.
2. Reduce the likelihood of loss of occupied bald eagle nests and snags
3. Reduce the likelihood of harassment of nesting bald eagles by the public

Southwestern willow flycatcher:

1. Reduce the likelihood that sufficient habitat quantity and quality is compromised in the Big Sandy-Santa Maria confluence with Alamo Lake such that it supports less than the current population of flycatchers.

Terms and conditions: *Terms and conditions implement reasonable and prudent measures and are mandatory requirements* (page 35).

Bald eagle: Nine terms and conditions are given to reduce incidental take.

Southwestern willow flycatcher: Five terms and conditions are given to reduce incidental take.

Conservation recommendations: *Implementation of conservation recommendations is discretionary* (page 36).

Produce a pamphlet for distribution to the interested public on the values of riparian habitat, bald eagles, and southwestern willow flycatchers, and management efforts at Alamo Dam.

Contribute funding for wintering grounds surveys for the southwestern willow flycatcher.

Contribute funding for a study to investigate the physiological condition/health of southwestern willow flycatchers breeding in native versus non-native habitats. This project has the potential of shedding light on whether non-native saltcedar is less productive nesting habitat for flycatchers compared to native tree habitat.

Contribute funding for the range-wide southwestern willow flycatcher Information Management System and Geographic Information System. Funding should be sufficient to cover the project area.

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In Reply Refer To:
AESO/SE
2-21-98-F-329

March 26, 1999

Mr. Robert E. Koplin
Chief, Planning Division
Department of the Army
Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

RE: Alamo Lake Re-operation and Ecosystem Restoration

Dear Mr. Koplin:

This document transmits the Fish and Wildlife Service's biological opinion based on our review of the U.S. Army Corps of Engineers' (Corps) proposed Alamo Lake Re-operation and Ecosystem Restoration located in Mohave and La Paz counties, Arizona, and its effects on the bald eagle (*Haliaeetus leucocephalus*) and southwestern willow flycatcher (*Empidonax traillii extimus*) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Your August 18, 1998, request for formal consultation was received on August 21, 1998.

This biological opinion is based on information provided in the August, 18 1998, biological assessment (Corps 1998), the 1994 Proposed Water Management Plan for Alamo Lake and the Bill Williams River, telephone conversations with Susan DeSaddi (Corps), a meeting with Nancy Gilbertson (Service), and Bill Werner (Arizona Game and Fish Department, AGFD), an October 13, 1998, e-mail from Bill Werner, field investigations, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern, effects actions considered in this biological opinion (dams, flooding, instream flow, and water regulation) or on other subjects considered in this opinion. A complete administrative record of this consultation is on file in this office.

After reviewing the current status of the southwestern willow flycatcher and the bald eagle, the environmental baseline for the action area, the effects of the proposed Alamo Lake Re-operation and Ecosystem Restoration and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the southwestern willow flycatcher or the bald eagle. This proposed action was deemed, by an interagency interdisciplinary group, to optimize benefits to bald eagles, southwestern willow flycatcher habitat,

and other resources, among a host of alternatives, while still operating the plan to meet the project needs.

CONSULTATION HISTORY

In 1990, the Corps completed a reconnaissance-level study for Alamo Dam. The report concluded that there was a Federal interest in reallocation at Alamo Dam for fish and wildlife conservation purposes.

In 1991, at the behest of an interagency steering committee, including AGFD, Arizona State Parks (ASP), Bureau of Land Management (BLM), the Service, and Corps, an interagency technical committee began preparing a proposal for an effective water management plan for the Bill Williams River corridor that would resolve riparian, fisheries, wildlife, and recreational issues while meeting Alamo Dam project purposes for flood control, water conservation and supply, and recreation.

In 1992, the Bureau of Reclamation and the Arizona Department of Water Resources joined as members of the technical committee.

In 1994, a final report was published: *Proposed Water Management Plan For Alamo Lake and the Bill Williams River* and was submitted to the steering committee.

In April 6, 1994, the Corps initiated consultation with the Service on the effect of Alamo Lake operations on the bald eagle.

On February 15, 1996, the Service completed a no jeopardy biological opinion on effects of Alamo Dam and Lake operation to bald eagles (94-F-305).

In 1996, Corps completed another reconnaissance study recommending continuing a cost-shared feasibility study for environmental restoration.

On June 24, 1998, the Service received a draft biological assessment for the Alamo Lake Reoperation Project.

On June 30, 1998, the Service responded to a June 26 request from Corps for a species list for the Alamo Lake Reoperation and Ecosystem Restoration Feasibility Study.

On July 16, 1998, the Service sent comments on the draft biological assessment to Corps.

On August 21, 1998, the Service received a request for formal consultation from Corps with an attached biological assessment, dated August, 1998.

On September 16, 1998, the Service responded to Corps by acknowledging receipt of their formal consultation request, acknowledging having sufficient information to begin, and beginning the formal consultation process.

On February 3, 1999, the Service transmitted a draft biological opinion to the Corps. The Corps responded with a March 9, 1999, letter, requesting some clarification and minor modifications of the draft biological opinion.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Setting

Alamo Dam and Lake are located on the Bill Williams River, approximately 39 miles upstream from its confluence with the Colorado River in Lake Havasu, Arizona (Figure 1). The lake is on the border of La Paz and Mohave counties, Arizona. Paved access is from the town of Wenden on U.S. Highway 60.

Alamo Dam was constructed under authorization of the Flood Control Act of 22 December 1944 (Public Law 534, 78th Congress, 2nd Session). Construction of the dam and appurtenant works was started in March 1965 and completed in July 1968. The reservoir was filled to its original recreational pool elevation of 1,046 feet above mean sea level (msl) in March of 1970. Current Alamo Lake operations are directed according to a revised 1973 Reservoir Regulation (Water Control) Manual.

The Alamo Lake recreation area encompasses 22,856 acres of Corps withdrawn lands of which approximately 16,400 acres represent the lake area for a probable maximum flood event. Fish and wildlife management responsibilities for the entire area have been turned over to AGFD under a license agreement. Approximately 17,960 acres are specifically managed as the Alamo Wildlife Area by the AGFD and approximately 4,893 acres are managed for recreational purposes by ASP.

Alamo Lake is fed by two main tributaries, the Big Sandy and Santa Maria rivers. These rivers merge to form the Bill Williams River, approximately 8 miles upstream of Alamo Dam. The Bill Williams River continues downstream of the dam for approximately 39 miles until it flows into the Colorado River at Lake Havasu, immediately upstream of Parker Dam.

Most of the land along the Bill Williams River is federally owned. The City of Scottsdale owns the Planet Ranch located along the Bill Williams River, approximately 24 miles downstream of the dam. The Bill Williams River National Wildlife Refuge (BWRNWR) is located approximately 30 miles downstream of the dam to the confluence with the Colorado River.

The Alamo Lake Feasibility Study has been conducted under the authority of Section 216 of Public Law 91-611 (Flood Control Act of 1970). Section 216 authorizes the Corps to review the operation of completed projects....

> *"...when found advisable due to significantly changed physical or economic conditions, and then report thereon to Congress with recommendations on the advisability of modifying the structures or their operation, and for improving the quality of the environment in the overall public interest."*

Specific appropriations language authorizing the Reconnaissance Report dated July 1996 was included in the Energy and Water Development Appropriations Bill, 1995 Report [To accompany H.R. 4506], which stated:

> *"The Committee has provided $200,000 for the Corps of Engineers to initiate and complete a reconnaissance study to consider modifications of storage allocation and operation of the Alamo Dam, Bill Williams River in Arizona for fish and wildlife restoration and enhancement purposes. The Committee understands that further analysis is warranted because earlier studies have indicated that river flows can affect riparian habitat, including habitat at the Bill Williams National Wildlife Refuge."*

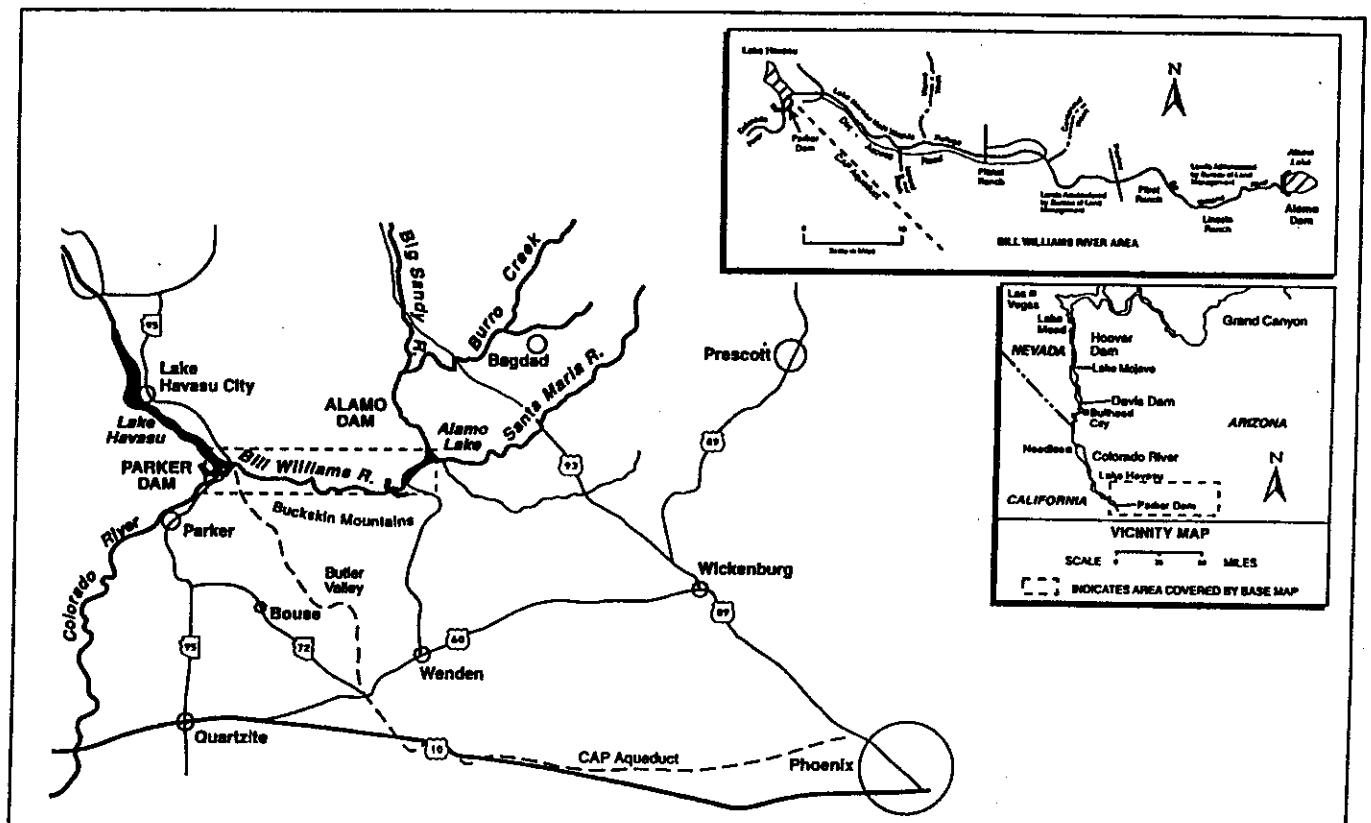
Section 301(b)(1) of the Water Resources Development Act of 1996 (WRDA 96) modified the project for flood control and other purposes—subject to completion of a feasibility report—to authorize the Secretary of the Army to:

> *"...operate the Alamo Dam to provide fish and wildlife benefits both upstream and downstream of the Dam. Such operation shall not reduce flood control and recreation benefits provided by the project."*

Objectives

The general planning objective guiding development was the balance between minimum flows needed to sustain and enhance riparian resources below the dam, and sustenance of suitable lake elevations with minimal fluctuations for reservoir resources and uses (including wildlife, fisheries and recreation).

Biological objectives affecting plan formulation include the establishment of native riparian habitat for fish and wildlife utilization through the manipulation of baseflows and flood flows in spring and fall; the maintenance of existing nesting and foraging habitat for wildlife species; and the preclusion of continued salt cedar establishment around the lake perimeter, the Bill Williams River tributaries, and downstream of the dam. Largemouth bass spawning success is dependent, in part, upon the net acreage of lake with water depths ranging from 0-20 feet. At Alamo Lake, suitable spawning habitat (depth) is optimized at lake elevations below 1,125 feet where submerged islands and ridges are within 6 m of the surface. As water surface elevations increase above 1,125 feet,



Source: Corps 1989

N

Not To Scale

Figure 1

Alamo Dam and Reservoir Study Area

the net acreage of suitable spawning habitat decreases until the water surface elevation reaches approximately 1,145 feet (BWRCTC 1994). Therefore, project alternatives above 1,125 feet were determined to have a declining effect upon existing fisheries resources as the net acreage of spawning habitat decreases.

Additionally, the probability of new inundation of existing cottonwood stands noticeably increases at or above 1,180 feet, resulting in expansion of salt cedar into higher elevations around the lake perimeter. Consequently, alternatives above 1,125 feet were unable to achieve all of the biological objectives as listed above, and were dropped from further analysis.

Proposed Action

The 1,125-foot target elevation water management alternative was selected by the Technical Committee as the plan which optimizes the resource objectives within operational constraints of Alamo Dam and provides for fish and wildlife benefits in perpetuity. Predicated on the analysis performed by the Technical Committee, the 1996 Reconnaissance Study (Corps 1996) and accompanying modified HEP analysis concluded the 1,125 foot plan would optimize the restoration of fish and wildlife values to the Bill Williams River and Alamo Lake ecosystem. The 1,125 foot plan would provide 80,000 acre-feet of lake storage above the 1,100-foot minimum lake level that represents current operations, for a total of 160,500 acre-feet of storage. The 1,125-foot Plan is considered the Proposed Action for the Alamo Lake Reoperation Project.

The Proposed Action would provide sufficient water storage for downstream flows, while keeping lake elevations greater than 1,100 feet for a majority of the time. When reservoir pool levels are below the target elevation, reduced reservoir releases would be made to maintain seasonal base flows ranging from 10-50 cfs throughout the Bill Williams River corridor. Operations would maintain relatively stable lake elevations.

The prescribed releases for the Proposed Action are presented in Table 1. Alamo Dam releases for riparian base flow requirements would range from 25 cfs between November and January and 40-50 cfs during the spring-fall period.

Above the 1,125-foot elevation, the release schedule attempts to mimic the pattern of pre-dam flood events. Pre-dam flood events typically had short duration high flows followed by long recession (tapering off).

Under the Proposed Action, Alamo Lake water levels would be decreased every five years for an inspection draw-down. Inspection of the outlet tunnel would occur in October/November, when reservoir inflows would be lowest (based on historic record) and downstream release requirements for riparian communities are low. The draw-down procedure for the inspection/maintenance would normally begin in June, permitting reservoir evacuation over a 6-month period without excessively high flows. In most cases, releases would be less than 1,000 cfs. An objective is to avoid root zone damage to the cottonwood trees caused by saturation from long-term inundation.

Table 1 Generalized Alamo Dam Release Schedule for the Proposed Action

If lake elevation is ≤1,125 feet (target elevation), then:

	Alamo Dam Releases			
Lake Elevation (ft. msl)	Oct	Nov-Jan	Feb-Apr	May-Sept
990-1070	10	10	10	10
1070-1100	15	10	25	25
1100 to Target Elevation	40	25	40	50

If the lake elevation exceeds the 1,125-foot target elevation at any time, then:

Lake Elevation (ft. msl)	Alamo Dam Releases (cfs)
1,125-1,126	Transition up to 1,000
1,126	1,000
1,127	2,000
1,128	3,000
1,129	4,000
1,130	5,000
1,131	6,000
1,132	6,621-7,000 (or outlet capacity)
1,148.4	7,000
Up to 1,235 feet (spillway crest)	7,000
From 1,235 - 1,265 feet (top of dam)	Over 7,000

If a monsoon event occurs during the draw-down period, outflows would mimic inflows as much as possible to provide the monsoon flow effect downstream. If, during a draw-down period, no monsoon event occurs and it is deemed that such an event would benefit the riparian zones, an artificial monsoon sequence of flows could be simulated. Normally, such a simulated monsoon event would be scheduled for early September, to mimic nature. It is expected that base-flow releases after the artificial monsoon release would be much less than the period prior to the monsoon release to ensure that the reservoir water surface elevation does not drop below elevation 1,100 feet.

Under the Proposed Action scenario, the larger spring and monsoon flushing releases would be coordinated with USBR operations on the Colorado River, similar to the present operating plan. If an excessive runoff condition occurred on the Colorado River, releases from Alamo Dam would be limited to the amount the USBR could incorporate into its river operation plan; however, base flows would be maintained. If the water elevation of Alamo Reservoir rises into the flood control pool, releases would be increased as necessary to be consistent with required flood control

operation. In a flood control operation, outflow may be as high as 7,000 cfs, as shown in Table 1.

In a similar manner, base-flow releases would be coordinated with the resource agencies downstream, as appropriate. Hence, if a specified seasonal release below the target elevation was deemed unnecessary to sustain downstream riparian needs, releases would be adjusted accordingly.

Conservation Measures

Current management measures would continue as described in the Corps' Biological Assessment (Corps 1994) and the resultant Biological Opinion (Service 1996) for the operation of Alamo Dam, including control of public access to portions of the lake during the nesting season and continued monitoring of eagles in the area. Contingency measures for rescue of eggs or young birds in case of potential inundation of nests would also be maintained. Those measures are reiterated here noting modifications. Additions from the 1996 biological opinion are written in **bold,** deletions are written as ~~strike-out~~.

1.1 Corps personnel shall notify the Service and the AGFD whenever inundation of active bald eagle nests (nests containing eggs or nestlings) is possible. Notification shall be given at least 24 hours before possible inundation, **or as soon as the information becomes available.**

1.2 The Corps shall logistically assist any rescue operations arising out of the contingency described in 1.1 above. This shall include providing access to areas restricted from the public use, access for nestwatchers to telephones, and transportation in Corps boats to nest sites, if such boats are present at Alamo Lake.

1.3 The Corps shall logistically assist any foster operations arising out of the contingencies described in 1.1 and 1.2 above. If the Service and/or AGFD deem it appropriate to place eggs or young rescued under 1.2 into an Alamo Lake area eagle nest after interim care, the Corps shall provide access to areas restricted from public use, access for nestwatchers to telephones, and transportation in Corps' boats to nest sites, if such boats are present at Alamo Lake.

1.4 Help fund the Arizona Bald Eagle Nestwatch Program ~~through 1998~~ **as long as deemed necessary by the Arizona Bald Eagle Nestwatch Program** in order to provide early notification of impending nest inundation so that measures to rescue eggs or chicks from nests can be undertaken in a timely manner. Funding shall **begin this year and** be in the amount sufficient to staff three nestwatchers through the breeding season, or approximately $15,000 annually. In most years, the nest watchers would be stationed at Alamo Lake. However, they will be reassigned to other Breeding Areas (BAs) within Arizona when appropriate (i.e., following nest failure or confirmation of cliff-nesting) to further the recovery of the population which would further buffer any losses occurring at Alamo Lake. The Corps shall secure a written agreement with the AGFD as the AGFD coordinates the

Arizona Bald Eagle Nestwatch Program. ~~The AGFD has assured the Service that they have established procedures through which funding contributions are made.~~

2.1 ~~When bald eagles are nesting in snags on the lake, maintain the lake elevation no higher than 1120 feet from December 1-July 15 unless weather conditions and operating constraints of the dam render the 1120 foot elevation unattainable. This will help lengthen the integrity of the nest structure as well as allow additional response time for egg or nestling rescue during flood events. It should be noted that 2.1 would not be required when bald eagles are nesting at the cliff nest, provided that ongoing monitoring documents nesting at the cliff nest.~~

2.2 Use the Arizona Bald Eagle Nestwatch Program (1.4) to determine if bald eagles are nesting at the snag nest at any time during the breeding season. Information gained through monitoring will determine whether implementation of 2.1 is required.

2.3 ~~Develop a drawdown plan for releasing stored water following major floods in order to alleviate threats to snag nesting bald eagles. Development of the plan must consider removal of immediate and future flooding threats to the eagles as well as operational constraints of the dam, and will require that the Corps coordinate with appropriate personnel from the Service and the AGFD.~~

3.1 Notify the AGFD within 24 hours **(or as soon as information becomes available)** whenever buoys surrounding an occupied nest are displaced by flooding or other means and assist the AGFD in replacing the buoys. Corps assistance should include providing access to areas restricted from public use, access for nestwatchers to telephones, and transportation in Corps boats to nest sites, if such boats are present at Alamo Lake.

3.2 Use the Arizona Bald Eagle Nestwatch Program 1.4) to ensure that nestwatchers will be present at Alamo Lake to minimize harassment of the bald eagles by recreationists whenever lake levels permit access to snag nests.

STATUS OF THE SPECIES

Bald Eagle

The bald eagle south of the 40th parallel was listed as endangered under the Endangered Species Act of 1966 on March 11, 1967 (Service 1967). It was reclassified to threatened status on July 12, 1995 (Service 1995a). No critical habitat has been designated for this species. The bald eagle is a large hawk that historically ranged throughout North America except extreme northern Alaska and Canada and central and southern Mexico. Bald eagles nested on both coasts of the United States, from Florida to Baja California in the south and from Labrador, Newfoundland, to the Aleutian Islands, Alaska, in the north.

The bald eagle occurs in association with aquatic ecosystems, frequenting estuaries, large lakes, reservoirs, major rivers, and some seacoast habitats. Suitable habitat for bald eagles includes those areas with an adequate food base, perching areas, and nesting sites. In winter, bald eagles often congregate at specific wintering sites that are generally close to open water and that offer good perch trees and night roosts (Service 1995a).

There were an estimated one-quarter to one-half million bald eagles on the North American continent when Europeans first arrived. Initial population declines probably began in the late 1800s, and coincided with declines in the number of waterfowl, shorebirds, and other prey species. Direct killing of bald eagles was also prevalent. Additionally, there was a lost of nesting habitat. These factors reduced bald eagle numbers until the 1940s when protection for the bald eagle was provided through the Bald Eagle Protection Act (16 U.S.C. 668). The Act accomplished protection and a slower decline in bald eagle populations by prohibiting numerous activities adversely affecting bald eagles and increasing public awareness of bald eagles. The widespread use of dichloro-diphenyl-trichloroethane (DDT) and other organochlorine compounds in the 1940s for mosquito control and as a general insecticide caused additional declines in bald eagle populations. DDT accumulated in individual birds following ingestion of contaminated food. DDT breaks down into dichlorophenyl-dichloroethylene (DDE) 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, and is considered a primary cause of declines in the bald eagle population. DDT was banned in the United States in 1972 (Service 1995a).

Since listing, bald eagles have increased in number and expanded in range due to the banning of DDT and other persistent organochlorine compounds, habitat protection, and recovery efforts. Surveys in 1963 indicated 417 active nests in the lower 48 states with an average of 0.59 young produced per nest. In 1994, 4,450 occupied breeding areas were reported with an estimated average of 1.17 young produced per occupied nest (Service 1995a).

Hunt *et al.* (1992) summarized the earliest records of bald eagles in the literature for Arizona. Coues noted bald eagles in the vicinity of Fort Whipple (now Prescott) in 1866, and Henshaw reported bald eagles south of Fort Apache in 1875. The first bald eagle breeding information was recorded in 1890 near Stoneman Lake by S.A. Mearns. Additionally, Bent reported breeding eagles at Fort Whipple in 1866 and on the Salt River Bird Reservation (since inundated by Roosevelt Lake) in 1911. Additionally, there are reports of bald eagles along rivers in the White Mountains from 1937, and reports of nesting bald eagles along the Salt and Verde Rivers as early as 1930.

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 1995, there were 36 known breeding areas, with 30 of those being occupied. Within those breeding areas, 22 nests were active, and six nests failed. Sixteen of the 22 nests were successful in producing young, and a total of 28 young hatched. Twenty-five of these young survived to fledge (Beatty *et al.* 1995). Results for the 1996 breeding season are not yet available.

In addition to breeding bald eagles, Arizona provides habitat for wintering bald eagles, which migrate through the state between October and April each year. For 1996, the standardized statewide Arizona winter count totaled 361 bald eagles, including 232 adults, 127 subadults, and two of unknown age. The most concentrated population of wintering bald eagles is found at Lake Mary and Mormon Lake, where 69 birds were located (Beatty and Driscoll 1996). Perch and roost trees that are sheltered from extreme weather and are close to abundant prey are especially important habitat features for wintering bald eagles (Grubb *et al.* 1989). Perch or roost sites at Navajo Lake, New Mexico included leafless mature cottonwoods, young saplings, live and dead ponderosa pine, douglas fir, pinyon pine, and juniper (Grubb 1984). Perches were typically in the upper half of trees. Wintering bald eagles also perched on rocks or outcrops, especially along ridgelines, and also perched on ice.

It is not known if the population of bald eagle in Arizona declined as a result of DDT contamination because records were not consistently kept during this 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).

Bald eagle breeding areas in Arizona are predominantly located in the upper and lower Sonoran life zones. The Luna Lake breeding area is unique in Arizona in that it is found in coniferous forests at Luna Lake, as opposed to occurring in Sonoran vegetation communities. All breed in close proximity to a variety of aquatic habitats including reservoirs, regulated river systems, and free-flowing rivers and creeks. The alteration of natural river systems has been both beneficial and detrimental 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 on which bald eagles prey.

Of 111 nests known in 1992, 46 were in 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. Arizona bald eagles are considered distinct behaviorally from bald eagles in the remaining lower 48 states in that they frequently construct nests on cliffs. Additionally, eagles nesting on cliffs were found to be marginally more successful at reproducing. Bald eagles in the southwest are additionally unique in that they lay eggs in January or February, which is early compared with bald eagles in other areas. It is believed that this is a behavioral adaptation to allow chicks to avoid the extreme desert heat of midsummer. Young eagles will remain in the vicinity of the nest until June (Hunt *et al.* 1992).

Bald eagles in Arizona consume a diversity of food items, including some invertebrates. However, their primary food is fish, which 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).

A recovery plan was developed for bald eagles in the southwest recovery region in 1982. Goals of the recovery plan were to produce a reproductive output of 10 to 12 young per year and to determine occupancy of one or more pairs on a drainage other than the Salt or Verde Rivers. These goals have been met, and the bald eagle was reclassified nationwide to threatened status. While bald eagles in the southwest were initially considered a distinct population, the final rule notes that the Service has determined that bald eagles in the southwestern recovery region are part of the same bald eagle population found in the remaining lower 48 states.

While the bald eagle has been reclassified to threatened, and although the status of the birds in the southwest recovery region is on an upward trend, the population remains small and under threat from a variety of factors. Threats persist largely due to the proximity of bald eagle breeding areas to major human population centers. Additionally, because water is a scarce resource in the southwest recovery region, recreation is concentrated along available water courses. Some of the threats and disturbances to bald eagle include entanglement in monofilament (fishing line) and fishing hooks, overgrazing and related degradation of riparian vegetation, shooting, alteration of water systems for water distribution systems, maintenance of existing water development features such as dams or diversion structures, and disturbance from recreation. The use of breeding area closures and close monitoring through the Bald Eagle Nestwatch program have been and will continue to be essential to the recovery of this species.

Southwestern Willow Flycatcher

The southwestern willow flycatcher is a small grayish-green passerine bird (Order Passeriformes; Family Tyrannidae) measuring approximately 14.6 cm (5.75 inches) in length from the tip of the bill to the tip of the tail and weighing only 11 grams (0.4 ounces). It has a grayish-green back and wings, whitish throat, light gray-olive breast, and pale yellowish belly. Two white wingbars are visible (juveniles have buffy wingbars). The eye ring is faint to absent. The upper mandible is dark, the lower is light yellow grading to black at the tip. The song is a sneezy "fitz-bew" or a "fit-a-bew," the call is a repeated "whitt."

One of four currently-recognized willow flycatcher subspecies (Phillips 1948, Unitt 1987, Browning 1993), the southwestern willow flycatcher 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 historical 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).

The southwestern willow flycatcher is a riparian obligate, nesting along rivers, streams, and other wetlands where dense growths of willow (*Salix* sp.), *Baccharis*, buttonbush (*Cephalanthus* sp.), boxelder (*Acer negundo*), saltcedar (*Tamarix* sp.) or other plants are present, often with a scattered overstory of cottonwood (*Populus* sp.) and/or willow. These riparian communities provide nesting, foraging, and migratory habitat for the flycatcher.

This species is an insectivore, typically perching on a branch and making short direct flights, or sallying, to capture flying insects. Drost *et al.* (1998) found that the major prey items of the southwestern willow flycatcher, from 15 sites in Arizona and Colorado, consisted of true flies (Diptera); ants, bees, and wasps (Hymenoptera); and true bugs (Hemiptera). Other insect prey taxa included leafhoppers (Homoptera: Cicadellidae); dragonflies and damselflies (Odonata); and caterpillars (Lepidoptera larvae). Non-insect prey included spiders (Araneae), sowbugs (Isopoda), and fragments of plant material. Drost *et al.* noted significant differences in dietary items based on sites and habitats.

The southwestern willow flycatcher was listed as endangered, without critical habitat on February 27, 1995 (USFWS 1995b). Critical habitat was designated on July 22, 1997, and a correction notice was published in the Federal Register on August 20, 1997. Eighteen critical habitat units totaling 599 river miles in Arizona, California, and New Mexico were designated. In Arizona, critical habitat was designated along portions of the San Pedro River (100 miles), Verde River (90 miles) including Tavasci Marsh and Ister Flat, Wet Beaver Creek (20 miles), West Clear Creek (9 miles), Colorado River in the Grand Canyon (32 miles), and Little Colorado River and the West, East, and South Forks of the Little Colorado River (30 miles) (USFWS 1997a).

Habitat

The southwestern willow flycatcher breeds in dense riparian habitats from sea level in California to over 7000 feet in Arizona and southwestern Colorado. Throughout its wide geographic and elevational range, its riparian habitat can be broadly described based on plant species composition and habitat structure (Sogge *et al.* 1997). Two components that vary less across this subspecies' range are vegetation density and the presence of surface water. Based on the diversity of plant species composition and complexity of habitat structure, four basic habitat types can be described for the southwestern willow flycatcher. Those types are described below and should be referenced with photographs provided in Sogge *et al.* (1997).

Monotypic willow: Nearly monotypic, dense stands of willow (often *S. exigua* or *S. geyeriana*) 3 to 7 meters in height with no distinct overstory layer; usually very dense structure in at least lower 2 m; live foliage density is high from the ground to canopy.

Monotypic exotic: Nearly monotypic, dense stand of exotics such as saltcedar (*Tamarix* sp.) or Russian olive (*Elaeagnus angustifolia*) 4 to 10 meters (m) in height forming a nearly continuous, closed canopy (with no distinct canopy layer); lower 2 m may be very difficult to penetrate due to branch density; however live foliage volume may be relatively low from 1 to 2 m above ground; canopy density uniformly high.

Native broadleaf dominated: Comprised of dense stands of single species (often Goodding's or other willows) or mixtures of native broadleaf trees and shrubs including, but not limited to, cottonwood, willows, boxelder, ash, buttonbush, and stinging nettle from 4 to 15 m in height; characterized by trees of different size classes; may have distinct overstory of cottonwood, willow or other broadleaf species, with recognizable subcanopy layers and a dense understory of mixed species; exotic/introduced species may be a rare component, particularly in understory.

Mixed native/exotic: Dense mixtures of native broadleaf trees and shrubs (such as those listed above) mixed with exotic species such as tamarisk and Russian olive; exotics are often primarily in the understory, but may also be a component of overstory; the native and exotic components may be dispersed throughout the habitat or concentrated as a distinct patch within a larger matrix of habitat; overall, a particular site may be dominated primarily by natives, exotics, or be a more or less equal mixture.

Open water, cienegas, marshy seeps, or saturated soil are typically in the vicinity of flycatcher territories and nests; flycatchers sometimes nest in areas where nesting substrates were in standing water (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

The southwestern willow flycatcher begins arriving on breeding grounds in late April and May (Sogge and Tibbitts 1992, Sogge *et al.* 1993, Sogge and Tibbitts 1994, Muiznieks *et al.* 1994, Maynard 1995, Sferra *et al.* 1995, 1997). Nesting begins in late May and early June and young fledge from late June through mid-August (Willard 1912, Ligon 1961, Brown 1988a,b, Whitfield 1990, Sogge and Tibbitts 1992, Sogge *et al.* 1993, Muiznieks *et al.* 1994, Whitfield 1994, Maynard 1995). Southwestern willow flycatchers typically lay three to four eggs in a clutch (range = 2-5). The breeding cycle, from laying of the first egg to fledging, is approximately 28 days. Eggs are laid at one-day intervals (Bent 1963, Walkinshaw 1966, McCabe 1991); they are incubated by the female for approximately 12 days; and young fledge approximately 12 to 13 days after hatching (King 1955, Harrison 1979). Southwestern willow flycatchers typically raise one

brood per year but have been documented raising two broods during one season (Whitfield 1990). They have also been documented renesting after nest failure (Whitfield 1990, Sogge and Tibbitts 1992, Sogge *et al.* 1993, Sogge and Tibbitts 1994, Muiznieks *et al.* 1994, Whitfield 1994, Whitfield and Strong 1995).

Southwestern willow flycatcher nests are open cup structures, approximately 8 centimeters (cm) high and 8 cm wide (outside dimensions), exclusive of any dangling material at the bottom. Nests are typically placed in the fork of a branch with the nest cup supported by several small-diameter vertical stems. The main branch from which the fork originates may be oriented vertically, horizontally, or at an angle, and stem diameter for the main supporting branch can be as small as three to four cm. Vertical stems supporting the nest cup are typically one to two cm in diameter. Occasionally, southwestern willow flycatchers place their nests at the juncture of stems from separate plants, sometimes different plant species. Those nests are also characterized by vertically-oriented stems supporting the nest cup. Spencer *et al.* (1996) measured the distance between flycatcher nests and shrub/tree center for 38 nests in monotypic saltcedar and mixed native broadleaf/saltcedar habitats. In monotypic saltcedar stands (n=31), nest placement varied from 0.0 m (center stem of shrub or tree) to 2.5 m. In the mixed riparian habitat (n=7), nest placement varied from 0.0 to 3.3 m.

Height of the nest varies across the southwestern willow flycatcher's range and may be correlated with the species and height of nest substrate, foliage densities, and/or overall canopy height. Southwestern willow flycatcher nests have been found as low as 0.6 m above the ground to 18 m above the ground. Flycatchers using predominantly native broadleaf riparian habitats nest relatively low to the ground (between 1.8 m and 2.1 m on average), whereas those using mixed native/exotic and monotypic exotic riparian habitats nest relatively high above the ground (between 4.3 m and 7.4 m on average).

Historic egg/nest collections and species' descriptions from throughout the southwestern willow flycatcher's range confirm the bird's widespread use of willow for nesting (Phillips 1948, Phillips *et al.* 1964, Hubbard 1987, Unitt 1987, T. Huels *in litt.* 1993, San Diego Natural History Museum 1995). Currently, southwestern willow flycatchers use a wide variety of plant species for nesting substrates primarily including Geyer willow, Goodding's willow, boxelder, saltcedar, Russian olive and live oak. Other plant species that southwestern willow flycatcher nests have been documented in include: buttonbush, black twinberry (*Lonicera involucrata*), Fremont cottonwood, white alder (*Alnus rhombifolia*), blackberry (*Rubus ursinus*), Russian olive, and *S. hindsiana*.

Brood parasitism of southwestern willow flycatcher nests by the brown-headed cowbird (*Molothrus ater*) has been documented throughout the flycatcher's range (Brown 1988a,b, Whitfield 1990, Muiznieks *et al.* 1994, Whitfield 1994, Hull and Parker 1995, Maynard 1995, Sferra *et al.* 1995, Sogge 1995b). Cowbirds lay their eggs in the nests of other species directly affecting their hosts by reducing nest success. Cowbird parasitism reduces host nest success in several ways. Cowbirds may remove some of the host's eggs, reducing overall fecundity. Hosts may abandon parasitized nests and attempt to renest, which can result in reduced clutch sizes,

delayed fledging, and reduced overall nesting success and fledgling survivorship (Whitfield 1994, Whitfield and Strong 1995). Cowbird eggs, which require a shorter incubation period than those of many passerine hosts, hatch earlier giving cowbird nestlings a competitive advantage over the host's young for parental care (Bent 1963, McGeen 1972, Mayfield 1977a,b, Brittingham and Temple 1983). Where studied, high rates of cowbird parasitism have coincided with southwestern willow flycatcher population declines (Whitfield 1994, Sogge 1995a, Sogge 1995c, Whitfield and Strong 1995), or, at a minimum, resulted in reduced or complete elimination of nesting success (Muiznieks *et al.* 1994, Whitfield 1994, Maynard 1995, Sferra *et al.* 1995, Sogge 1995a, Sogge 1995c, Whitfield and Strong 1995). Whitfield and Strong (1995) found that flycatcher nestlings fledged after July 20th had a significantly lower return rate and that cowbird parasitism was often the cause of delayed fledging.

Territory size

Southwestern willow flycatcher territory size, as defined by song locations of territorial birds, probably changes with population density, habitat quality, and nesting stage. Estimated territory sizes are 0.24-1.3 ha for monogamous males and 1.1-2.3 ha for polygynous males at the Kern River (Whitfield and Enos 1996), 0.06-.2 ha for bird in a 0.6-0.9 ha patches on the Colorado River (Sogge 1995c) and 0.2-0.5 ha in a 1.5 ha patch on the Verde River (Sogge 1995a).

Rangewide Distribution and Abundance

Unitt (1987) documented the loss of more than 70 breeding locations rangewide, including locations along the periphery and within core drainages that form this subspecies range. Unitt estimated that the rangewide population probably was comprised of 500 to 1000 pairs. The current known population of southwestern willow flycatchers stands at approximately 587 territories (Table 2). Breeding occurs at approximately 75 sites (Sogge *et al.* 1997).

The data presented in Table 2 represents both a summary of current survey data as well as a composite of surveys conducted since 1992. Locations that had southwestern willow flycatchers for only one year were tabulated as if the location is still extant. Given that extirpation has been documented at several locations during the survey period, this method of analysis introduces a bias that may overestimate the number of breeding groups and overall population size. In addition, females have been documented singing. Because the established survey method relies on singing birds as the entity defining a territory (Tibbitts *et al.* 1994), double-counting may be another source of sampling error that biases population estimates upward. The figure of 587 southwestern willow flycatcher territories is a preliminary rangewide estimate for 1997 and is an approximation based on considerable survey effort, both extensive and intensive. 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 between 350 and 550 pairs. A substantial proportion of individuals appear to remain unmated. At such low population levels, random demographic, environmental, and/or genetic events could

Table 2. Rangewide population status for the southwestern willow flycatcher based on 1996 survey data for New Mexico and California, and 1997 survey data for Arizona, Colorado, Nevada and Utah. Composite data indicated by () represents multi-year survey data for 1993-1996 for New Mexico and California and 1993-1997 for Arizona, Colorado, Nevada and Utah[1].

State	No. of Sites with Territories (Composite No. of Sites)	No of. Drainages with Territories (Composite No. of Drainages)	No. of Sites (Composite) with Territories			
			with ≤5	with 6-20	with >20	Total No. of Territories (Composite)
Arizona	41 (65)	12 (12)	33 (53)	8 (9)	1 (3)	190 (287)
California	11 (23)	8 (14)	7 (17)	2 (4)	2 (2)	91 (130)
Colorado	7 (15)	6 (11)	2 (10)	4 (4)	1 (1)	69 (92)
New Mexico	19 (30)	6 (8)	16 (26)	3 (3)	1 (1)	209 (232)
Nevada	5 (6)	3 (3)	4 (5)	1 (1)	0 (0)	20 (23)
Utah	5 (10)	4 (7)	5 (10)	0 (0)	0 (0)	8 (16)
Texas	?	?	?	?	?	?
Total	88 (149)	39 (55)	67 (121)	18 (21)	5 (7)	587 (780)

[1] Based on surveys conducted at >800 historic and new sites in AZ (Sogge and Tibbitts 1992, Sogge *et al.* 1993, Muiznieks *et al.* 1994, Sogge and Tibbitts 1994, Sferra *et al.* 1995, 1997, Sogge 1995a, Sogge *et al.* 1995, Spencer *et al.* 1996, McKernan 1997, McKernan and Braden 1998., McCarthey *et al.* 1998); CA (Camp Pendleton 1994, Whitfield 1994, Griffith and Griffith 1995, Holmgren and Collins 1995, Kus 1995, San Diego Natural History Museum 1995, Whitfield and Strong 1995, Griffith and Griffith 1996); CO (T. Ireland 1994 *in litt.*, Stransky 1995); NM (Maynard 1995, Cooper 1996, 1997, Parker 1997, Skaggs 1996, Williams 1995); NV (C. Tomlinson 1995 *in litt*, 1997); UT (McDonald *et al.* 1995, 1997, Sogge 1995b). Systematic surveys have not been conducted in Texas. For sites surveyed multiple years, highest single-year estimate of territories was used to tabulate status data. Tabulations do not include documented extirpations within survey period. Thus, individual state estimates and rangewide totals may be biased upward.

lead to loss of breeding groups and the continued decline of the species. The high proportion of unmated individuals documented during recent survey efforts suggests the southwestern willow flycatcher may already be subject to a combination of these factors (e.g., uneven sex ratios, low probability of finding mates in a highly fragmented landscape).

The results shown in Table 2 demonstrates the critical population status of the flycatcher. More than 75% of the locations where flycatchers have been found are comprised of 5 or fewer territorial birds. Approximately 20% of the locations are comprised of single, unmated individuals. The distribution of breeding groups is highly fragmented, with groups often separated by considerable distances (e.g., approximately 88 kilometer straight-line distance between breeding flycatchers at Roosevelt Lake, Gila County, Arizona, and the next closest breeding groups known on either the San Pedro River (Pinal County) or Verde River (Yavapai County). Continued survey efforts may discover additional small breeding groups. To date, survey results reveal a consistent pattern rangewide--the southwestern willow flycatcher population as a whole is comprised of extremely small, widely-separated breeding groups including unmated individuals.

Declining numbers have been attributed to loss, modification, and fragmentation of riparian breeding habitat, loss of wintering habitat, and brood parasitism by the brown-headed cowbird (*Molothrus ater*) (McCarthey *et al.* 1998, Sogge *et al.* 1997). Habitat loss and degradation is caused by a variety of factors, including urban, recreational, and agricultural development, water diversion and groundwater pumping, channelization, and livestock grazing. Fire is an increasing threat to willow flycatcher habitat (Paxton *et al.* 1996). Fire frequency in riparian vegetation increases with dominance by saltcedar (DeLoach 1991), and water diversions or groundwater pumping that results in dessication of riparian vegetation (Sogge *et al.* 1997). The presence of livestock and range improvements such as waters and corrals; agriculture; urban areas such as golf courses, bird feeders, and trash areas may provide feeding sites for cowbirds. These feeding areas coupled with habitat fragmentation, facilitate cowbird parasitism of flycatcher nests (Tibbitts *et al.* 1994, Hanna 1928, Mayfield 1977).

Arizona Distribution and Abundance

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 headwaters, and White River.

As of 1997, 190 territories were known from 41 sites along 12 drainages statewide (Table 2). The majority of breeding groups in Arizona are extremely small; of the 41 sites where flycatchers have been documented, 80% (33) contain 5 or fewer territorial flycatchers. Moreover, 15% to 18% of all sites in Arizona are comprised of single, unmated territorial birds.

As reported by McCarthey *et al.* (1998), the greatest concentrations of willow flycatchers in Arizona in 1997 were near the confluence of the Gila and San Pedro Rivers (146 flycatchers, 76 territories); at the inflows of Roosevelt Lake (74 flycatchers, 39 territories); between Fort Thomas and Solomon on the middle Gila River (32 flycatchers, 18 territories); Topock Marsh on the Lower Colorado River (24 flycatchers, 12 territories); Verde River at Camp Verde (20 flycatchers, 10, territories); Alpine/Greer on the San Francisco River/Little Colorado River (16 flycatchers, 9 territories); and Alamo Lake on the Bill Williams River (includes Santa Maria and Big Sandy River sites) (16 flycatchers, 10 territories). The lowest elevation where territorial pairs were detected was 60 m at Adobe Lake on the Lower Colorado River. Nesting flycatchers were observed as low as 140 m at Topock Marsh and as high a 2530 m at the Greer town site.

In 1997, nest success or failure was documented at 131 of the 171 nesting attempts at 28 sites in Arizona. Of the 135 nests, an estimated 160 flycatchers fledged. The nest failure rate was 48%. Causes of nest failure included predation (29%), brood parasitism (8%), nest abandonment (7%), and unknown causes (3%) (McCarthey *et al.* 1998). Thirty-one percent of all parasitized nests were subsequently abandoned. One nest in Camp Verde, was parasitized, but successfully fledged at least one willow flycatcher. It is important to note that cowbird trapping programs occurred at seven of the monitored nest sites.

Table 3 lists all Federal agency actions that have undergone section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide since listing in 1995. As indicated in the table, many activities continue to adversely affect the distribution and extent of occupied and potential breeding habitat throughout Arizona. Stochastic events also continue to adversely affect the distribution and extent of occupied and potential breeding habitat. A catastrophic fire in June of 1996, destroyed approximately one km of occupied habitat on the San Pedro River in Pinal County. That fire resulted in the forced dispersal or loss of up to 8 pairs of flycatchers (Paxton *et al.* 1996).

Reproductive Success

Intensive nest monitoring efforts in California, Arizona, and New Mexico have revealed that: (1) sites with both relatively large and small numbers of pairs have experienced extremely high rates of brood parasitism; (2) high levels of cowbird parasitism in combination with nest loss due to predation have resulted in low reproductive success and, in some cases, population declines; (3) at some sites, the level of cowbird parasitism remains high across years, while at others parasitism varies temporally with cowbirds absent in some years; (4) the probability of a southwestern willow flycatcher successfully fledging its own young from a nest that has been parasitized by cowbirds is low (i.e., <5%); (5) cowbird parasitism and/or nest loss due to predation often result in reduced fecundity in subsequent nesting attempts, delayed fledging, and reduced survivorship of late-fledged young, and; (6) nest loss due to predation appears fairly consistent from year to year and across sites, generally in the range of 30 to 50%.

Table 3. Agency actions that have undergone section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide.

Action (County)	Year	Federal Agency[1]	Incidental Take Anticipated
Arizona			
Cedar Bench Allotment (Yavapai)	1995	Tonto NF	Indeterminable
Tuzigoot Bridge (Yavapai)	1995*	NPS	None
Windmill Allotment (Yavapai)	1995	Coconino NF	Loss of 1 nest annually/for 2 years
Solomon Bridge (Graham)	1995	FHWA	Loss of 2 territories
Tonto Creek Riparian Unit (Maricopa)	1995	Tonto NF	Indeterminable
Eastern Roosevelt Lake Watershed Allotment (Maricopa)	1995	Tonto NF	Indeterminable
Cienega Creek (Pima)	1996	BLM	1 nest annually by cowbird parasitism
Glen Canyon Spike Flow (Coconino)	1996	USBR	Indeterminable
Verde Valley Ranch (Yavapai)	1996*	Corps	Loss of 2 flycatcher territories
Modified Roosevelt Dam (Gila/Maricopa)	1996*	USBR	Loss of 45 territories; reduced productivity/ survivorship 90 birds
Lower Colorado River Operations (Mohave/Yuma)	1997*	USBR	Indeterminable
Blue River Road (Greenlee)	1997	A/S NF	Indeterminable
Skeleton Ridge (Yavapai)	1997	Tonto NF	Indeterminable
White Canyon Fire - Emergency Consultation (Pinal)	1997	Bureau	Harassment of 4 pairs
U.S. Hwy 93 Wickenburg (Mohave/Yavapai)	1997	FHWA	Harassment of 6 birds in 3 territories and 1 bird killed/decade

Table 3. Agency actions that have undergone section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide.

Action (County)	Year	Federal Agency[1]	Incidental Take Anticipated
Safford District Grazing Allotments (Greenlee, Graham, Pinal, Cochise & Pima)	1997	Bureau	Indeterminable
Lower Gila Resource Plan Amend. (Maricopa, Yavapai, Pima, Pinal, La Paz & Yuma)	1997	Bureau	Indeterminable
Storm Water Permit for Verde Valley Ranch (Yavapai)	1997	EPA	Indeterminable
Gila River Transmission Structures (Graham)	1997	AZ Electric Power Coop. Inc.	Indeterminable
Arizona Strip Resource Mgmt Plan Amendment (Mohave)	1998	Bureau	Harm of 1 nest every 3 years
CAP Water Transfer Cottonwood/Camp Verde (Yavapai/Maricopa)	1998	USBR	Indeterminable
Cienega Creek Stream Restoration Project (Pima)	1998	Bureau	Harassment of 1 bird
Kearny Wastewater Treatment (Pinal)	1998	FEMA	in consultation
Fort Huachuca Programatic (Cochise)	1998	US Army	in consultation
SR 260 Expansion (Yavapai)	1998	FHWA	in consultation
Wildlife Services (ADC) Nationwide consultation	1998	Wildlife Services	in consultation
California			
Prado Basin (Riverside/San Bernardino)	1994	Corps	None
Orange County Water District (Orange)	1995	Corps	None
Temescal Wash Bridge (Riverside)	1995	Corps	Harm to 2 flycatchers

Table 3. Agency actions that have undergone section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide.

Action (County)	Year	Federal Agency[1]	Incidental Take Anticipated
Camp Pendleton (San Diego)	1995	DOD	Loss of 4 flycatcher territories
Lake Isabella Operations 1996 (Kern)	1996	Corps	Inundation 700 ac critical habitat; reduced productivity 14 pairs
Lake Isabella Long-Term Operations (Kern)	1997	Corps	Indeterminable
Nevada			
Gold Properties Resort (Clark)	1995	BIA	Harm to 1 flycatcher from habitat loss
Las Vegas Wash, Pabco Road Erosion Control Structure	1998	Corps	Harm to 2-3 pairs of flycatchers
New Mexico			
Corrales Unit, Rio Grande (Bernalillo)	1995	Corps	None
Rio Puerco Resource Area	1997	Bureau	None
Farmington District Resource Management Plan	1997*	Bureau	None
Mimbres Resource Area Management Plan	1997*	Bureau	1 pair of flycatchers
Belen Unit, Rio Grande (Valencia)	1998	Corps	Consultation in progress

BIA = Bureau of Indian Affairs; Bureau = Bureau of Land Management; Corps = Army Corps of Engineers; DOD = Dept. of Defense; EPA = Environmental Protection Agency; FEMA = Federal Emergency Management Agency; FHWA = Federal Highway Administration; NF = National Forest;
NPS = National Park Service; USBR = U.S. Bureau of Reclamation; USFS = U.S. Forest Service.

* Jeopardy opinions.

Table 4. Nest predation and brood parasitism rates documented for the southwestern willow flycatcher across its range[1].

Location	Pre-1993	1993	1994	1995	1996
S. Fork Kern River (Kern Co., CA)					
% nests parasitized[2]	50 - 80	38*	16*	19*	11*
% nests depredated	33 - 42	37	47	34	28
San Luis Rey River (San Diego Co. CA)					
% nests parasitized	-	-*	0*	0*	?
% nests depredated	-	-	28	5	?
Colorado River (Coconino Co., AZ)					
% nests parasitized	≥50	100	44	100	0
% nests depredated	-	30	78	0	0
Verde River (Yavapai Co., AZ)					
% nests parasitized	-	100	50	extirpated	extirpated
% nests depredated	-	100	50		
Little Colorado River (Apache Co., AZ)					
% nests parasitized	-	-	22	0	57
% nests depredated	-	-	33	28	14
Rio Grande (Socorro Co., NM)					
% nests parasitized	-	-	20	66	?
% nests depredated	-	-	40	60	?
Gila River (Grant Co., NM)					
% nests parasitized	-	-	-	16-27	?
% nests depredated	-	-	-	45	?

[1] Sources: Sogge and Tibbitts (1992), Sogge *et al.* (1993), Brown (1994), Maynard 1994, Muiznieks *et al.*(1994), Sogge and Tibbitts (1994), Cooper (1996, 1997), Sferra *et al.* (1997), Skaggs (1995), Sogge (1995a), Sogge *et al.* (1995), Parker (1997), Petterson and Sogge (1996), Spencer *et al.* (1996), Whitfield and Strong (1995), Whitfield and Enos (1996).

[2] Proportion of nests containing at least one brown-headed cowbird egg.

* Brown-headed cowbird control program implemented.

Nest loss due to predation is common among small Passerines. The rates documented for southwestern willow flycatchers are also typical for small Passerines (i.e., rates < 50%). However, even at these "typical" levels, nest loss due to predation is a significant factor contributing to low reproductive success. Especially in a depressed population, nest predation presents a difficult management challenge because of the variety of predators. Documented predators of southwestern willow flycatcher nests identified to date include common king snake (*Lampropeltis getulus*) and Coopers hawk (*Accipiter cooperii*) (McCarthey *et al.* 1998, Paxton *et al.* 1997). Efforts to reduce predation may include restricting activities in flycatcher habitat that attract predators, such as camping, picnicking, etc. where pets are loose and refuse is concentrated.

The data presented above and in Table 4 demonstrate that cowbird parasitism and nest depredation are affecting southwestern willow flycatchers throughout their range. Cowbirds have been documented at more than 90% of sites surveyed (Sogge and Tibbitts 1992, Sogge *et al.* 1993, Camp Pendleton 1994, Muiznieks *et al.* 1994, Sogge and Tibbitts 1994, T. Ireland 1994 *in litt.*, Whitfield 1994, C. Tomlinson 1995 *in litt.*, Griffith and Griffith 1995, Holmgren and Collins 1995, Kus 1995, Maynard 1995, McDonald *et al.* 1995, Sferra *et al.* 1995, Sogge 1995, 1996, San Diego Natural History Museum 1995, Stransky 1995, Whitfield and Strong 1995, Griffith and Griffith 1996, Skaggs 1995, Spencer *et al.* 1996, Whitfield and Enos 1996, Sferra *et al.* 1997, McCarthey *et al.*1998). Thus, the potential for cowbirds to be a persistent and widespread threat remains high. Cowbird trapping has been demonstrated to be an effective management strategy for increasing reproductive success for the southwestern willow flycatcher as well as for other endangered Passerines (e.g., least Bell's vireo [*Vireo bellii pusillus*], black-capped vireo [*V. atricapillus*], golden-cheeked warbler [*Dendroica chrysoparia*]). It may also benefit juvenile survivorship by increasing the probability that parents fledge birds early in the season. Expansion of cowbird management programs has the potential to not only increase reproductive output and juvenile survivorship at source populations, but also to potentially convert small, sink populations into breeding groups that contribute to population growth and expansion.

ENVIRONMENTAL BASELINE

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 defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

The Bill Williams River contains the last extensive native riparian woodland habitat in the lower Colorado River area. Much of the native riparian community, however, has been lost or severely degraded since construction of Alamo Dam. Dam operations have restricted flows of 10 cfs of sediment-poor water during much of the year. Additionally, long-duration water conservation releases (for periods greater than 60 days) sometimes inundate the vegetation. This altered water

regime has severely stressed existing native vegetation, prevented natural recruitment of cottonwoods, and allowed native vegetation to be extensively replaced by nonnative salt cedar, which has much less habitat value. A properly functioning riparian ecosystem could be restored by implementing a flow regime that mimics the pattern of historic pre-dam flows.

There are both new and long-term ongoing actions in the project area. Effects of these activities on Alamo Lake and on the Bill Williams River watershed have had profound effects on the river and associated riparian areas. Water diversions and return flows, flood control projects, livestock grazing, feral burro grazing, recreational activities, and changes in annual flows due to off-stream uses of water have affected the distribution, stability, and regeneration of native riparian vegetation. Cottonwood-willow/saltcedar habitat has experienced a lack of recruitment of the cottonwood-willow component, except for a few sporadic events. Overuse of the riparian areas by livestock has hindered or eliminated most regeneration of cottonwoods, sycamores, and willows which could be used as perching or nesting substrate, until recently. A biological opinion with BLM on the Lower Gila Resource Area Plan Amendment (Service 1997b) provided for managing the burro herd to promote riparian regeneration and woody species recruitment, primarily in the lower Big Sandy and Santa Maria River areas.

Bald Eagle

Degradation of the riparian habitat within the Bill Williams River corridor has affected pairs of nesting bald eagles. The loss of riparian vegetation due to activities described above has affected the habitat of the bald eagle. Nests in the Alamo breeding area were usually placed in trees, primarily cottonwood snags killed by inundation at the upper lake inflow. Lack of cottonwood recruitment has left few or no suitable snags remaining. In the early 1980s, a pair of bald eagles, then a Federally listed endangered species, was discovered nesting in a partially inundated cottonwood tree within the upper reaches of Alamo Lake. Subsequently, another pair was discovered nesting on a bluff in the canyon wall downstream of the dam. The use of the lake by the eagles for foraging prompted the Service to request that the lake elevation remain within the range of 1,100-1,135 feet for the conservation of the eagles. The request was then made to ensure sufficient lake surface foraging area for the eagles living in the two nests. The 1,135 maximum lake elevation was requested to prevent inundation of the reservoir nest.

Bald eagles both winter and nest in the project area; thus, bald eagles may be found there any time of year and use the Big Sandy, Santa Maria, and Bill Williams Rivers, and Alamo Lake for foraging. In the latest published Arizona bald eagle winter count report (Beatty and Driscoll 1996), three adults and one subadult were found in the Alamo Lake area. Largemouth bass are an important prey item for bald eagles in the project area (Werner pers comm).

Three breeding areas are known from the project area: Chino, Alamo, and Ives Wash (Corps 1998). The Ives Wash breeding area is immediately downstream from Alamo Dam, Alamo is at the upper end of the lake, and Chino is on the lower Big Sandy River. The Chino site has been unoccupied for the last 10 years and is considered an historic breeding area in 1998 (Driscoll *et*

al. 1998). Most breeding areas have several nests which are thought to provide several benefits, including avoiding infestations of nest parasites. These provide an alternative nest if the original nest becomes unusable, and advertise to other eagles that the territory is occupied. The Alamo and Ives Wash sites are of most concern in the project area, as the Chino area is upstream of lake influence (Corps 1994).

At 1,120 feet msl, the Alamo site is the lowest elevation breeding area in Arizona within the Lower Sonoran Life Zone. This breeding pair was established in 1986 when the radio tagged female from the Chino breeding area constructed a nest with a mate at the northern end of Alamo Lake. Two subsequent nests were also constructed in cottonwood snags in the northern end of the lake by 1990. The Alamo pair tended to nest early, laying eggs in early January. Young hatched approximately five weeks later. Two additional nests were constructed in cottonwood snags in the early 1990's. Record rainfall in 1993 resulted in unusually high water at the lake. Water levels quickly reached 1,130 feet in elevation resulting in the inundation of four nests. A clutch of two eggs were rescued and one egg was subsequently hatched at the Phoenix Zoo. The requirement to restrict the lake elevation to 1,120 feet from December 1 through July 15, was designed to protect a nest in a snag which no longer exists.

A new nest was established by the Alamo pair on the cliffs above Alamo Dam. Another clutch of eggs was subsequently fledged in 1993. Since none of the four inundated nests survived the flood and one entire cottonwood snag disappeared, nesting has usually continued in the cliffs. In 1996, the main supporting branch in what may be the last best cottonwood snag broke, sending the nest to the ground. The Alamo nest failed in 1997 (Beatty et al 1998).

The Ives Wash breeding area is located on the Bill Williams River approximately one mile downstream from Alamo Dam and on the upper reaches of Alamo Lake in Woody's cove. A pair has been observed nesting in Ives Wash since 1987 although adults are occasionally replaced. Although a cottonwood snag was used for nesting during one year prior to the 1993 flood, the nest within the cliffs above the Bill Williams River has been used consistently before and after the flood. The pair has been observed foraging both within the lake and along the Bill Williams River. Most foraging along the Bill Williams River was observed during the lower flow periods, when prey was more easily seen and caught (Corps 1994). The Ives Wash nest failed in 1997 (Beatty *et al.* 1998).

Despite recent setbacks (both nest failures in 1997), combined occupancy, success, and total productivity levels at the Alamo and Ives breeding areas are above the Arizona average. From 1987 to 1994, Alamo and Ives maintained an occupancy rate of 100 percent, a success rate of 87.5 percent, and an average productivity of 1.21 young fledged per breeding area per year. The overall Arizona population averaging a nesting success rate of 47.3 percent, and a productivity of 0.71 young fledged per BA per year (Service 1996).

In its Biological Opinion for the Operations of the Alamo Dam and Alamo Lake (Service 1996), the Service placed terms and conditions in its incidental take statement that the reservoir be

maintained at a level of approximately 1,120 feet from December 1 through July 15 when bald eagles are nesting in snags. In its incidental take statement, the Service identified the likelihood of two nests being destroyed, take of four eggs or nestlings through harassment during rescue operations to avoid take by death, after opinion issuance in 1996 and through 1998. Reasonable and prudent measures were provided to minimize incidental take as follows: 1)reduction of the likelihood of drowning nestlings and/or eggs; 2) reduction of the likelihood of occupied bald eagle nest inundation, and; 3) reduction of the possibility of harassment of nesting bald eagles by the public.

Southwestern Willow Flycatcher

The altered flow regime of the Bill Williams River downstream of the Alamo Dam has resulted in the degradation of the riparian habitat (Bill Williams River Corridor Technical Committee, 1994). The major cause of the degradation has been attributed to the relative absence of maximum discharges which tended to result in reduced recruitment of cottonwoods (Shafroth, *et al.* 1998). Between 1,100 feet and 1,140 feet lies a delta dominated by younger cottonwood and willow trees (Corps 1996). Between 1,140 and 1,208 is a band of saltcedar. At the active channel, there is a mix of both cottonwood-willow and saltcedar dominated vegetation. Depending on lake level at the arrival of southwestern willow flycatchers, these habitats are available for breeding activities. Elevations of occupied territories in the confluence area are approximately 1,150; 1,160; 1,190; 1,200 feet msl, all above the 1,125 target elevation.

In 1995, six flycatcher territories were located along the Big Sandy River and nesting was confirmed for two of these territories (Arizona Game and Fish Department /Arizona State Parks 1997). Six breeding territories and two breeding pairs were also identified in the Bill Williams River National Wildlife Refuge (McKernan 1997). Surveys in 1996 and 1997 have confirmed the presence of breeding pairs immediately upstream of Alamo Lake near the confluence of Santa Maria and Big Sandy Rivers (McCarthey personal communication). Heavy rains and runoff from the 1997-1998 *El Niño* rainy season resulted in the inundation of a substantial portion of the willow habitat on the upper end of Alamo Lake (McCarthey personal communication). However, as of July, 1998, AGFD had reported 2 nesting pairs at the Bill Williams River National Wildlife Refuge, 5 territories with 2 pairs at Brown's Crossing, 6 territories with 3 active nests at the confluence of the Big Sandy River with Alamo Lake, and 2 territories with 1 pair at the Santa Maria confluence with Alamo Lake (Figure 2). Extended inundation may result in loss of willow habitat for the species. There is, however, potential for additional habitat for the southwestern willow flycatcher both at the upper end of Alamo Lake and the tributaries to the lake, as well as downstream of the Dam along the Bill Williams River.

As legitimate cattle grazing in the riparian sections of the action area is rarely authorized, effects of cattle grazing generally result from strays from adjacent areas. In the Bill Williams River, BLM has a standing trespass order for those public lands whereby any cattle found there are held to be in trespass and removed.

Two biological opinions have been issued within the action area concerning project effects to the southwestern willow flycatcher. A biological opinion dated August 27, 1997, considered effects of improving Highway 93 at the river crossings of the Big Sandy and Santa Maria Rivers. In this non-jeopardy opinion, short-term reduced productivity of two nests at the Big Sandy River and disruption of attempted nesting at the Santa Maria River was predicted. Cowbird trapping and habitat compensation are being implemented to offset the effects.

A biological opinion dated October 2, 1997, considered the effects of wild burro use in the lower Big Sandy and Santa Maria River areas. This non-jeopardy opinion considered incidental take to be habitat-related or from direct nest disturbance. To offset these effects, BLM will remove burros in the Alamo Herd Management Area in response to effects of burros on vegetation above a certain reference level.

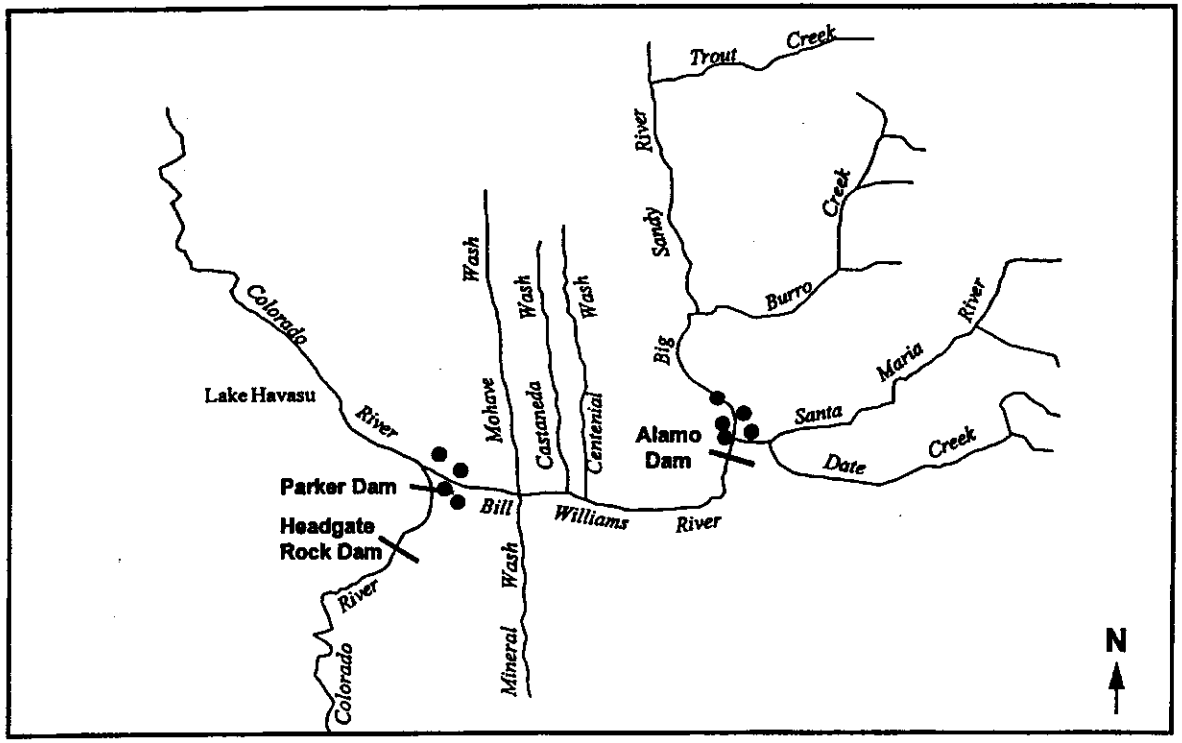
EFFECTS OF THE ACTION

Bald Eagle

Implementation of the Proposed Action would result in the management of the reservoir and downstream areas of the Bill Williams River to a level that more closely approximates natural river flows. Additionally, the Proposed Action would be consistent with the USFWS' recommendation that the reservoir level be maintained at a minimum level of 1,100 feet (BWRCTC 1994). The Proposed Action would make it easier to operate the dam during almost all but dam inspection periods and extreme drought conditions above this level.

If nesting again occurs in the cottonwood snags, the nests could still be prone to inundation during extremely heavy periods of rain, and therefore, would likely be adversely affected. Modeling for the period of record between 1928 and 1993 shows that reservoir peaks above 1,135 would have occurred seven times, or 11 percent of the period (Corps 1996). When inflows are high, releases with higher peaks than the past should reduce the elapsed time when the reservoir water surface elevation exceeds 1,135 feet. This would reduce the chance of take of bald eagles in cottonwood snags over some other alternatives considered. An often-used nest tree was situated at 1,138 feet in recent years. Maintenance at the 1,125 foot level would increase the aquatic resources within the lake. In turn, this is expected to increase the available food sources for the eagles in the area (BWRCTC 1994).

The riparian areas of the Bill Williams River would be subjected to a more natural water flow including periods of relatively high water flows. This is anticipated to result in a substantial enhancement and expansion of the riparian resources (Corps 1996). In the long term, this area is expected to become a more natural foraging area for bald eagles. It is also likely that additional recruitment of cottonwoods could occur within the Bill Williams River, increasing potential nesting sites.



● - Presumed Nesting Pairs

Not to Scale

Source: State of Arizona Heritage Program Data Base

Figure 2.
Distribution of Nesting Southern Willow Flycatcher in the Bill Williams River Watershed 1994-1996

Southwestern Willow Flycatcher

Implementation of the Proposed Action would likely increase riparian habitat downstream of the dam through the establishment of a more natural flow regime. Therefore, implementation of the Proposed Action would be expected to increase the habitat for the southwestern willow flycatcher in the Bill Williams River. The expected increase of likely suitable (saltcedar or cottonwood-willow) habitat with the proposed action is approximately 67 acres, a 6 percent increase over the future without the project. Most, but not all of this increase, is expected in the Bill Williams River.

The nature of impacts to habitat for southwestern willow flycatchers in the vicinity of Alamo Lake depend largely on where it is found. Dense stands of riparian vegetation, including Goodding willow (*Salix gooddingi*), become established episodically along the Santa Maria and Big Sandy River following spring floodflows. As spring flows recede many seedlings perish from lack of adequate soil moisture. Others which germinated in sites supported by baseflow of springs along the sides of the rivers may become established. In addition, seedlings located in the Bill Williams floodplain near the upper end of Alamo Lake may be supported for some time by high groundwater at the elevation of the lake, which is not a reliable source since the lake will recede due to evaporation at a rate of at least 6 vertical feet per year (pan evaporation in Phoenix) even without deliberate releases from the dam.

Willows and other riparian vegetation in the area depend to a large degree on baseflow of the Big Sandy and Santa Maria Rivers, resulting in the established vegetation occurring in or near the active channels of those rivers. Neither the Big Sandy or Santa Maria are regulated above Alamo Dam and both experience large increases in flow during flood periods. In February of 1993 the flow on the Big Sandy, at the gage in Wickiup upstream of the lake, ranged from 137 cfs to 68,700 cfs (USGS 1994). During the same month flows on the Santa Maria, at the gage near US 93, ranged from 133 cfs to 15,700 cfs (USGS 1994). The combined flows were on the order of 84,000 cfs below the confluence as the water entered Alamo Lake. Vegetation depending on base flow along the Big Sandy and Santa Maria Rivers was subject to intense scour and succession was set back to bare ground in much of the area. The riparian habitat at the upper end of Alamo Lake and along the Big Sandy and Santa Maria Rivers is consequently ephemeral and dynamic in nature.

In analyzing potential impacts of the proposed re-operation to nest sites from inundation by the lake, elevations of these sites were considered. Ground elevations at nest sites documented on the Big Sandy are approximately 1150 and 1200 feet msl. Ground elevations at nest sites documented on the Santa Maria are approximately 1160 and 1190 feet msl. Comparing inundation by the lake itself, as contrasted with inundation by floodflows which is part of the without project condition, the proposed re-operation includes maximal releases at a much lower elevation of the lake, generally reducing the likelihood of inundation of nests along the Big Sandy and Santa Maria Rivers. The HEC-5 analysis performed by the Corps concluded that the percent of time that the water surface of Alamo Lake would be between 1144 and 1154 feet msl would remain the same at 0.2% between the with and without project conditions and that the number of days the water

surface would be above 1171.3 would drop from 27 to 0 based on the period of record (BWRCTC 1994).

In addition to considering probability of inundation by the lake, timing of inundation must be considered as well. High inflows into Alamo Lake typically occur early in the year. Since the proposed re-operation includes high releases at a much lower lake elevations, generally during or immediately following the inflow period, the probability that nest sites inundated early in the spring would no longer be inundated by late May, and therefore usable that year, would be higher with the proposed re-operation. This was the case in the high inflow year of 1998. Flycatchers had trees in which to build nests over water that had receded since the late winter-early spring period. Additionally, unless willows are completely submerged, the short period of inundation is unlikely to cause mortality of the trees.

There may be a slightly increased potential for inundation of some nesting sites near the lake itself during high inflow years with the proposed action, but reduced potential for inundation of nesting sites nearer the top of the water conservation pool. With all known nest sites occurring at or above 1,150, the frequency of reaching this elevation is expected to occur during the month of May only 1 in 500 years, and is even less frequent from June through August. The lake should reach its highest elevation in May. Direct take of birds at actual known nest sites is unlikely because the frequency of lake elevation rising markedly during the June-August nesting period is extremely low. Flows will exist above the target elevation of 1,125 feet about 1 in 7 years during the month of May forbidding the availability of this area for nesting. It is not clear how this will affect newly established sites for southwestern willow flycatcher. Flycatchers may establish at or near the 1,125 even though nesting is available at nearby higher elevation where known nests occur. Birds successfully establishing at or near the 1,125 level are not likely to be flooded later in the year. The establishment of 67 acres of new saltcedar or cottonwood-willow, may include some additional suitable willow flycatcher habitat. The net long-term effect should be an increase and enhancement of southwestern willow flycatcher habitat throughout the Bill Williams River system, primarily downstream of Alamo Dam.

CUMULATIVE EFFECTS

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 lands withing the action area are overwhelmingly Federally managed. Most actions are likely to have a Federal nexus. Therefore, few cumulative effects are expected. Recreation use, however, is likely to grow at a rate of 1.7 percent per year at which carrying capacity would be reached at 2030.

Bald Eagle

It is likely that the recreational use of Alamo Lake and potentially the Bill Williams River would increase in the future, due primarily to the increase in population and recreational demand as well as somewhat enhanced fisheries and recreational opportunities. This increased human presence in the area would increase the potential for human disturbance to nesting or foraging eagles. The Corps' ongoing conservation measures, however, would continue to reduce that effect.

Southwestern Willow Flycatcher

The AGFD is actively addressing effects of recreation, cattle and feral burros in the Alamo Lake area under its license agreement to manage the area for fish and wildlife purposes. To this end, investigations on impacts of burros to riparian habitat within the area have been completed. These effects are being addressed through ongoing land management planning which complements dam operation and water management planning outlined by the BWRCTC. Maintenance of fences is currently being considered as an additional management measure to help reduce impacts to riparian habitat. Coordination between AGFD and BLM is continuing to establish appropriate numbers and locations of burros for effective management and habitat.

CONCLUSION

After reviewing the current status of the southwestern willow flycatcher and the bald eagle, the environmental baseline for the action area, the effects of the proposed Alamo Lake Re-operation and Ecosystem Restoration and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the southwestern willow flycatcher or the bald eagle. No critical habitat has been designated for the bald eagle, therefore, none will be affected. In Arizona, critical habitat for the southwestern willow flycatcher was designated along portions of the San Pedro River, Verde River, Wet Beaver Creek, West Clear Creek, Colorado River in the Grand Canyon, and the Little Colorado River and the West, East, and South Forks of the Little Colorado River. This project, however, does not affect those areas and no destruction or adverse modification of that critical habitat is anticipated.

This proposed action was deemed, by an interagency interdisciplinary group, to optimize benefits to bald eagles, southwestern willow flycatcher habitat, and other resources, among a host of alternatives, while still operating the plan to meet the project needs. Although there is a chance for incidental take of southwestern flycatchers due to rare inundation of nests from reservoir elevations over 1,150 feet in May and June, the most likely adverse effect will likely be infrequent inundation of habitat between the 1,125 and 1,140 foot elevations, not resulting in take of the known nest sites. Such inundation is expected to constitute a short-term setback in habitat availability and is more than balanced by the creation of new habitat. Bald eagles will have additional riparian habitat to use and a larger potential food supply in the reservoir. Since the breeding area most at risk now includes at least one cliff nesting site, and remaining large cottonwoods are further upstream, the chance for incidental take is diminished.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by Service as intentional or negligent 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 defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. 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 to be prohibited taking under the Act 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 undertaken by the Corps so that they become binding conditions of any grant or permit issued an applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require an applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(i)(3)]

AMOUNT OR EXTENT OF TAKE

Bald Eagle

The Service anticipates four bald eagle eggs or fledglings every ten years could be taken as a result of this proposed action. The incidental take is expected to be in the form of harm or harassment due to removal from nests to avoid inundation by rising lake levels, per the Corps' project description. Such inundation could occur in 11% of simulated years, as predicted in the HEC-5 analyses.

Southwestern Willow Flycatcher

The Service anticipates one nest with two eggs or fledglings every twenty years could be taken as a result of this proposed action. The incidental take is expected to be in the form of kill due to inundation. Inundation during the summer season is extremely unlikely and much less than the 11% of years predicted in the HEC-5 analyses.

The Fish and Wildlife Service will not refer the incidental take of any migratory bird or bald eagle for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§ 703-712), or the Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. §§ 668-668d), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

EFFECT OF THE TAKE

Bald Eagle

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

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 or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

Bald Eagle

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of the bald eagle:

1. Reduce likelihood of drowning of nestlings and/or eggs.
2. Reduce the likelihood of loss of occupied bald eagle nests and snags
3. Reduce the likelihood of harassment of nesting bald eagles by the public

Southwestern Willow Flycatcher

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of the southwestern willow flycatcher:

1. Reduce the likelihood that sufficient habitat quantity and quality is compromised in the Big Sandy-Santa Maria confluence with Alamo Lake such that it supports less than the current population of flycatchers.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

Bald Eagle

To implement the reasonable and prudent measures the Corps shall complete the previously agreed upon Conservation Measures described in the Proposed Action of this document as modified from the 1996 Biological Opinion issued to the Corps. In addition, we add one term and condition (labeled 2.4) to replace the deletion of 2.1 and 2.3 from the 1996 biological opinion.

2.4 When bald eagles are nesting in snags on the lake, maintain the lake levels to ensure the protection and integrity of the nest structure and to allow response time for egg or nestling rescue during flood events. Operations shall be modified between December 1 and July 15, and be coordinated with personnel from the Service and AGFD. This requirement is not in force when bald eagles are nesting at the cliff sites.

Southwestern Willow Flycatcher

1.1 Habitat monitoring of the Big Sandy-Santa Maria confluence area, including areas occupied by southwestern willow flycatchers in 1998, shall be implemented on a yearly basis. Aerial extent and structure of riparian vegetation supporting flycatchers shall be quantified for trends over time and compared with inflows and lake levels. Lake elevations, and timing, during the reporting period will be compared with elevations of known southwestern willow flycatcher nest sites and timing of occupation, which, when used with other pertinent information, will be used as an assessment associated with dam operations.

1.2 Monitoring of southwestern willow flycatcher use of the confluence area, including areas occupied in 1998, shall be implemented on a yearly basis to ascertain take of individuals of the species that causes kill, harm or harassment to the species. This monitoring shall be accomplished using trained and permitted flycatcher biologists. AGFD has an ongoing program that could fulfill 1.2. The collection of presence/absence data will assist in documenting and monitoring territory establishment and breeding locations.

1.3 Make the monitoring data available to the expanding range-wide southwestern willow flycatcher Information Management System and Geographic Information System begun by U.S. Geological Survey-Biological Resources Division in Flagstaff, Arizona, and the Bureau of Reclamation in Phoenix. Having the Big Sandy-Santa Maria-Bill Williams birds on this system will ensure that monitoring data are shared and analyzed together with birds in the remainder of the species' range.

1.4 A report of the results of the monitoring, including complete and accurate records of all incidental take that occurred during the course of the project, shall be submitted to the Service yearly, on the anniversary date of the biological opinion accompanying this incidental take statement. This report will also describe how the terms and conditions of all reasonable and prudent measures in this incidental take statement were implemented.

1.5 At five year intervals, determine, in cooperation with AGFD and the Service, whether operations are allowing sustained habitat and productivity of flycatchers in the Big Sandy-Santa Maria inflow area. If, at any review period, it appears lake/dam operations are having a different effect than anticipated, prepare a strategy that conserves the flycatcher and its habitat at the confluence/inflow area.

Upon locating a dead, injured, or sick individual of an endangered or threatened species, initial notification must be made to the nearest Service Law Enforcement Office at Federal Building, Room 105, 26 North McDonald, Mesa Arizona, 85201 (telephone: 602/379-6443) or the Arizona Ecological Services Field Office at 602/640-2720, within three days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the finding, a photograph of the animal, and any other pertinent information. The notification shall be sent to Law Enforcement with a copy to the Arizona Ecological Services Field Office. Care should be taken in handling sick or injured individuals and in the preservation of specimens in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered species or preservation of biological materials from a dead animal; the finder has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed.

The Service believes that no more than four bald eagle eggs or fledglings every ten years and two southwestern willow flycatcher eggs or fledglings every twenty years will be incidentally taken as a result of the proposed action. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Produce a pamphlet for distribution to the interested public on the values of riparian habitat, bald eagles, and southwestern willow flycatchers, and management efforts at Alamo Dam.

2. Continued shared funding of the Arizona Bald Eagle Nestwatch Program, coordinated by the Arizona Game and Fish Department after eventual delisting, would continue conservation efforts and help ensure adequate monitoring after recovery.

3. Contribute funding for wintering grounds surveys for the southwestern willow flycatcher

4. Contribute funding for a study to investigate the physiological condition/health of southwestern willow flycatchers breeding in native versus non-native habitats. This project has the potential of shedding light on whether non-native saltcedar is less productive nesting habitat for flycatchers compared to native tree habitat.

5. Contribute funding for the range-wide southwestern willow flycatcher Information Management System and Geographic Information System. Funding should be sufficient to cover the project area.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the actions outlined in your request. 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 retained (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 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 Service appreciates the Corps' efforts on this project. It will have great long-term benefits to the riparian and aquatic resources in western Arizona and to endangered species conservation. We trust you will inform the other members of the Bill Williams River Corridor Steering and Technical Committees of our thanks. For further information please contact Debra Bills or Tom

Gatz. Please refer to the consultation number, 2-21-98-F-329, in future correspondence concerning this project.

Sincerely,

David L. Harlow
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (GM:AZ/NM)
Complex Manager, Colorado River Refuges Complex, Yuma, AZ

Refuge Manager, Bill Williams National Wildlife Refuge, Parker, AZ
State Director, Bureau of Land Management, Phoenix, AZ
Director, Arizona Game and Fish Department, Phoenix, AZ
Director, Arizona State Parks, Phoenix, AZ

98-329.wp:DTB:jh

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