

III. CONSERVATION MEASURES

A. Regulatory Protection

1. Federal Laws Protecting the Southwestern Willow Flycatcher

Endangered Species Act

Listing under the ESA affords the southwestern willow flycatcher a number of protections, and also authorizes various conservation actions. Section 2 of the ESA directs all Federal agencies to seek to conserve endangered and threatened species, and to use their authorities in the furtherance of the purposes of the ESA. All agencies of the United States government are therefore authorized and obligated to proactively promote conservation and recovery of the southwestern willow flycatcher. Section 4 of the Act requires the Department of Interior and the Department of Commerce to develop and implement recovery plans for listed species. Section 7 reiterates the responsibility of all Federal agencies to proactively conserve and recover listed species, and requires all Federal agencies to consult with the USFWS on any actions they authorize, fund, permit, or carry out that may affect listed species or adversely modify critical habitat. Incidental “take” of a Federally listed species may be permitted through this consultation process. Section 9 provides protection for the southwestern willow flycatcher by prohibiting “take.” “Take” is defined as “...to harass, harm, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct.” Within the realm of “take,” “harm” is further defined to include significant habitat modification or degradation that results in death or injury of the listed species, and significantly impairing essential behavior patterns, including breeding, feeding, or sheltering.

Section 10 of the ESA gives the authority to issue permits to non-Federal and private entities for “take,” as long as such taking is incidental to, and not the purpose of, carrying out otherwise lawful activities. Often, these permits are issued for “habitat conservation plans” (HCP) developed under §10(a)(1)(B). Take permits issued for HCPs authorize incidental take, but not the underlying activities that result in take. This process ensures that the effects of the authorized incidental take will be adequately minimized and mitigated. Congress intended that the HCP process would be used to reduce conflicts between listed species and economic development activities. HCPs are used to develop creative partnerships between the public and private sectors in the interest of conserving listed species. In 1999, the USFWS issued a new policy under Section 10(a)(1)(A) of the ESA, for Safe Harbor Agreements (SHA) through enhancement of survival permits for listed species. The standard for an SHA is that the agreement must realize a “net conservation benefit” (i.e., by implementing the terms of one or more SHA, populations of a listed species will increase and/or their habitats will be improved). SHAs are temporary habitat protections with “take” allowed at sometime in the future back to an agreed upon baseline; if several SHAs were implemented simultaneously or sequentially, these efforts could assist in species’ recovery.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (16 U.S.C. 701-711) was enacted in 1916 between the governments of the United States and Great Britain (representing Canada), subsequently Mexico in 1936, Japan in 1972, and the Union of Soviet Socialist Republics in 1976. The Migratory Bird Treaty Act expanded the definition of migratory birds to include virtually all birds found in the United States. It establishes provisions regulating take, possession, transport, and import of migratory birds, including nests and eggs.

Federal Land Policy and Management Act of 1976

The Federal Land Policy and Management Act of 1976 requires that “. . . the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that . . . will preserve and protect certain public lands in their natural condition; (and) that will provide food and habitat for fish and wildlife . . .” Furthermore, it is the policy of the Bureau of Land Management “to manage habitat with emphasis on ecosystems to ensure self-sustaining populations and a natural abundance and diversity of wildlife, fish, and plant resources on public lands” (BLM manual 6500.06).

National Forest Management Act

The National Forest Management Act of 1976 directs that the National Forest System “. . . where appropriate and to the extent practicable, will preserve and enhance the diversity of plant and animal communities.” Additionally, sec. 219.12(g) requires the maintenance of viable populations of native vertebrates in national forests.

Clean Water Act

Congress passed the Federal Water Pollution Control Act Amendments of 1972 and the Clean Water Act (CWA) of 1977 to provide for the restoration and maintenance of the chemical, physical, and biological integrity of the nation’s lakes, streams, and coastal waters. Primary authority for the implementation and enforcement of the CWA now rests with the U.S. Environmental Protection Agency (EPA) and to a lesser extent, the U.S. Army Corps of Engineers (COE). In addition to the measures authorized before 1972, the CWA implements a variety of programs, including: Federal effluent limitations and state water quality standards, permits for the discharge of pollutants and dredged and fill materials into navigable waters, and enforcement mechanisms.

Section 404 of the CWA is the principal Federal program that regulates activities affecting the integrity of wetlands. Section 404 prohibits the discharge of dredged or fill material in jurisdictional waters of the United States, unless permitted by COE under § 404 (a) (individual permits), 404 (e) (general permits), or unless the discharge is exempt from regulation as designated in § 404 (f).

There is controversy in administration of the COE's permit system and their responsibilities pursuant to the ESA. The limits of jurisdictional waters of the United States (the area covered under § 404) are determined by: 1) in the absence of adjacent wetlands, jurisdiction extends to the ordinary high water mark; or 2) when adjacent wetlands are present, jurisdiction extends beyond the ordinary high water mark to the limit of the adjacent wetlands; or 3) when the water of the United States consists only of wetlands, jurisdiction extends to the limit of the wetland. Riparian habitat in the Southwest is usually above the ordinary high water mark and often does not meet the definition of jurisdictional wetlands of the United States.

Section 402 of the CWA is the principal Federal program that regulates activities affecting water quality. One of the most significant features of the 1972 CWA is the creation of a national pollutant discharge elimination system (NPDES). Except as otherwise provided in the CWA, industrial sources and publicly owned treatment works may not discharge pollutants into navigable waters without a permit. The EPA may issue a permit for discharge upon condition that the discharge meets applicable requirements, which are outlined extensively in the CWA and which reflect, among other things, the need to meet Federal effluent limitations and state water quality standards.

2. State Laws Protecting the Southwestern Willow Flycatcher

Arizona

The State of Arizona is in the process of developing a list of "Wildlife of Special Concern in Arizona," which identifies species whose occurrence in Arizona is or may be in jeopardy, or those with known or perceived threats or population declines. The southwestern willow flycatcher is included in the most current (1996) draft of the list of "Wildlife of Special Concern in Arizona." This list will replace the previous list of "Threatened Native Wildlife in Arizona" (AGFD 1988) which categorized the willow flycatcher as "endangered." Both lists are informative and nonregulatory, serving mainly as policy guides for wildlife management. Under Arizona Revised Statutes, for a nongame passerine bird like the southwestern willow flycatcher, permits are required to take (R12-4-304), possess, sell, transport, import, and export carcasses (R12-4-305), and collect for scientific purposes (R12-4-418).

California

Three subspecies of willow flycatcher occur in California: the southwestern (*Empidonax traillii extimus*), the “little” willow flycatcher (*E.t. brewsteri*) and the Great Basin form (*E.t. adastus*). The State of California classifies willow flycatchers breeding within the state (all subspecies) as endangered (California Department of Fish and Game 1992). Under the California Endangered Species Act of 1984 (Fish and Game Code Sections 2050-216), the southwestern willow flycatcher therefore has the following protections: unless permitted by the California Department of Fish and Game (CDFG), a listed species shall not be imported into California or exported from California, and shall not be taken, possessed, purchased, or sold within California (Summary of Fish and Game Code Section 2080). Section 86 of the Fish and Game Code defines take as “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill”.

The following restrictions and regulations from the CDFG Code apply to a nongame passerine bird like the southwestern willow flycatcher: All birds occurring naturally in California that are not resident game birds, migratory game birds, or fully-protected birds are nongame birds. It is unlawful to take any nongame bird except as provided in the Fish and Game Code or in accordance with regulations of the Fish and Game Commission or in a mitigation plan for a mining operation approved by the CDFG (Fish and Game Code Section 3800). It is unlawful to take or possess any bird except as provided in the code or in regulations adopted by the commission pursuant to the Code (Summary of Section 2000). It also is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird (§3503). Further, it is unlawful to take or possess any migratory nongame bird designated in the Migratory Bird Treaty Act except as provided by rules and regulations adopted by the U.S. Secretary of the Interior (§3513).

The California Environmental Quality Act (CEQA [Public Resources Code Sections {PRC}] 21000-21178.1) and the regulations enacting it (California Code of Regulations [CCR] 15000-15387) are important tools for protecting biological resources in California. CEQA, which is similar to the National Environmental Policy Act (NEPA), has three primary purposes: 1) Minimizing impacts on the environment by identifying impacts and then applying mitigation measures; 2) Disclosing to decision makers and the public the potential impacts of a proposed action and associated mitigation measures; and 3) Disclosing the rationale behind decision makers’ determinations to the public. With the exception of a few exempt actions, CEQA must be followed by all state and local public agencies for discretionary projects. Projects are defined as those actions carried out, funded, or permitted by the agencies.

CEQA is effected by completing documentation appropriate for the level of impact. Documentation ranges from a Negative Declaration for low-no impact projects to Environmental Impact Reports (EIR) for larger, more complex, or more impacting projects. Review and opportunity to comment by the public, and agencies other than the action agency, is mandatory. There is no enforcement agency for CEQA compliance; its intents are realized by the good-faith efforts of the decision-making agency, or through litigation. The California Department of Fish and Game is entitled, under certain circumstances involving noncompliance with CEQA, to replace another state or local public entity as lead agency.

The impacts of a project on biological resources are considered to be significant if the project has the potential to substantially reduce the habitat of fish and wildlife species, cause a fish or wildlife population to drop below self-sustaining

levels, threaten to eliminate a plant or animal community, and/or reduce the number or restrict the range of an endangered, rare or threatened species. Further, it directs that threats be viewed as both those posed directly by the project and those posed cumulatively by the project and other projects together. CEQA defines endangered, rare, or threatened species as those listed under the Federal and state Endangered Species Acts and also any other species that meet the definition under those acts, even if no listing action has been taken.

Decision-making agencies may deny projects which may cause a significant impact after mitigation, or for which the proponent is unwilling to accept mitigation conditions attached to the permit. On the other hand, if after applying feasible mitigation measures, the project still will result in significant impacts, the decision-making agency may still approve the action by adopting a "Statement of Overriding Considerations." In this, the decision-making body must describe in writing the specific reasons (economic, legal, social, technological, or other benefits) which override the adverse environmental effects.

Colorado

The State of Colorado listed the southwestern willow flycatcher as endangered in May 1998. The flycatcher is therefore protected under Colorado Revised Statutes (C.R.S.) 33-2-105. Section 3 of this statute states that ". . . it is unlawful for any person to take, possess, transport, export, process, sell or offer for sale, or ship and for any common or contract carrier to knowingly transport or receive for shipment any species or subspecies of wildlife appearing on the list of wildlife indigenous to this state determined to be endangered within the state pursuant to subsection (1) of this section." Section 4 contains identical language for taxa listed as threatened. Penalties for the take of state-listed endangered species are established in C.R.S. 33-6-109(3)(a). These penalties are ". . . a fine of not less than two thousand dollars and not more than one hundred thousand dollars, or by imprisonment for not more than one year in the county jail, or by both such fine and such imprisonment, and an assessment of twenty points." The Colorado Division of Wildlife is also authorized to pursue civil action to recover the value of wildlife. C.R.S. 33-6-110(1)(a) establishes a minimum value of \$1,000 for any endangered species. Colorado Wildlife Commission Regulation #1315 (a) provides that a ". . . Scientific Collecting License may be issued for the purpose of marking or banding or temporary or permanent possession of wildlife specimens outside of established seasons."

Nevada

The southwestern willow flycatcher was proposed for re-classification from state Protected to Endangered status in the State of Nevada in 1997. As of 1999 the flycatcher has not been re-classified to state Endangered status. However, the flycatcher is currently a protected bird under the Nevada Administrative Code (NAC) §503.050. This protection means "...there is no open season and a person shall not capture or kill this wildlife or possess any part thereof, without first obtaining the appropriate license, permit, or written authorization from the Nevada Division of Wildlife." (NAC §503.090, §503.093). Penalties for violation include fines up to \$500 and/or up to six months in prison (Nevada Revised Statute §501.385). There are no state habitat designations that govern land use practices or are analogous to the designation of critical habitat, under the ESA.

New Mexico

The State of New Mexico listed the southwestern willow flycatcher as Threatened (then called 'Group 2') in 1988 (NMDGF 1988), then re-classified the subspecies to Endangered status in 1996. The flycatcher is therefore protected under New Mexico's Wildlife Conservation Act (WCA) (17-2-37 to 17-2-46 NMSA 1978) of 1974. This protection means "except as otherwise provided in the WCA, it is unlawful for any person to take (including 'harass, hunt, capture or kill, or attempt to do so'), possess, transport, export, sell or offer for sale, or ship" the flycatcher in New Mexico. Penalties for violation include fines up to \$1,000 or up to one year in prison. The WCA provides for no habitat designations analogous to the designation of critical habitat, and does not govern land use practices. The WCA provides for the issuance of permits for take, possession, transport, export or shipment for scientific, zoological or educational purposes, or for propagation in captivity.

Texas

The southwestern willow flycatcher is listed as an endangered species in Texas Parks and Wildlife Code (TPWC), §65.180. This designation affords the flycatcher the protections of TPWC §68.015, which prohibit capture, trapping, take, or killing, or attempting any of these acts. Also prohibited are possession, sale, distribution, or offering or advertising for sale any goods made from endangered fish or wildlife unless the goods were made from fish or wildlife that were lawfully born and raised in captivity for commercial purposes, or were made from fish or wildlife lawfully taken in another state. Also, TPWC §68.006 prohibits possession, taking, or transportation for zoological gardens or scientific purposes, and take or transportation from its natural habitat for propagation for commercial purposes. A permit for these activities may be issued under TPWC §43.022. Violation of the above provisions constitutes a TPWC Class B misdemeanor; multiple convictions constitute a Class A misdemeanor. The above provisions afford no protections for the habitat of state-listed endangered species.

Utah

The State of Utah lists the southwestern willow flycatcher as an endangered species on its Utah Sensitive Species List (Utah Division of Wildlife Resources 1998). This list, compiled pursuant to Policy Number W2NAT-1 (State Sensitive Species), is intended to stimulate management actions (e.g., conservation strategies) to benefit listed species. The list carries no regulatory authority. However, under Title 23, Wildlife Resources Code of Utah, the flycatcher may not be collected and possessed (R657-3-21), or imported and possessed (R657-3-32). The flycatcher may be transported live through Utah, and imported to a State or Federally regulated establishment (R657-3-37 and 38).

B. Actions to Offset Impacts, and Mitigation Efforts

The following are examples of some, but not all, actions to offset habitat impacts, and mitigation efforts directed at benefitting the flycatcher.

1. Marine Corps Base, Camp Pendleton, California

Annual cowbird trapping has been conducted since 1983 at Marine Corps Base, Camp Pendleton, California, in compliance with a Biological Opinion addressing impacts of Marine training operations on riparian habitat used by least Bell's vireos and southwestern willow flycatchers. In addition, annual surveys for flycatchers, and since 1999, nest monitoring, have been conducted, providing information on flycatcher population size, distribution, and productivity at the Base.

2. Prado Basin, California

In conjunction with efforts to conserve and recover the endangered least Bell's vireo and southwestern willow flycatcher, species monitoring, cowbird trapping and habitat restoration and conservation efforts have been undertaken in the Prado Basin and contiguous reaches of the Santa Ana River since 1996. Although the local management effort, funded largely by the Orange County Water District pursuant to several Biological Opinions, originally emphasized monitoring and management of the vireo, the conservation of the small breeding population of the flycatcher has been the top priority of the management team since the species was Federally listed as endangered. Given the past creation and present supervision of species management and habitat restoration endowments, management efforts will be sustained in perpetuity at current levels.

3. *Lake Isabella, California*

The construction of Isabella Dam on the Kern River (near Weldon, CA) and subsequent filling of the reservoir resulted in the development of a riparian woodland at the inflow of the South Fork of the Kern River. In 1997, the USFWS and COE convened a team of scientific experts to assist in resolution of issues relating to the operation of Isabella Reservoir and potential impacts to southwestern willow flycatchers that were breeding in dense willow habitat at the inflow area. The team determined that future reservoir operations were likely to continue impacting the flycatcher and its breeding habitat, and recommended the development and protection of an additional 1,000 ac of floodplain habitat (approximately 500 of which would be dense willow habitat) upstream in the Kern River Valley, continued cowbird trapping (to maximize local breeding productivity), and continued monitoring and research (del Nevo et al. 1998). To date, the COE has funded continued flycatcher monitoring and research, cowbird trapping, and efforts are still underway to identify and secure the needed floodplain habitat.

4. *Clark County, Nevada, Habitat Conservation Plan*

Clark County and its Desert Conservation Plan Implementation and Monitoring Committee is responsible for the implementation of the provisions of Section 10(a)(1)(B) Incidental Take permit, issued by the USFWS, pursuant to the ESA of 1973. Clark County administers the plan by assuming responsibility for the collection of mitigation fees, ensuring adherence to all compliance measures associated with the permit as well as overseeing implementation of the Plan. The Desert Conservation Plan is intended to promote a balance between economic stability and environmental integrity in Clark County, Nevada. Clark County is also responsible for the preparation of the Multiple Species Habitat Conservation Plan which, upon approval, will supercede the Desert Conservation Plan. The Plan will initially provide coverage for approximately 79 species and may include coverage for additional species as more information becomes available for these taxa over time, thereby assuring that clearly established conservation measures are not jeopardized alongside a vibrant local economy and the sustained appreciation of our natural resources.

5. *Lower Colorado River Multi-Species Conservation Program*

The objectives of the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) are to:

- 1) Conserve habitat and work toward the recovery of “included species” within the 100-year floodplain of the Lower Colorado River, pursuant to the ESA, and attempt to reduce the likelihood of additional species listings under the ESA;
- 2) Accommodate current water diversions and power production and optimize opportunities for future water and power

development, to the extent consistent with the law; and 3) provide the basis for take authorizations pursuant to the Federal ESA and California ESA. The LCR MSCP contains Federal project elements (U.S. Bureau of Reclamation (USBR) operations and maintenance) as well as State and private projects.

It is anticipated that the LCR MSCP will preserve existing habitat, create new riparian habitat, and restore damaged or degraded areas in order to provide habitat suitable for the southwestern willow flycatcher and yellow-billed cuckoo. To the extent practicable, these habitat areas will be managed as an integrated mosaic with wet sloughs and marshes designed to support the Yuma clapper rail and other marsh and aquatic wildlife. Conservation measures are being designed with the goal of distributing habitat for the southwestern willow flycatcher throughout the LCR MSCP planning area, to the extent consistent with the morphology of the river and floodplain, in order to maintain or establish connectivity.

The LCR MSCP will build on the ongoing implementation of the USFWS biological and conference opinion on LCR operations and maintenance, dated April 30, 1997, that directed Reclamation to implement Reasonable and Prudent Alternatives (RPAs) to: 1) protect approximately 1400 ac (565 ha) of currently unprotected occupied or potential southwestern willow flycatcher habitat through acquisition, easements, partnerships, and other means; 2) provide protective management for willow flycatchers and suitable habitat on the LCR through fire prevention planning, fencing, cowbird control, public education; 3) conduct five years of willow flycatcher research and monitoring on the LCR, and conduct other studies or projects that contribute to willow flycatcher conservation; 4) identify historical willow flycatcher habitat on the LCR that no longer exists and is unrestorable, and develop management recommendations for the MSCP to compensate for loss of habitat, through acquisition, easements; and 5) evaluate effectiveness of modified or removed channels on comparable river systems, assess how and where to modify or remove channels to restore riparian habitat on the LCR, and evaluate the success of different habitat restoration demonstration projects on the LCR (USFWS 1997c). Endangered Species Act coverage for USBR's LCR operations and maintenance was extended from April 30, 2002, to April 30, 2005. Some of the RPAs USBR was directed to do were completed (numbers 1, 4, and 5 described above). USBR will continue to conduct research, monitoring, and other conservation actions through 2005, or until the completion date of the LCR MSCP, whichever comes first.

6. *Roosevelt Lake, Arizona*

The USFWS biological opinion on the operation of the modified Roosevelt Dam, dated July 23, 1996, directed USBR to implement an RPA that would allow the use of the newly developed water conservation space within the reservoir. To partially fulfill requirements of the RPA, USBR was required to: 1) acquire occupied willow flycatcher habitat on the lower San Pedro River, now owned and managed by The Nature Conservancy as the San Pedro River Preserve; 2) establish a \$1.25 million Management Fund to conduct management activities that benefit the willow flycatcher through habitat acquisition, fencing, restoration, cowbird trapping, and other projects; 3) create a Southwestern Willow Flycatcher Conservation Coordinator position to assist the USFWS in initiating recovery and conservation planning, and to implement

activities required by the Biological Opinion; 4) implement a 10-year program of willow flycatcher research and monitoring at Roosevelt Lake and the lower San Pedro River; 5) implement a cowbird trapping program on the lower San Pedro River; and, 6) fund a variety of research and monitoring programs range-wide (USFWS 1996).

In addition to the above, the public is currently reviewing the Salt River Project's incidental take application, draft Environmental Impact Statement and draft Roosevelt Lake Habitat Conservation Plan (HCP) for the continued operation of the reservoir. The goals of the Roosevelt HCP are to "minimize and mitigate incidental take (due to continued operation of Roosevelt) of flycatchers, Yuma clapper rails, bald eagles, and cuckoos, to the maximum extent practicable, and to not appreciably reduce the likelihood of survival and recovery...in the wild." If the Roosevelt HCP is approved, the Salt River Project commits to implementing the following measures for the southwestern willow flycatcher in Gila and Maricopa counties, Arizona: (1) creating and managing riparian habitat at Roosevelt Lake; (2) acquiring and managing riparian habitat in several basins in central Arizona to provide a diversity of geographic locations; and, (3) focusing acquisition of riparian land in locations that birds are expected to occupy (i.e., in proximity to existing populations of flycatchers). This commitment will entail protection in perpetuity of a minimum of 1,500 acres of riparian habitat either on-site or near-site of Roosevelt reservoir, as well as 750 acres of riparian habitat management, water rights acquisition, and/or providing of benefits.

7. Sonoran Desert Multi-Species Conservation Plan

In Pima County, Arizona, the Sonoran Desert Conservation Plan's multi-species habitat conservation component includes the southwestern willow flycatcher as a "Priority Vulnerable Species." Recently identified in the Empire Cienega watershed in Pima County, it is anticipated that the Sonoran Desert Conservation Plan will preserve existing habitat, restore habitat, and manage lands consistent with conservation efforts for the flycatcher and up to 50 other species.

C. Conservation Efforts

1. Pro-Active Conservation Efforts Directed at the Flycatcher

A number of pro-active efforts, not driven by legal requirements, are being directed at conservation and recovery of the southwestern willow flycatcher. Several of these are discussed below, as examples of the range of beneficial programs that can be implemented.

Habitat Protection and Restoration

Kern River, California

The 456 ha (1127 ac) Kern River Preserve (KRP) was purchased in 1981 by The Nature Conservancy (TNC). The land had been operated as a cattle ranch since the mid-1800s. TNC removed cattle from the riparian areas shortly after they purchased the property in order to enhance the riparian habitat. However, some riparian areas are lightly to moderately grazed during the winter. The change in management resulted in the regeneration of at least 150 ha (370 ac) of riparian forest. In addition, TNC has planted over 125 ha (309 ac) of riparian habitat. In 1997, Audubon California took over management of the KRP and continues to manage the property for riparian values. One of California's largest populations of the southwestern willow flycatcher nests on the KRP.

Virgin River, Utah

Washington County, Utah, which is home to more than half of the Virgin River's length, has ranked among the nation's ten fastest-growing counties for the last four years. This growth in human community is facilitating detrimental uses of the Virgin River and its riparian resources. For example, a current proposal calls for a 60% reduction of the river's winter flow in the last reach where two endangered fish maintain relatively healthy populations.

According to the Natural Heritage Programs in Utah, Arizona, and Nevada, the Virgin River Basin supports 32 species which are globally rare and of pressing conservation concern. The USFWS lists six of these species as endangered; two more are threatened and an additional 24 are being monitored. Many of these species rely on the Virgin River's riparian habitat which occurs on only 1% of the entire Basin's land base.

The Grand Canyon Trust has responded by launching a two-pronged effort: first, an extensive information gathering effort to prepare for reasonable discussions regarding management decisions, and second, an effort to regularly participate in key management processes which are determining the river's future. The Trust's vision is a healthy, accessible river with self-sustaining native plant and animal populations for the children of 2097 and beyond.

Gila River, New Mexico

In the Cliff-Gila Valley, The Nature Conservancy has initiated habitat enhancement on its lands, including reducing levees to allow controlled flooding and subsequent establishment of riparian vegetation for nesting flycatchers. Also in the same area, the Gila National Forest and the U-Bar Ranch have used the construction of artificial oxbows as a means to stabilize eroded banks while simultaneously creating wetland habitats of slack water surrounded by native riparian vegetation. These sites were constructed by digging down to the water table in linear troughs parallel to the Gila River

course. The banks were then pole-planted with willows, cottonwoods, and sycamores. Southwestern willow flycatchers occupied the Gila Bird Area project on the Gila National Forest in 1997, within three years of its construction. Several pairs bred in the U-Bar project in 1999. Farther downstream, in the vicinity of the Lower Gila Box, the Bureau of Land Management has enhanced riparian patches by reducing or eliminating livestock grazing and by controlling off-road vehicles.

Monitoring and Research

Prior to approximately 1990, research regarding southwestern willow flycatchers was limited, consisting primarily of one regional and one State-based status and taxonomic review, and a handful of localized survey and breeding ecology efforts. Research was carried out by several independent researchers, in a few local areas, with little communication of data or regional data compilation. As the southwestern willow flycatcher drew increasing regulatory and management attention (starting with the proposed listing in 1991), survey, monitoring, and research efforts grew from minimal in 1992 to extensive by 1999. Since the early 1990s, statewide surveys have been initiated in Arizona, New Mexico, and Utah, generally as part of the Partners In Flight program. Standardized survey protocols were developed in 1994 and updated in 1997, and statewide survey data integration and reporting have been instituted in some States. In the mid-1990s, intensive breeding and migration ecology, demography, and habitat research was being conducted at several sites in Arizona, California, Nevada, and New Mexico. Range-wide population genetics work was also initiated at this time. Collaborative research is now being conducted throughout the flycatcher's range. Collectively, this body of inventory, monitoring, and research has provided sound quantitative data addressing key questions relative to the recovery and conservation of the southwestern willow flycatcher. Work has recently begun on the presence and potential impacts of environmental contaminants at selected flycatcher breeding sites in Arizona. Recent research has also investigated the status, distribution, habitat use and ecology of the willow flycatcher on its wintering grounds in Central America. Much of this valuable work is expected to continue into the future (given continued funding), and will yield valuable insights on flycatcher status, distribution, and ecology - with the overall goal of better designing, executing, and evaluating flycatcher conservation and management actions. As this occurs, it will be critical to continue local, statewide, and rangewide data synthesis and reporting, and the collaborative sharing of research needs, ideas, and information.

2. Other Efforts of Riparian Conservation That May Benefit the Flycatcher

Throughout the southwest, there are numerous private, local, State and regional efforts aimed at improving and/or reducing the degradation of riparian and wetland habitats. Specific examples include, but are not limited to: the Santa Clara River Enhancement and Management Plan; the Cascabel Community Conservation Plan; the San Pedro Riparian and Las Cienegas National Conservation Areas; the Verde River Management Plan; riparian habitat development downstream of the Nogales International Waste Water Treatment Plant; Las Vegas Wash wetlands restoration program; willow riparian

restoration at Key Pittman Wildlife Management Area; San Juan Pueblo post-fire riparian restoration program; Santa Ana Pueblo riparian restoration project; Pueblo of Zuni riparian restoration program; restoration of instream flows on the Agua Fria below Lake Pleasant; water (effluent) releases into the Gila River below Phoenix; experimental releases of beaver on the San Pedro River; and, riparian fuels reduction research on the Rio Grande. These projects are at varying stages of development and implementation.

The USFWS applauds the agencies and groups involved in these and other efforts intended to increase the amount of, and improve the condition of, ecologically valuable riparian habitats. Similar projects are underway in virtually every flycatcher Recovery Unit (see Section IV.A.1.). While all such projects are welcome, it is important to recognize that not all of these efforts will directly benefit breeding southwestern willow flycatchers. The flycatcher breeds only in dense, mesic riparian patches - a subset of the types of riparian likely to be developed as a result of the above programs. It is quite possible, if not likely, that the basic objectives of many of these projects could be met without the development and maintenance of suitable flycatcher breeding habitat. Therefore, the USFWS encourages the groups responsible for these projects to work with flycatcher biologists to include, where possible, specific objectives and design criteria for development, enhancement, and protection of the types of habitats in which flycatchers breed. In this way, these myriad projects have the potential to contribute greatly to the recovery of the flycatcher.

D. Conservation of Listed, Proposed, Candidate, and Species of Special Concern

1. Listed Species Occupying The Same Ecosystem As The Flycatcher

A large number of species are listed as threatened or endangered, which inhabit the riparian and/or aquatic habitats to which the flycatcher also is tied (Table 6; also see <http://endangered.fws.gov/wildlife.html#Species>). This underscores that southwestern riparian and aquatic habitats, while supporting disproportionately high levels of biodiversity, have also been degraded at a landscape scale. The presence of so many threatened and endangered species within this broad ecosystem type does not mean that difficult decisions must be made of managing for one listed species rather than, or at the expense of, another. Rather, this situation illustrates that if riparian and aquatic ecosystems are restored to their natural, dynamic, heterogenous conditions, many imperiled species will benefit.

Table 6. Listed vertebrate species occupying the same ecosystems as the southwestern willow flycatcher. (E = Endangered, T = Threatened, P = Proposed, NA = Not Applicable, MX = Mexico)

Species/Status	Range, Habitat, Comments	Recovery Plan	Critical Habitat
Fox, San Joaquin kit (E) <i>Vulpes macrotis mutica</i>	Central CA: Various habitats, grassland and scrubland. May have benefitted from riparian habitats. Overlap with flycatcher hypothetical. Threats: habitat loss due to agricultural, industrial, urban development.	Yes	No
Jaguar (E) <i>Panthera onca</i>	AZ, NM, TX, MX: Various habitats; oak-pine woodlands in U.S., riverbottom jungle and thickets in tropics. May have benefitted from riparian habitats. Overlap with flycatcher hypothetical, possibly San Pedro and Santa Cruz rivers.	No	No
Jaguarundi, Sinaloa (E) <i>Herpailurus (=Felis) yagouaroundi tolteca</i>	TX, AZ(?): Tropical bottomland thickets. AZ reports unconfirmed. Overlap with flycatcher hypothetical, possibly San Pedro and Santa Cruz rivers.	Yes	No
Owl, Mexican spotted (T) <i>Strix occidentalis lucida</i>	UT, AZ, CO, NM, MX: Steep, wooded mountain slopes and rocky canyons, some wintering in lowland riparian woodlands. Threats: habitat loss - possibly including loss of wintering riparian habitat.	Yes	Yes
Pygmy-owl, cactus ferruginous (E) <i>Glaucidium brasilianum cactorum</i>	So. AZ: Riparian woodlands and desertscrub. Probably once sympatric along San Pedro, lower Gila, possibly Santa Cruz rivers. Threats: loss of riparian woodlands.	No	No (to be finalized in 2003)
Rails, light-footed clapper (E) <i>Rallus longirostris levipus</i> and Yuma clapper (E) <i>R. l. yumanensis</i>	CA, AZ, MX: Cattail-bulrush marshes. Local habitats dissimilar, but ranges likely include substantial flycatcher habitat. Threats: loss of habitat due to dewatering, channelization, loss of floods, contaminants.	Yes (Yuma)	No
Vireo, least Bell's (E) <i>Vireo bellii pusilis</i>	So. CA: Riparian thickets. Habitat similar to flycatcher's. Threats also similar: loss of habitat due to dewatering, loss of floods, channelization, cowbird parasitism.	Draft	Yes
Snake, giant garter (T) <i>Thamnophis gigas</i>	Central CA: Streams and sloughs, usually with mud bottoms. Threats: dewatering, agricultural conversion, urbanization.	No	No

Table 6, continued. Listed vertebrate species occupying the same ecosystems as the southwestern willow flycatcher . (E = Endangered, T = Threatened, P = Proposed)

Species/Status	Range, Habitat, Comments	Recovery Plan	Critical Habitat
Salamander, Sonoran tiger (E) <i>Ambystoma tigrinum stebbinsi</i>	AZ, MX: Ponds and marshes. Possibly once sympatric with flycatchers in San Pedro and upper Santa Cruz rivers. Threats: habitat alteration, climatic trends, isolation of small populations.	Yes	No
Salamander, California tiger (E) <i>Ambystoma californiense</i>	CA: Santa Barbara County lowland wetlands. Threats: severe degradation of breeding sites and associated uplands.	No	No
Toad, arroyo (E) <i>Bufo californicus</i>	CA, MX: Streams with shallow gravelly pools adjacent to sandy terraces. Sympatric with much of So. CA flycatcher populations. Threats: loss and degradation of riparian habitat, predation.	Yes	Yes
Leopard frog, Chiricahua (T) <i>Rana chiricahuensis</i>	AZ, NM, MX: Lowland cienegas, pools, livestock tanks, lakes, reservoirs, streams, most abundant in Gila and San Francisco drainages. Threats: habitat loss and predation by introduced predators.	No	No
Catfish, Yaqui (T) <i>Ictalurus pricei</i>	AZ, MX (Rio Yaqui drainage basin): In large rivers in areas of medium to slow current. Threats: habitat loss and non-native species.	Yes	Yes
Chub, Chihuahua (T) <i>Gila nigrescens</i>	NM, MX (Mimbres River NM): In deep pools bordered by undercut banks or with downed trees. Threats: riparian degradation	Yes	No
Chub, Pahrnagat roundtail (E) <i>Gila robusta jordani</i>	NV: Pahrnagat River drainage	Yes	No
Chub, humpback(E) <i>Gila cypha</i>	CA, AZ, UT, WY, CO: Strong, continuous water flow in the Colorado River between Nevada and Arizona, the Moapa and Virgin Rivers and the Pahrnagat Valley. Threats: dewatering of rivers, flow control, migration and dispersal routes blocked by dams.	Yes	Yes
Chub, Virgin river (E) <i>Gila seminuda</i>	AZ, NV, UT: Pools and runs over sand and other sediment in the Virgin river. Threats: water diversion, exotic fish.	Yes	Yes
Chub, Owens tui (E) <i>Gila bicolor snyderi</i>	CA: Owens River system. Schools in weedy shallows of quiet waters. Threats: water diversion, exotic fish.	Yes	Yes

Table 6, continued. Listed vertebrate species occupying the same ecosystems as the southwestern willow flycatcher . (E = Endangered, T = Threatened, P = Proposed)

Species/Status	Range, Habitat, Comments	Recovery Plan	Critical Habitat
Chub, Sonora (T) <i>Gila ditaenia</i>	AZ, MX (Rio de la Concepcion drainage): In pools. Threats: habitat loss, dewatering of rivers.	Yes	Yes
Chub, Yaqui (E) <i>Gila purpurea</i>	AZ, MX: Rio Yaqui system and adjacent southeastem AZ. Sympatry with flycatchers questionable. Threats: riparian habitat degradation, possibly predation by exotic fish.	Yes	Yes
Dace, Ash Meadows speckled (E) <i>Rhinichthys osculus nevadensis</i>	NV: Amargosa River system. Flycatchers in area. Threats: exotic fish, earlier channelization and pumping.	Yes	Yes
Gambusia, Big Bend (E) <i>Gambusia gaigei</i>	TX: Springs in Big Bend National Park. Sympatry hypothetical. Threats: reduction in springflow	Yes	No
Minnow, loach (T) <i>Rhinichthys (=Tiaroga) cobitis</i>	AZ, NM, MX: Inhabits turbulent, rocky riffles of rivers and tributaries up to approximately 2200 m. Endemic to Gila River basin. Threats: modification of rivers, streams, and landscapes through dewatering &/or impoundment of streams, loss of natural flooding, livestock grazing, and non-native fishes.	Yes	Yes
Minnow, Rio Grande silvery (E) <i>Hybognathus amarus</i>	NM, TX, MX: Rio Grande. Sympatric with Rio Grande corridor flycatchers. Threats: Dewatering of river system, changes in flood regimes, and barriers(dams) to migration and dispersal.	Yes	No (to be finalized in 2003)
Pupfish, Ash Meadows Amargosa (E) <i>Cyprinodon nevadensis mionectes</i>	NV, Ash Meadows NWR and Amargosa River. Threats: exotic fish and dewatering.	Yes	Yes
Pupfish, Warm Springs (E) <i>Cyprinodon nevadensis pectoralis</i>	NV, Ash Meadows NWR. Threats: exotic fish and dewatering.	Yes	No
Pupfish, desert (E) <i>Cyprinodon macularius</i>	AZ, CA, MX: Lower CO River system. Threats: dewatering.	Yes	Yes
Spikedace (T) <i>Meda fulgida</i>	AZ, NM: Gila and Verde river systems. Variable habitats, young at stream margins and adults in main channels, in clear, year-round streams. Formerly sympatric with much of flycatcher's central range; remaining spikedace occur with or near flycatchers on Verde and Gila Rivers, including Cliff-Gila area.	Yes	Yes

Table 6, continued. Listed vertebrate species occupying the same ecosystems as the southwestern willow flycatcher . (E = Endangered, T = Threatened, P = Proposed)

Species/Status	Range, Habitat, Comments	Recovery Plan	Critical Habitat
Moapa Dace (E) <i>Moapa coriacea</i>	Muddy River, NV: Spring pools, spring outflows, and the main stem. Threats: habitat degradation, exotic fish.	Yes	No
Spinedace, Little Colorado (T) <i>Lepidomeda vittata</i>	AZ: Headwaters of Little CO River. Sympatric with flycatchers. Threats: habitat degradation, exotic fish.	Yes	Yes
Topminnow, Gila & Yaqui (E) <i>Poeciliopsis occidentalis</i>	AZ, NM: Ephemeral flooded habitats in lowland Gila basin, stenothermal springs, and natural lentic habitats, primarily in shallow areas with aquatic vegetation and debris. Threats: loss of springs, river backwaters, and small stream habitat due to water impoundment and diversion, water pollution, introduction and spread of exotic predatory and competitive fish species.	Yes	No
Trout, Apache (=Arizona) (T) <i>Oncorhynchus (Salmo) apache</i>	AZ: Lakes and streams in White Mts	Yes	No
Trout, Gila (E) <i>Oncorhynchus (Salmo) gilae</i>	AZ, NM: Upper Gila River system	Yes	No
Chub, bonytail (E) <i>Gila elegans</i>	CA, AZ, NV, UT, CO, WY: Larger swiftwater channels of Colorado River system. Threats: changes in water temp, quality, availability, flood regimes; migration and dispersal routes blocked by dams.	Yes	Yes
Razorback sucker (E) <i>Xyrauchen texanus</i>	CA, AZ, NV, UT, CO, NM, WY, MX: CO and Gila River basins. Threats: changes in water temp, quality, availability, flood regimes; migration and dispersal routes blocked by dams.	Yes	Yes
Sucker, Santa Ana (T) <i>Catostomus santaanae</i>	CA: Los Angeles, San Gabriel, and Santa Ana rivers. Threats: water diversions, channelization, exotic fishes.	No	No
Pikeminnow (squawfish), Colorado (E) <i>Ptychocheilus lucius</i>	CA, AZ, NV, UT, CO, NM, WY, MX: CO River system except Salt and Verde rivers. Threats: changes in water temp, quality, availability, flood regimes; migration and dispersal routes blocked by dams.	Yes	Yes
Woundfin (E) <i>Plagopterus argentissimus</i>	AZ, NV, UT: Virgin River system, formerly in Gila system. Threats: water diversion, exotic fish.	Yes	Yes

2. Species of Special Concern Occupying The Same Ecosystem As The Flycatcher

A large number of riparian and aquatic species are listed by the States comprising the flycatchers breeding range as threatened, endangered, sensitive, or species of concern (For lists see AGFD 1988 and 1996, CDFG 1992, Colorado Revised Statutes 33-2-105, Nevada Administrative Code §503.050, NMDGF 1988, Texas Parks and Wildlife Code §65.180, UDWR 1998). These species are dependent on habitats that are similar to, and/or ecologically and hydrologically connected to the breeding and migration habitat of the flycatcher. Where they take the approach of restoring or mimicking natural hydrological processes, conservation efforts directed at the flycatcher or these species should be mutually beneficial.