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In Reply Refer To:
AESO/SE
22410-2006-F-0511 November 9, 2006
CC2006714

Mr. Hector E. Montalvo
Director, Logistics Center, Facilities and Engineering
US Customs and Border Protection
24000 Avila Road
P.O. Box 30080
Laguna Niguel, California 92607-0080

Dear Mr. Montalvo:

Thank you for your request for formal consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your request was dated April 28, 2006, and received by us on May 4, 2006. At issue are impacts that may result from activities proposed along the U.S. and Mexico border at the San Pedro River, Cochise County. You requested formal consultation on the endangered southwestern willow flycatcher (*Empidonax traillii extimus*).

This biological opinion is based on information provided in your letter, an April 2006 biological assessment for the project (USCBP 2006) labeled as "draft," the Naco-Douglas Supplemental Environmental Assessment (USCBP 2003), field investigations, our files, and other sources of information. References cited in this opinion are not a complete bibliography of all references available on the listed species evaluated, effects of the proposed action, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

CONSULTATION HISTORY

- December 9, 2003. Meeting regarding proposed action, water use, and species.
- February 3, 2004. Site visit and discussion of project alternatives.
- October 19, 2005. Site visit and agreement on project scope.

- April 28, 2006. We received your request for consultation and the biological assessment for the project.

- September 29, 2006. We mailed you the draft biological opinion.

- October 10, 2006. We received your comments on the draft biological opinion.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed action is part of a larger action along the Arizona-Sonora border, and also within the San Pedro River valley. The Border Patrol uses infrastructure to control and impede illegal access into the United States.

The entire project is described in an environmental assessment for the Naco-Douglas corridor (US CBP 2003). However, this biological opinion covers only the actions described in the BA; it does not address all the actions in the various environmental assessments for the area. The action at and near the San Pedro River (Figure 1) includes an unimproved low-water crossing, temporary vehicle barriers in the floodplain, permanent vehicle barriers above the floodplain, erosion control, access-road improvements, and a vehicle turn-around spot on the east bank of the floodplain. No new roads will be built in the riparian corridor.

The existing low-water crossing will not be changed. However, periodic grading of the low water crossing and the road in the floodplain on the west part of the project area may need to be done after flood flows.

A part of the eastern floodplain bank next to the low-water crossing will be graded back to provide adequate site distance and speed for pursuit operations for the OBP and to address some erosion problems that threaten the east road. Only the top-most portion of the bank is to be removed. The access and approach road will be designed and constructed to a maximum vertical slope of 10 percent and will be covered with an all-weather surface to reduce maintenance and repair costs, as well as erosion and sedimentation. The low-water crossing in the floodplain will not be improved.

The east bank road will be moved slightly east, and improvements will be done to retard the severe erosion that currently threatens the road. These improvements will include installation of culverts; a parallel drainage ditch; nuisance drainage culverts; and bank-stabilization measures such as engineered fill, revegetation, geo-fabric, and rip-rap.

A turnaround area will be constructed on the east bank to provide an observation position. Numerous saplings and three large cottonwood trees (> 12” diameter at breast height) will be removed from the banks during excavation and construction of the turnaround area. Once felled, the largest of these will be placed across or adjacent to the exposed channel to provide temporary shade and refuge. Trees at the turn-around site will be removed or trimmed to maintain the view-shed there.

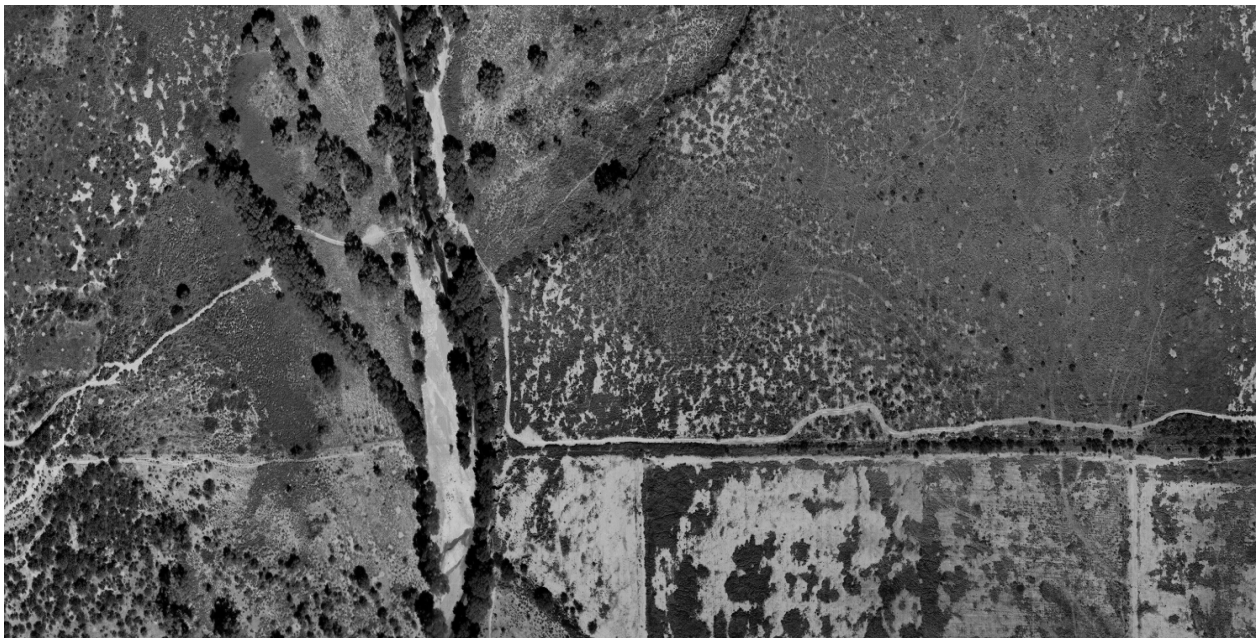

Figure 1. Aerial view of project site.

A temporary vehicle barrier will be placed in the floodplain. The temporary barriers will be moved out of the floodplain before expected floods. However, it is expected that this will prove problematic, especially if they are welded together (USCBP 2006), and the barriers are likely to be in the floodplain during most high flows.

Conservation Measures

Project construction will occur outside of the southwestern willow flycatcher migration period if possible, but it could also occur within the migration and nesting periods. If work occurs during migration or nesting periods, a biological monitor will be on-site to document the presence of listed species. Construction will continue if flycatchers are detected. Disturbed soils will be stabilized and revegetated with native species, including cottonwood and willow saplings, to provide erosion and sediment control. Disturbed areas will also be sprayed with a hydroseed mixture of native species to provide herbaceous cover more rapidly.

OBP intends to haul construction water from Naco to avoid using water in the Sierra Vista Subwatershed. However, contrary to language in the BA, Naco is within the subwatershed, therefore, construction water must come from some place other than Naco. The BA also states that energy dissipation or erosion control structures may be placed near the in-stream road crossing. This action was from an earlier alternative and is not part of the current action (Mark Doles, COE, pers. comm., Sep. 2006).

STATUS OF THE SPECIES

Description

The southwestern willow flycatcher is one of four currently recognized willow flycatcher subspecies (Phillips 1948, Browning 1993). It is a neotropical migrant that breeds in the southwestern U.S. and migrates to Mexico, Central America, and possibly northern South America during the non-breeding season (Phillips 1948, Peterson 1990, Howell and Webb 1995). The historical breeding range of the southwestern willow flycatcher included southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Utah, extreme southern Nevada, and extreme northwestern Mexico (Sonora and Baja)(Unitt 1987).

Listing and critical habitat

The southwestern willow flycatcher was listed as endangered, without critical habitat, in 1995 (USFWS 1995). Critical habitat was later designated in 1997 (USFWS 1997a). A correction notice was published in the Federal Register in 1997 to clarify the lateral extent of the designation (USFWS 1997b).

In 2001, the 10th circuit court of appeals set aside designated critical habitat in those states under the 10th circuit's jurisdiction (New Mexico). The Fish and Wildlife Service decided to set aside critical habitat designated for the southwestern willow flycatcher in all other states (California and Arizona) until it could re-assess the economic analysis.

In 2005, the Fish and Wildlife Service re-designated critical habitat for the southwestern willow flycatcher (USFWS 2005). A total of 737 river miles across southern California, Arizona, New Mexico, southern Nevada, and southern Utah were included in the final designation. The lateral extent of critical habitat includes areas within the 100-year floodplain.

A final recovery plan for the southwestern willow flycatcher was signed in 2002 (USFWS 2002a). The Plan describes the reasons for endangerment and current status of the flycatcher, addresses recovery actions, includes detailed papers on management issues, and provides recovery goals. Recovery is based on reaching numerical and habitat-related goals for each specific Management Unit established throughout the subspecies range and establishing long-term conservation plans (USFWS 2002a).

Reasons for endangerment

Reasons for decline have been attributed primarily to loss, modification, and fragmentation of riparian breeding habitat, along with a host of other factors including loss of wintering habitat and brood parasitism by the brown-headed cowbird (Sogge et al. 1997, McCarthey et al. 1998). Habitat loss and degradation are caused by a variety of factors, including urban, recreational, and agricultural development, water diversion and groundwater pumping, channelization, dams, and livestock grazing. Fire is an increasing threat to willow flycatcher habitat (Paxton et al. 1996), especially in monotypic saltcedar vegetation (DeLoach 1991) and where water diversions and groundwater pumping desiccates riparian vegetation (Sogge et al. 1997). Willow flycatcher nests are parasitized by brown-headed cowbirds (*Molothrus ater*), which lay their eggs in the

host's nest. Feeding sites for cowbirds are enhanced by the presence of livestock and range projects such as waters and corrals; agriculture; urban areas; golf courses; bird feeders; and trash areas. When these feeding areas are in or near flycatcher breeding habitat, especially coupled with habitat fragmentation, cowbird parasitism of flycatcher nests may increase (Hanna 1928, Mayfield 1977, Tibbitts et al. 1994).

Habitat

The southwestern willow flycatcher breeds in dense riparian habitats from sea level to about 8500'. Historical egg and nest collections and species' descriptions throughout its range describe the southwestern willow flycatcher's widespread use of willow (*Salix* spp.) for nesting (Phillips 1948, Phillips et al. 1964, Unitt 1987, San Diego Natural History Museum 1995). Currently, southwestern willow flycatchers primarily use Geyer willow (*S. geyeriana*), coyote willow (*S. exigua*), Goodding willow (*S. gooddingii*), boxelder (*Acer negundo*), tamarisk (*Tamarix* sp.), Russian olive (*Elaeagnus angustifolio*), and live oak (*Quercus agrifolia*) for nesting. Other plant species less commonly used for nesting include buttonbush (*Cephalanthus* sp.), black twinberry (*Lonicera involucrata*), cottonwood (*Populus* spp.), white alder (*Alnus rhombifolia*), blackberry (*Rubus ursinus*), and stinging nettle (*Urtica* spp.). 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: monotypic willow, monotypic exotic, native broadleaf-dominated, and mixed native/exotic (Sogge et al. 1997).

Tamarisk is an important component of the flycatchers's nesting and foraging habitat in Arizona and other parts of the bird's range. In 2001 in Arizona, 323 of the 404 (80 percent) known flycatcher nests (in 346 territories) were built in a tamarisk tree (Smith et al. 2002). Tamarisk had been believed by some to be a habitat type of lesser quality for the southwestern willow flycatcher, however comparisons of reproductive performance (USFWS 2002a), prey populations (Durst 2004), and physiological conditions (Owen and Sogge 2002) of flycatchers breeding in native and exotic vegetation has revealed no difference.

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 are in standing water (Maynard 1995, Sferra et al. 1997). Hydrological conditions at a particular site can vary remarkably in the arid Southwest within a season and among 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 floods (Spencer et al. 1996).

The flycatcher's habitat is dynamic and can change rapidly: nesting habitat can grow out of suitability; saltcedar habitat can develop from seeds to suitability in five years; heavy runoff can remove or reduce habitat suitability in a day; or river channels, floodplain width, location, and vegetation density may change over time. For example, over-mature or young habitat not suitable for nest placement can be occupied and used for foraging and shelter by migrating, breeding, dispersing, or non-territorial flycatchers (Cardinal and Paxton 2005, McLeod et al. 2005). That same habitat may subsequently grow or cycle into habitat used for nest placement.

Because of those changes, flycatcher "nesting habitat" is often described as occupied, suitable, or potential (USFWS 2002a). Areas other than those where nests are located (foraging, sheltering, territory defense, singing, etc.) can also be "occupied flycatcher habitat," and as a result, essential to the survival and recovery of the flycatcher (USFWS 2002a). The development of flycatcher habitat is a dynamic process involving maintenance, recycling, and regeneration of habitat. Flycatcher habitat can quickly change and vary in suitability, location, use, and occupancy over time (Finch and Stoleson 2000).

Breeding Biology

Throughout its range the southwestern willow flycatcher arrives on breeding grounds in late April and May (Sogge and Tibbitts 1992, Sogge and Tibbitts 1994, Sferra et al. 1997). Nesting begins in late May and early June and young fledge from late June through mid-August (Willard 1912, Ligon 1961, Brown 1988, Sogge and Tibbitts 1992, Muiznieks et al. 1994). Southwestern willow flycatchers typically lay three to four eggs per clutch (range 1-5). Eggs are laid at one-day intervals and are incubated by the female for about 12 days (Bent 1960, Walkinshaw 1966, McCabe 1991). Young fledge about 12 to 13 days after hatching (King 1955, Harrison 1979). Typically one brood is raised per year, but birds have been documented raising two broods during one season and renesting after a failure (Whitfield 1990, Sogge et al. 1993, Whitfield and Strong 1995). The entire breeding cycle, from egg laying to fledging, is about 28 days.

Territory and home range size

Southwestern willow flycatcher territory size likely fluctuates with population density, habitat quality, and nesting stage. Territories are established within a larger patch of appropriate habitat sufficient to contain several nesting pairs of flycatchers. Cardinal and Paxton (2005) found that the home ranges of telemetered flycatchers at Roosevelt Lake, Arizona, varied from 0.37 to 890 acres. Birds were found using a variety of riparian habitat in a variety of conditions (open, young mature, exotic, mixed, etc.) and the distances moved indicate that birds can occupy a larger area and use more types of habitat than previously believed (Cardinal and Paxton 2005).

Movements

The site and patch fidelity, dispersal, and movement behavior of adult, nestling, breeding, non-breeding, and migratory southwestern willow flycatchers are just beginning to be understood (Kenwood and Paxton 2001, Koronkiewicz and Sogge 2001). Most southwestern willow flycatchers return to former breeding sites, although flycatchers can regularly move among sites within and between years (Kenwood and Paxton 2001). Within-drainage movements are more common than between-drainage movements (Kenwood and Paxton 2001). Year-to-year movements of birds have been detected between the San Pedro/Gila river confluence and Roosevelt Lake, the Verde River near Camp Verde and Roosevelt Lake, and the Little Colorado River near Greer and Roosevelt Lake (Kenwood and Paxton 2001). Typical distances moved range from 1.2 to 18 miles. However, long-distance movements of up to 137 miles have been observed on the lower Colorado River and Virgin River (McKernan and Braden 2001). Breeding groups of southwestern willow flycatchers act as a meta-population (Busch et al. 2000).

Rangewide distribution and abundance

Unitt (1987) documented the loss of more than 70 southwestern willow flycatcher breeding locations rangewide estimating the rangewide population at 500 to 1000 pairs. Since 1993, a total of 122 sites once known to have breeding flycatchers are no longer occupied by nesting birds. There are currently 265 known southwestern willow flycatcher breeding sites in the United States (all sites from 1993 to 2004 where a resident flycatcher has been detected) holding an estimated 1,256 territories (Durst et al. 2005). Numbers have increased since the bird was listed and some habitat remains unsurveyed; however, after nearly a decade of intense surveys, the existing known numbers are just past the upper end of Unitt's 1987 estimate. About 40 percent of the 1,256 territories (Table 1) currently estimated throughout the subspecies' range is in three locations (Cliff/Gila Valley, Roosevelt Lake, San Pedro/Gila confluence).

Rangewide, the population is comprised mostly of extremely small, widely-separated breeding groups including unmated individuals. However, across the bird's range, 3 percent of all sites support greater than 50 territories (Durst et al. 2005).

The distribution of breeding groups is highly fragmented, often separated by considerable distance. In Arizona, about a 55-mile straight-line distance exists between breeding flycatchers at Roosevelt Lake and the next closest territories on the San Pedro River or Verde River. Long distances between breeding groups and small size of those populations reduces meta-population stability and increases the risks of local extirpation due to stochastic events, predation, cowbird parasitism, and other factors (USFWS 2002a). Conversely, having about 40 percent of the entire subspecies at three locations can also create instability should catastrophic events occur that would remove or significantly reduce habitat suitability at those places. The survival and recovery of the flycatcher is not dependent on having a few locations with large numbers of birds, but rather properly distributed populations throughout the subspecies' range placed close together (USFWS 2002a).

Arizona distribution and abundance

Unitt (1987) concluded that "...probably the steepest decline in the population level of *E. t. extimus* has occurred in Arizona..." Historical records for Arizona indicate that 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.

In 2004, 522 territories were known from 40 sites along 12 drainages in Arizona (Munzer et al. 2005). The lowest elevation where territorial pairs were detected was 98' along the Lower Colorado River; the highest elevation was in eastern Arizona in the White Mountains (8329').

Table 1. Rangewide population status for the southwestern willow flycatcher based on 1993 to 2004 survey data for Arizona, California, Colorado, New Mexico, Nevada, Utah, and Texas (Durst et al. 2005).

State	Number of sites with WIFL territories 1993-04[1]	Percentage of sites with WIFL territories 1993-04	Number of territories[2]	Percentage of total territories
Arizona	112	42.3 %	544	43.3 %
California	91	34.3 %	200	15.9 %
Colorado	5	3.8 %	65	5.2 %
Nevada	13	4.9 %	68	5.4 %
New Mexico	36	13.6 %	372	29.6 %
Utah	3	1.1 %	7	0.6%
Texas	?	?	?	?
Total	265	100 %	1256	100 %

[1] Site boundaries are not defined uniformly throughout the bird's range.
[2] Total territory numbers recorded are based upon the most recent years survey information from that site between 1993 and 2004.

As reported by Munzer et al. (2005), the largest concentrations of breeding willow flycatchers in Arizona in 2004 were at the Salt River and Tonto Creek inflows to Roosevelt Lake (374 flycatchers, 209 territories); near the San Pedro/Gila river confluence (352 flycatchers, 186 territories); Gila River, Safford area (6 flycatchers, 3 territories); Alamo Lake on the Bill Williams River (includes lower Santa Maria and Big Sandy river sites) (51 flycatchers, 31 territories); Topock Marsh on the Lower Colorado River (57 flycatchers, 34 territories); Big Sandy River, Wikieup (54 flycatchers, 28 territories); Horseshoe Lake, Verde River (28 flycatchers, 19 territories), and Alpine/Greer on the San Francisco River/Little Colorado River (7 flycatchers, 4 territories). Combined, Roosevelt Lake and the San Pedro/Gila confluence make up 395 (76%) of the 522 territories known in the state.

While numbers have significantly increased in Arizona, overall distribution of flycatchers throughout the state has changed little. Note that 85 percent of the growth in Arizona since listing has occurred at two locations. Recovery and survival of the flycatcher depends not only on numbers of birds, but territories and sites that are well distributed (USFWS 2002a). Currently, population stability in Arizona is believed to be largely dependent on the presence of two large populations (Roosevelt Lake and San Pedro/Gila River confluence). Therefore, the result of catastrophic events or losses of significant populations either in size or location could greatly change the status and survival of the bird. Conversely, expansion into new habitats or discovery of other populations would improve the known stability and status of the flycatcher.

Fire

The evidence suggests that fire was not a primary disturbance factor in southwestern riparian areas near larger streams (USFWS 2002a). Yet, in recent time, fire size and frequency has increased on the lower Colorado, Gila, Bill Williams, and Rio Grande rivers. The increase has been attributed to increasing dry, fine fuels and ignition sources. The spread of highly flammable tamarisk and drying of river areas due to river-flow regulation, water diversion, lowering of groundwater tables, and other land practices is largely responsible for these fuels. A catastrophic fire in June of 1996, destroyed about a half mile of occupied tamarisk flycatcher habitat on the San Pedro River. That fire resulted in the forced dispersal or loss of up to eight pairs of flycatchers (Paxton et al. 1996). Smaller fires have occurred along the upper most portion of the San Pedro River closer to the Mexico Border and another large fire occurred on the lower San Pedro River at the Nature Conservancy's San Pedro Preserve between Winkelman and Dudleyville in 2004. Recreationists cause over 95 percent of the fires on the lower Colorado River (USFWS 2002a). In California, Brothers (1984) attributed increased fire along the Owens River to more use of the riparian zones by campers and fishermen in the previous 30 years.

Mortality and Survivorship

There are no extensive records for the actual causes of adult southwestern willow flycatcher mortality. Incidents associated with nest failures, human disturbance, and nestlings are typically the most often recorded due to the static location of nestlings, eggs, and nests. As a result, nestling predation and brood parasitism are the most commonly recorded causes of southwestern willow flycatcher mortality. Band returns at Roosevelt Lake determined that the average adult return rate from 1998 to 2004 was 60 percent with survivorship estimated at 65 percent (Newell et al. 2005). From 1998 to 2004, the average nestling return rate was 28 percent and survivorship estimated at 35 percent (Newell et al. 2005).

Reproductive success

Intensive nest monitoring efforts in California, Arizona, and New Mexico have shown that cowbird parasitism and predation can result in the following: failure of the nest; reduced fecundity in subsequent nesting attempts; delayed fledging; and reduced survivorship of late-fledged young. Cowbirds have been documented at more than 90 percent of sites surveyed (Sogge and Tibbitts 1992, Camp Pendleton 1994, Sogge and Tibbitts 1994, Holmgren and Collins 1995, Maynard 1995, San Diego Natural History Museum 1995, Sogge 1995b, Skaggs 1996, Whitfield and Enos 1996, Tomlinson 1997, McCarthey et al.1998). The probability of a southwestern willow flycatcher successfully fledging its own young from a cowbird parasitized nest is low (i.e. <5%). Also, nest loss due to predation appears consistent from year to year and across sites, generally in the range of 30 to 50 percent.

Past Consultations

Since listing in 1995, at least 146 Federal agency actions have undergone formal section 7 consultation throughout the flycatcher's range to 2005 (Appendix). Many activities continue to adversely affect the distribution and extent of all stages of flycatcher habitat throughout its range (development, urbanization, improper grazing, recreation, native and non-native habitat removal,

dam operations, river crossings, ground and surface water extraction, etc.). Stochastic events also continue to change the distribution, quality, and extent of flycatcher habitat.

Anticipated, actual, or temporary loss of flycatcher habitat due to Federal actions (i.e. modification of Roosevelt Dam, operation of Lower Colorado River dams, etc.) has resulted in biological opinions and Habitat Conservation Plans that led to acquisition, development, and protection of property specifically for the southwestern willow flycatcher to remove jeopardy, and mitigate, reduce, or minimize take or adverse effects. A small portion of the lower San Pedro River was acquired by the Bureau of Reclamation as a result of raising Roosevelt Dam and is now under the management of The Nature Conservancy. Commitments to acquire and manage unprotected habitat specifically for breeding flycatchers have been made for loss of flycatcher habitat along the Lower Colorado River (Operations of Colorado River dams and 4.4 Plan/Change in Points of Diversion, Lower Colorado River MSCP), Tonto Creek and Salt River (raising of Roosevelt Dam, operation of Roosevelt Dam) in Arizona, and Lake Isabella, California (operation of dams). The Roosevelt Lake HCP completed by Salt River Project (SRP) has resulted in acquisition of over 1000 acres along the Verde, San Pedro, and Gila rivers. The Army Corps of Engineers has acquired approximately 1000 acres along the South Fork Kern River as a result of operations of Isabella Dam. Various Regional HCPs have been developed in southern California that have protected southwestern willow flycatcher habitat.

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 project area is where the proposed actions will occur. The action area is that area in which effects of the action will occur. In this case, the action area includes the footprint of the actions in and next to the San Pedro floodplain, and an area 0.25 mile downstream of the low-water crossing where project-related sedimentation may occur. The land in the immediate area is part of the Bureau of Land Management's San Pedro Riparian National Conservation Area (SPRNCA). Private land is outside of the conservation area, and Mexico is immediately south of the project area.

There are several threats to the area, the largest of which is groundwater pumping. Decreasing stream flow and, in certain areas, decreasing ground water tables have been recorded downstream of the project area (USFWS 2002b). Stream flow at the Palominas stream gauge has also declined. Stream flow is likely to continue declining with increasing development in the area and growth in Mexico. Actions are occurring in the area to reduce the threat of losing perennial flow in the San Pedro River, such as the programs of the Upper San Pedro Partnership (USPP 2005) and the acquisition of Rancho Los Fresnos by The Nature Conservancy.

The pumping of groundwater affects the quality of riparian and aquatic habitat in the project area. This activity can result in lower stream flows or complete drying of the stream course for all or part of the year. The result is reduced survival of cottonwood and willow, species requiring water available to their root zones throughout the year. Salt cedar may gain a competitive advantage and dominate the plant community if future trends continue.

The San Pedro River is a meandering desert river with stretches of perennial and intermittent flows. Dry-season flows during May and June may be as low as 1 cubic foot per second (cfs.). Floods occur in winter and during the summer "monsoon" season. These floods are often sudden and with flows as high as 20,000 cfs.

With the arrival of Europeans, major alterations began in the Gila River Basin. As a result of these changes, the riverine communities of the Gila Basin became fragmented, and connectivity was substantially reduced. Populations of fish or other aquatic species eradicated by perturbation were not replaced by colonization. Habitat fragmentation contributes to the genetic isolation of populations. Population fragmentation can reduce genetic variation and viability. This, in turn, can increase the risk of extinction by reducing survival, reproduction, and dispersal. Isolation also precludes re-colonization should one or more populations be eliminated. When an inhospitable environment that imposes a high degree of threat on the remnant habitat surrounds isolated populations, these risks are compounded.

Overgrazing, mining, hay harvesting, timber harvest, fire suppression, and other activities in the nineteenth century led to widespread erosion and channel entrenchment in southeastern Arizona streams and cienegas when above-average precipitation and flooding occurred in the late 1800s and early 1900s (Bryan 1925, Martin 1975, Hastings and Turner 1980, Dobyns 1981, Hendrickson and Minckley 1984, Sheridan 1986, Bahre 1991, Webb and Betancourt 1992, Hereford 1993). A major earthquake near Batepito, Sonora, approximately 40 miles south of the upper San Pedro Valley, resulted in land fissures, changes in groundwater elevation and spring flow, and may have preconditioned the San Pedro River channel for rapid flood-induced entrenchment (Hereford 1993, Geraghty and Miller, Inc. 1995). These events contributed to long-term or permanent degradation and loss of cienega and riparian habitat on the San Pedro River and throughout southern Arizona and northern Mexico.

The SPRNCA has been rested from authorized livestock grazing. No gravel extraction or vehicle use has been allowed in the riparian zone. Grazing and pasture development near riparian areas can increase habitat for cowbirds thereby increasing the incidence of cowbird parasitism on flycatchers. Urban and rural subdivision of private lands also provides food sources and habitat for cowbirds. Since cowbirds are capable of flying six miles or more in search of parasitism opportunities, these activities can combine to depress willow flycatcher nesting despite beneficial management measures within the SPRNCA.

The use of the area by cross-border violators and the ensuing law enforcement actions have, and continue to, impact the San Pedro Valley and the SPRNCA. The San Pedro River is a highly traveled corridor that continues to be negatively affected by cross-border violators. Cross-border violators leave trash and human waste, start fires, cut fences, and create trails. Law-enforcement activity creates additional traffic on area roads and trails.

Several formal and informal consultations have been completed on various actions on the SPRNCA. Actions associated with border law enforcement are occurring in the area, as the upper San Pedro valley is a corridor heavily used by cross-border violators.

Status of the species within the action area

Southwestern willow flycatchers have been recorded in the SPRNCA during migration, though no known detections have occurred near the project site. There are a few records of nesting birds on the SPRNCA, but not near the project site (near Hereford).

Willow flycatchers (subspecies unknown) were documented as migrating individuals during the spring in the San Pedro Avian Inventory in the SPRNCA (Krueper and Corman 1988). Close to 100 nests of the endangered southwestern sub-species have been documented on the lower San Pedro River approximately 40 miles downstream of the project site in recent years (FWS files). This area is outside of the action area.

Dave Krueper (BLM) documented one active southwestern willow flycatcher nest on the SPRNCA in 1997. However, this nest was parasitized by cowbirds and abandoned. Engineering and Environmental Consultants (EEC) conducted comprehensive surveys for the species on the SPRNCA. No southwestern willow flycatchers were detected along the SPRNCA during 2001 and 2002 surveys (EEC 2002a, 2002b). However, Jack Whetstone (BLM) made an incidental sighting while conducting weekly Monitoring Avian Productivity and Survivorship (MAPS) at the Banding Station near Kingfisher Pond in August 2000 and 2001 (Whetstone, pers. comm., 2000, 2001). The EEC surveys detected three southwestern willow flycatchers in 2003, including one south of State Route 92. These birds were probably migrants (EEC 2003). Two probable migrants were also detected in 2003, near State Route 90 (EEC 2003).

EFFECTS OF THE PROPOSED ACTION

“Effects of the action” refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action (50 CFR 402.02). "Interrelated actions” are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration (50 CFR 402.02).

The effects of the action on the southwestern willow flycatcher may occur through vegetation removal or noise disturbance. If construction water is brought from outside the Sierra Vista subwatershed, there will be no effects to flow in the San Pedro River.
Vegetation removal will be both temporary and permanent. Temporary loss of riparian trees may occur along the east bank during slope stabilization and during placement of the temporary vehicle barriers. The conservation measures provide for replanting of cottonwoods (*Populus fremontii*) and willows that are lost to these activities. Riparian tree loss at the turnaround will be long-term, as any trees that grow there will be removed or trimmed. Three large trees and numerous saplings will be removed at the turnaround (0.1 ac).

Effects from the temporary vegetation loss will be transitory to the habitat and to migrating flycatchers because the vegetation will eventually be replaced. Impacts from the permanent loss

of vegetation at the turnaround site will be minimal because the area is small, especially when compared to the amount of vegetation in the surrounding area.

Noise from construction, maintenance, and use of the area may disturb migrating southwestern willow flycatchers and cause them to leave or avoid the immediate area. These effects should be minimal to flycatchers because the project area is small and surrounded by vegetation, and noise levels for use and maintenance of the road will be minimal. Noise during construction will be greater, but is expected to last less than four months. In addition, construction will not occur every day during that time.

If the proposed action is successful in reducing the volume of cross-border violators in the San Pedro riparian corridor, the effects to the southwestern willow flycatcher will be mostly positive in the long term. A reduction of illegal use of the riparian corridor will reduce trash, trampling, and fires and the impacts they have on the riparian corridor. Better access for OBP and the proposed infrastructure may eventually reduce OBP use of the riparian corridor. However, in the interim, the effects described above may occur.

Cumulative Effects

Cumulative effects are those impacts of future non-Federal (State, local government, and private) actions that are reasonably certain to occur in the project area. Future Federal actions will be subject to the consultation and conferencing requirements established in section 7 of the Act and, therefore, are not considered cumulative to the proposed project.

Because the action area is Federal land, most activities that could affect the flycatcher will be Federal actions subject to section 7. The primary cumulative effects in the action area are due to passage of cross-border violators and water use. These affects are discussed above

CONCLUSION

After reviewing the current status of the southwestern willow flycatcher, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of the southwestern willow flycatcher. Critical habitat has been designated, but is outside the action area and will thus not be affected by the proposed action. Our rationale for this conclusion is summarized here.

1) Most of the impacts from the project will be transitory.

2) Both the short- and long-term effects have a small footprint.

3) Migrating southwestern willow flycatchers should still be able to move through the area.

4) If better control of the border is achieved by OBP, impacts from cross-border violators and law enforcement activities should be less than they are now.

5) Use of the area by migrating southwestern willow flycatchers is probably low.

7) The proposed conservation measures will minimize effects to the species and its habitat.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations 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 defined (50 CFR 17.3) 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 (50 CFR 17.3) 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.

We do not anticipate the proposed action will incidentally take any southwestern willow flycatchers

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. We recommend you implement the following conservation recommendations for the southwestern willow flycatcher.

1) Assist us in implementing the southwestern willow flycatcher recovery plan.

2) Attempt to keep infrastructure and enforcement personnel as close to the border as possible, so cross-border violators are deterred from entering the U.S., or caught shortly thereafter. This minimizes impacts to listed species and the ecosystems on which they depend.

3) Provide protected lands/environmental awareness training to all agents. We will assist with training.

4) Pursue funding and implement conservation measures necessary to offset effects of OBP actions on listed species and their habitats.

REINITIATION NOTICE

This concludes formal consultation for the proposed San Pedro River crossing at the SPRNCA. 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.

We appreciate your efforts to conserve and recover the southwestern willow flycatcher and other listed species in your jurisdiction. For further information please contact Doug Duncan (520) 670-6150 (x236) or Sherry Barrett (520) 670-6150 (x223). Please refer to consultation number, 22410-2006-F-0511, in future correspondence concerning this project.

Sincerely,

/s/ Steven L. Spangle
Field Supervisor

cc: Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ
Branch Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ

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REFERENCES CITED

Bahre, C. J. 1991. A legacy of change: Historic human impact on vegetation of the Arizona borderlands. University of Arizona Press, Tucson. 231pp.

Bent, A. C. 1960. Life histories of North American flycatchers, larks, swallows and their allies. Dover Press, New York, New York. 555pp.

Brittingham, M. C., and S. A. Temple. 1983. Have cowbirds caused forest songbirds to decline? BioScience 33:31-35.

Brothers, T. S. 1984. Historical vegetation change in the Owens River riparian woodland, pages 74-84 *in* R.E. Warner and K.M. Hendrix (eds.), California riparian systems: Ecology, conservation, and productive management. UC Press, Berkeley, CA.

Brown, B. T. 1988. Breeding Ecology of a Willow Flycatcher Population in Grand Canyon, Arizona. Western Birds 19:25-33.

Browning, M. R. 1993. Comments on the taxonomy of *Empidonax traillii* (willow flycatcher). Western Birds 24:241-257.

Bryan, K. 1925. Date of channel trenching (arroyo cutting) in the arid southwest. Science 62:338-344.

Busch, J. D., M. P. Miller, E. H. Paxton, M. K. Sogge, and P. Keim. 2000. Genetic variation in the endangered southwestern willow flycatcher. The Auk: 117 (3): 586-595.

Camp Pendleton Marine Corps Base. 1994. Biological assessment: Riparian and estuarine habitat.

Cardinal S. N., and E. H. Paxton. 2005. Home range, movement, and habitat use of the southwestern willow flycatcher at Roosevelt Lake, AZ – 2004. U.S. Geological Survey report to the U.S. Bureau of Reclamation, Phoenix, AZ.

DeLoach, C. J. 1991. Saltcedar, an exotic weed of western North American riparian areas: a review of its taxonomy, biology, harmful and beneficial values, and its potential for biological control. Report to the Bureau of Reclamation, Boulder City, NV, Contract No. 7-AG-30-04930.

Dobyns, H. F. 1981. From fire to flood: historic human destruction of Sonoran Desert riverine oases. Ballena Press, Socorro, New Mexico. 222pp.

Drost, C. A., M. K. Sogge, and E. Paxton. 1998. Preliminary Diet Study of the Endangered Southwestern Willow Flycatcher. Report to U.S. Bureau of Reclamation, USGS Biological Resources Division/Colorado Plateau Res. Station/N. Ariz. University. 26pp.

Durst, S. L. 2004. Southwestern willow flycatcher potential prey base and diet in native and exotic habitat. Masters Thesis. Northern Arizona University, Flagstaff, AZ.

_____, M. K. Sogge, A. B. Smith, S. O. Williams, B. E. Kus, and S. J. Sferra. 2005. Southwestern willow flycatcher breeding site and territory summary – 2003. U.S. Geological Survey, Colorado Plateau Research Station, Flagstaff, AZ.

Engineering and Environmental Consultants, Inc. 2002a. Southwestern willow flycatcher. 2001 surveys of the San Pedro National Conservation Area. Prepared for US Army Garrison, Ft. Huachuca. 13pp.

_____. 2002b. Southwestern willow flycatcher survey and yellow billed cuckoo detections on the San Pedro Riparian National Conservation Area Report. Prepared for US Army Garrison, Ft. Huachuca. 20pp.

_____. 2003. Year 2003 southwestern willow flycatcher (*Empidonax traillii extimus*) survey and yellow-billed cuckoo (*Coccyzus americanus*) detections on the San Pedro Riparian National Conservation Area and the Babocomari Cienega. Prepared for Directorate of Installation Support, US Army Garrison, Ft. Huachuca. 20pp.

Esler, D. 2000. Applying metapopulation theory to conservation of migratory birds. Conservation Biology 14(2).

Finch, D. M., and S. H. Stoleson, eds. 2000. Status, ecology, and conservation of the southwestern willow flycatcher. Gen. Tech. Rep. RMRS-GTR-60, USDA Forest Service, Rocky Mountain Research Station, Ogden, Utah. 131pp.

Fleischner, T. L. 1994. Ecological cost of livestock grazing in western North America. Cons. Biology 8(3):629-644.

Furniss, M. J., T. D. Roelofs, and C. S. Yee. 1991. Road construction and maintenance. American Fisheries Society, Publication 19, Bethesda, Maryland.

Geraghty and Miller, Inc. 1995. Historical flows and conditions in the San Pedro River. Report to the Water Action Task Force, Sierra Vista Economic Development Foundation, Project No. AZ0473.001. 33pp +figures.

Gifford, G. F., and R. H. Hawkins. 1976. Hydrologic impacts of grazing on infiltration: a critical review. Water Resources Research 14(2):305-313.

Griffith, J. T., and J. C. Griffith. 1995. Brown-headed cowbird trapping and least Bell's vireo recovery on Marine Corps base camp Pendleton, 1983-1993. Abstracts of the North American Research Workshop on the Ecology and Management of Cowbirds. The Nature Conservancy of Texas, Austin. 88pp.

_____, and _____. 1996. Brown-headed cowbird trapping and the endangered least Bell's vireo: a management success story. 33pp.

Hadley, D., P. Warshall, and D. Bufkin. 1991. Environmental change in Aravaipa, 1870-1970: an ethnoecological survey. Cultural Resource Series Monograph No.7, US Dept. of Interior, Bureau of Land Management, Phoenix.

Hanna, W. C. 1928. Notes on the dwarf cowbird in southern California. Condor 30:161-162.

Harrison, H. H. 1979. A field guide to western birds' nests of 520 species found breeding in the United States west of the Mississippi River. Houghton Mifflin Co., Boston. 279pp.

Hastings, J. R., and R. M. Turner. 1980. The changing mile. University of Arizona Press, Tucson. 327pp.

Hendrickson, D. A., and W. L. Minckley. 1984. Cienegas - vanishing climax communities of the American southwest. Desert Plants 6(3):131-175.

Hereford, R. 1993. Geomorphic evolution of the San Pedro River channel since 1900 in the San Pedro Riparian National Conservation Area, southeast Arizona. US Geological Survey, Open File Report 92-339. 71pp.

Holmgren, M. A. and P. W. Collins. 1995. Interim report on the distribution, breeding status, and habitat associations of seven federal special-status bird species and brown-headed cowbirds at Vandenberg Air Force Base, Santa Barbara County, California. Environmental Report No. 3, Museum of Systematics and Ecology, Department of Ecology, Evolution, and Marine Biology, University of California: Santa Barbara.

Howell, S. N. G., and S. Webb. 1995. A guide to the birds of Mexico and northern Central America. Oxford University Press, New York, New York. 851pp.

Humphrey, R. R. 1987. Ninety years and 535 miles. Vegetation changes along the Mexican border. University of New Mexico Press, Albuquerque.

Kenwood, K. E., and E. H. Paxton. 2001. Survivorship and movements of southwestern willow flycatchers at Roosevelt Lake, Arizona - 2001. US Geologic Survey report to the US Bureau of Reclamation, Phoenix.

King, J. R. 1955. Notes on the life history of Traill's flycatcher (*Empidonax traillii*) in southeastern Washington. The Auk 72:148-173.

Koronkiewicz, T. J,. and M. K. Sogge. 2001. Southwestern willow flycatchers recaptured at wintering sites in Costa Rica. North American Bird Bander 26:161-162.

Lamberson, R. H., B. R. Noon, and M. L. Farnsworth. 2000. An incidence function analysis of the viability of the southwestern willow flycatcher. Report to the Bureau of Reclamation, Colorado State University. Phoenix, AZ.

Ligon, J. S. 1961. New Mexico Birds and where to find them. The University of New Mexico Press, Albuquerque, New Mexico. 360pp.

Luff, J., E. H. Paxton, K. Kenwood, and M. K. Sogge. 2000. Survivorship and movements of southwestern willow flycatchers in Arizona. USGS Biological Resources Division, Colorado Plateau Research Station/Northern Arizona University, Flagstaff, AZ.

Mayfield, H. F. 1977. Brown-headed cowbird: agent of extermination? American Birds 31:107-113.

Maynard, W. R. 1995. Summary of 1994 survey efforts in New Mexico for southwestern willow flycatcher (*Empidonax traillii extimus*). Contract # 94-516-69, New Mexico Department of Game and Fish, Sante Fe, New Mexico. 48pp.

McCabe, R. A. 1991. The little green bird: ecology of the willow flycatcher. Palmer Publications, Inc., Amherst, Wisconsin. 171pp.

McCarthey T. D., C. E. Paradzick, J. W. Rourke, M. W. Sumner, and R. F. Davidson. 1998. Arizona Partners In Flight southwestern willow flycatcher survey: 1997 survey and nest monitoring report. Tech. Report, Nongame Branch, Ariz. Game & Fish Dept., Phoenix.

McKernan R. L., and G. Braden. 2001. Status, distribution, and habitat affinities of the southwestern willow flycatcher along the lower Colorado River: year 5 -2000. Report submitted to the U.S. Bureau of Reclamation, Boulder City, Nevada.

McLeod, M. A., T. J. Koronkiewicz, B. T. Brown, and S. W. Carothers. 2005. Southwestern willow flycatcher surveys, demography, and ecology along the lower Colorado River and tributaries. Annual report submitted U.S. Bureau of Reclamation, Boulder City, Nevada, by SWCA Environmental Consultants, Flagstaff, AZ.

Minckley, W. L. 1981. Ecological studies of Aravaipa Creek, Central Arizona, relative to past, present and future uses. Final contract report for US Department of the Interior, Bureau of Land Management, YA-512-CT6-98, Dept. of Zool.., Ariz. State Univ., Tempe.

___. 1987. Fishes and aquatic habitats of the upper San Pedro River system, Arizona and Sonora. Final Rep. for USDI BLM, Denver Fed. Center, Denver. 81pp.

___, and J. E. Deacon. 1991. Battle against extinction: native fish management in the American West. University of Arizona Press, Tucson.

Muiznieks, B. D., S. J. Sferra, T. E. Corman, M. K. Sogge, and T. J. Tibbitts. 1994. Arizona Partners In Flight southwestern willow flycatcher survey, 1993. Draft report: Nongame and Endangered Wildlife Program, Arizona Game and Fish Department, Phoenix, Arizona. Draft of April 1994. 28pp.

Munzer, O. M, H. C. English, A. P. Smith, A. A. Tudor. 2005. Southwestern willow flycatcher 2004 survey and nest monitoring report. Technical Report 244, Nongame and Endangered Wildlife Program, Arizona Game and Fish Department, Phoenix.

Nelson, R. L., M. L. McHenry and W. S. Platts. 1991. Mining. American Fisheries Society, Publication 19, Bethesda, Maryland.

Newell, P. J., C. Causey, M. Pollock, E. H. Paxton, and M. K. Sogge. 2005. Survivorship and movements of southwestern willow flycatchers at Roosevelt Lake, Arizona – 2004. US Geological Survey report to U.S. Bureau of Reclamation, Phoenix.

Owen, J. C., and M. K. Sogge. 2002. Physiological condition of southwestern willow flycatchers in native and saltcedar habitats. US Geological Survey report to the Arizona Department of Transportation.

Paradzick, C. E., R. F. Davidson, J. W. Rourke, M. W. Sumner, A. D. Wartell, T. D. McCarthey. 2000. Southwestern willow flycatcher 1999 survey and nest monitoring report. Tech. Rept. 151, Nongame & Endangered Wildl. Progr., Arizona Game & Fish Dept., Phoenix.

Paxton, E., J. Owen, and M. K. Sogge. 1996. Southwestern willow flycatcher response to catastrophic habitat loss. U.S. Geological Survey Biological Resources Division, Colorado Plateau Research Station, Northern Arizona University, Flagstaff. 12pp.

_____, S. M. Langridge, and M. K. Sogge. 1997. Banding and Population Genetics of Southwestern willow flycatchers in Arizona-1997 Summary Report. U.S. Geological Survey Biological Resources Division, Colorado Plateau Research Station, Northern Arizona University, Flagstaff. 63pp.

Peterson, R. T. 1990. A field guide to western birds. Houghton Mifflin Co., Boston. 432pp.

Phillips, A. R. 1948. Geographic variation in *Empidonax traillii*. The Auk 65:507-514.

_____, J. Marshall, and G. Monson. 1964. The Birds of Arizona. University of Arizona Press, Tucson, Arizona. 212pp.

Rabini, C. F. 1992. Habitat evolution in a watershed context. American Fisheries Symp. 13.

Rea, A. M. 1983. Once a river: Bird life and habitat changes on the middle Gila. University of Arizona Press, Tucson.

San Diego Natural History Museum. 1995. *Empidonax traillii extimus* in California. The willow flycatcher workshop. 17 November 1995. 66pp.

Sferra, S. J., T. E. Corman, C. E. Paradzick, J. W. Rourke, J. A. Spencer, and M. W. Sumner. 1997. Arizona Partners in Flight southwestern willow flycatcher survey: 1993-1996 summary report. Technical Report 113, Arizona Game and Fish Department. 104pp.

Sheridan, T. E. 1986. Los Tucsonenses: the Mexican community in Tucson, 1854-1941. University of Arizona Press, Tucson. 327pp.

Skaggs, R. W. 1996. Population size, breeding biology, and habitat of willow flycatchers in the Cliff-Gila Valley, New Mexico. New Mexico Department of Game and Fish, Sante Fe, New Mexico. 38pp.

Skovlin, J. M. 1984. Impacts of grazing on wetlands and riparian habitat. Pages 1001-1103 *in* Developing Strategies for Rangeland Management, Westview Press.

Smith, A. B., C. E. Paradzick, A. A. Woodward, P. E. T. Dockens, and T. D. McCarthey. 2002. Southwestern willow flycatcher 2001 survey and nest monitoring report. Technical Report 191, Nongame and Endangered Wildlife Program, Arizona Game and Fish Department, Phoenix.

Sogge, M. K. 1995a. Southwestern willow flycatcher (*Empidonax traillii extimus*) monitoring at Tuzigoot National Monument. 1995 progress report to the Nat'l. Park Serv., Nat'l. Biol. Serv., Colorado Plateau Res. Stn./Northern Arizona University, Flagstaff, Arizona. 20pp.

_____. 1995b. Southwestern willow flycatcher surveys along the San Juan River, 1994 - 1995. Final report to Bureau of Land Management, San Juan Resource Area, Natl. Biol. Serv., Colorado Plateau Res. Stn./Northern Arizona University, Flagstaff, Arizona. 27pp.

_____. 1995c. Southwestern willow flycatchers in the Grand Canyon. Pages 89-91 *in* LaRoe, E. T., G. S. Farris, C. E. Puckett, P. D. Doran, and M. J. Mac, eds., Our Living Resources: a Report to the Nation on the Distribution, Abundance, and Health of U.S. Plants, Animals, and Ecosystems. USDI, National Biological Service, Washington, DC.

_____, R. M. Marshall, S. J. Sferra, and T. J. Tibbitts. 1997. A southwestern willow flycatcher survey protocol and breeding ecology summary. Tech. Rept. NRTR-97/12, National Park Service/Colorado Plateau Res. Station/N. Arizona University. 37pp.

_____, and T. J. Tibbitts. 1992. Southwestern willow flycatcher (*Empidonax traillii extimus*) surveys along the Colorado River in Grand Canyon National Park and Glen Canyon National Recreation Area. NPS CPSU/N. Arizona University, Flagstaff, Arizona. 43pp.

_____, and _____. 1994. Distribution and status of the southwestern willow flycatcher along the Colorado river in the Grand Canyon - 1994. Summary Report. Natl. Biol. Serv., Colorado Plateau Res. Stn./N. Arizona Univ., Flagstaff, Arizona. 37pp.

_____, _____, and S. J. Sferra. 1993. Status of the southwestern willow flycatcher along the Colorado River between Glen Canyon Dam and Lake Mead - 1993. Summary Report. Natl. Park Serv. Coop. Park Studies Unit/N. Ariz. University, U.S. Fish and Wildlife Service, and Arizona Game and Fish Department, Flagstaff, Arizona. 69pp.

Spencer, J. A., S. J. Sferra, T. E. Corman, J. W. Rourke, and M. W. Sumner. 1996. Arizona Partners In Flight 1995 southwestern willow flycatcher survey. Technical Report 97, Arizona Game and Fish Department, Phoenix. 69pp.

Taylor, F. R., L. Gillman, J. W. Pedretti, and J. E. Deacon. 1991. Impact of cattle on two endemic fish populations in the Pahranagat Valley, Nevada. Proc. Desert Fishes Council 21:81.

Tibbitts, T. J., M. K. Sogge, and S. J. Sferra. 1994. A survey protocol for the southwestern willow flycatcher (*Empidonax traillii extimus*). Tech Rep., NPS/NAUCPRS/NRTR-94/04, North. Ariz. Univ., Flagstaff. 24pp.

Tomlinson, C. 1997. Summary of surveys in 1997 for southwestern willow flycatchers in southern Nevada.

Unitt, P. 1987. *Empidonax traillii extimus*: An endangered subspecies. Western Birds 18:137-162.

U.S. Customs and Border Protection. 2003. Supplemental environmental assessment for infrastructure within U.S. Border Patrol Naco-Douglas corridor, Cochise County, Arizona. USCBP, Department of Homeland Security, Washington, DC.

_____. 2006. Draft biological assessment: proposed San Pedro River crossing, Office of Border Patrol, Tucson Sector, Naco Station, Cochise County, Arizona. USCBP, Department of Homeland Security, Washington, DC.

U.S. Fish and Wildlife Service. 1995. Final rule determining endangered status for the southwestern willow flycatcher. Federal Register 60:10694-10715.

_____. 1997a. Final determination of critical habitat for the southwestern willow flycatcher. Federal Register 62(140):39129-39146.

_____. 1997b. Correction; final determination of critical habitat for the southwestern willow flycatcher. Federal Register 62 (161):44228.

_____. 2002a. Southwestern Willow Flycatcher Recovery Plan, Region 2, Albuquerque, NM.

_____. 2002b. Biological opinion: Effects of proposed programs at Fort Huachuca, Cochise County, Arizona. Arizona Ecological Services Office, Phoenix. 263pp.

_____. 2005. Designation of critical habitat for the southwestern willow flycatcher: final rule. Federal Register 70 (201):60886.

USPP. 2005. 2005 water management and conservation plan. 27pp.

Walkinshaw, L.H. 1966. Summer biology of Traill's Flycatcher. *Wilson Bulletin* 78:31-46.

Webb, R. H., and J. L. Betancourt. 1992. Climatic variability and flood frequency of the Santa Cruz River, Pima County, Arizona. US Geological Survey, Water-supply Paper 2379.

Whitfield, M.J. 1990. Willow flycatcher reproductive response to brown-headed cowbird parasitism. Masters Thesis, California State University, Chico, California. 25pp.

_____. 1994. A brown-headed cowbird control program and monitoring for the southwestern willow flycatcher, South Fork Kern River, California, 1994. Prepared for the California Department of Fish and Game, Kern River Research Center, Weldon, CA. 12pp.

_____, and Enos, K.M. 1996. A Brown-headed Cowbird control program and monitoring for the Southwestern Willow Flycatcher, South Fork Kern River, California, 1996. Final report to the U.S. Army Corps of Engineers, Contract DACW05-96-P-0900. Weldon, California: Kern River Research Center; 1996. 16pp.

_____, and C. M. Strong. 1995. A brown-headed cowbird control program and monitoring for the southwestern willow flycatcher, South Fork Kern River, California. Calif. Dept. Fish and Game, Bird and Mammal Cons. Program Report 95-4, Sacramento, California. 17pp.

Willard, F. C. 1912. A week afield in southern Arizona. The Condor 14:53-63.

Woodward, H. D., and S. H. Stoleson. 2002. Brown-headed cowbird attacks southwestern willow flycatcher. The Southwestern Naturalist 47(4).

York, J. C., and W. A. Dick-Peddie. 1969. Vegetation changes in southern New Mexico during the past hundred years. Pages 157-166 *in* McGinnies, W. G., and B. J. Goldman, eds., Arid Lands in Perspective, University of Arizona Press, Tucson.

APPENDIX

Agency actions that have undergone formal section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide through 2005.

Action (County)	Year	Federal Agency[1]	Incidental Take Anticipated
Arizona			
Apache Maid Allotment	1995	USFS	None
Tuzigoot Bridge (Yavapai)	1995	NPS	Take of 1 WIFL each year the site is occupied
Windmill Allotment (Yavapai)	1995	USFS	Take of 1 WIFL nest annually for 2 years due to parasitism
Solomon Bridge (Graham)	1995	FHWA	Take of 2 territories
Tonto Creek Riparian Unit (Maricopa)	1995	USFS	Take unquantifiable. Take as a result of parasitism, disturbance, modification of nesting habitat, loss of nesting sites.
Eastern Roosevelt Lake Watershed Allotment (Maricopa)	1995	USFS	Take unquantifiable. Take as a result of parasitism, disturbance, modification of nesting habitat, loss of nesting sites.
Cienega Creek (Pima)	1996	BLM	Take of 1 WIFL nest annually by cowbird parasitism
Glen Canyon Spike Flow (Coconino)	1996	USBR	Take unquantifiable. Take of WIFL habitat, loss of riparian understory
Verde Valley Ranch Development	1996 *	Corps	Take of 2 flycatcher territories
Modified Roosevelt Dam (Gila, Maricopa)	1996 *	USBR	Take of 45 territories through habitat removal; take of 90 birds via reduced productivity/ survivorship.
Removal of unauthorized fill from Virgin River at Hidden Valley Hunting Preserve	1997	EPA	None

Agency actions that have undergone formal section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide through 2005.			
Lower Colorado River Operations and Maintenance - Lake Mead to Southerly International Border - AZ/CA/NV (Mohave, La Paz, Yuma)	1997 *	USBR	Take unquantifiable. Take as a result of riparian habitat loss and degradation, inundation, reduced productivity & survivorship, nest loss/abandonment, parasitism, recreation, fire, predation.
Blue River Road (Greenlee)	1997	USFS	Take unquantifiable. Take of WIFL habitat, feeding, sheltering, increased rates of mortality, starvation, predation.
Skeleton Ridge - Cedar Bench Allotments (Yavapai)	1997	USFS	Take unquantifiable. Take of WIFL habitat.
White Canyon Fire – Emergency Consultation (Pinal)	1997	BLM	Take of 4 WIFL pairs from harassment
U.S. Hwy 93 Wickenburg (Mohave,Yavapai)	1997	FHWA	Harassment of 6 birds in 3 territories and 1 bird killed/decade
Safford District Grazing Allotments (Greenlee, Graham, Pinal, Cochise & Pima)	1997	BLM	Take unquantifiable from parasitism, disturbance, modification of nesting habitat, loss of nesting sites.
Lower Gila Resource Plan Amend. (Maricopa, Yavapai, Pima, Pinal, La Paz, Yuma)	1997	BLM	Take unquantifiable. Take of WIFL habitat through loss of cottonwood and willow seedlings, bark stripping, and trailing.
Storm Water Permit for Verde Valley Ranch (Yavapai)	1997	EPA	Take unquantifiable. Take in the form of degraded watershed and riparian WIFL habitat, and loss of WIFL habitat due to groundwater pumping and pollutants.
Gila River Transmission Structures (Graham)	1997	AZ Electric Power Coop. Inc.	Take from harassment or harm due to habitat modification, reduced productivity, disturbance, parasitism.
Land and Resource Management Plans for the 11 National Forests and National Grasslands of the USFS Southwestern Region	1997	USFS	None
Phoenix Resource Management Plan	1998	BLM	None
Yuma Resource Management	1998	BLM	None

Agency actions that have undergone formal section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide through 2005.			
Plan (Yuma, La Paz, Mohave)			
Arizona Strip Resource Mgmt Plan Amendment (Mohave)	1998	BLM	Take of 1 nesting attempt every 3 years through parasitism, habitat loss from fire, recreation, development
CAP Water Transfer Cottonwood/Camp Verde (Yavapai, Maricopa)	1998	USBR	Take unquantifiable through loss of nesting sites, parasitism, disturbance, modification of nesting habitat
Cienega Creek Stream Restoration Project (Pima)	1998	BLM	Take of 1 WIFL through harrassment
Kearny Wastewater Treatment (Pinal)	1998	FEMA	Take unquantifiable. Take through WIFL habitat loss, modification, harassment.
Bridge Fire, San Pedro National Conservation Area, Emergency Consultation (Cochise)	1998	BLM	None
Reintroduction of Beaver into the San Pedro NCA (Cochise)	1998	BLM	Take of 1 WIFL nest every 5 years due to beaver, and 1 WIFL nest every 5 years due to flooding increased predation/parasitism
SR 260 Cottonwood to Camp Verde (Yavapai)	1999	FHWA	Take unquantifiable from harm, injury, & death as a result of the loss of nesting sites, disturbance, modification of habitat, reduced productivity and survivorship, parasitism, & collision with vehicles.
Fort Huachuca Programmatic	1999	DOD	None
Alamo Dam Reoperation (LaPaz, Mohave)	1999	ACOE	Take of a WIFL nest with 2 eggs/ fledglings every 20 years due to inundation
Duncan HWY 75 Bridge over Gila River (Greenlee)	2000	FHWA	None
Red Creek Grazing Allotment	2000	USFS	None

Agency actions that have undergone formal section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide through 2005.			
Re-initiation of 1997 BO for vegetation trimming at Gila River transmission structures (Graham)	2000	USDA/AZ Electric Power Coop. Inc.	No additional incidental take anticipated
Lower Colorado River, Interim Surplus Criteria Criteria/4.4 Plan	2001	USBR	Loss of 372 acres of flycatcher habitat
Mingus Ave Extension, Bridge over Verde River (Yavapai)	2001	ACOE	Take of 3.34 acres of flycatcher habitat
Pleasant Valley Grazing Allotment, Apache (Greenlee)	2001	USFS	None
Peck Canyon Scour HWY I-19 protection	2001	Corps	None
The Homestead at Camp Verde Development	2001	EPA	None
20 grazing allotments on Tonto National Forest (Various)	2002	USFS	None
Eagle Creek watershed grazing allotments - (Greenlee)	2002	USFS	None
Dos Pobres -San Juan project	2002	BLM	None
Re-initiation of Lower Colorado River Operations and Maintenance - Lake Mead to Southerly International Border	2002	USBR	None
Re-initiation of Fort Huachuca Programmatic (Cochise)	2002	DOD	None
Las Cienagas NCA RMP (Pima and Santa Cruz)	2002	BLM	Harassment of 6 flycatchers due to maintenance of road and trail crossings, recreational use, livestock management, fence maintenance & mortality of 1 due to increased cowbird parasitism
Lake Mead NRA Management Plan (Mohave County, AZ and Clark County NV)	2002	NPS	Harassment to nesting and migrating birds due to recreationists. Harm as result of the loss of >5% of occupied/suitable habitat as a result of recreational activities (fire, etc.)

Agency actions that have undergone formal section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide through 2005.			
Issuance of Section 10 permit for Operation of Roosevelt Dam at Roosevelt Lake HCP (Gila, Maricopa)	2003	USFWS/ SRP	Take of up to 1,250 acres of occupied nesting flycatcher habitat in a single year 2-3 times over a 50-year period. Loss of nesting habitat, nestlings and eggs due to habitat modification
Livestock grazing on 18 allotments along the Middle Gila River Ecosystem	2003	BLM	Harm, harassment, injury or death resulting in degradation of 5 territories, greater than 10% parasitism, harassment of 5 pairs due to livestock management
Issuance of permit for Safe Harbor Agreement for 60 acres at EC Ranch (Apache County)	2003	USFWS/ J.W. Crosswhite	Baseline is 0, ability to take all flycatchers at end of 50 year agreement by removing habitat
Re-initiation of U.S. Hwy 93 (Mohave,Yavapai)	2003	FHWA	Harassment & harm of 2 pairs through reduced productivity and survivorship from permanent loss of nesting habitat, 2 birds killed or injured per decade to collision, and harassment and harm from increased predation & parasitism as a result of habitat modification, fragmentation
Approval of CAP water exchange by San Carlos Apache Tribe for retention in San Carlos Reservoir (Gila and Pinal counties)	2004	USBR	Harm to flycatchers below Winkelman on the Gila River resulting in failure of 43 percent of all nests due to dam operations
Biological and conference opinion for BLM Arizona Statewide Land Use Plan Amendment for fires, fuels, and air quality management	2004	BLM	Harm, harassment and death of up to 5 pairs and their young/eggs due to fire suppression activities over next 10 years
26 Bar Grazing Allotments	2005	USFS	None
Intra-Service Consultation on Issuance of Recovery Permits for the WIFL for Scientific Purposes	2005	USFWS	Harm and harassment of up to 7 pairs and 17 territorial males

Agency actions that have undergone formal section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide through 2005.			
Intra-Service Formal Section 7 Consultation/Conference Opinion for issuance of 10(a)(1)(B) permit for LCR MSCP (Various)	2005	USFWS	Loss of 1853 acres of habitat, harm and harassment from operations and projects
Tamarisk Removal, Hazardous Fuels Treatment, and Boundary Fence Construction at Tumacácori National Historical Park (Santa Cruz)	2006	NPS	None
California			
Prado Basin	1994	Corps	None
Mesa Grande and Lusardi Grazing Allotments	1994	USFS	
Red Top Grazing Allotment, Cleveland National Forest	1994	USFS	
Storm Damage Repair at Four Locations Along State Route 76	1994	FHWA	None
Orange County Water District	1995	Corps	None
Temescal Wash Bridge	1995	Corps	Take of 2 flycatchers
Camp Pendleton (San Diego)	1995	DOD	Take 4 flycatcher territories
Grazing Allotments on the Cleveland National Forest	1995	USFS	None
Recovery Permits in Region 1	1996	FWS	
Sediment Removal Project at Fullerton Dam Basin	1996	Corps	None
Norco Bluffs Bank Stabilization Project	1996	Corps	None
Hansen Dam Recreationa-Swim Lake Project	1996	Corps	None
Repair of the I-5 Bridge over the Santa Clara River	1996	FHWA	
Santa Clara River Bridge Replacement Project - Amendment	1996	FHWA	

Agency actions that have undergone formal section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide through 2005.			
Renewal of Five-Year Pesticide use Permit to the California Dept of Food and Ag for Use of Malathion to Control Curly Top Virus in California (various)	1996	BLM	
Lake Isabella Operations 1996 (Kern)	1996	Corps	Inundation 700 acres critical habitat; reduced productivity 14 pairs
Lake Isabella Long-Term Operations (Kern)	1997	Corps	Annual inundation of 1,100 ac critical habitat
H.G. Fenton Sand Mine and Levee near Pala on the San Luis Rey River (San Diego)	1997	Corps	None
Issuance of an Incidental Take Permit to the City of San Diego to the Multiple Spp. Conservation Program (San Diego County)	1997	FWS	
Shearer Crossing Bridge Project, San Luis Rey River	1997	Corps	
Cannon Road (Reaches 1 and 2) City of Carlsbad	1997	Corps	3 non-paired flycatchers
Cleveland National Forest Grazing Program	1997	USFS	None
City of Corona Wastewater Treatment Plant Outfall Project	1997	Corps	None
South Bay Water Reclamation Plant and Dairy Mart Road and Bridge Improvements	1997	BLM	None
Western Riverside Co. Regional Wastewater Treatment System and Outfall Project in Prado Basin	1997	Corps	None
BO for the Seismic Retrofit of 13 Bridges	1997	FHWA	
Biological and Conference Opinion for the Replacement of the Interstate 5 Bridge over the Santa Clara River	1997	FHWA	
Replacement of the Highway 101	1997	FHWA	

Agency actions that have undergone formal section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide through 2005.			
Bridge over the Santa Clara River			
Partners for Fish and Wildlife Proposed Actions	1998	USFWS	
Mission Valley East Light Rail Transit Project, San Diego River	1998	FHWA	1 flycatcher
BO for Incidental Take Permit to County of San Diego under the Multiple Spp. Conservation Program for their Subarea Plan	1998	USFWS	
Department of the Army Flood Control and Maintenance in the Mojave River	1998	Corps	
Hansen Dam Water Conservation and Supply Feasibility Study	1999	Corps	
San Bernadino Flood Control Maintenance of Reaches 2-3 of the Santa Ana River	1999	Corps	
Southern CA Forest Plans	1999	USFS	
BO for Department of the Army Authorization to Conduct Flood Control Maintenance in the Mojave River	1999	Corps	
Natural River Management Plan, Santa Clarita	1999	Corps	
Replacement of the Fifth Street Bridge Over City Creek, City of Highland	1999	FHWA	
Water-detention basins on Loma Alta Creek and Garrison Creek	2000	Corps	
Realignment and Widening of Laguna Canyon Road, State Route 133 (Orange County)	2000	FHWA	
54 City of Coronoa Operation and Maintenance Projects on Federal Lands within the Prado Basin	2000	Corps	
Prado Dam Operation for Water Conservation	2000	Corps	

Agency actions that have undergone formal section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide through 2005.			
Valencia Company's Clean Water Act Section 404 Authorization for Portions of the Santa Clara River	2000	Corps	
Re-initiation of Lake Isabella Dam Operation (Kern)	2000	Corps	inundation of 1,100 ac critical habitat & reduced productivity & survival of all nesting pairs & young
Questar's southern trails pipeline, CA, AZ, UT	2000	FERC	
Mill Creek Diversion, Prado Basin (Riverside)	2000	Corps	None
Level 3 long haul fiber optic network, San Diego CA to CA/AZ state line	2000	BLM	
Land and Resource Plans for 4 southern CA National Forests	2001	USFS	Take as described in 1-6-99-F-21, riparian species biological opinion
San Timoteo Creek Reach 3B Flood Control Project	2001	Corps	Take of 1 pair of flycatchers and 16.2 ac of flycatcher habitat
CA FDA 5-year permit for malathion use	2001	BLM	2 flycatchers
Prado mainstem and Santa Ana River flood control and Norco Bluffs stabilization project	2001	Corps	None
Four grazing allotments on San Bernardino NF (San Bernardino)	2001	USFS	None
Cleveland NF grazing program (Orange, Riverside, San Diego)	2001	USFS	Two parasitized nests/year. Take through parasitism, nest abandonment, loss of eggs/young, degradation of nesting habitat
Sierra Nevada Forest Plan Amendment (various)	2001	USFS	
Intra-Service opinion for issuance of a 10(a)(1)(b) permit for CA Dept of Corrections for 27 electrified fences	2002	USFWS	2 WIFLs in the form of kill, wound, or harassment
Highway 71 widening amendment	2002	FHWA	None
Sierra Nevada Forest Plan	2003	USFS	

Agency actions that have undergone formal section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide through 2005.			
Amendment, Supplemental EIS			
Intra-Service opinion for issuance of a 10(a)(1)(b) permit for Western Riverside County MHSCP (Riverside County)	2004	USFWS	Loss of 3,207 acres of foraging habitat leading to harm and injury reducing in impaired reproduction and reduced life expectancy
Colorado			
AB Lateral -Hydroelectric - Hydropower Facility, Gunnison River to Uncompahgre River	1996	USBR	None
TransColorado Gas Transmission Line Project (Meeker, Colorado to Bloomfield, New Mexico)	1998	BLM	None
Control of non-native fishes in floodplain ponds of upper Colorado and Gunnison rivers.	1998	USFWS	Take of 1 pair nesting flycatchers to harassment and harm to 1 pair through loss of prey
Amendment for control of non-native fishes in floodplain ponds of upper Colorado and Gunnison rivers	1998	USFWS	None
Development of Alexander off-channel cold-water fish ponds	1998	Corps	None
Pagosa Area Water and Sanitation District Water Intake	2000	Corps	1 pair of flycatchers
US Highway 160/County Road 501 widening -realignment, Bayfield	2001	FHWA	2 pairs of flycatchers
Archuleta County Rd 119 widening/realignment, Pagosa Springs (Archuleta County)	2001	Corps	1 pair of flycatchers
Creation of defensible space by private land owners in habitat occupied by Federally listed species (various counties)	2002	USFWS/ State of Colorado	harm and harassment of flycatchers by loss of 10 acres of habitat
Los Pinos Bridge replacement (La Plata County)	2003	FHWA	harm to 1 pair of flycatchers due to loss/deterioration of habitat

Nevada			
Gold Properties Resort (Clark)	1995	BIA	Take of 1 flycatcher from habitat loss
Las Vegas Wash, Pabco Road Erosion Control Structure	1998	Corps	Take of 2-3 pairs of flycatchers
Clark County Multiple Species Habitat Conservation Plan	2000	USFWS	Conditional upon actions not yet completed by Clark County
Crystal Springs Exotic Vegetation Removal Project	2002	USFWS	Take of 1 pair of flycatchers due to habitat loss
Re-initiation of consultation for City of Mesquite's post-flood actions and 2005 flood control actions, Virgin River	2005	ACOE	Adverse affect to WIFL critical habitat, harm through loss of habitat to flycatchers and harassment of 8 flycatchers.
New Mexico			
Corrales Unit, Rio Grande	1995	Corps	None
Rio Puerco Resource Area	1997	BLM	None
Taos Resource Area (Various)	1997	BLM	1 pair of flycatchers
Caballo Resource Area (Various)	1997	BLM	None
Farmington District Resource Management Plan (Various)	1997 *	BLM	None
Mimbres Resource Area Management Plan (Various)	1997 *	BLM	2 pairs of flycatchers
Discretionary actions related to water management on the Middle Rio Grande River (various)	2001 *	USBR/ Corps	None
Issuance of a 10(a)(1)(A) enchancement of survival permit to Caroline H. And Thomas W. Paterson on 209 acres of the Spur Ranch (Catron County)	2002	USFWS	Up to 3 pairs of flycatchers and offspring at end of agreement.
Water and River Maintenance Operations on the Middle Rio Grande (various)	2003	Corps	15 pairs of flycatchers and their offspring for 10-years, no more than 5 in any one year
Programmatic consultation to Land Use Plans to include wind energy	2005	BLM	None – would be addressed in individual section 7 consultations

Utah			
Reclamation of Atlas Mill Tailings Site (Moab)	1998	Nuclear Regulatory Comm.	one pair of flycatchers as a result of harm and harassment
UT BLM Land Use Plans Amendments BA and Fire Management Plans BA (various)	2005	BLM	Harm and harassment, unquantifiable, will be addressed implementing more site and project specific project consultations.

BIA = Bureau of Indian Affairs; BLM = 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; WAPA =Western Area Power Administration.

* Jeopardy opinions.