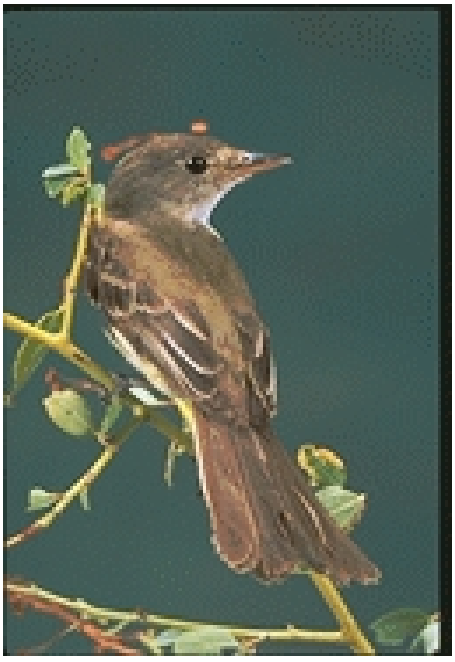
Final Recovery Plan
Southwestern Willow Flycatcher
(*Empidonax traillii extimus*)

August 2002

Prepared By

Southwestern Willow Flycatcher Recovery Team
Technical Subgroup



For

Region 2
U.S. Fish and Wildlife Service
Albuquerque, New Mexico 87103

Approved: H. Dale Hall

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Disclaimer

Recovery Plans delineate reasonable actions that are believed to be required to recover and/or protect listed species. Plans are published by the U.S. Fish and Wildlife Service, sometimes prepared with the assistance of recovery teams, contractors, State agencies, and others. Objectives will be attained and any necessary funds made available subject to budgetary and other constraints affecting the parties involved, as well as the need to address other priorities. Recovery plans do not necessarily represent the views nor the official positions or approval of any individuals or agencies involved in the plan formulation, other than the U.S. Fish and Wildlife Service. They represent the official position of the U.S. Fish and Wildlife Service only after they have been signed by the Regional Director or Director as approved. Approved Recovery plans are subject to modification as dictated by new findings, changes in species status, and the completion of recovery tasks.

Some of the techniques outlined for recovery efforts in this plan are completely new regarding this subspecies. Therefore, the cost and time estimates are approximations.

Citations

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Executive Summary
Southwestern Willow Flycatcher Recovery Plan

Current Status of the Species

The southwestern willow flycatcher (*Empidonax traillii extimus*) breeds in dense riparian habitats in southwestern North America, and winters in southern Mexico, Central America, and northern South America. Its breeding range includes far western Texas, New Mexico, Arizona, southern California, southern portions of Nevada and Utah, southwestern Colorado, and possibly extreme northern portions of the Mexican States of Baja California del Norte, Sonora, and Chihuahua. The subspecies was listed as endangered effective March 29, 1995. Approximately 900 to 1100 pairs exist.

Habitat Requirements, Threats, and Other Limiting factors

The southwestern willow flycatcher breeds in relatively dense riparian tree and shrub communities associated with rivers, swamps, and other wetlands, including lakes (e.g., reservoirs). Most of these habitats are classified as forested wetlands or scrub-shrub wetlands. Habitat requirements for wintering are not well known, but include brushy savanna edges, second growth, shrubby clearings and pastures, and woodlands near water. The southwestern willow flycatcher has experienced extensive loss and modification of breeding habitat, with consequent reductions in population levels. Destruction and modification of riparian habitats have been caused mainly by: reduction or elimination of surface and subsurface water due to diversion and groundwater pumping; changes in flood and fire regimes due to dams and stream channelization; clearing and controlling vegetation; livestock grazing; changes in water and soil chemistry due to disruption of natural hydrologic cycles; and establishment of invasive non-native plants. Concurrent with habitat loss have been increases in brood parasitism by the brown-headed cowbird (*Molothrus ater*), which inhibit reproductive success and further reduce population levels.

Recovery Objectives

1. Recovery to the point that reclassification to “threatened” is warranted.
2. Recovery to the point that delisting is warranted.

Recovery Criteria

Reclassification from endangered to threatened may be considered when either of the following criterion have been met:

Criterion A: Increase the total known population to a minimum of 1,950 territories (equating to approximately 3,900 individuals), geographically distributed to allow proper functioning as metapopulations, so that the flycatcher is no longer in danger of extinction. For reclassification to threatened status, these prescribed numbers and distributions must be reached *as a minimum*, *and maintained over a five year period*.

Criterion B**:** Increase the total known population to a minimum of 1,500 territories (equating to approximately 3,000 individuals), geographically distributed among Management Units and Recovery Units, so that the flycatcher is no longer in danger of extinction. For reclassification to threatened status, these prescribed numbers and distributions must be reached *as a minimum*, *and maintained over a three year period*, and the habitats supporting these flycatchers must be protected from threats and loss.

The southwestern willow flycatcher may be removed from the list of threatened and endangered species when both of the following criteria have been met:

Criterion 1. Meet and maintain, at a minimum, the population levels and geographic distribution specified under reclassification to threatened Criterion A; increase the total known population to a minimum of 1,950 territories (equating to approximately 3,900 individuals), geographically distributed to allow proper functioning as metapopulations, as presented in Table 10.

Criterion 2. Provide protection from threats and create/secure sufficient habitat to assure maintenance of these populations and/or habitats over time. The sites containing flycatcher breeding groups, in sufficient number and distribution to warrant downlisting, must be protected into the foreseeable future through development and implementation of conservation management agreements (e.g., public land management planning process for Federal lands, habitat conservation plans (under Section 10 of the ESA), conservation easements, and land acquisition agreements for private lands, and inter-governmental conservation agreements with Tribes). Prior to delisting, the USFWS must confirm that the agreements have been created and executed in such a way as to achieve their role in flycatcher recovery, and individual agreements for all areas within all Management Units (public, private, and Tribal) that are critical to metapopulation stability (including suitable, unoccupied habitat) must have demonstrated their effectiveness for a period of at least 5 years.

Actions Needed

Recovery actions in the Plan are categorized into nine types:

1. Increase and improve occupied, suitable, and potential breeding habitat; 2. Increase metapopulation stability; 3. Improve demographic parameters; 4. Minimize threats to wintering and migration habitat; 5. Survey and monitor; 6. Conduct research; 7. Provide public education and outreach; 8. Assure implementation of laws, policies, and agreements that benefit the flycatcher; 9. Track recovery progress.

Estimated Cost of Recovery ($1000s)

Costs associated with recovery are estimated for each of the nine categories listed above, based on the years in which specific actions are scheduled to occur. These costs are further detailed in the Implementation Schedule.

Year	Action 1	Action 2	Action 3	Action 4	Action 5	Action 6	Action 7	Action 8	Action 9	**Total**
FY01	8182*	1629	0*	225	835	2147	30*	183*	30	13261
FY02	8182*	1629	0*	225	835	2147	30*	183*	30	13261
FY03	7816*	4951	390*	225	835	2773	30*	183*	30	17233
FY04	7216*	4951	390*	225*	835	2348	30*	183*	50	16228
FY05	7216*	4951	390*	225*	850	2348	30*	183*	190	16383
FY 6-20	25430*	6300	1950*	0*	0	860*	25*	25*	0	34590
FY 21-30	16210*	0	0	0*	0	0*	50*	250*	0	16510
Total	80252*	24411	3120*	1125*	4190	12623*	225*	1190*	330	127466

*Does not represent total potential funds due to inability to estimate costs for specific recovery actions at this time. See Section V. Implementation Schedule for detailed estimate of funds and potential partners.

Date of Recovery

Reclassification to threatened could be initiated in 2020, or earlier.

Delisting could be accomplished within 10 years of reclassification.

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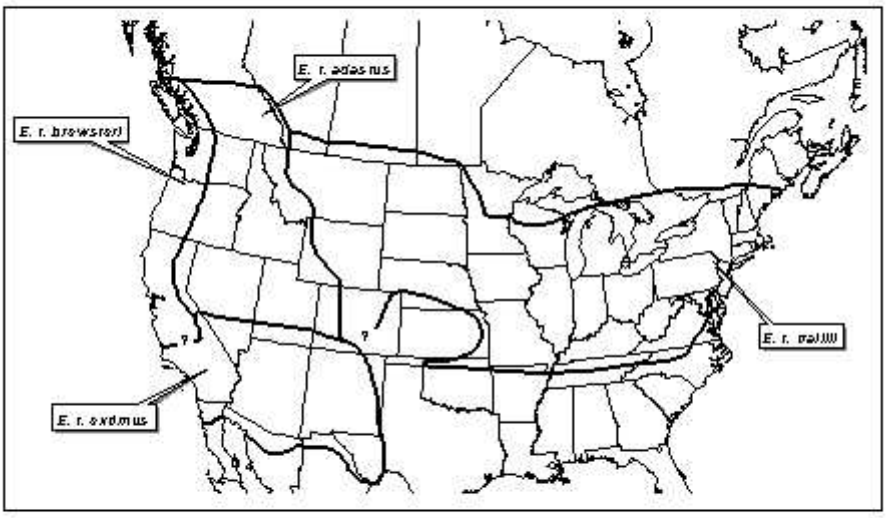

Figure 1. Breeding ranges of the subspecies of the willow flycatcher (*Empidonax traillii*). From Sogge et al. (1997b), adapted from Unitt (1987), Browning (1993).

B. Range and Distribution

The historical breeding range of the southwestern willow flycatcher included southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, southwestern Colorado, and extreme northwestern Mexico (Figures 1 and 3[Fig. 3 follows page 68]; Hubbard 1987, Unitt 1987, Browning 1993). The flycatcher's current range is similar to the historical range, but the quantity of suitable habitat within that range is much reduced from historical levels. The flycatcher occurs from near sea level to over 2600 m (8500 ft), but is primarily found in lower elevation riparian habitats. Throughout its range, the flycatcher's distribution follows that of its riparian habitat; relatively small, isolated, widely dispersed locales in a vast arid region. Marshall (2000) found that 53% of southwestern willow flycatchers were in just 10 sites (breeding groups) rangewide, while the other 47% were distributed among 99 small sites of ten or fewer territories. In some parts of its northern range, questions of range boundaries between other willow flycatcher subspecies exist, including possible intergradations between subspecies. In California (see Figures 1 and 3), individuals of *E. t. extimus* and *E. t. brewsteri* are morphologically fairly distinct, even where their ranges are near one another (Unitt 1987). However, in southern Utah, southwestern Colorado, and perhaps northern New Mexico, there may be fairly broad clinal gradations between the southwestern willow flycatcher and the Great Basin/Rocky Mountain race *E. t. adastus* (Unitt 1987). Phillips et al. (1964)

affiliated with *E. t. extimus*, but uncertainties remain about the subspecies status of willow flycatchers elsewhere in extreme southwestern Colorado.

Mexico

As discussed above ("Range and Distribution"), it is possible the flycatcher was abundant on the delta of the Colorado River in Mexico prior to establishment of numerous dams upstream. Currently, surface water delivery to the delta is minimal or absent for long periods; habitat is much reduced and altered. Similarly, the flycatcher is likely to have occurred in northern Chihuahua along the Rio Grande, where habitat is now reduced and altered due to upstream dams. Historic record of breeding flycatchers on the Rio Grande at Fort Hancock, Texas, suggests occurrence in adjacent Chihuahua; the Rio Grande now is typically dry in that region.

J. Reasons for Listing and Current Threats

Section 4(a)(1) of the ESA lists five factors that must be considered when determining if a species should be designated as threatened or endangered. These factors are: A. The present or threatened destruction, modification, or curtailment of its habitat or range; B. Overutilization for commercial, recreational, scientific, or educational purposes; C. Disease or predation; D. The inadequacy of existing regulatory mechanisms; and E. Other natural or manmade factors affecting its continued existence. A species may be determined to be an endangered or threatened species due to one or more of the five factors. The southwestern willow flycatcher was determined to be endangered by numerous threats causing extensive loss of habitat (factor A), lack of adequate protective regulations (factor D; see Section III.), and other natural or manmade factors including brood parasitism by the brown-headed cowbird (factor E) (USFWS 1995).

The reasons for the decline of the southwestern willow flycatcher and current threats it faces are numerous, complex, and inter-related. The major factors are summarized below by categories, in approximate order of their significance. For additional discussions see USFWS (1995) and Marshall and Stoleson (2000). However, these factors vary in severity over the landscape and at any given locale, several are likely to be at work, with cumulative and synergistic effects. The most significant impact should be expected to vary from site to site. And because of their inter-relatedness, distinctions between different types of impacts are sometimes ambiguous or artificial. This is true even for divisions presented here, "Habitat Loss and Modification" and "Changes in Abundance of Other Species." For example, urban and agricultural development may cause both habitat degradation and changes in the abundance of cowbirds, domestic cats, and non-native vegetation. When assessing and addressing the impacts to any riparian ecosystem, the cumulative and inter-related impacts of all potential factors should be considered.

1. Habitat Loss and Modification

The primary cause of the flycatcher's decline is loss and modification of habitat. Its riparian nesting habitat tends to be uncommon, isolated, and widely dispersed. Historically, these habitats have always been dynamic and unstable in

Table 9. Recovery Criteria, by Recovery and Management Units: Minimum number of southwestern willow flycatcher territories needed to achieve reclassification to Threatened. Values for current number of known territories are based on the most recent available survey data for all breeding sites known to be occupied for at least one year between 1993 and 2001.

Recovery Unit	Management Unit	Current Number of Known Territories	Minimum Number of Territories for Reclassification
Coastal California	Santa Ynez	33	75
	Santa Clara	13	25
	Santa Ana	39	50
	San Diego	101	125
	Recovery Unit Total	**186**	**275**
Basin & Mojave	Owens	28	50
	Kern	23	75
	Amargosa	3	25
	Mojave	13	25
	Salton	2	25
	Recovery Unit Total	**69**	**200**
Upper Colorado	San Juan	3	25
	Powell	0	25
	Recovery Unit Total	**3**	**50**
Lower Colorado	Little Colorado	6	50
	Middle Colorado	16	25
	Virgin	40	100
	Pahranagat	34	50
	Hoover - Parker	15	50
	Bill Williams	32	100
	Parker - Southerly International Boundary	3	150
	Recovery Unit Total	**146**	**525**

7. Presence of Water and Hydrological Conditions

In addition to dense riparian thickets, another characteristic common to the vast majority of flycatcher nesting sites is that they are associated with lentic water (quiet, slow-moving, swampy, or still) or saturated soil. Occupied sites are often located in situations such as along slow-moving stream reaches, at stream backwaters, in swampy abandoned oxbows/ marshes/cienegas, and at the margins of impounded water, including the inflows of streams into reservoirs. Where flycatchers occur along moving streams, those streams tend to be of relatively low slope (or gradient), i.e., slow-moving with few (or widely spaced) riffles or other cataracts. The apparent association between southwestern willow flycatcher habitat and quiet water likely represents the relationship between the requirements of the bird for certain vegetation characteristics and patch size/shape, and the hydrological conditions that allow those conditions to develop. Lentic water conditions may also be important in influencing the insect prey base of the flycatcher.

Flycatcher habitat becomes established because of water flow conditions that result from the following factors (not in order of importance): seasonality/duration, gradient, width of flow, depth of flow, hydraulic roughness, sediment particle sizes for bed and banks, suspended sediment load, channel cross sectional morphology, longitudinal morphology (pool and riffle, rapids, step pools), vegetation in the channel, channel sinuosity, and channel pattern (single thread, braided, compound). It is not possible to define "suitable" or "potential" flycatcher habitat with specific values or configurations for just one or several of these factors (e.g., gradient or channel pattern), because all these factors are related to one other. The range and variety of flow conditions that will establish and maintain flycatcher habitat can arise in free flowing streams differing substantially in these factors. Also, flow conditions that will establish and maintain flycatcher habitat can be achieved in regulated streams, depending on scale of operation and the interaction of the primary physical controls. Still, very generally flycatcher habitat tends to occur along streams of relatively low gradient. However, the low gradient may exist only at the habitat patch itself, on streams that are generally steeper when viewed on the large scale (e.g., percent gradient over miles or kilometers). For example, obstructions such as logjams, beaver dams, or debris deposits from tributaries may partially dam streams, creating relatively quiet, lentic pools upstream.

By definition, the riparian vegetation that constitutes southwestern willow flycatcher breeding habitat requires substantial water. Further, hydrological events such as scouring floods, sediment deposition, periodic inundation, and groundwater recharge are important for the flycatcher's riparian habitats to become established, develop, and be recycled through disturbance. It is critical to keep in mind that in the southwest, hydrological conditions at a site can vary remarkably within a season and between years. At some locations, particularly during drier years, water or saturated soil is only present early in the breeding season (i.e., May and part of June). At other sites, vegetation may be immersed in standing water during a wet year, but be hundreds of meters from surface water in dry years. This is particularly true of reservoir sites such as the Kern River at Lake Isabella, Tonto Creek and Salt River at Roosevelt Lake, and the Rio Grande near Elephant Butte Reservoir. Human-related factors such as river channel modifications (e.g., by creation of pilot channels) or altered subsurface flows (e.g., from agricultural runoff) can temporarily or permanently dry a site. Similarly, where a river channel has changed naturally (Sferra et al. 1997), there may be a total absence of water or visibly saturated soil for several years. In such cases, the riparian vegetation and any flycatchers breeding within it may persist for several

years. However, we do not know how long such sites will continue to support riparian vegetation and/or remain occupied by breeding flycatchers.

In the geographical setting of the southwest, most streams descend from the higher elevations of their upper watersheds at relatively high slope or gradient. Drainages descend toward the lowlands through valleys and canyons where streamflow is in a single-thread channel, confined by steep banks, steep upland slopes, and/or canyon walls. Under these conditions even floodwaters do not spread far laterally from the banks, but rise vertically between the confining slopes or canyon walls. Flood-scour zones often are present at the stream margins, where riparian vegetation is absent or frequently removed. The zone of frequently-wetted land adjacent to the stream is relatively narrow, because the land rises steeply from the level of typical base streamflow (Figure 18). Also, high-gradient streams possess high erosive energy. Soil and sediment comprising streambanks is often coarse, cobbly, bouldery, or even bedrock. Such soil/sediment types are rarely associated with the wet, dense vegetation of willow flycatcher habitat. Under all the above conditions, riparian vegetation is seldom dense enough to provide flycatcher breeding habitat. Riparian vegetation is often present in much narrower configurations, usually a relatively narrow, linear growth with inadequate width to constitute willow flycatcher habitat.

In contrast, streams of lower gradient and/or more open valleys have a greater tendency to support potential willow flycatcher habitat patches. As streams reach the lowlands, their gradients typically flatten out. Simultaneously, the surrounding terrain often opens up into broader floodplains. Under such conditions streams meander back and forth, higher flow events spread shallowly across the floodplain, backwaters develop, and abandoned channels from previous stream alignments persist, often with moist conditions and riparian vegetation. The permanently-wetted perimeter of the stream (by either surface or subsurface water) is much more extensive and wider. The sediments of a lower floodplain are capable of retaining much more subsurface water, being deeper, finer, and extending farther laterally from the active stream channel. Riparian plant communities that are wider, more extensive, and more dense are able to develop. Conditions like these lower floodplains also develop where streams enter impoundments, either natural (e.g., beaver ponds) or human-made (reservoirs). Low-gradient stream conditions may also occur high in watersheds, as in the marshy mountain meadows supporting flycatchers in the headwaters of the Little Colorado River near Greer, Arizona.

In summary, suitable southwestern willow flycatcher habitat is less likely to occur in steep, confined streams as are found in narrow canyons. Flycatcher habitat is more likely to develop, and in more extensive patches, along lower gradient streams with wider floodplains. However, exceptions to this generality indicate that relatively steep, confined streams can also support significant flycatcher habitats. The San Luis Rey River in California supports a substantial flycatcher population, and stands out among flycatcher habitats as having a relatively high gradient and being confined in a fairly narrow, steep-sided valley. The San Luis Rey may not be an eccentric exception to typical flycatcher habitat settings, but instead an indication of the true range of potential habitat. Although stream gradient (and even vegetation) seem unusual there, the many other factors of hydrology and vegetation characteristics allow flycatchers to thrive. Finally, it is important to note that even a steep, confined canyon or mountain stream may present local conditions where just a portion of an acre or hectare of flycatcher habitat may develop. Such sites are important individually, and in aggregate. Flycatchers are known to occupy very small, isolated habitat patches, and may occur in fairly high densities within those patches.

Recovering and conserving such sites may be an important contribution to recovering the flycatcher.

8. Other Habitat Components

Other potentially important aspects of southwestern willow flycatcher habitat include distribution and isolation of vegetation patches, prey types and abundance, parasites, predators, environmental factors (e.g., temperature, humidity), and interspecific competition (see Breeding Season Biology chapter of the Recovery Plan for additional information regarding some of these factors). Population dynamics factors such as demography (i.e. birth and death rates, age-specific fecundity), distribution of breeding groups across the landscape, flycatcher dispersal patterns, migration routes, site fidelity, philopatry, and conspecific sociality also influence where flycatchers are found and what habitats they use. Most of these factors are poorly understood at this time, but may be critical to understanding current population dynamics and habitat use. Refer to Wiens (1985, 1989a, 1989b) for additional discussion of habitat selection and influences on bird species and communities.

9. What Is <u>Not</u> Willow Flycatcher Breeding Habitat

Cottonwood-willow gallery forests that are devoid of an understory and that appear park-like do not provide breeding habitat for southwestern willow flycatchers. Similarly, isolated, linear riparian patches less than approximately 10 m (33 ft) wide do not provide breeding habitat. However, mosaics made up of aggregations of these small, linear riparian "stringers"may be used by breeding flycatchers, particularly at high elevations. Short stature (< 4 m or <13 ft) tamarisk stands as well as sparse stands of tamarisk characterized by a scattering of trees of any height also do not provide breeding habitat for flycatchers. Finally, riparian mesquite woodlands ("bosques') do not provide willow flycatcher breeding habitat, although they may be adjacent to (typically upland) nesting habitat (See Figures 18 - 20). At Ash Meadows National Wildlife Refuge, a unique exception is found where flycatchers nest in a tamarisk-mesquite association.

10. Potential Habitat

Loss of habitat is one of the primary causes for the endangered status of the southwestern willow flycatcher. As a result, a fundamental question to be addressed in recovering the bird is "where can suitable breeding habitat be re-established?" Suitable habitats arise from areas of potentially suitable habitat.

Potentially suitable habitat (hereafter "potential habitat") is defined as a riparian system that does not currently have all the components needed to provide conditions suitable for nesting flycatchers (as described above), but which could - if managed effectively - develop these components over time. **Regenerating potential habitats** are those areas that are degraded or in early successional stages, but have the correct hydrological and ecological setting to be become, under appropriate management, suitable flycatcher habitat. **Restorable potential habitats** are those areas that could have the appropriate hydrological and ecological characteristics to develop into suitable habitat if not for one or more key stressors, and which may require active abatement of stressors in order to become suitable. Potential habitat occurs where the flood plain conditions, sediment characteristics, and hydrological setting provide potential for development of dense riparian