Upper Rio Grande Basin Water Operations Review and EIS
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Comments/Summary:

RIP-64

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018 AB97

Endangered and Threatened Wildlife and Plants; Final Rule Determining Endangered Status for the Southwestern Willow Flycatcher

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: The Fish and Wildlife Service (Service) determines the southwestern willow flycatcher (*Empidonax traillii extimus*) to be an endangered species under the authority of the Endangered Species Act of 1973, as amended (Act). The breeding range of this bird includes southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, southwestern Colorado, and extreme northwestern Mexico. Within this region, the species is restricted to dense riparian associations of willow, cottonwood, buttonbush, and other deciduous shrubs and trees. This habitat was historically rare and sparsely distributed and is currently more rare owing to extensive destruction and modification. The southwestern willow flycatcher is endangered by extensive loss of habitat, brood parasitism, and lack of adequate protective regulations. This rule implements Federal protection provided by the Act for the southwestern willow flycatcher. Designation of critical habitat for the southwestern willow flycatcher is deferred while the Service gathers further comments and reconsiders the prudence of designation and the appropriate boundaries of any area to be designated.

DATES: The listing of the southwestern willow flycatcher is effective March 29, 1995. Comments on the designation of critical habitat may be submitted until April 28, 1995.

ADDRESSES: The complete file for this rule is available for inspection, by appointment, during normal business hours at Ecological Services State Office, U.S. Fish and Wildlife Service, 2321 West Royal Palm Road, Suite 103, Phoenix, Arizona 85021.

FOR FURTHER INFORMATION CONTACT: Sam F. Spiller or Robert M. Marshall at the above address (Telephone 602/640–2720).

SUPPLEMENTARY INFORMATION:

Background

The southwestern willow flycatcher is a small bird, approximately 15 centimeters (cm) (5.75 inches) long. It has a grayish-green back and wings, whitish throat, light grey-olive breast, and pale yellowish belly. Two wingbars are visible; the eye ring is faint or absent. The upper mandible is dark, the lower is light. The song is a sneezy "fitz-bew" or "fit-za-bew," the call a repeated "whitt."

The southwestern willow flycatcher occurs in riparian habitats along rivers, streams, or other wetlands, where dense growths of willows (*Salix* sp.), *Baccharis*, arrowweed (*Pluchea* sp.), buttonbush (*Cephalanthus* sp.), tamarisk (*Tamarix* sp.), Russian olive (*Eleagnus* sp.) or other plants are present, often with a scattered overstory of cottonwood (*Populus* sp.) (Grinnell and Miller 1944, Phillips 1948, Phillips *et al.* 1964, Whitmore 1977, Hubbard 1987, Unitt 1987, Whitfield 1990, Brown and Trosset 1989, Brown 1991, Sogge *et al.* 1993, Muiznieks *et al.* 1994). Throughout the range of *E. t. extimus*, these riparian habitats tend to be rare, widely separated, small and/or linear locales, separated by vast expanses of arid lands. The southwestern willow flycatcher has experienced extensive loss and modification of this habitat and is also endangered by other factors, including brood parasitism by the brown-headed cowbird (*Molothrus ater*) (Unitt 1987, Ehrlich *et al.* 1992, Sogge *et al.* 1993, Muiznieks *et al.* 1994).

The southwestern willow flycatcher (Order Passeriformes; Family Tyrannidae) is a subspecies of one of the ten North American flycatchers in the genus *Empidonax*. The willow flycatcher and alder flycatcher (*E. alnorum*) were once considered a single species, the Traill's flycatcher (*E. traillii*). Some sources [American Ornithologists' Union (AOU) 1983, McCabe 1991] treat *E. traillii* and *E. alnorum*, and all their subspecies as a superspecies, the "*traillii* complex". However, the two species are distinguishable by morphology (Aldrich 1951), song type, habitat use, structure and placement of nests (Aldrich 1953), eggs (Walkinshaw 1966), ecological separation (Barlow and McGillivray 1983), and genetic distinctness (Seutin and Simon 1988). The breeding range of the alder flycatcher generally occurs north of the willow flycatcher's range.

The southwestern willow flycatcher is one of five subspecies of the willow flycatcher currently recognized (Hubbard 1987, Unitt 1987, Browning 1993) (Figure 1.). The breeding ranges of the widely distributed *E. t. traillii* and *E. t. campestris* extend across the northern United States and southern Canada, from New England and Nova Scotia west, through northern Wyoming and Montana, and into British Columbia. Hubbard (1987) and Unitt (1987) treated *E. t. campestris* as synonymous with *E. t. traillii*, but Browning (1993) considered them separate subspecies (Figure 1.). The subspecies *E. t. adastus* breeds from Colorado west of the plains, west through the Great Basin States and into the eastern portions of California, Oregon and Washington. The breeding range of *E. t. brewsteri* extends from the central California coast north, through western Oregon and Washington to Vancouver Island. The breeding range of the southwestern willow flycatcher (*E. t. extimus*) includes southern California, southern Nevada, southern Utah, Arizona, New Mexico, and western Texas (Hubbard 1987, Unitt 1987, Browning 1993). It may also breed in southwestern Colorado, but nesting records are lacking. Records of probable breeding *E. t. extimus* in Mexico are few and are restricted to extreme northern Baja California del Norte and Sonora (Unitt 1987, Wilbur 1987).

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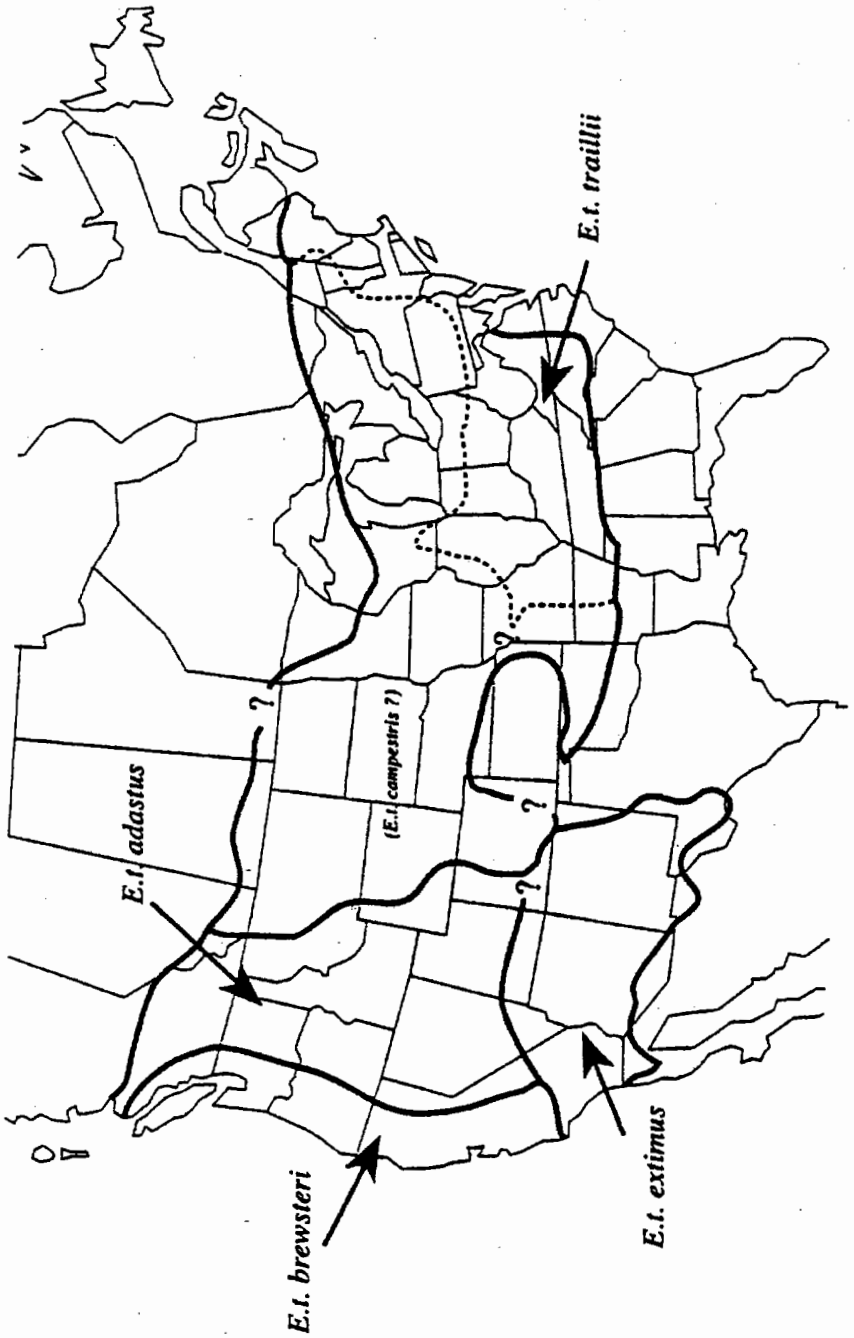

Figure 1. Approximate breeding ranges of the races of the willow flycatcher.

Adaptation of Unitt (1987) and Browning (1993), from Tibbitts et al. 1994.

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The willow flycatcher subspecies are distinguished primarily by subtle differences in color and morphology. Unitt (1987) noted that these differences "* * * are minor, but differ little in magnitude from those distinguishing the species *E. traillii* from *E. alnorum*. In *Empidonax*, small differences in morphology may mask large differences in biology."

The subspecies *E. t. extimus* was described by A.R. Phillips (1948) from a collection by G. Monson from the lower San Pedro River in southeastern Arizona. The taxonomy of *E. t. extimus* was critically reviewed by Hubbard (1987), Unitt (1987), and Browning (1993). Hubbard (1987) gave a qualified endorsement of the validity of *E. t. extimus*, recommending continued examination of the taxonomy. Unitt (1987) found that *E. t. extimus* was distinguishable from other willow flycatchers by color, being paler, and morphology (primarily wing formula) but not overall size. Browning (1993) also found that *E. t. extimus* was distinguishable as a more pale-colored subspecies. The song dialect of *E. t. extimus* may also be distinguishable from other willow flycatchers. Rather than the crisp, sneezy "fitz-bew" of the northerly subspecies, *E. t. extimus* sings a more protracted, slurred "fit-za-bew," with a burry "bew" syllable (recordings by M. Sogge and J. Travis). The subspecies *E. t. extimus* is accepted by most authors (*e.g.*, Aldrich 1951, Behle and Higgins 1959, Phillips *et al.* 1964, Bailey and Niedrach 1965, Oberholser 1974, Monson and Phillips 1981, Harris *et al.* 1987, Schlorff 1990, Harris 1991). Section 3(15) of the Act and regulations at 50 CFR 424.02(k) defines the term "species" as any subspecies of fish or wildlife or plants, and any distinct population segment of any vertebrate species which interbreeds when mature. Based on the above information, the Service has determined that *E. t. extimus* is eligible for protection under the Act.

The southwestern willow flycatcher nests in thickets of trees and shrubs approximately 4–7 meters (m) (13–23 feet) or more in height, with dense foliage from approximately 0–4 m (13 feet) above ground, and often a high canopy cover percentage. The diversity of nest site plant species may be low (*e.g.*, willows) or comparatively high (*e.g.*, mixtures of willow, buttonbush, cottonwood, boxelder, Russian olive, *Baccharis*, and tamarisk). Nest site vegetation may be even- or uneven-aged, but is usually dense and structurally homogeneous (Brown 1988, Whitfield 1990, Sogge *et al.* 1993, Muiznieks *et al.* 1994). Historically, *E. t. extimus* nested primarily in willows, buttonbush, and *Baccharis*, with a scattered overstory of cottonwood (Grinnell and Miller 1944, Phillips 1948, Whitmore 1977, Unitt 1987). Following modern changes in riparian plant communities, *E. t. extimus* still nests in native vegetation where available, but has been known to nest in thickets dominated by tamarisk and Russian olive (Hubbard 1987, Brown 1988, Sogge *et al.* 1993, Muiznieks *et al.* 1994). Sedgwick and Knopf (1992) found that sites selected as song perches by male willow flycatchers (*E. t. traillii/campestris*) exhibited higher variability in shrub size than did nest sites and often included large central shrubs. Habitats not selected for either nesting or singing were narrower riparian zones, with greater distances between willow patches and individual willow plants. Nesting willow flycatchers of all subspecies generally prefer areas with surface water nearby (Bent 1960, Stafford and Valentine 1985, Harris *et al.* 1987), but *E. t. extimus* virtually always nests near surface water or saturated soil (Phillips *et al.* 1964, Muiznieks *et al.* 1994). At some nest sites surface water may be present early in the breeding season but only damp soil is present by late June or early July (Muiznieks *et al.* 1994, M. Whitfield, Kern River Research Center, *in litt.*-1993, J. and J. Griffith, Griffith Wildlife Biology, *in litt.*-1993). Ultimately, a water table close enough to the surface to support riparian vegetation is necessary.

Defining a minimum habitat patch size required to support a nesting pair of *E. t. extimus* is difficult. Throughout its range, determining the capability of habitat patches to support southwestern willow flycatchers is confused by the species' rarity, unstable populations, variations in habitat types, and other factors. However, the available information indicates that habitat patches as small as 0.5 hectare (ha) (1.23 acres) can support one or two nesting pairs. Sogge *et al.* (1993) found territorial flycatchers in habitat patches ranging from 0.5 to 1.2 ha (1.23 to 2.96 acres). Two habitat patches of 0.5 and 0.9 ha (1.23 and 2.2 acres) each supported two territories. Muiznieks *et al.* (1994) also reported groups of territorial *E. t. extimus* in habitat patches of approximately one to several hectares.

The nest is a compact cup of fiber, bark, and grass, typically with feathers on the rim, lined with a layer of grass or other fine, silky plant material, and often has plant material dangling from the bottom (Harrison 1979). It is constructed in a fork or on a horizontal branch, approximately 1–4.5 m (3.2–15 feet) above ground in a medium-sized bush or small tree, with dense vegetation above and around the nest (Brown 1988, Whitfield 1990, Muiznieks *et al.* 1994).

The southwestern willow flycatcher is present and singing on breeding territories by mid-May, although its presence and status is often confused by the migrating individuals of northern subspecies passing through *E. t. extimus* breeding habitat [D. Kreuper, Bureau of Land Management (BLM), unpubl. data]. The southwestern willow flycatcher builds nests and lays eggs in late May and early June and fledges young in early to mid-July (Willard 1912, Ligon 1961, Brown 1988, Whitfield 1990, Sogge and Tibbitts 1992, Sogge *et al.* 1993, Muiznieks *et al.* 1994). Some variation in these dates has been observed (Carothers and Johnson 1975, Brown 1988, Muiznieks *et al.* 1994) and may be related to altitude, latitude, and renesting.

The southwestern willow flycatcher is an insectivore. It forages within and above dense riparian vegetation, taking insects on the wing or gleaning them from foliage (Wheelock 1912, Bent 1960). It also forages in areas adjacent to nest sites, which may be more open (M. Sogge, National Biological Survey, pers. comm. 1993). No information is available on specific prey species.

The migration routes and wintering grounds of *E. t. extimus* are not well known. *Empidonax* flycatchers rarely sing during fall migration, so that a means of distinguishing subspecies is not available (Blake 1953, Peterson and Chalif 1973). However, willow flycatchers have been reported to sing and defend winter territories in Mexico and Central America (Gorski 1969, McCabe 1991). The southwestern willow flycatcher most likely winters in Mexico, Central America, and perhaps northern South America (Phillips 1948, Peterson 1990). However, the habitats it uses on wintering grounds are unknown. Tropical deforestation may restrict wintering habitat for this and other neotropical migratory birds (Finch 1991, Sherry and Holmes 1993).

Breeding bird survey data for 1965 through 1979 combined the willow and alder flycatchers into a "Traill's flycatcher superspecies", because of taxonomic uncertainty during the 15-year reporting period. These data showed fairly stable numbers in central and eastern North America but strong declines in the West, the region including the range of the southwestern willow flycatcher, and where the alder flycatcher is absent (Robbins *et al.* 1986).

Unitt (1987) reviewed historical and contemporary records of *E. t. extimus* throughout its range, determining that it had "declined precipitously," and that "although the data reveal no trend in the past few years, the population is clearly much smaller now than 50 years ago, and no change in the factors responsible for the decline seem likely." Data are now available that indicate continued declines, poor reproductive performance, and/or continued threats for most remaining populations (Brown 1991, Whitfield and Laymon, Kern River Research Center, *in litt.* 1993, Sogge and Tibbitts 1992, Sogge *et al.* 1993, Muiznieks *et al.* 1994).

Previous Federal Actions

The Service included the southwestern willow flycatcher on its Animal Notice of Review as a category 2 candidate species on January 6, 1989 (54 FR 554). A category 2 species is one for which listing may be appropriate but for which additional biological information is needed. After soliciting and reviewing additional information, the Service elevated *E. t. extimus* to category 1 candidate status on November 21, 1991 (56 FR 58804). A category 1 species is one for which the Service has on file substantial information to support listing, but for which a proposal to list has not been issued because it is precluded at present by other listing activity.

On January 25, 1992, a coalition of conservation organizations (Suckling *et al.* 1992) petitioned the Service, requesting listing of *E. t. extimus* as an endangered species under the Act. The petitioners also requested emergency listing and designation of critical habitat. On September 1, 1992, the Service published a finding (57 FR 39664) that the petition presented substantial information indicating that listing may be warranted and requested public comments and biological data on the species. On July 23, 1993, the Service published a proposal (58 FR 39495) to list *E. t. extimus* as endangered with critical habitat, and again requested public comments and biological data on the southwestern willow flycatcher.

Summary of Comments and Recommendations

In the July 23, 1993, proposed rule (58 FR 39495) and associated notifications, all interested parties were requested to submit comments or information that might bear on whether to list the southwestern willow flycatcher. The comment period was originally scheduled to close October 21, 1993, then was extended to November 30, 1993. Appropriate State agencies, county governments, Federal agencies, scientific organizations, and other interested parties were contacted and requested to comment. Newspaper notices inviting public comment were published in the following newspapers; In California, *Los Angeles Times, L.A. Watts Times, Kern Valley Sun,* and *San Diego Union-Tribune;* in Arizona, *Arizona Daily Sun, Arizona Republic, Tucson Daily Citizen, White Mountain Independent,* and *Arizona Daily Star;* in New Mexico, *Albuquerque Journal, Albuquerque Tribune, Santa Fe New Mexican, Carlsbad Current-Argus, Silver City Daily Press;* in Nevada, *Las Vegas Sun;* in Colorado, *Durango Herald;* in Utah, *Daily Spectrum;* and in Texas, *El Paso Times.* The inclusive dates of publications were August 31 through September 13, 1993, for the initial comment period and October 28 through November 5, 1993, for the public hearings and extension of public comment period.

The Service held six public hearings. Because of anticipated interest in the proposed rule, the Service announced its intention to hold at least three public hearings. In response to requests from the public, three additional hearings were scheduled. A notice of the hearing dates and locations was published in the Federal Register on October 18, 1993 (58 FR 53702). Approximately 424 people attended the hearings. About 17 people attended the hearing in Tucson, Arizona; 27 in Flagstaff, Arizona; 10 in Las Cruces, New Mexico; 12 in Albuquerque, New Mexico; 350 in Lake Isabella, California; and 8 in San Diego, California. Transcripts of these hearings are available for inspection (see **ADDRESSES**).

A total of 3,102 written comment letters were received at the Service's Ecological Services State Office in Arizona: 264 supported the proposed listing; 2,650 opposed the proposed listing; and 188 expressed neither support nor opposition, but either commented on information in the proposed rule, provided additional information, or were non-substantive or irrelevant to the proposed listing.

Oral or written comments were received from 62 parties at the hearings: 8 supported the proposed listing; 40 opposed the proposed listing; and 14 expressed neither support nor opposition but provided additional information, or were non-substantive or irrelevant to the proposed listing.

In total, oral or written comments were received from 31 Federal and State agencies and officials, 17 local officials, and 3,116 private organizations, companies, and individuals. All comments received during the comment period are addressed in the following summary. Comments of a similar nature are grouped into a number of general issues.

Issue 1: The American Ornithologists' Union (AOU) did not list *E. t. extimus* in its latest Checklist of North American Birds; Unitt (1987) could not distinguish *E. t. extimus* by color or morphology; genetic analysis is necessary to distinguish subspecies; significant disagreement exists among scientists regarding taxonomy, for example, McCabe (1991) did not recognize *E. t. extimus;* the willow flycatcher subspecies, in fact the North American *Empidonax* flycatcher species are too difficult to distinguish to make it reasonable to list subspecies of those species; hybridization of the willow flycatcher subspecies occurs; subspecies are not worth listing; *E. t. extimus* is a subspecies of a very common species; *E. t. extimus* is not worth listing because it is one of nine common species in the genus *Empidonax;* this subspecies and subspecies in general are of minor ecological value; their loss would be unimportant; there is little value in preserving rare species/subspecies; and historical taxonomic questions may confuse population trend information.

Service Response: The Service has determined that *E. t. extimus* is a valid taxon. The Service relies on the most current and authoritative data available in making decisions regarding the validity of species, subspecies, or distinct vertebrate population segments. These data include articles published in professional journals, agency reports, and other unpublished data provided by researchers. For the southwestern willow flycatcher, the Service reviewed this information and found a majority opinion that *E. t. extimus* is a valid subspecies. Authorities who critically examined the taxonomy of *E. traillii* and recognized *E. t. extimus* include Phillips (1948), Aldrich (1951), Hubbard (1987), Unitt (1987), and Browning (1993). Other authorities accepting the subspecies include Behle and Higgins (1959), Phillips *et al.* (1964), Bailey and Niedrach (1965), Oberholser (1974), Monson and Phillips (1981), Harris *et al.* (1987), Schlorff (1990), Whitfield (1990), Brown (1991), Harris (1991), Western Foundation for Vertebrate Zoology *in litt.* 1993, University of California *in litt.* 1993. The AOU (1983) did not list subspecies of any bird, including the willow flycatcher, in its 1983 Checklist of North America Birds. However, this does not indicate a lack of recognition of *E. t. extimus,* or for the concept of subspecies. The preface to the 1983 Checklist states "The Committee

strongly endorses the concept of the subspecies * * * and we wish to make it clear that the omission of separate listings of subspecies in this edition is not a rejection of the validity or utility of this systematic category * * *."

The Service noted McCabe's (1991) consideration of the willow and alder (*E. alnorum*) flycatchers as a single species, and his reluctance to recognize willow flycatcher subspecies. McCabe (1991) provides a thorough review of the history of *E. alnorum* and *E. traillii* taxonomy, and the questions of ecological, morphological, and song-type distinction on which this taxonomic evaluation has been based. However, the Service agrees with Sedgwick's (1993) comments and McCabe's own observation that McCabe (1991) contrasts with the majority opinion regarding taxonomy of the willow and alder flycatchers.

After examining 305 study skins, Unitt (1987) found that while four subspecies (*E. t. traillii, E. t. adastus, E. t. brewsteri,* and *E. t. extimus*) could be tentatively separated by the "75 percent rule" using overall size (wing and tail lengths and their ratios to one another), these criteria were not satisfactorily conclusive. However, he found that the subspecies could be satisfactorily distinguished, under the "75 percent rule," using color, wing formula (relative lengths of primary wing feathers), or both. Browning (1993) examined 270 specimens and found that all four subspecies, and a fifth (*E. t. campestris*) were distinguishable by color.

The Service acknowledges that taxonomy of *E. traillii* races continues to pose questions and may be revised in the future. The Service has determined that *E. t. extimus* is a sufficiently distinct entity to be listed under the Act at the very least as a distinct vertebrate population [50 CFR § 424.02(k)]. However, the Service accepts the majority opinion that *E. t. extimus* is a valid subspecies and lists it as such.

The Service considers taxonomic distinctness in assigning priorities for species listings, but not in determining whether or not to list species. The Act authorizes listing of species, subspecies, or distinct population segments, all of which have ecological significance.

Issue 2: The southwestern willow flycatcher is not a riparian obligate species. It also occurs in open prairie woodlots, dry and brushy pastures, and brushy fields or slopes. No surveys of dry habitats have been done to prove riparian obligacy. The southwestern willow flycatcher does not "invariably" nest near surface water.

Service Response: The Service is unaware of any study, report, or species account that describes *E. t. extimus* as anything but a riparian obligate. No commenter provided data, studies, or reports indicating that *E. t. extimus* nests outside riparian habitats. Several commenters cited field guides which describe the willow flycatcher (all subspecies) as occurring "* * * in drier situations (than the alder flycatcher) * * *" (Peterson 1990), "* * * on brushy slopes * * *" (Robbins *et al.* 1983), and "* * * dry, brushy upland pastures * * *" (National Geographic Society 1990). The Service believes that field guide species accounts do not constitute the best available scientific information on biology, ecology or habitat requirements. Field guide accounts tend to be brief and generalized, and in this case represent habitat use of other willow flycatcher subspecies, which occur in more mesic regions. Similarly, Barlow and McGillivray's (1983) description of willow flycatchers *(E. t. campestris/traillii)* selecting "* * * a more xeric upland habitat * * *" in Ontario, Canada, is not considered relevant to habitat selection of *E. t. extimus* in the desert Southwest. In the wetter climates of the north, upper midwest, and northeast, habitat conditions of moist soil or surface water, supporting thickets of deciduous shrubs and trees, are not restricted to riparian areas. However, in the arid Southwest where *E. t. extimus* occurs, these conditions are limited to riparian areas, usually in profound contrast to the adjacent and prevailing desert conditions. Various authors (*e.g.*, King 1955) have noted that while willow flycatchers may nest away from riparian areas in the north and east, in arid regions (the ranges of *E. t. brewsteri* and *E. t. extimus* particularly) the species is restricted to riparian habitats. Regarding the presence of surface water during the breeding season, new information was provided indicating that some nest sites have surface water in close proximity early in the breeding season, which recedes underground by the end of the breeding season. At these sites, the water table remains at least high enough to sustain riparian vegetation. The Service is unaware of any surveys performed in non-riparian habitats specifically to verify the absence of nesting *E. t. extimus*. However, the Service relied on local, State, and regional species accounts of distribution and habitat use, none of which describe occurrence outside of riparian habitats.

Issue 3: The loss and modification of southwestern riparian habitat is overstated, poorly documented, and does not constitute a threat to the flycatcher; the statement that 90 percent loss of riparian habitat has occurred is inaccurate and an exaggeration; riparian habitat has not decreased, but increased as a result of diversions, irrigation, etc; habitat has increased, not decreased, in local area(s) over the past 20 years; riparian regeneration is approaching 1,000 percent in southeastern Arizona; Hastings and Turner (1965) show that cottonwood riparian habitat has increased in southeastern Arizona; the upper San Pedro River is recovered, not "unsuitable and unoccupied" as the Service claimed; because tamarisk has increased, and *E. t. extimus* uses tamarisk, tamarisk invasion does not constitute modification of habitat, but expansion of habitat; population declines in the past 20 years are concurrent with improved riparian habitats, so no correlation exists between trends in habitat and populations; the proposal fails to support claims that urban development, agriculture, and livestock grazing are harmful to the flycatcher.

Service Response: The Service has determined that the documentation of loss and modification of southwestern riparian habitats, cited in this final rule, is adequate. Regarding the "90 percent loss and modification" statement, the proposed rule stated that "* * * *as much as* 90 percent * * *" (emphasis added) has been lost or modified. The actual percentage lost or modified is not expected to be consistent across the region, but should vary with elevation, rainfall, geographic area, relative size of drainage system, and severity of impacts. Loss and modification may be lesser at higher elevations, where precipitation is greater and evaporation less. In most major lower elevation desert riparian systems, loss or modification may in fact be near 100 percent, *e.g.*, the lower Colorado, lower Gila, lower Rio Grande, and lower Salt Rivers. Because "modification" includes alterations in flow regimes, channel confinement, changes in water quality, and floristic makeup of riparian systems, the Service believes it is not a misrepresentation to state that up to 90 percent of southwestern riparian ecosystems have been lost or modified.

Commenters stating that riparian habitat has not decreased, but increased as a result of diversions and irrigation, presented no supporting information. The Service recognizes that some diversions, particularly unmaintained irrigation ditches, sometimes support riparian vegetation. However, the Service believes diversion and irrigation result in a net loss of riparian habitat.

Where riparian vegetation becomes established along irrigation systems, it is often cleared away at regular intervals. Where it is not, it is sometimes because an artificially created riparian/wetland habitat is being maintained as mitigation or compensation for loss of natural riparian habitat elsewhere.

The Service recognizes that in some local areas in recent decades, riparian habitat has been rehabilitated or increased, not decreased. However, the Service accepts the consensus of literature cited in this rule that the overall trend continues to be one of habitat loss.

Hastings and Turner (1965) and Bahre (1991) noted that riparian habitats were already significantly altered by the turn of the last century. Hastings and Turner (1965) also noted that all major watercourses in southern Arizona suffered entrenchment and became more ephemeral in flow in approximately 1890. Land use practices that had already affected riparian habitats in this Arizona-Mexico border region included livestock grazing, woodcutting, and water diversion; climatic changes may also have contributed. The differences between the historic and more recent photographs show some riparian recovery, concurrent with reductions in livestock stocking levels from their highs in the late 1800's. No data, or elaboration, were presented to support statements that riparian regeneration is approaching 1000 percent in southeastern Arizona.

As this final rules discusses, *E. t. extimus* sometimes nests in tamarisk, but does so at lower densities, and apparently at lower success rates than in native vegetation (Hunter *et al.* 1988, Sogge *et al.* 1993, Muiznieks *et al.* 1994). Therefore, tamarisk invasion likely represents replacement of native habitat with lower-quality habitat, rather than an increase in habitat availability. Only in a few unique situations does tamarisk truly represent "new" habitat. For example, in the Grand Canyon flycatchers nest in a "new" riparian habitat, dominated by tamarisk (Carothers and Brown 1991). This new riparian habitat became established in the historic flood-scour zone of the Colorado River, after construction of Glen Canyon Dam eliminated annual scouring floods. However, flycatchers nest in this area in low numbers (Brown 1991, Sogge and Tibbitts 1992, Sogge *et al.* 1993) and have low nesting success. It is noteworthy that by forming Lake Powell, Glen Canyon Dam also inundated habitat in Glen Canyon. The southwestern willow flycatcher was described as a common nester in Glen Canyon prior to inundation (Behle and Higgins 1959, Behle 1985), indicating that this historic habitat was of higher quality than the new habitat in Grand Canyon.

Issue 4: The flycatcher has always been a rare bird, so its rarity now is no change from historical situations; historical specimens are few, indicating the bird was always rare; population data are insufficient to show decline; population data are suspect, developed by parties with agendas of land control/acquisition; the flycatcher is not declining in all areas; historical taxonomic questions may confuse population trend information; accuracy or existence of population trend data for the last 50 years is questionable; population sampling techniques were not discussed; these could bias trend studies; population data are incomplete; the proposal relies on data reflecting loss of habitat rather than comprehensive population trend analysis; there are no recent collections of *E. t. extimus* from southern Arizona riparian areas.

Service Response: The Service agrees that the flycatcher has probably always been sparsely distributed, as a function of the sparse distribution of its wetland habitat in a predominantly xeric region. However, sparse distribution and rarity are not necessarily equivalent. At individual locales the flycatcher may occur in considerable numbers, as indicated by Herbert Brown's collection of 36 nests near Yuma in 1902, and the persistence of several populations of considerable numbers (30–40 pairs) in relatively small areas like the Kern River Preserve in California (Harris *et al.* 1986, Whitfield 1990). Although *E. t. extimus* habitat is rare, where it is present nesting pairs may occur in relatively high densities. This phenomenon has caused some authors to describe *E. t. extimus* as something of a colonial nester (*e.g.*, Unitt 1987).

Regarding the lack of historic or recent specimens available from various parts of the bird's range, the Service notes that specimen collection is largely a function of collecting activity, not simple presence of the subject.

The Service agrees that, as with many non-game species, population trend data are incomplete. No wide scale, and few local studies have been funded or undertaken to track this species through time. Comprehensive, long-term population data are not necessarily required for making listing determinations. Rather, these decisions often rest upon data on loss and modification of habitat and other threats, which are reasonably assumed to result in population declines. In many cases, population declines are inferred from decline in habitat availability. However, in this and other listing determinations, the Service seeks to measure such inference against whatever population trend data are available. Regarding concerns over sources of these data, the Service endeavors to verify accuracy and credibility of data. The reports published by government agencies, academic institutions, and professional journals on which this determination is based are accepted as credible. To interpret population trends in the light of changing taxonomic status, the Service considered all information for willow flycatchers in the current range of *E. t. extimus* to be relevant.

Issue 5: Livestock grazing is not a threat to *E. t. extimus* or its habitat; Montgomery *et al.* (1985) found 53 singing birds in a grazed area in New Mexico; on Marine Corps Base Camp Pendleton, *E. t. extimus* is increasing where sheep graze; nest disturbance by cattle is unsubstantiated; southwestern flora evolved with large grazing ungulates; the proposed rule lacks examples of flycatcher status improving with reduction in livestock or improved livestock management; *E. t. extimus* is not improving in areas with no grazing; the proposed rule equates any livestock grazing with overgrazing, and fails to distinguish between overgrazing and well-managed grazing; proper livestock management is compatible with healthy riparian habitat; some level of livestock grazing is compatible with/necessary for healthy riparian ecosystems; willows are brush, which cattle don't eat, but cattle are blamed for both brush encroachment and brush destruction; cattle trample stream banks, which allows water to escape, creating more riparian habitat; livestock grazing prevents urbanization of land, which would have a greater impact on riparian habitats.

Service Response: The proposed and final rules discuss overuse by livestock as a threat to *E. t. extimus*, through impacts on riparian habitat. The Service recognizes that what constitutes "overuse" varies with differing riparian ecosystems, elevation, type of livestock, seasonality of use, and other factors. The Service believes that some livestock grazing regimes are likely to be found compatible with rehabilitation and maintenance of *E. t. extimus* habitat.

Montgomery *et al.* (1985) did not determine whether the willow flycatchers they detected on grazed land were resident *E. t. extimus* or migrating individuals of other subspecies. Further, neither grazing intensity nor nesting

success were quantified, so that no correlations can be made. On Camp Pendleton, increases in *E. t. extimus* were concurrent with livestock (sheep) grazing but also with an extensive cowbird trapping program (Griffith and Griffith 1993). Finally, as discussed in this rule, examples exist of *E. t. extimus* (and other *E. traillii* subspecies) numbers and habitat increasing as a result of grazing reductions or other improvements in livestock management.

The Service recognizes that southwestern riparian ecosystems evolved with native grazing ungulates (*e.g.*, deer and elk). However, domestic livestock do not forage, herd or move in the same manner as native species. Further, elk occur at higher elevations of the Southwest, and are absent from the lowland river systems that constitute the majority of *E. t. extimus* habitat.

Issue 6: Timber harvesting is not a threat to the flycatcher's riparian habitat.

Service Response: The proposed rule noted that the petitioners claimed timber harvest caused watershed changes which could result in damage to riparian habitats through increasing intensity and frequency of floods. The petitioners presented no specific information on this claim. A number of experimental treatments on Southwestern forested watersheds have demonstrated increased peak and flood flows as a result of timber harvest (Tecle 1991). The degree to which timber harvesting has affected riparian habitats inhabited by the willow flycatcher, however, has not been quantified and is unknown. The Service did not implicate timber harvesting in the proposed rule as a major cause of riparian habitat loss. Rather, it pointed to that activity as one of many factors potentially responsible for riparian habitat loss and modification. Pending new information demonstrating otherwise, the Service still considers timber harvesting a potential threat to riparian habitat through loss and modification. However, the Service does not believe that this threat exists rangewide, nor does it believe that timber harvesting alone is responsible for riparian habitat loss or the endangered status of the southwestern willow flycatcher.

All causal factors will be addressed in the recovery planning process, and through the Act's section 7 consultation process, through which Federal agencies will be responsible for evaluating the effects of activities such as timber harvest on the flycatcher's riparian habitat.

Issue 7: Water impoundments have been beneficial, not detrimental; fluctuating flows below dams are not detrimental, in fact have increased riparian habitat (Glen Canyon Dam resulted in creation of riparian habitat in Grand Canyon); impoundments protect habitat by preventing catastrophic floods; the proposal had inadequate discussion of water impoundments as threat.

Service Response: As discussed elsewhere in this final rule, water impoundments have a variety of effects on riparian habitats. The Service has determined that, with respect to *E. t. extimus*, the net effect of these influences is negative. For example, Glen Canyon Dam eliminated massive annual scouring floods in the Grand Canyon. This resulted in the development of a new riparian zone dominated by tamarisk (Carothers and Brown 1991). However, flycatchers nest there in very low numbers and with low nesting success (Brown 1991, Sogge and Tibbitts 1992, Sogge *et al.* 1993). In contrast, *E. t. extimus* was described as a common nester in Glen Canyon (Behle and Higgins 1959, Behle 1985), prior to its inundation by Lake Powell.

Issue 8: Comments concerning the ecology of cowbirds and cowbird parasitism included the following: Breeding Bird Survey (BBS) data indicate that cowbirds have declined, not increased; the claim that cowbirds are associated with livestock is not supported; cowbirds are associated with deer and elk, not cows; the cowbird threat is a natural one; there is inconclusive evidence that cowbird increases are directly connected with livestock grazing; cowbird parasitism of *E. t. extimus* is known in areas without livestock grazing (*e.g.*, Grand Canyon, Kern River); there is no correlation between livestock grazing in riparian areas and cowbird parasitism; Taylor (1986) showed that cowbirds were most abundant in areas with long-term livestock exclusion; because flycatchers and cowbirds are positively associated (they tend to occur together), flycatchers can coexist with cowbirds; there is inconclusive evidence that cowbird parasitism is responsible for declines in nesting success; cowbirds have increased as a result of increases in bird feeders, campgrounds, etc. and increases in wintering food/habitat; the proposed rule cited no studies that documented cowbird parasitism of *E. t. extimus;* citations regarding parasitism of other species are irrelevant. Section 4(a)(1)(E) of the Act allows listing species because of "* * * natural or manmade factors affecting its continued existence * * *."

Service Response: Cowbird numbers appear to be declining only in the northeastern United States and southeastern Canada. Through the 27 years of the BBS, cowbird populations have remained fairly stable, with a small increase in the 1970's, small decrease in the 1980's, and slight increase in recent years; however, the West has experienced a marked population increase over the last five years (Wiedenfeld 1993).

The association of cowbirds with domestic livestock is detailed in the sources cited in this final rule. The Service has neither found nor been provided information indicating that cowbirds are associated with deer or elk. Other factors, including habitat fragmentation and urban/suburban feeding, are likely to have contributed to increases in cowbirds. These causal factors will be important to address in the section 7 consultation process and the development of recovery actions. However, it is the threat of parasitism, regardless of cause, that in part necessitates listing.

Where high parasitism rates are found in *E. t. extimus* nesting locations in areas with no livestock grazing at the nest site, there have been livestock nearby that provide feeding sites in close enough proximity to facilitate cowbird parasitism. Cowbirds may disperse up to 7 kilometers (km) from their daily feeding/roosting sites to areas with host species (Rothstein *et al.* 1984). At the Kern River Preserve, the riparian habitat supporting *E. t. extimus* is not grazed, but the immediately adjacent lands are. Similarly, although livestock grazing does not occur in Grand Canyon National Park, open range grazing and an introduced bison herd occur on adjacent lands. Further, cowbirds concentrate at pack animal corrals at various points within the National Park (Johnson and Sogge 1993). Thus, flycatcher habitat may be ungrazed but still be affected by cowbirds, by having livestock concentrations nearby to serve as cowbird feeding sites.

Cowbirds and *E. t. extimus* are positively associated because cowbirds require, and therefore associate with, prospective hosts. The Service finds that extensive information indicates cowbird parasitism negatively affects the southwestern willow flycatcher. This information includes specific examples of parasitism of *E. t. extimus*, cited in this rule, and examples of the effects of cowbird parasitism on other rare species of limited habitat. Recent information continues to document high parasitism rates for *E. t. extimus* (Sogge *et al.* 1993, Muiznieks *et al.* 1994), and increases in flycatcher reproduction or populations, concurrent with reductions in cowbird numbers (Griffith and Griffith 1993, M. Whitfield *in litt.*—1993).

Issue 9: Tamarisk is not an invader species, but a successional stage, becoming established on recently-scoured areas; livestock do eat tamarisk for its salt content; the Service needs to clarify the positive and negative characteristics of tamarisk; tamarisk increases habitat availability, in fact provides high-quality bird habitat.

Service Response: The Service found no information, and was not provided any information by commenters, indicating that tamarisk is primarily a successional stage vegetation type, rather than an invasive exotic. This final rule presents an updated discussion of tamarisk ecology, supported by additional literature references. The Service concurs with the consensus among published authorities that tamarisk is an invasive, usually dominant exotic plant, not a successional species. Commenters that stated livestock eat tamarisk for its salt content provided no supporting information. The Service's understanding of the literature is that cattle prefer native species over tamarisk for forage.

As discussed in this rule, *E. t. extimus* has been documented nesting in tamarisk at elevations above approximately 625 m (2000 feet). Rather than attempt to present criteria here for when tamarisk eradication presents a threat or a positive recovery action, the Service will address this issue on a case-by-case basis through the section 7 consultation process with other Federal agencies. This will allow Federal agencies the flexibility to consider individual cases in the light of the specific circumstances surrounding each one.

Although Brown and Trosset (1989) suggested that tamarisk provided an "ecological equivalent" to native vegetation, they qualified this statement. They noted that their study involved small sample sizes, and that their methods differed from Whitmore's (1975, 1977), which was their basis for comparison with native riparian habitats. Further, Brown and Trosset (1989) noted that this "ecological equivalent" function may be most significant where tamarisk became established where no native riparian vegetation existed previously (*e.g.*, the Colorado River in Grand Canyon).

Issue 10: Herbert Brown's collection of 36 nests with eggs from the lower Colorado River, in 1900 and 1902, indicates overcollection for science may have caused declines.

Service Response: The effects of Brown's collections on populations over 90 years ago are unknown. These effects may have been significant. However, Brown's collections themselves may suggest that populations at that time could sustain such collecting pressure. The origin of Brown's collections from several specific locales suggests that *E. t. extimus* was an abundant nesting bird in the area of the confluence of the Gila and Colorado rivers. Collection of 36 nests would have impacted reproduction alone, only for 1902, when all but one of the nests was collected. Considering continued habitat loss, and increasing cowbird populations since 1902, the Service does not believe that Brown's collection of 36 nests with eggs in 1900 and 1902 significantly affects *E. t. extimus* populations in 1995. However, the Service believes that current flycatcher populations are unlikely to be able to sustain collecting pressures like Brown's activities of 1902. In 1993, extensive surveys of the region of Brown's collections located only four to five territories (Muiznieks *et al.* 1994).

Issue 11: Drought has impacted habitat.

Service Response: The Service recognizes that extended droughts are likely to have impacted *E. t. extimus* through habitat reduction. This natural phenomenon and human-induced habitat impacts may exacerbate one another's effects on *E. t. extimus* habitat.

Issue 12: Predators such as snakes, hawks, ravens, grackles, and domestic cats are threats to *E. t. extimus.*

Service Response: The Service agrees that these constitute potential predators of songbirds, including *E. t. extimus.* While predation would not normally be expected to be a major threat to the flycatcher, its populations may be so low currently that they cannot withstand normal predation. Further, several of these types of predation may be facilitated by habitat alteration or other human actions. Therefore, the Service will address predation in recovery planning, and other Federal agencies should consider the effects of their actions on some of these forms of predation.

Issue 13: Hikers, elk, deer, and beaver are threats to flycatcher nests and habitat; listing would cause restrictions on fishing and water recreation.

Service Response: No information was provided to support statements that hikers constitute a threat to *E. t. extimus.* This rule briefly discusses possible impacts of recreation on *E. t. extimus* and its habitat. These impacts are expected to be primarily effects on vegetation through soil compaction, clearing vegetation, and creating trails. Because *E. t. extimus* is not a timid species, disturbance is expected to be an impact only when continuous intrusive activities take place near habitat, or when recreation takes place within or adjacent to the nest stand. Because nest stands tend to be very dense, virtually impenetrable thickets, often with swampy conditions, recreational impacts are not expected to occur often.

Elk and deer use riparian habitats for foraging, but generally behave differently than domestic livestock. They tend not to occur in large concentrations and remain in riparian areas for long periods like domestic cattle. The Service is aware that elk can impact riparian systems when their numbers reach high levels. However, elk are lacking from the majority of southwestern willow flycatcher habitats, because these riparian areas occur at lower elevations than elk. Beaver cut and use willow and cottonwood, but may also be important in creating quiet-water riparian habitats by damming smaller and steeper creeks.

Issue 14: The presence of unoccupied habitat indicates that *E. t. extimus* is not currently habitat limited.

Service Response: As discussed in this rule, the Service has determined that *E. t. extimus* has suffered extensive habitat loss, which is complicated by the current low number of flycatchers, and reduction of reproductive output due to brood parasitism by brown-headed cowbirds. The current existence of apparently suitable habitat that is not occupied by *E. t. extimus* more likely indicates that its numbers are too low to fill all available habitat. Further, habitat exists in isolated, fragmented patches. With low population numbers and inhibited reproduction, *E. t. extimus* may be unable to maintain local populations, much less be able to disperse and colonize unoccupied locales.

Issue 15: Cowbird parasitism is the main threat to *E. t. extimus*, not habitat loss; cowbird control is the primary recovery need, not habitat protection; cowbird trapping would eliminate the need for designating critical habitat; the Service should implement and fund cowbird control programs instead of listing.

Service Response: The Service has determined that cowbird parasitism is one of several primary threats to *E. t. extimus*, which also includes the loss and modification of habitat. Cowbird parasitism and loss and modification of habitat are interrelated. Cowbird parasitism is a function not just of cowbird abundance, but also habitat quality. Potential host species in degraded, fragmented habitat are more susceptible to nest parasitism than those nesting in larger tracts of dense, contiguous habitat. Cowbird parasitism

will probably remain an imminent threat until habitat rehabilitation is accomplished. The Service acknowledges that cowbird control should be an immediate, high priority recovery action. However, cowbird control is a "stop-gap" action. Rehabilitating riparian habitat to make *E. t. extimus* and other riparian birds less susceptible to cowbird parasitism will be necessary for a long-term solution. Ultimately, the ranking of threats in order of severity is not relevant to the listing question. It is because a number of often interdependent threats exist that listing *E. t. extimus* is necessary. Ranking threats in order of severity and addressing them accordingly will be part of the recovery process.

Issue 16: Willow flycatchers nesting in the northern States, Alaska, and Canada are subspecies other than *E. t. extimus*. The boundaries of the breeding range of *E. t. extimus* should be expanded to include the Santa Ynez River in California, and the Green and Colorado River systems in west-central Utah; *E. t. extimus* does not occur in Utah, Colorado, or the Carson National Forest in northern New Mexico; the willow flycatcher is common in the northern States, Alaska, Canada, most of the U.S., Mexico and Panama; caution should be exercised in defining range limits of the subspecies, including elevational limits.

Service Response: Two primary authorities (Unitt 1987, Browning 1993) provide the range limits of *E. t. extimus* identified in this rule (see Figure 1). The Service also considered other information, such as historical nesting records, habitat characteristics, and proximity to neighboring populations of *E. t. extimus* or other willow flycatcher subspecies. Using this information, the Service provisionally defines the northwestern limit of the subspecies' range to be the Santa Ynez River in California. Willow flycatchers nesting along the Santa Ynez River occupy lowland riparian habitat similar to other coastal California locations of *E. t. extimus*, and few willow flycatcher (i.e., *E. t. brewsteri*) nesting locales are known in coastal California for a considerable distance north of the Santa Ynez River.

Browning (1993) found no evidence of intergrades between *E. t. extimus* and *E. t. adastus* in Utah. The northern limit of *E. t. extimus* in Utah is believed to correspond closely to the area comprising the following counties: Garfield, Kane, San Juan, Washington, and Wayne. This area takes in stretches of riverine riparian habitat in southern Utah that have historical records of flycatchers and that still have potential willow flycatcher habitat.

The Service recognizes that taxonomic questions may arise concerning flycatchers occupying some high-elevation locales within the range of *E. t. extimus*. Because the genetic relatedness of willow flycatchers breeding at some high elevation areas, such as the White Mountains of Arizona, may be substantial, willow flycatchers in those locales should be considered *E. t. extimus* until further research demonstrates otherwise. Protection of these breeding groups could be critical for population recovery, immigration, and exchange of genetic material within a highly-fragmented landscape.

Issue 17: It is inappropriate to use data from *E. t. brewsteri* and *E. t. adastus* to support listing *E. t. extimus;* information cited on livestock damaging nests comes from other subspecies.

Service Response: The Service carefully considered the propriety of using information on other willow flycatcher subspecies in evaluating the listing question for *E. t. extimus*. In applying such information, the Service considered ecological similarities and dissimilarities between the subspecies. The Service believes that data from other subspecies are applicable in some cases, but not others. The Service has identified which subspecies provided data sources throughout the proposed and final rules. The phenomenon of livestock damaging nests and/or contents through physical contact is known for willow flycatcher subspecies other than *E. t. extimus*. This threat was noted to recognize that the potential exists, where nests occur low enough in vegetation or in other vulnerable locations, that livestock, humans, or other animals may contact them or the nest plant.

Issue 18: Habitat in California was lost to urbanization, not livestock; the proposed rule had inadequate discussion of urban and suburban development as a threat; urban development is not a threat to some populations.

Service Response: Loss and modification of the riparian habitat of *E. t. extimus* is the result of numerous factors, discussed in depth in this rule. Not all these factors have affected all riparian habitats, and some rare habitats remain unaffected. Further, the degree to which these factors influence riparian habitat varies across the landscape. Urban and suburban development has certainly impacted some *E. t. extimus* habitats. These impacts may result from direct encroachment and channelization of riparian habitats, as in coastal southern California and central Arizona. Urban and suburban development also increase demands on river systems for water and hydropower. Thus, expanding urban centers can result in dewatering or alteration of riparian systems tens or hundreds of miles away. For example, the water and power demands of Los Angeles, Phoenix and Las Vegas result in effects on the Colorado River hundreds of miles from any of these cities.

Issue 19: The primary threat to *E. t. extimus* is loss of wintering habitat in Central and South America, or other factors along migration routes; the proposed rule contained insufficient information on migration studies; protecting breeding grounds is not logical, because *E. t. extimus* spends eight months of the year in migration or on wintering grounds.

Service Response: Although tropical deforestation possibly may restrict wintering habitat of the willow flycatcher, the best available current information on the subject suggests otherwise. The limited data on willow flycatcher wintering habitat indicates that this species uses "* * * brushy savannah edges and second growth" in Costa Rica (Stiles and Skutch 1989); in Panama it has been documented in "shrubby areas" (Ridgely 1981); and in South America it has been documented in "* * * shrubby clearings, pastures, and lighter woodland" or "* * * on islands with early successional growth" (Ridgely and Tudor 1994). Given existing land use practices in Central and South America, which are characterized by conversion of old-growth forested habitat to agricultural and second-growth habitats, few if any of the winter habitat types in which willow flycatchers have been documented should currently be in jeopardy.

Issue 20: The Service cannot define nesting habitat; habitat requirements are poorly understood; the proposed rule's description of nesting habitat is flawed and inadequate to direct management; the minimum patch size necessary to support a nesting pair of *E. t. extimus* is 1 to 1.5 hectares.

Service Response: The Service believes the proposed rule and this final rule accurately compile and summarize the existing information on *E. t. extimus* nesting habitat, and that information is sufficient to identify, conserve, and recover the riparian ecosystem of which *E. t. extimus* is a part. Habitat patches occupied by *E. t. extimus* vary somewhat in size, floristic composition, vegetation structure, and type of wetland. Therefore, the Service believes it is inappropriate and inaccurate to

narrowly define suitable habitat in terms of plants per unit area, vegetation density, specific plant community composition, type and volume of surface water, and patch size. The Service has no information to indicate inaccuracy or inadequacy of the habitat description presented in this rule. Specifically regarding patch sizes, one to two *E. t. extimus* pairs have been observed nesting in habitat patches of 0.5 ha (Sogge *et al.* 1993, Sogge *et al.* unpubl. 1994 data); therefore 1.0 to 1.5 ha is not an accurate estimate of the minimum patch size needed to support a single nesting pair.

Issue 21: Habitats used by nesting pairs differ from those used by single, unmated, wandering, or migrant flycatchers; the latter face minimal threats and are not essential to conservation of the species.

Service Response: The commenters provided no data supporting the statement that habitats used by unpaired *E. t. extimus* differ from nesting habitat, and the Service found no indication of this in the available literature. Unmated, resident *E. t. extimus* have been found in habitats identical to nearby habitats occupied by nesting pairs (Sogge and Tibbitts 1992, Sogge *et al.* 1993). The Service believes that single, unmated *E. t. extimus* also face threats of habitat loss, and that conservation of these individuals is essential to the conservation of the species, particularly at the low current numbers of flycatchers.

Issue 22: Listing constitutes single-species management that will damage other species; *E. t. extimus* habitat is incompatible with habitat needs of other listed and sensitive species, particularly the spikedace and loach minnow.

Service Response: The purposes of the Act are to provide a program for the conservation of threatened and endangered species and to conserve the ecosystems upon which threatened and endangered species depend. The Service believes that managing for *E. t. extimus* and other listed riparian and aquatic species accomplishes this purpose, to the mutual benefit of listed and nonlisted species alike. The intent of this listing is to conserve and recover *E. t. extimus* and the riparian and aquatic ecosystems of which it is a part.

The primary constituent elements of critical habitat described for the spikedace (59 FR 10906) and loach minnow (59 FR 10898) are not in conflict with the habitat requirements for the southwestern willow flycatcher, and are not in conflict with the primary constituent elements of its proposed critical habitat (58 FR 39495). The fishes require "a healthy, intact riparian community," which will also benefit *E. t. extimus* and other riparian and aquatic species. The spikedace, loach minnow, and *E. t. extimus* all require surface water and/or a high water table, a low to moderate stream gradient, and periodic flooding. The fishes specifically require a "natural, unregulated hydrograph," which the Service believes would also benefit the flycatcher. These fish also require moderate to high bank stability; maintenance of the riparian vegetation on which *E. t. extimus* depends will provide such bank stability. The Service does not view management for *E. t. extimus*, spikedace, and loach minnow as mutually exclusive, but as mutually beneficial.

Issue 23: Floods regenerate habitat, they do not destroy it; floods destroy habitat; floods, not livestock, caused much of riparian degradation; the proposed rule is confusing and contradictory on the role of floods as a threat or necessary ecological function.

Service Response: The proposed rule stated that "Its habitat rarity, and small, isolated populations make the remaining *E. t. extimus* increasingly susceptible to local extirpation through stochastic events such as floods * * *. In early 1993, catastrophic floods in southern California and Arizona damaged or destroyed much of the remaining occupied or potential breeding habitat. Historically, these floods have always destroyed habitat but were also important events in regenerating cottonwood-willow communities."

It is important to note that *E. t. extimus* is threatened by stochastic events like floods because of its current rarity and isolated nature of populations. If the species existed at healthy population levels, and if its riparian habitat were not greatly reduced, these natural stochastic events would not constitute threats. The 1993 flood events referred to were extraordinary in nature, described regionally as 500-year floods. Therefore, they do not typify flood events in the river systems involved. Further, while natural flood events are expected to destroy some flycatcher habitat, they are also crucial for regenerating natural riparian nesting habitat. In a healthy system where riparian vegetation is abundant and the stream channel is not eroded or destabilized, destruction and regeneration are balanced and habitat is generally available. Only when riparian vegetation is severely reduced and the stream channel and watershed are destabilized are riparian and aquatic species threatened by the natural, short-term habitat losses resulting from flooding.

Issue 24: To manage for *E. t. extimus*, the Service will enforce or has proposed a fenced livestock-free corridor.

Service Response: The Service has neither proposed nor been consulted regarding a fenced, livestock-free corridor established along riparian areas on State, Federal, or private lands.

Issue 25: Beneficial land management practices should be recognized and discussed; the proposed rule fails to acknowledge that some habitats are protected from urban development.

Service Response: The Service recognizes that some management practices are beneficial. Some practices have protected or improved habitat, resulted in expanded populations, and/or improved reproduction. The Service will look to these beneficial land management practices as important examples in the recovery planning process. However, in making a listing determination the Service must consider the situation across the species' entire range. It is this overall perspective that drives the listing decision. Although some nesting groups of *E. t. extimus* may be safe, stable, or perhaps even increasing, the Service has determined that overall the species is endangered.

Issue 26: Existing regulatory mechanisms are adequate, including: the Migratory Bird Treaty Act (MBTA); State listings for Arizona, New Mexico, and California; section 404 of the Clean Water Act; Bureau of Land Management and Forest Service policies; Executive Orders 11988 and 11990; protection of riparian habitat due to presence of other listed species; private and/or cooperative management plans at local areas.

Service Response: The Service considered these regulatory mechanisms and management plans, and determines that overall existing regulatory mechanisms are insufficient to conserve and recover *E. t. extimus* in the face of the primary threats of loss and modification of habitat and cowbird parasitism. A full discussion of Federal and State protection is found in this document under Factor D: "*Inadequacy of existing regulatory mechanisms*".

The Service recognizes that some local management plans benefit and conserve *E. t. extimus* and its habitat. Examples include management of the Bureau of Land Management's San Pedro Riparian National Conservation Area (SPRNCA) in Arizona, where six years of livestock exclusion have resulted in significant restoration of riparian habitats and increases in birds associated with habitats similar to *E. t. extimus* (Krueper 1993). Willow

flycatchers have not yet returned to their historical locations on the SPRNCA but may soon. Habitat protection and cowbird management at The Nature Conservancy's Kern River Preserve and on Marine Corps Base Camp Pendleton in California have improved habitat and reduced brood parasitism pressures for resident *E. t. extimus* (Griffith and Griffith 1993). Wetland management at Bosque del Apache National Wildlife Refuge in New Mexico is apparently sustaining a small population of flycatchers. While these actions are beneficial, they provide for *E. t. extimus* only at several locales. Further, long-term continuation of these management actions is not assured.

Provisions of section 404 of the Clean Water Act do not specifically protect *E. t. extimus* or its habitat, but do provide some protection to the aquatic and riparian ecosystems of which it is a part. Section 404 of the Clean Water Act also provides for mitigation of destruction of these habitats, however, allowing even temporary destruction of riparian habitat is not consistent with the immediate conservation needs of *E. t. extimus*.

Issue 27: The Service did not use the best available scientific or commercial information in making this determination; the Service presented insufficient and inconclusive information to support listing; the proposed rule used information which was general, incomplete, and originated with other flycatcher subspecies; the proposed rule was premature; the Service did not adequately solicit information and public input; scientific, economic, biological, hydrological and botanical data must support listing; how does the Service know the scientific information supporting listing was right?

Service Response: The Service canvassed the published literature regarding the taxonomy, ecology, and biology of the southwestern willow flycatcher, and the threats to it and its habitat. Because numerous and complex phenomena and processes were involved, this information ranged from general (e.g., wide scale trends in riparian habitat) to very specific (status of nesting groups). The Service believes it used the best available information, and has determined that this information is adequate to support listing. The Service evaluates sources before using or discounting information. In general, the Service expects that publications in peer-reviewed scientific journals, reports from land and resource management agencies, and dissertations or reports from academic or research institutions have undergone technical review. Other information sources are considered more anecdotal, and the Service seeks to confirm such information before using it.

Issue 28: The Service should comply with the National Environmental Policy Act (NEPA) by completing an Environmental Impact Statement (EIS), and comply with 40 CFR 1506 to reduce duplication between NEPA and State and local requirements; the Service should comply with 40 CFR 1508.20 to compensate for producing substitute resources or environments; the Service should engage in joint planning with local governments under NEPA regulations.

Service Response: As noted in this final rule, the Service has determined that an Environmental Assessment, as defined under the authority of NEPA, need not be prepared for listing actions. A notice outlining the Service's reasons for this determination was published in the Federal Register on October 25, 1983 (48 FR 49244). Because of this determination, an EIS also need not be prepared. Also because of this determination, reduction of duplication between the NEPA process and State and local agencies, and joint planning between those agencies and the NEPA process, are rendered moot.

Issue 29: The proposed rule violates the Regulatory Flexibility Act; no Regulatory Impact Analysis/Assessment as required under Executive Orders 12291 and 12866 was completed; it also may be inconsistent with the mandates of other agencies.

Service Response: Decisions on listing and reclassification under the Act are made based on five factors defined in section 4(a)(1) of the Act. These five factors are discussed in this rule, as they relate to *E. t. extimus*. The Act requires the Service to consider only scientific and commercial information relating to these five factors in making listing determinations, not economic information. Economic information is considered in designating critical habitat, which is not part of this rule. Therefore, compliance with the Regulatory Flexibility Act and Executive Orders 12291 and 12866 is not an issue for this action, but will be addressed if a critical habitat designation is made (H.R. Conf. Rep. No. 835, 97th Cong., 2d Sess. 20 (1982); *accord*, S. Rep. No. 418, 97th Cong., 2d Sess. 4 (1982)).

Where conservation and recovery of threatened and endangered species is inconsistent with other mandates of Federal agencies, processes under section 7 of the Act serve to evaluate projects arising from those mandates, with regard to protection of listed species. However, section 2(c) of the Act requires all Federal departments and agencies to conserve listed species and further the purposes of the Act.

Issue 30: The Service should complete a Takings Implications Assessment prior to listing/designating critical habitat.

Service Response: The Service will complete a takings analysis for any final designation of critical habitat in compliance with Executive Order 12630 and the Attorney General's supplemental guidelines issued June 30, 1988. In accordance with those guidelines and Interior Department policy, this analysis will be completed after listing, not as part of consideration of the listing determination itself.

Issue 31: Requests were received for local public hearings.

Service Response: The proposed rule stated that three public hearings would be held. Because of many requests for additional hearings, a total of six public hearings were held. Regulations at 50 CFR 424.16(c)(3) require the Service to hold one public hearing if requested.

Issue 32: The time allowed for public comments was inadequate; the proposal should have been subjected to peer review.

Service Response: The Service is required to accept public comments for at least 60 days regarding proposals to list and/or designate critical habitat (50 CFR 424.16(c)(2)). In this case the Service initially announced a 90-day public comment period, then extended that another 40 days for a total of 130 days (July 23, 1993 through November 30, 1993). Public comment periods and public hearings are the mechanisms by which the Service receives input from all interested parties, including scientific peer review.

Issue 33: Listing would require private property owners to consult with the Service on their actions; listing and/or designating critical habitat constitute take of private property rights; adverse modification of critical habitat would be prohibited on private lands; the Service failed to notify the affected public of the consequences of adverse modification of critical habitat; listing and/or designating critical habitat may affect civil rights.

Service Response: Listing does not require private property owners to consult with the Service on actions which may affect a listed species. However, section 7 of the Act does require Federal agencies to consult on actions which they fund, permit, or carry out if those actions may affect a listed species or adversely modify critical habitat. Any potential take of private property will be analyzed in compliance with Executive Order 12630

(see Issue 30). As discussed later (Issue 35), because critical habitat is not being designated with this rule, comments regarding critical habitat will be addressed during subsequent actions regarding critical habitat.

Issue 34: Requests were received to be on a mailing list for all actions relating to this issue or to be provided personal notification of a final decision.

Service Response: The Service tries to maintain mailing lists for specific issues whenever possible. However, when large numbers of parties request to be on such lists, it becomes logistically and financially unfeasible to mail information to each party. This issue is one of those, and the Service must rely to some degree on mass communication forums like news releases, public notices in newspapers, and publications in the Federal Register.

Issue 35: Numerous comments were received regarding critical habitat.

Service Response: Critical habitat for *E. t. extimus* is not being designated with this rule; therefore, the above issues are not addressed here. Designation of critical habitat is being deferred while the Service further considers the extent to which designation is appropriate. Issues pertaining to this designation will be addressed when a final decision is made with regard to the critical habitat proposal.

Issue 36: Numerous comments were received regarding recovery of *E. t. extimus*, including: the Service has no recovery plan for *E. t. extimus;* the proposed rule failed to identify recovery goals for habitat, flycatcher numbers, and flycatcher distribution; the proposed rule failed to identify what actions will be used to achieve recovery; a recovery plan should address control of cowbird parasitism, nest damage by livestock, tamarisk eradication, wintering habitat, monitoring populations, protection of public and private lands from fire; cowbird parasitism cannot be addressed by listing and designating critical habitat; cowbirds are not easily controlled without sacrificing flycatchers and/or impacting habitat; the proposed rule contained no livestock managing strategy; rotating livestock will allow habitat enhancement/recovery; the factors affecting riparian habitats are numerous and complex; failure to address all could be futile or have damaging effects.

Service Response: Section 4(f) of the Act authorizes the Service to develop and implement recovery plans for listed species, not species that are proposed for listing. For *E. t. extimus*, this process therefore begins with the effective date of listing. In accordance with section 4(f)(B) of the Act the recovery plan process will address actions necessary to achieve conservation and recovery of *E. t. extimus*, will identify measurable criteria by which recovery (*i.e.*, the point at which protection under the Act is no longer necessary) can be gauged, and will identify the time and costs required to achieve recovery. The specific issues identified above will be considered in developing a recovery plan, and that plan will be available for public review and comment prior to adoption. Monitoring species is frequently an element of recovery plans, and is also required by section 4(g) of the Act for any species deemed to be recovered.

Issue 37: Several commenters questioned the motivations of the petitioners in requesting the listing, and others apparently believed the petitioners authored the listing proposal. Several commenters noted that the petition contained inaccuracies, and therefore no listing proposal should have resulted.

Service Response: The Service cannot speak for the petitioners' motivations in requesting listing of *E. t. extimus*. The Service judged the petition solely on the scientific information it contained. Inaccuracies were found in the petition, but on the whole the Service determined that it presented substantial information indicating that listing may be warranted. The listing proposal was authored by the Service, not the petitioners. The Service developed its proposal not from the petition, but from information gained from journal publications, agency reports, and the general public's responses to several information solicitations. This status review process had resulted in the Service designating *E. t. extimus* a category 1 candidate species prior to the petition being received. That designation indicated that the Service had sufficient information to support a listing proposal but did not publish a proposal immediately because it was dealing with listing actions of higher priority. Information presented by the petitioners that the Service did not already possess was checked for accuracy; information that could not be confirmed, or was found to be inaccurate, was not used.

Issue 38: The Service is required to purchase interest in land or water for implementation of the Act; this violates the U.S. Constitution.

Service Response: Section 5 of the Act directs the Secretary to use land acquisition and other authorities of the Fish and Wildlife Act of 1956, as amended, the Fish and Wildlife Coordination Act, as amended, and the Migratory Bird Conservation Act, as appropriate. The Secretary is authorized, but not required, to acquire interest in land or water to conserve threatened and endangered species. The Service does not carry out these authorities in violation of the U.S. Constitution. The Service does not acquire all lands designated as critical habitat for a listed species, and does not develop critical habitat designations based on land ownership or interest of landowners in purchasing or selling properties. It is the Service's policy to acquire property only on a voluntary basis from willing sellers.

Issue 39: Land use outside occupied/critical habitat will be adversely impacted.

Service Response: Federal actions that take place outside occupied habitat or critical habitat, but that may affect *E. t. extimus*, will be subject to consultation between the action agency and the Service in accordance with section 7 of the Act. Exclusively private actions are unaffected by listing and/or designation of critical habitat, provided they do not result in violation of section 9 of the Act (*e.g.*, take of the species).

Issue 40: Listing (regardless of critical habitat) will have adverse impacts on local economy; economic impacts of listing were not addressed; the Act requires the Service to consider impacts on other wildlife species and social and economic impacts prior to listing.

Service Response: Consideration of economic effects is required for designation of critical habitat. The Act requires that species listing decisions be based solely on the best scientific and commercial information available, which precludes consideration of social or cultural impacts or impacts on other species. (See section 4(b)(1)(A) of the Act). The Service anticipates no significant impacts on other native wildlife species as a result of listing, with the probable exception of the brown-headed cowbird.

Issue 41: Who initiated, performed, and paid for studies along the Kern River?

Service Response: Reports on studies done on the Kern River were published by Harris *et al.* (1986), Harris *et al.* (1987), Whitfield (1990), and Harris (1991). Specific information on project participants, funding sources, and cooperators can be found in those sources. The Service understands that monitoring and cowbird control are being continued by the Kern River Research Center and The Nature Conservancy, with funding assistance from the State of California and the Service.

Issue 42: The Service should perform additional surveys before listing.

Service Response: The Service is supporting continuing surveys to detect additional *E. t. extimus*, to monitor known nest sites, and to evaluate habitat presence, quality, and distribution. The Service supports these surveys with funding to States in accordance with section 6 of the Act, and through logistical and technical assistance to other agencies and parties. Extensive surveys in New Mexico and Arizona in 1993 located *E. t. extimus* in numbers that do not significantly change the total population estimates made in the proposed rule. These surveys also confirmed high levels of brood parasitism by cowbirds. With low estimates of total flycatcher numbers being validated by continuing surveys, the Service has determined that sufficient information exists on the threats of habitat loss and cowbird parasitism to justify listing.

Issue 43: The Service failed to consult adequately with private interests, State, Federal, and local agencies prior to publishing the proposed rule.

Service Response: The Service published public requests for information on the status of *E. t. extimus* in the Federal Register when it was designated a category 2 candidate species in January 1989, and when it was designated a category 1 species in November 1991. The Service supplemented these requests with general mailings soliciting information, and information solicitations in professional publications. Beyond these mechanisms, the Service is constrained by funding limitations and citizens' suits such as *Environmental Defense Center, Inc. vs. Babbitt et al.* IV 93–1848–R (C.D. Calif.), which was brought to compel the Service to propose listing and designation of critical habitat for the species, that preclude individually contacting every interested party.

Issue 44: The parties who petitioned for listing should pay for studies supporting their request.

Service Response: Regulations implementing section 4 of the Act, specifically the petition process [50 CFR 424.14], do not require petitioners to fund studies supporting their request. Listing determinations are made if existing information is deemed sufficient to make a determination. This information typically originates from a variety of sources.

Issue 45: The southwestern willow flycatcher is abundant. There is no need to list.

Service Response: The Service has determined that *E. t. extimus* is rare, not abundant, faces serious threats to its continued existence, and warrants listing as endangered. See discussion under Factor A: *The present or threatened destruction, modification, or curtailment of its habitat or range.*

Issue 46: The "little" willow flycatcher (*E. t. brewsteri*) is the most common subspecies observed and collected in the Southwest.

Service Response: The abundance of collections of *E. t. brewsteri* from within the breeding range of *E. t. extimus* is because *E. t. brewsteri* migrates through the Southwest between its Pacific coastal breeding range and wintering grounds in Central America. *E. t. brewsteri* passes through riparian habitats in the breeding range of *E. t. extimus* in spring and fall, but does not breed there.

Issue 47: There is no need to list *E. t. extimus* in areas where it is doing well.

Service Response: The Service has determined that *E. t. extimus* is endangered; local areas where the bird is relatively stable could only be excluded from listing or classified as threatened if they constituted distinct population segments [50 CFR 424.02(k)]. The Service has not identified any distinct population segments of *E. t. extimus*. Further, because the Service determines *E. t. extimus* to be endangered, all existing habitat and local nesting concentrations are deemed to be essential to the conservation and recovery of the species. Protection of locales where the bird is doing relatively well may be especially important for the conservation and recovery of *E. t. extimus*.

Issue 48: Prey availability may be a limiting factor.

Service Response: The Service recognizes that food availability is always a potential limiting factor in wildlife populations. It is possible that reduction of riparian habitats not only reduced vegetation for nesting, but reduced or altered the arthropod fauna associated with surface water and extensive vegetation. Also, as noted in this rule, some speculation exists that tamarisk provides a substandard nesting habitat because it supports a significantly different insect fauna than native vegetation. However, no information was available to evaluate this factor directly for *E. t. extimus*.

Issue 49: Several comments were received that pertained to the Service's management of the 90-day petition finding, including that the 90-day petition finding was late; that it is not the Service's role to conduct a status review if information in a petition is lacking; and that a 30-day comment period on the 90-day petition finding was insufficient.

Service Response: The Service acknowledges that its finding on the listing petition was published after 90 days, however, the Act (section 4(b)(3)(A) states that the [Service] shall, *to the maximum extent practicable*, make a petition finding within 90 days (emphasis added). Because the petition was found to present substantial information indicating that the petitioned action may have been warranted, the Service continued a status review after this finding, in accordance with 50 CFR 424.14(b)(3). There are no requirements for the Service to open a formal comment period regarding a 90-day petition finding. The Service did so in this case to solicit additional information on *E. t. extimus*. In reaching its 12-month petition finding, the Service considered all information received within the 30-day period identified, and information received for several months thereafter.

Issue 50: E. t. extimus should be listed as threatened, not endangered.

Service Response: The Service carefully evaluated the status of *E. t. extimus* and has determined that it meets the definition of an endangered species, not a threatened species. As stated in the proposed rule, (58 FR 39495) threatened status would not be appropriate because the large historic habitat loss already has caused extirpation throughout a significant portion of the species' range. Population numbers are extremely low, and a variety of threats are serious and imminent.

Issue 51: Restrictions on rural livestock grazing will cause ranching to become nonviable, and the land will be converted by suburban development, which is a greater threat to *E. t. extimus* than overgrazing.

Service Response: The conversion of lands from livestock grazing to suburban development is hypothetical and therefore cannot drive the Service's determination on this issue. Much of the livestock grazing that may be affected by this rule takes place on Federal lands.

Therefore, conversion to suburban development would require land exchanges or sales. These actions, if they were determined to affect *E. t. extimus*, would require consultation under section 7 of the Act. Regardless, prioritization of threats should be undertaken in the recovery, rather than listing, process.

Issue 52: The proposed rule fails to consider changing ecological factors: drought, migration patterns, nesting habits, and climatic changes.

Service Response: The Service recognizes that populations of *E. t. extimus* are likely to fluctuate naturally in response to various ecological factors. However, the Service believes that declines in habitat availability and increased exposure to cowbird parasitism have caused population reductions beyond the scale of natural fluctuations. Fluctuations in response to nonanthropogenic phenomena are likely to continue, but the current population levels are so low that these natural phenomena may be sufficient to cause local extirpations.

Issue 53: Restrictions associated with listing would be in conflict with Kern County's General Plan.

Service Response: Under section 4 of the Act, the Service considers only scientific and commercial information relating to the five listing factors outlined in section 4(a)(1) and discussed with respect to *E. t. extimus* in this rule. Therefore, conflicts with local plans were not considered in making this determination. However, the Service strives to pursue conservation and recovery of listed species in cooperation with State and local authorities, and seeks to minimize conflicts.

Issue 54: Listing and critical habitat designations will adversely affect flood control measures, some authorized by the Federal Emergency Management Agency and other Federal and State regulations; the proposed rule failed to consider flood accommodation needs, channelization, and clearing vegetation.

Service Response: Flood control measures virtually always involve a Federal agency, through funding, permitting, and/or other action. Therefore, flood control measures that may affect *E. t. extimus* would undergo consultation under section 7 of the Act. Section 7 and its implementing regulations have provisions for emergency consultations, and for actions within presidentially declared disaster areas.

Issue 55: Government agencies are responsible for many impacts to riparian areas; campgrounds, fish hatcheries, and some district offices are located in riparian areas.

Service Response: The Service acknowledges that some Federal actions are in part responsible for the threats facing *E. t. extimus*. As a result of listing, those Federal actions will be subject to consultation under section 7 of the Act to evaluate and minimize the effects of those actions.

Issue 56: The Service does not acknowledge receipt of comments on listing, and probably does not read them.

Service Response: The Service does not routinely acknowledge receipt of each letter commenting on listing proposals. The number of letters in this case made it logistically and financially impossible to acknowledge each one. However, all letters were read, and their issues addressed either here or elsewhere in this final rule. All comment letters and transcripts of public hearings are retained in the permanent file on this species and are available for public inspection.

Issue 57: Protecting flycatcher habitat may restrict mosquito control, which is important for control of encephalitis and other mosquito-borne diseases.

Service Response: Where such control involves a Federal action, mosquito and disease control actions may be subject to consultation under section 7(a)(2) of the Act, which would evaluate but not necessarily restrict or significantly modify the project. Ultimately, section 7(e) of the Act allows exemptions to the requirements of section 7(a)(2).

Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, the Service has determined that the southwestern willow flycatcher should be classified as an endangered species. Procedures found at section 4(a)(1) of the Act and regulations implementing the listing provisions of the Act (50 CFR Part 424) were followed. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1). These factors and their application to the southwestern willow flycatcher (*Empidonax traillii extimus*) are as follows:

A. The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range

Large scale losses of southwestern wetlands have occurred, particularly the cottonwood-willow riparian habitats of the southwestern willow flycatcher (Phillips *et al.* 1964, Carothers 1977, Rea 1983, Johnson and Haight 1984, Katibah 1984, Johnson *et al.* 1987, Unitt 1987, General Accounting Office (GAO) 1988, Bowler 1989, Szaro 1989, Dahl 1990, State of Arizona 1990, Howe and Knopf 1991). Changes in riparian plant communities have resulted in the reduction, degradation, and elimination of nesting habitat for the willow flycatcher, curtailing the ranges, distributions, and numbers of western subspecies, including *E. t. extimus* (Gaines 1974, Serena 1982, Cannon and Knopf 1984, Klebenow and Oakleaf 1984, Taylor 1986, Unitt 1987, Schlorff 1990, Ehrlich *et al.* 1992).

Dahl (1990) reviewed estimated losses of wetlands between 1780 and the 1980's in the Southwest: California is estimated to have lost 91 percent, Nevada 52 percent, Utah 30 percent, Arizona 36 percent, New Mexico 33 percent, and Texas 52 percent. As much as 90 percent of major lowland riparian habitat has been lost or modified in Arizona (State of Arizona 1990). Franzreb (1987) noted that "[B]ottomland riparian forests are the most highly modified of natural landscapes in California."

Loss and modification of southwestern riparian habitats have occurred from urban and agricultural development, water diversion and impoundment, channelization, livestock grazing, off-road vehicle and other recreational uses, and hydrological changes resulting from these and other land uses. Rosenberg *et al.* (1991) noted that "it is the cottonwood-willow plant community that has declined most with modern river management." Loss of the cottonwood-willow riparian forests has had widespread impact on the distribution and abundance of bird species associated with that forest type (Hunter *et al.* 1987, Hunter *et al.* 1988, Rosenberg *et al.* 1991).

Overuse by livestock has been a major factor in the degradation and modification of riparian habitats in the western United States. These effects include changes in plant community structure and species composition, and relative abundance of species and plant density. These changes are often linked to more widespread changes in watershed hydrology (Rea 1983, General Accounting Office 1988) and directly affect the habitat characteristics critical to *E. t. extimus*. Livestock grazing in riparian habitats typically results in reduction of plant species diversity and density, especially of palatable broadleaf plants like willows and cottonwood saplings, and is one of the most common causes of riparian degradation (Carothers 1977, USDA Forest Service 1979, Rickard and Cushing 1982, Cannon and Knopf 1984, Klebenow and Oakleaf 1984, GAO 1988, Clary and Webster 1989, Schultz and Leininger 1990).

Increases in abundance of riparian bird species have followed reduction, modification, or removal of cattle grazing. Krueper (1993) found the following increases in birds associated with cottonwood-willow habitat on Arizona's San Pedro River four years after the removal of livestock: yellow warbler, 606 percent; common yellow-throat, 2,128 percent; yellow-breasted

chat, 423 percent. Bock *et al.* (1993) found that 40 percent of the riparian bird species they examined, including the willow flycatcher (various subspecies), were negatively affected by livestock grazing. Increases in willow flycatcher numbers (various subspecies) have followed reduction, modification, or removal of cattle grazing. Taylor (1986) found a negative correlation between recent cattle grazing and abundance of numerous riparian birds, including the Great Basin willow flycatcher (*E. t. adastus*). In an area ungrazed since 1940, his bird counts were five to seven times higher than comparable plots where grazing was terminated in 1980. Taylor and Littlefield (1986) found higher numbers of Great Basin willow flycatchers correlated with minimal or nonexistent livestock grazing. Klebenow and Oakleaf (1984) listed the Great Basin willow flycatcher among bird species that declined from abundant to absent in riparian habitats degraded in part by overgrazing. Schlorff reported willow flycatchers returning to Modoc County, California, several years after removal of livestock grazing (pers. comm. cited in Valentine *et al.* 1988). Knopf *et al.* (1988) found that, during the summer, Great Basin willow flycatchers were present on winter-grazed pastures, but were virtually absent from summer-grazed pastures.

The Service believes that documentation of livestock impacts on other willow flycatcher subspecies is relevant to *E. t. extimus*, because linear riparian habitats in the arid range of *E. t. extimus* are especially vulnerable to fragmentation and destruction by livestock. As shady, cool, wet areas providing abundant forage, they are disproportionately preferred by livestock over the surrounding xeric uplands (Ames 1977, Valentine *et al.* 1988, A. Johnson 1989). Harris *et al.* (1987) believed that termination of grazing along portions of the South Fork of the Kern River in California was responsible for increases in riparian vegetation and, consequently, nesting *E. t. extimus*. Suckling *et al.* (1992) noted that most of the areas still known to support *E. t. extimus* have low or nonexistent levels of livestock grazing. More recent surveys (Muiznieks *et al.* 1994) have found *E. t. extimus* in areas with livestock grazing; however, these occur in widely dispersed, small groups whose nesting success is largely unknown, and where livestock grazing intensity and seasonality are also unknown.

Another likely factor in the loss and modification of southwestern willow flycatcher habitat is invasion by the exotic tamarisk. Tamarisk (also called saltcedar) was introduced into western North America from the Middle East in the late 1800's as an ornamental windbreak and for erosion control. It has spread rapidly along southwestern watercourses, typically at the expense of native riparian vegetation, especially cottonwood/willow communities. Although tamarisk is present in nearly every southwestern riparian community, its dominance varies. It has replaced some communities entirely, but occurs at a low frequency in others.

The spread and persistence of tamarisk has resulted in significant changes in riparian plant communities. In monotypic tamarisk stands, the most striking change is the loss of community structure. The multilayered community of herbaceous understory, small shrubs, middle-layer willows, and overstory deciduous trees is often replaced by one monotonous layer. Plant species diversity has declined in many areas, and relative species abundance has shifted in others. Other effects include changes in percent cover, total biomass, fire cycles, thermal regimes, and perhaps insect fauna (Kerpez and Smith 1987, Carothers and Brown 1991, Rosenberg *et al.* 1991, Busch and Smith 1993).

Disturbance regimes imposed by man (e.g., grazing, water diversion, flood control, woodcutting, and vegetation clearing) have facilitated the spread of tamarisk (Behle and Higgins 1959, Kerpez and Smith 1987, Hunter *et al.* 1988, Rosenberg *et al.* 1991). Cattle find tamarisk unpalatable. However, they eat the shoots and seedlings of cottonwood and willow, acting as a selective agent to shift the relative abundance of these species (Kerpez and Smith 1987). Degradation and, in some cases, loss of native riparian vegetation lowered the water table and resulted in the loss of perennial flows in some streams. With its deep root system and adaptive reproductive strategy, tamarisk thrives or persists where surface flow has been reduced or lost. Further, tamarisk establishment often results in a self-perpetuating regime of periodic fires, which were uncommon in native riparian woodlands (Busch and Smith 1993).

Manipulation of perennial rivers and streams has resulted in habitats that tend to allow tamarisk to outcompete native vegetation. Construction of dams created impoundments that destroyed native riparian communities. Dams also eliminated or changed flood regimes, which were essential in maintaining native riparian ecosystems. Changing (usually eliminating) flood regimes provided a competitive edge to tamarisk. In contrast to native phreatophytes, tamarisk does not need floods and is intolerant of submersion when young. Diversion of water caused the lowering of near-surface groundwater and reduced the relative success of native species in becoming established. Irrigation water containing high levels of dissolved salts also favors tamarisk, which is more tolerant of high salt levels than most native species (Kerpez and Smith 1987, Busch and Smith 1993).

The rapid spread of tamarisk has coincided with the decline of the southwestern willow flycatcher. Although *E. t. extimus* has been documented nesting in tamarisk, it is not known whether, over the long term, reproductive success of southwestern willow flycatchers nesting in tamarisk has differed from the success of flycatchers nesting in native vegetation. Studies in Arizona have documented low breeding densities and low reproductive success for southwestern willow flycatchers nesting in tamarisk (Hunter *et al.* 1988, Muiznieks *et al.* 1994). These data, coupled with a possible decrease in the arthropod prey base and thermal protection for nests provided by tamarisk, suggest that tamarisk may provide poor quality nesting habitat. However, more extensive comparative studies are needed to determine the overall impact on the southwestern willow flycatcher of the conversion of native broadleaf-dominated riparian habitat to tamarisk-dominated habitat.

Other studies of riparian bird communities have documented changes in bird species diversity, corresponding with invasion by tamarisk.

Conversion to tamarisk typically coincides with reduction or complete loss of bird species strongly associated with cottonwood-willow habitats. These include the yellow-billed cuckoo (*Coccyzus americanus*), summer tanager (*Piranga rubra*), northern oriole (*Icterus galbula*), and the southwestern willow flycatcher (Hunter *et al.* 1987, Hunter *et al.* 1988, Rosenberg *et al.* 1991). While Brown and Trosset (1989) believed tamarisk may serve as an "ecological equivalent" to native vegetation, they noted that their study occurred where a tamarisk community became established where no native equivalent existed before.

Some authors believe tamarisk may not provide the thermal protection that native broadleaf species do (Hunter *et al.* 1987, Hunter *et al.* 1988). This could be important at lower elevations in the Southwest, where extreme high temperatures are common during the bird's midsummer breeding season. It is

also possible that tamarisk affects *E. t. extimus* by altering the riparian insect fauna (Carothers and Brown 1991). Some sources also speculated that nests in tamarisk stands may be more easily located by brown-headed cowbirds (see cowbird discussion below). Hunter *et al.* (1987) reported the willow flycatcher as one of seven midsummer-breeding builders of open nests that were found in tamarisk at higher elevations but not lower elevations. Nesting *E. t. extimus* have been found in tamarisk at middle elevations (610–1200 m (2000–3500 feet)) (Hundertmark 1978, Hubbard 1987, Hunter *et al.* 1987, Brown 1988, Sogge *et al.* 1993, Muiznieks *et al.* 1994). However, nest success in tamarisk at these elevations appears to be low (Sogge and Tibbitts 1992, Sogge *et al.* 1993, Muiznieks *et al.* 1994). The species is essentially absent from tamarisk-dominated habitats below 610 m (2000 feet). On the lower Colorado River (approximately 25 m (80 feet)) where tamarisk is widely dominant, the only territories found in recent decades were in relict stands dominated by willow, cottonwood, and other native vegetation (Muiznieks *et al.* 1994). Unitt (1987) speculated that at higher elevations and in the eastern portion of its range, some *E. t. extimus* populations may be adapting to tamarisk.

Water developments also likely reduced and modified southwestern willow flycatcher habitat. The series of dams along most major southwestern rivers (Colorado, Gila, Salt, Verde, Rio Grande, Kern, San Diegito, and Mojave) have altered riparian habitats downstream of dams through hydrological changes, vegetational changes, and inundated habitats upstream. New habitat is sometimes created along the shoreline of reservoirs, but this habitat (often tamarisk) is often unstable because of fluctuating levels of regulated reservoirs (Grinnell 1914, Phillips *et al.* 1964, Rosenberg *et al.* 1991). Construction of Glen Canyon Dam on the Colorado River allowed establishment of a tamarisk riparian community downstream in the Grand Canyon, where a small population of *E. t. extimus* exists, with poor reproduction (Brown 1991, Sogge *et al.* 1993). However, Lake Powell, formed upstream of the dam, inundated what was apparently superior habitat, with *E. t. extimus* considered common (Behle and Higgins 1959).

Diversion and channelization of natural watercourses are also likely to have reduced *E. t. extimus* habitat. Diversion results in diminished surface flows and increased salinity of residual flows. Consequent reductions and composition changes in riparian vegetation are likely. Channelization often alters stream banks and fluvial dynamics necessary to maintain native riparian vegetation.

Suckling *et al.* (1992) suggested that logging in the upper watersheds of southwestern rivers may constitute another potential threat to the southwestern willow flycatcher. They stated that logging increases the likelihood of damaging floods in southwestern willow flycatcher nesting habitat.

Finally, the willow flycatcher (all subspecies) is listed among neotropical migratory birds that may be impacted by alteration of wintering habitat, as through tropical deforestation (Finch 1991, Sherry and Holmes 1993).

Population Trends for Each State Are Discussed Briefly Below

California. All three resident subspecies of the willow flycatcher (*E. t. extimus, E. t. brewsteri,* and *E. t. adastus*) were once considered widely distributed and common in California, wherever suitable habitat existed (Wheelock 1912, Willett 1912, Grinnell and Miller 1944). The historic range of *E. t. extimus* in California apparently included all lowland riparian areas of the southern third of the State. Unitt (1984, 1987) concluded that it was once fairly common in the Los Angeles basin, the San Bernardino/Riverside area, and San Diego County. Willett (1912, 1933) considered the bird to be a common breeder in coastal southern California. Nest and egg collections indicate the bird was a common breeder along the lower Colorado River near Yuma in 1902 (T. Huels, University of Arizona *in litt.*, transcripts of H. Brown's field notes).

All three willow flycatcher subspecies breeding in California have declined, with declines most critical in *E. t. extimus,* which remains only in small, disjunct nesting groups (Unitt 1984 and 1987, Gaines 1988, Schlorff 1990, Service unpubl. data). Only two nesting groups have been stable or increasing in recent years. One is on private land where habitat impacts from livestock grazing have been virtually eliminated (Harris *et al.* 1987, Whitfield 1990). This group on the South Fork of the Kern River experienced numerical declines in 1991 and 1992, but increases in nesting success were realized in 1992 and 1993, attributed to shaking (killing) or removing cowbird eggs or nestlings found in flycatcher nests, and trapping cowbirds (Whitfield and Laymon, Kern River Research Center, *in litt.* 1993). The other apparently stable nesting group is along the Santa Margarita River on Marine Corps Base Camp Pendleton, where cowbird numbers have also been reduced by trapping (Griffith and Griffith 1993). Approximately eight other nesting groups are known in southern California, all of which consisted of six or fewer nesting pairs in recent years (Unitt 1987, Schlorff 1990, Service, unpubl. data). Using the most recent information for all areas, approximately 70 pairs and 8 single southwestern willow flycatchers are known to exist in California. Where information on population trends since the mid-1980's is available, most areas show declines. Three recent status reviews considered extirpation from California to be possible, even likely, in the foreseeable future (Garrett and Dunn 1981, Harris *et al.* 1986, Schlorff 1990). The State of California classifies the willow flycatcher as endangered [California Department of Fish and Game (CDFG) 1992].

Arizona. Records indicate that the former range of the southwestern willow flycatcher in Arizona included portions of all major watersheds (Colorado, Salt, Verde, Gila, Santa Cruz, and San Pedro). Historical records exist from the Colorado River near Lee's Ferry and near the Little Colorado River confluence (Phillips, pers. comm., cited in Unitt 1987), and along the Arizona-California border (Phillips 1948, Unitt 1987), the Santa Cruz River near Tucson (Swarth 1914, Phillips 1948), the Verde River at Camp Verde (Phillips 1948), the Gila River at Fort Thomas (W.C. Hunter, pers. comm., cited in Unitt 1987), the White River at Whiteriver, the upper and lower San Pedro River (Willard 1912, Phillips 1948), and the Little Colorado River headwaters area (Phillips 1948).

The southwestern willow flycatcher has declined throughout Arizona. The subspecies was apparently abundant on the lower Colorado River in 1902 (T. Huels *in litt.*, transcripts of H. Brown's field notes), but only four to five territories were located in 1993 (Muiznieks *et al.* 1994). Elsewhere in the State, *E. t. extimus* persists only in several small, widely scattered locations. In the Grand Canyon, several groups of nesting birds have fluctuated from a high of 11 singing males in 1986 (Brown 1988) to two pairs and three single birds in 1992 (Sogge and Tibbitts 1992). Grand Canyon surveys in 1993 located 13 birds; six unpaired individuals, two pairs, and what appeared to be one male with two females. No nesting attempts were successful (Sogge *et al.* 1993). Although Brown (*et al.* 1987) noted *E. t. extimus* as nesting in Havasu Canyon, in 1993 none were located there and cowbirds were abundant (Sogge *et al.* 1993). A

location on the lower San Pedro River apparently supported relatively large numbers of *E. t. extimus* in the 1940's (G. Monson, private individual, *in litt.* 1993 and pers. comm. 1993), but only a single pair in 1978 and 1979, and none in 1986 (Unitt 1987). Following habitat improvements at this locale, six to seven singing males were present in 1993, and a total of 11 singing males were located at two other locations on the lower San Pedro in 1993 (Muiznieks *et al.* 1994).

Historically occupied habitat on the upper San Pedro River is in the process of rehabilitation, but remains unoccupied by nesting *E. t. extimus* (Krueper and Corman 1988, D. Krueper unpubl. data). Two small groups at high elevations in the White Mountains, comprising approximately five singing males each, have remained relatively stable numerically from 1985 to 1993 (Muiznieks *et al.* 1994, Arizona Game and Fish Department (AGFD), unpubl. data). At a site on the Verde River in central Arizona where R. Ohmart (unpubl. data) observed four nesting pairs in 1992, one pair and one single male were present in 1993. The single nest produced only a cowbird young. Of 13 river reaches in Arizona studied by Hunter *et al.* (1987), nesting *E. t. extimus* were extirpated from eight, declining in two, and present in stable numbers in three.

Statewide surveys in 1993 located between 42 and 56 territorial males, and all nest sites were considered vulnerable to habitat loss and cowbird parasitism (Muiznieks *et al.* 1994). Preliminary data from 1994 surveys indicate that approximately 70 to 80 breeding pairs were found at a total of 12 locations in the State. This included the discovery of a group of flycatchers at one location consisting of approximately 15 breeding pairs. Brood parasitism by cowbirds was documented at at least six (50%) of those 12 sites. Brown-headed cowbirds were documented at all 12 breeding locations (Arizona Game and Fish Department, *in prep.*).

Where information on population trends since the mid-1980's is available, most areas show declines and/or high rates of cowbird parasitism. In early 1993, catastrophic flooding on the Verde, Gila, and San Pedro Rivers temporarily damaged many sites inhabited since the mid-1980's, and much potential habitat. Unitt (1987) concluded that "Probably the steepest decline in the population levels of *E. t. extimus* has occurred in Arizona * * * *E. t.* extimus has been extirpated from much of the area from which it was originally described, the riparian woodlands of southern Arizona." The State of Arizona classifies the willow flycatcher as endangered (AGFD 1988).

New Mexico. Bailey (1928) classified breeding willow flycatchers in New Mexico as *E. t. brewsteri*, according to Oberholser's (1918) taxonomy of that time. Because of few records at that time, she believed that either the bird was rare or was overlooked by most observers and collectors. More recently, Hubbard (1987) reviewed and summarized the flycatcher's status in New Mexico. He classified breeding birds in the State as *E. t. extimus* and reported breeding locations that were generally confined to the regions west of the Rio Grande, with records from the Rio Grande, Chama, Zuni, San Francisco, and Gila drainages (See also Hubbard 1982). However, he provisionally assigned all willow flycatchers nesting in New Mexico to *E. t. extimus*, noting records from the Pecos River and Penasco Creek in the southeast and from near Las Vegas in the northeast.

Both Hubbard (1987) and Unitt (1987) believed that the overall range of *E. t. extimus* had not been reduced in New Mexico, but that habitat and numbers had declined. Unitt (1987) believed the majority of all remaining nesting birds may occur in New Mexico. Areas with 19 and 53 singing flycatchers, not distinguished as nesting or migrants, were found on the upper Gila River (Montgomery *et al.* 1985, cited in Suckling *et al.* 1992). Preliminary data from 1994 surveys indicate that this breeding group is still present. However, the breeding status of flycatchers and trend over time have not been determined (S.O. Williams, New Mexico Department of Game and Fish—pers. comm.)

Hubbard (1987) noted that data were lacking for trends of most nesting areas. However, where data were available, they indicated loss of a group of 15 breeding pairs by the rising waters of Elephant Butte Reservoir. The willow flycatcher was considered fairly common in this area on the middle Rio Grande in the late 1970's (Hundertmark 1978). Hubbard hypothesized that some of these birds could have moved upstream, to new shoreline habitat created by the impoundment. Between 1987 and 1990, bird surveys along the Rio Grande Valley State Park in Albuquerque found a single singing willow flycatcher during the breeding season (Hoffman 1990). Current trends in New Mexico are not being extensively monitored. However, in 1992, 71 transects along the Rio Grande were surveyed for breeding birds, but not specifically targeting willow flycatcher habitat. A single willow flycatcher was located near Espanola (Leal, Meyer and Thompson, unpubl. data). In 1993, surveys of 52 locations found 31 pairs or singing males at 15 of those locations (S.O. Williams III, New Mexico Department of Game and Fish (NMDGF), *in litt.* 1993). Hubbard (1987) estimated that the State population may total 100 pairs; that estimate has not been revised. Hubbard (1987) found that "the conclusion is virtually inescapable * * * a decrease has occurred in the population of breeding willow flycatchers in New Mexico over historic time," resulting from habitat loss. The State of New Mexico classifies the willow flycatcher as endangered (NMDGF 1988).

Texas. The eastern limit of the southwestern willow flycatcher's breeding range is in western Texas (Unitt 1987). Collections have been made at Fort Hancock on the Rio Grande (Phillips 1948), in the Guadalupe Mountains (Phillips, pers. comm., cited in Unitt 1987), the Davis Mountains (Oberholser 1974), and from unspecified locales in Brewster County (Wolfe 1956). Wauer (1973 and 1985) considered *E. t. extimus* a rare summer resident in Big Bend National Park. Data are lacking on current population levels and trends in Texas. Loss and modification of habitat may have reduced populations on the Rio Grande and Pecos Rivers.

Utah. The north-central limit of breeding southwestern willow flycatchers is in southern Utah. Behle (1985) and Unitt (1987) believed a clinal gradation between *E. t. extimus* and *E. t. adastus* existed, but Browning (1993) disagreed, identifying a range boundary at approximately the 38th north parallel. Southern Utah is characterized by extreme topographic relief. In this region, subspecific separation may be a function of elevation, with *E. t. extimus* at lower elevations (e.g., Virgin and Colorado Rivers) and *E. t. adastus* higher (e.g., Sevier River, wet meadows of mountains and high plateaus). Records that are likely to represent *E. t. extimus* are from the Virgin River (Phillips 1948, Wauer and Carter 1965, Whitmore 1975), Kanab Creek, and along the San Juan and Colorado Rivers (Behle *et al.* 1958, cited in Unitt 1987; Behle and Higgins 1959, Behle 1985; see also Browning 1993). Other reports document the subspecies being present along the Virgin, Colorado, San Juan, and perhaps Paria Rivers (BLM, unpubl. data). Although Behle believed *E. t. extimus* was always rare in southern Utah overall (pers. comm. cited in Unitt 1987), he considered it a locally common breeding resident where habitat existed along the Colorado River

and its tributaries in southeastern Utah (Behle and Higgins 1959).

Few data are available on population trends in southern Utah. However, loss and modification of habitat is likely to have reduced populations on the Virgin, Colorado, and San Juan Rivers. These losses have been due to suburban expansion and habitat changes along the Virgin River, inundation by Lake Powell on the Colorado and San Juan Rivers, and encroachment of tamarisk throughout the region (Unitt 1987, BLM unpublished data).

Nevada. Unitt (1987) reported only three records for Nevada, all made before 1962. Unitt (1987), Hubbard (1987), and Browning (1993) all considered southern Nevada (approximately south of 38° north parallel) to be within the range of *E. t. extimus*. However, no recent data are available on population levels or trends. Habitat may remain along the lower Virgin River and at the inflow of the Virgin River into Lake Mead. However, loss and modification of habitat is likely to have reduced populations on the Virgin and Colorado Rivers.

Colorado. Whether or not the southwestern willow flycatcher breeds in Colorado is unclear. Hubbard (1987) believed the subspecies ranged into extreme southwestern Colorado, Browning (1993) was noncommittal, and Unitt (1987) tentatively used the New Mexico-Colorado border as the boundary between *E. t. extimus* and *E. t. adastus*. Several specimens taken in late summer have been identified as *E. t. extimus*, but nesting was not confirmed (Bailey and Niedrach 1965). Phillips (1948) cautioned that willow flycatchers in this region displayed considerable individual variation and may represent intergrades between *E. t. extimus* and *E. t. adastus*. No recent data are available on occurrence, population levels, or trends in this area.

Mexico. Six specimens from Baja California del Norte and two from Sonora were discussed by Unitt (1987). He and Phillips (pers. comm., cited in Unitt 1987) believed *E. t. extimus* was not common in northwestern Mexico. Wilbur (1987) was skeptical of its presence as a breeder in Baja California. In the more general treatments of field guides, the willow flycatcher is described as breeding in extreme northwestern Mexico, including northern Baja California del Norte (Blake 1953, Peterson 1973). No recent data are available on current population levels or trends.

Using the most recent censuses and estimates for all areas, the estimated total of all southwestern willow flycatchers is approximately 300 to 500 nesting pairs. Unitt (1987) believed the total was "well under" 1000 pairs, more likely 500. The regional estimates and information on which these total estimates are based generally date from the late 1980's to 1993 (e.g., Hubbard 1987, T. Johnson 1989). Virtually all nesting groups monitored since that time have continued to decline (Whitfield 1990, Brown 1991, Sogge *et al.* 1993, Whitfield and Laymon, unpubl. data).

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

The Service is unaware of threats resulting from overutilization.

C. Disease or Predation

The Service is unaware of any disease that constitutes a significant threat to *E. t. extimus*. Boland *et al.* (1989) found only one case of larval parasites in willow flycatcher nestlings in California.

Predation of southwestern willow flycatchers may constitute a significant threat and may be increasing with habitat fragmentation. Where *E. t. extimus* has been extirpated in the lower Colorado River valley, Rosenberg *et al.* (1991) found increases in the great-tailed grackle (*Quiscalus mexicanus*), which preys on the eggs and young of other birds (Bent 1965). Whitfield (1990) found predation on *E. t. extimus* nests to be significant. Predation increased with decreasing distance from nests to thicket edges, suggesting that habitat fragmentation may increase the threat of predation.

D. The Inadequacy of Existing Regulatory Mechanisms

The Migratory Bird Treaty Act (MBTA)(16 U.S.C. § 703–712) is the only current Federal protection provided for the southwestern willow flycatcher. The MBTA prohibits "take" of any migratory bird, which is defined as: "* * * to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect * * *" However, unlike the Act, there are no provisions in the MBTA preventing habitat destruction unless direct mortality or destruction of active nests occurs.

The majority of the southwestern willow flycatcher's range lies within California, Arizona, and New Mexico (Phillips 1948, Hubbard 1987, Unitt 1987). All of those States classify the willow flycatcher as endangered (AGFD 1988, NMDGF 1988, CDFG 1992). The State listings in New Mexico and Arizona do not convey habitat protection or protection of individuals beyond existing regulations on capture, handling, transportation, and take of native wildlife. The California Endangered Species Act (CESA) prohibits unpermitted possession, purchase, sale, or take of listed species. However, the CESA definition of take does not include harm, which under the Act can include destruction of habitat that actually kills or injures wildlife by significantly impairing essential behavioral patterns (50 CFR 17.3). However, CESA requires consultation between the CDFG and other State agencies to ensure that activities of State agencies will not jeopardize the continued existence of State-listed species (E. Toffoli, State of California, *in litt.* 1992). The Service believes that this and other regulatory mechanisms are inadequate to ensure the continued existence of the southwestern willow flycatcher.

E. Other Natural or Manmade Factors Affecting Its Continued Existence

The riparian habitat of the southwestern willow flycatcher has always been rare and has become more so. Its habitat rarity and small, isolated populations make the remaining *E. t. extimus* increasingly susceptible to local extirpation through stochastic events such as floods, fire, brood parasitism, predation, depredation, and land development. In early 1993, catastrophic floods in southern California and Arizona impacted much of the remaining occupied or potential breeding habitat. Historically, these floods have always destroyed habitat but were also important events in regenerating cottonwood-willow communities. However, with little southwestern willow flycatcher habitat remaining, widespread events like those of 1993 could destroy virtually all remaining habitat throughout all or a significant portion of the subspecies' range. Further, regeneration with natural vegetation after floods may be inhibited if the area is subjected to overgrazing by domestic livestock.

The disjunct nature of habitats and small breeding populations impede the flow of genetic material and reduce the chance of demographic rescue from migration from adjacent populations. The resulting constraints on the gene pool intensify the external threats to the species.

Brood parasitism by the brown-headed cowbird also threatens the southwestern willow flycatcher. Cowbirds lay their eggs in the nests of other, usually smaller, songbirds. The cowbird often removes a number of the host's eggs and replaces them with an equal number of cowbird eggs. The host

species then incubates the cowbird eggs, which typically hatch prior to the host's own eggs. Cowbird eggs require a relatively short incubation period of 10 to 12 days. Thus, the young cowbirds have several advantages over the host's young; they hatch earlier, they are larger, and they are also more aggressive than the host's young. Cowbird nestlings typically outcompete those of the host species for parental care, and, as a result, the host species' own reproduction is reduced or eliminated (Bent 1965, McGeen 1972, Mayfield 1977a, Harrison 1979, Brittingham and Temple 1983).

The brown-headed cowbird commonly preys on insects stirred up by grazing ungulates, and was originally restricted to the Great Plains, where it was strongly associated with American bison (*Bison bison*). As North America was settled, cowbirds became associated with livestock and human agriculture because of the food sources they provided (Bent 1965, Flett and Sanders 1987, Valentine *et al.* 1988). The expansion of agriculture, livestock grazing, and wide scale human activities in general caused opening and fragmenting of forest and woodland habitats. Habitat fragmentation and agriculture are strongly correlated with increased rates of brood parasitism by brown-headed cowbirds (Rothstein *et al.* 1980, Brittingham and Temple 1983, Airola 1986, Robinson *et al.* 1993). Some species are likely to have adapted to parasitism over time, particularly prairie nesters in the original range of the cowbird. However, the cowbird's rapid expansion now brings it into contact with forest and woodland species not adapted to deal with brood parasitism, significantly impacting those species (Hill 1976, Mayfield 1977a, Robinson *et al.* 1993).

The brown-headed cowbird was apparently an uncommon bird within the range of *E. t. extimus,* until the late 1800's. Since then, the species has greatly expanded in numbers and distribution throughout the region (Laymon 1987, Rothstein *in prep.*). Increases in cowbirds in the San Bernardino Valley between 1918 and 1928 caused Hanna (1928) "considerable alarm." Although Friedmann *et al.* (1977) reported relatively low rates of parasitism of willow flycatchers in the western United States, this was apparently owing to their data (egg sets) being collected prior to the major incursions of cowbirds into Pacific coast riparian habitats (L. Kiff, Western Foundation for Vertebrate Zoology, *in litt.* 1993). Brood parasitism of several subspecies of the willow flycatcher, including *E. t. extimus,* by brown-headed cowbirds is well documented (Hanna 1928, Rowley 1930, Willett 1933, Hicks 1934, King 1954, Holcomb 1972, Friedmann *et al.* 1977, Garret and Dunn 1981, Harris *et al.* 1987, Brown 1988, 1991, Sedgewick and Knopf 1988, Whitfield 1990, Harris 1991, Sogge *et al.* 1993, Muiznieks *et al.* 1994).

The increases in cowbirds in the Southwest and parasitism of *E. t. extimus* and other birds are generally attributed to the following scenario: The introduction of modern human settlements, livestock grazing, and other agricultural developments resulted in habitat fragmentation. Simultaneously, livestock grazing and other agricultural developments served as vectors for cowbirds by providing feeding areas near host species' nesting habitats (Hanna 1928, Gaines 1974, Mayfield 1977a). Cowbirds may travel almost 7 kilometers (4.2 miles) from feeding sites where livestock congregate to areas where host species are parasitized (Rothstein *et al.* 1984). These factors increased both the vulnerability of *E. t. extimus* and the likelihood of encounters with cowbirds. Finally, the high edge-to-interior ratio of linear riparian habitats like those used by *E. t. extimus* renders birds nesting there particularly vulnerable to parasitism (Airola 1986, Laymon 1987, Harris 1991). Linear riparian habitats are also especially vulnerable to fragmentation by grazing, which further increases both the edge-to-interior ratio and the threat of parasitism.

The effects of parasitism by brown-headed cowbirds on willow flycatchers include reducing nest success rate and egg-to-fledging rate, and delaying successful fledging (because of renesting attempts) (Harris 1991). A common response to parasitism is abandonment of the nest (Holcomb 1972). Willow flycatchers may also respond to parasitism by ejecting cowbird eggs, by burying them with nesting material and renesting on top of them, or by renesting in another nest (Harris *et al.* 1991). However, the success rate of renesting is often reduced, because these attempts produce fledglings several weeks later than normal, which may not allow them adequate time to prepare for migration (Harris 1991). Renesting also usually consists of smaller clutches, further reducing overall reproductive potential (Holcomb 1974).

McCabe (1991) downplayed the significance of cowbird parasitism as a threat to any species except Kirtland's warbler (*Dendroica kirtlandii*). McCabe's monograph focussed on the combined "Traill's flycatcher" superspecies, comprised of *E. t. traillii* and *E. alnorum* in marshy habitats in the upper Midwest, where parasitism rates ranged from 3 percent to 19 percent. However, perhaps reflecting his regional perspective, he characterized the high parasitism rates on willow flycatchers reported by Trautman (1940, cited in McCabe 1991) and Sedgwick and Knopf (1988) as aberrant (56 percent and 41 percent, respectively). McCabe considered the high rates the result of the "* * * linear configuration of the habitat * * * [c]owbirds lay eggs in songbird nests closest to cover edge." The vast majority of southwestern willow flycatcher habitat is very linear and may experience higher rates of parasitism than other willow flycatcher subspecies.

Brittingham and Temple (1983) considered "high" parasitism rates (percent of nests parasitized) to be 24 percent, with some as high as 72 percent. Mayfield (1977a) thought a species (or population) might be able to survive a 24 percent parasitism rate, but that losses much higher than that "would be alarming." Parasitism rates of 72 percent to 83 percent on Kirtland's warbler (Mayfield 1977b) resulted in a precipitous population decline. Where parasitism rates are known for *E. t. extimus,* they are comparable to rates for Kirtland's warbler and are capable of causing similar declines. In California, parasitism rates ranged from 50 percent to 80 percent between 1987 and 1992, when an estimated population size decreased from 44 to 28 nesting pairs (Whitfield 1990, Harris *et al.* 1991, Whitfield and Laymon, unpubl. data). These parasitism rates were considered minimum measures, because several nests were abandoned each year due to unknown causes, which could have been parasitism. Brown (1988) reported an average 50 percent parasitism rate in the Grand Canyon between 1982 and 1987. Although his estimated population increased from two pairs to 11 during that period, it has since decreased back as low as two nesting pairs (Brown 1991, Sogge and Tibbitts 1992). In 1993, parasitism reached 100 percent in the Grand Canyon, and no *E. t. extimus* were fledged (Sogge *et al.* 1993). Harris *et al.* (1991) believed that the parasitism rates observed on the Kern River in 1987 (68 percent of all nests, 88 percent of all nest territories) were high enough to prevent *E. t. extimus* from recolonizing lowland riparian habitat, even if it were restored.

Rothstein *et al.* (1980), Stafford and Valentine (1985), and Harris (1991) believed parasitism may be correlated with elevation, being more severe at lower elevations. Coupled with greater loss of lowland (desert) riparian habitat,

the effects of habitat loss and parasitism are compounded. However, cowbirds now appear to be increasing at higher elevations (Hanka 1985).

In addition to causing habitat degradation and facilitating brood parasitism, livestock grazing in and near riparian areas may also threaten *E. t. extimus* through direct mortality. Livestock in riparian habitats sometimes make physical contact with nests or supporting branches, resulting in destruction of nests and spillage of eggs or nestlings. All known documentation of this threat involves *E. t. brewsteri*, perhaps because virtually all known remaining populations of *E. t. extimus* are in ungrazed habitats (Serena 1982, Harris *et al.* 1987, Whitfield and Laymon, unpubl. data). Valentine *et al.* (1988) studied willow flycatchers in California from 1983 through 1987, when 11 of their 20 recorded nesting attempts failed. They found that "Prior to reduction of grazing intensity in 1987, livestock accounted for 36 percent of the failed nests or 20 percent of all nesting attempts. In addition, livestock destroyed four successful nests shortly after the young had fledged." Stafford and Valentine (1985) reported that three of eight (37.5 percent) willow flycatcher nests in their study site were probably destroyed by cattle. Flett and Sanders (1987) documented no nest upsets due to livestock but noted the vulnerability of nests to upset, due to their placement low in willow clumps (see also Serena 1982). Livestock grazing may affect *E. t. extimus* similarly.

The southwestern willow flycatcher's preference for, and former abundance in, floodplain areas that are now largely agricultural may indicate a potential threat from pesticides. Where flycatcher populations remain, they are sometimes in proximity to agricultural areas, with the associated pesticides and herbicides. Without appropriate precautions, these agents may potentially affect the southwestern willow flycatcher through direct toxicity or effects on their insect food base. No quantitative data on this potential threat are known at this time.

Recreation that is focused on riparian areas, particularly during warm summer breeding months, may also constitute a threat to *E. t. extimus*. Taylor (1986) found a possible correlation between recreational activities and decreased riparian bird abundance. Blakesley and Reese (1988) reported the willow flycatcher (probably *E. t. adastus*) as one of seven species negatively associated with campgrounds in riparian areas in northern Utah. It is unknown whether these possible effects involve impacts to habitat or disturbance of nesting birds.

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by this species in determining to make this rule final. Based on this evaluation, the preferred action is to list the southwestern willow flycatcher as endangered. A decision regarding designation of critical habitat for this species is being deferred, and a final decision regarding the designation will be made by July 23, 1995. Critical habitat for this species is not now determinable.

Critical Habitat

Critical Habitat is defined in section 3 of the Act as (i) the specific areas within the area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management considerations or protection and; (ii) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. "Conservation" means the use of all methods and procedures needed to bring the species to a point at which listing under the Act is no longer necessary.

Section 4(a)(3) of the Act and implementing regulations (50 CFR 424.12) require that, to the maximum extent prudent and determinable, the Secretary designate critical habitat at the time a species is determined to be endangered or threatened. Critical habitat was proposed to be designated for the flycatcher at the time it was proposed for listing as endangered to encompass approximately 640 miles (1000 km) of riparian zones in the States of California, Arizona, and New Mexico.

After reviewing comments submitted during the public comment period the Service is deferring the designation of critical habitat for this endangered species. The Service received numerous comments on the proposed rule, including many recommendations for additions and deletions to proposed critical habitat. The Service is reviewing these comments as well as survey data collected in 1994. These sources included more complete information on the primary constituent elements of flycatcher habitat and on the distribution of that habitat across the bird's range. Substantial disagreement has also been found among scientists knowledgeable about the species regarding the proposed designations. Further, written comments submitted by State agencies recommended substantial changes in proposed critical habitat areas.

The Service is presently reconsidering the prudence of critical habitat designation for this species, the need for special management considerations or protection of habitat within the species' range, and the proper boundaries of any areas that might be designated as critical habitat. Issues raised in public comments, new information, and the lack of the economic information necessary to perform the required economic analysis cause the Service to conclude that critical habitat is not now determinable and to invoke an extension until July 23, 1995, pursuant to 16 U.S.C. § 1533(b)(6)(C) for reaching a final decision on the proposal of critical habitat for the flycatcher. The Service has determined that this is in compliance with provisions of 50 CFR 424.12(a) and § 424.17, regarding delaying final rules on proposed critical habitat designations, and with provisions for addressing State agencies that disagree in whole or part with a proposed rule (50 CFR 424.18(c)). In order to assist in its deliberation, the Service is reopening comment on the proposal to designate critical habitat for a period of 60 days. Comments are particularly sought on the following topics:

1. The need for special management of areas within the range of the flycatcher, including those proposed as critical habitat as well as other areas,
2. The net benefit to the flycatcher in addition to the protection provided by its listing as endangered likely to accrue from a designation of critical habitat, and
3. Any indication that areas should be added to or excluded from those proposed for designation.

Comments already received that address the above topics will be considered in reaching a final decision regarding critical habitat designation, and need not be resubmitted.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing encourages and results in conservation actions by Federal, State, and local agencies, private organizations, and individuals. The Act provides for possible land acquisition and cooperation with the States and requires that recovery actions be carried out for all listed species. The protection required of Federal agencies

and the prohibitions against taking and harm are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat, if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR Part 402. Section 7(a)(4) requires Federal agencies to confer informally with the Service on any action that is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, Section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into consultation with the Service.

No conservation plans or habitat restoration projects specific to the southwestern willow flycatcher exist on lands managed by the U.S. Forest Service (USFS), BLM, U.S. Bureau of Reclamation (Reclamation), Indian Nations, State agencies, or the Service. The USFS and BLM have focussed some attention on modifying livestock grazing practices in recent years, particularly as they affect riparian ecosystems. As mitigation for other projects impacting riparian habitats, Reclamation is engaged in riparian habitat restoration projects in several areas in the range of *E. t. extimus*, including some historical nesting locations. The BLM currently manages approximately 40 miles of the upper San Pedro River in Arizona (including historic nest sites), as a Riparian National Conservation Area. Riparian habitat rehabilitation is also underway at several National Wildlife Refuges in the breeding range of *E. t. extimus*, which are managed by the Service. The Nature Conservancy manages one of the largest remaining flycatcher populations, as well as several other areas with high recovery potential. The U.S. Marines have maintained a cowbird control program near the Santa Margarita River to benefit the least Bell's vireo. This program has benefitted nesting southwestern willow flycatchers there. Grand Canyon National Park has instituted a seasonal recreation closure at the remaining site with nesting willow flycatchers in the Grand Canyon, and has begun a cowbird monitoring program.

The Act and implementing regulations found at 50 CFR 17.21 set forth a series of general prohibitions and exceptions that apply to all endangered wildlife. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to take (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, or collect; or to attempt any of these), import or export, ship in interstate commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any listed species. It also is illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply to agents of the Service and State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving endangered wildlife species under certain circumstances. Regulations governing permits are at 50 CFR 17.22 and 17.23. Such permits are available for scientific purposes, to enhance the propagation or survival of the species, and/or for incidental take in connection with otherwise lawful activities.

It is the policy of the Service (59 FR 34272) to identify to the maximum extent practicable at the time a species is listed those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a listing on proposed and ongoing activities within a species' range. The Service believes that, based on the best available information, the following are examples of actions that will not result in a violation of section 9:

(1) Dispersed recreational activities near willow flycatcher breeding areas that do not disrupt normal flycatcher breeding activities and behavior, attract avian and mammalian predators, nor result in the trampling or destruction of riparian breeding habitat;

(2) Federally-approved projects that involve activities such as discharge of fill material, draining, ditching, tiling, pond construction, stream channelization or diversion, or diversion or alteration of surface or ground water flow into or out of the wetland (i.e., due to roads, impoundments, discharge pipes, stormwater detention basins, etc.)—when such activity is conducted in accordance with any reasonable and prudent measures given by the Service in accordance with section 7 of the Act; and

(3) Livestock grazing that does not attract the brood parasitic brown-headed cowbird or result in the destruction of riparian habitat or the disturbance of breeding flycatchers.

Activities that the Service believes could potentially harm the southwestern willow flycatcher and result in "take," include, but are not limited to:

(1) Unauthorized handling or collecting of the species;

(2) Destruction/alteration of the species' habitat by discharge of fill material, draining, ditching, tiling, pond construction, stream channelization or diversion, or diversion or alteration of surface or ground water flow into or out of the wetland (i.e., due to roads, impoundments, discharge pipes, stormwater detention basins, etc.);

(3) Livestock grazing that results in direct or indirect destruction of riparian habitat;

(4) Activities such as continued presence of cattle and fragmentation of flycatcher habitat that facilitate brood parasitism by the brown-headed cowbird; and

(5) Pesticide applications in violation of label restrictions.

Questions as to whether specific activities will constitute a violation of section 9 should be directed to Sam F. Spiller or Robert M. Marshall at the Service's Ecological Services State Office, 2321 West Royal Palm Road, Suite 103, Phoenix, Arizona 85021 (Telephone 602/640–2720)

National Environmental Policy Act

The Fish and Wildlife Service has determined that an Environmental Assessment and Environmental Impact Statements, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to Section 4(a) of the Act. A notice outlining the Service's reasons for this determination was published in the Federal Register on October 25, 1983 (48 FR 49244).

References Cited

A complete list of all references cited herein, as well as others, is available upon request from the Supervisor, Ecological Services State Office in Arizona (see **ADDRESSES** above).

Author

The primary author of this rule is Robert M. Marshall, Ecological Services State Office in Arizona (see **ADDRESSES** above).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and record keeping requirements, and Transportation.

Regulation Promulgation

Accordingly, part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, is amended as set forth below:

PART 17—[AMENDED]

1. The authority citation for Part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

2. Section 17.11(h) is amended by adding the following, in alphabetical order under Birds, to the List of Endangered and Threatened Wildlife to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
*	*	*	*	*	*		*
BIRDS							
*	*	*	*	*	*		*
Flycatcher, southwestern willow.	*Empidonax traillii, extimus.*	U.S.A. (AZ, CA, CO, NM, NV, TX, UT).	Entire	E	577	NA	NA
*	*	*	*	*	*		*

Dated: February 16, 1995.

Mollie H. Beattie,

Director, Fish and Wildlife Service.

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