Petition to Remove the

"Southwestern" Willow Flycatcher (Empidonax traillii "extimus") (SWWF)

From the List of Endangered Species

Under the

United States Endangered Species Act

Due to Significant New Data that Demonstrates Original Data Error

by

The Center for Environmental Science, Accuracy, and Reliability (CESAR)

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New Mexico Business Coalition

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EXECUTIVE SUMMARY

This petition seeks to remove the "Southwestern" willow flycatcher (*Empidonax traillii "extimus"*) (SWWF) from the list of endangered species under the United States Endangered Species Act[1], (ESA), due to **significant new data that demonstrate both original data error and classification error.**

In 1995, the SWWF was listed as endangered under the provisions of the ESA in 1995. In order to protect the SWWF under the ESA, the Fish and Wildlife Service (FWS) made two determinations. First, they determined that the SWWF was a listable entity[2], and second, they determined that the SWWF was threatened or endangered under the provisions of the ESA. In the absence of data at the time of the listing, the FWS relied primarily on speculation based on the information available. Using new data and analyses not available at the time of listing, this petition demonstrates that the SWWF is not a valid subspecies of willow flycatcher, which is a classification error. This petition also demonstrates that the threats to the continued existence of the putative SWWF are contradicted by the information and data collected since the listing. As a result, the SWWF should be removed from the list of endangered species.

PART I: Classification Error

The original 1995 listing of the SWWF identified it as a subspecies of the wide-ranging and common willow flycatcher (*Empidonax traillii*). The identification of the "Southwestern" subspecies is based on the FWS determination that *E. traillii* can reasonably be divided into distinct subspecies, of which the "Southwestern" willow flycatcher was one such subspecies. Implicit in the definition of a distinct subspecies is the idea that there are particular characteristics peculiar to SWWFs that allow them to be distinguished from the species level willow flycatcher.

The Treatment of the SWWF as a Subspecies is Not Supported by Best Available Scientific Data

The petition relies on newly published analyses that examine morphology, genetics and ecology of the SWWF to ascertain a reliable description of the SWWF that distinguishes it from the more common willow flycatchers that are widespread in North America. The available analyses demonstrate unequivocally, that there is no available basis for distinguishing SWWF from willow flycatchers. This eliminates the fundamental basis for the listing; there is no species, subspecies or distinct population that meets the definition of "species" of the ESA.[3] In the 20 years since its listing, many new analytical tools have been developed and the scientific community's understanding of genetics has deepened. A recently completed paper[4] examines the available data on SWWF. The author reanalyzed both the molecular-genetic and the morphological (coloration) data from the sources used by the FWS. In addition, vocalization data and ecological distinctiveness were analyzed. **No statistically valid morphological, genetic, vocal or ecological basis for designating the SWWF as a distinct subspecies was found.**

Morphology -- The results of the reanalysis are consistent with the genetic data on SWWF that support the existence of a genetic cline, rather than clearly defined (e.g., diagnosably distinct) subspecies. The original definition of the SWWF was based in large part on putative differences in coloration, which were derived from visual comparison of museum specimens. Subsequently, an assessment of coloration was based on matching colors of museum specimens to color "standards". Because both of the previous studies are now known to be inconsistent, a recent study of coloration used a colorimeter which produces quantitative data on color variation within and among populations. These data show that there is no statistically valid difference between willow flycatcher populations that would support the FWS's previous conclusion that the SWWF is distinct in the very color characteristics used (qualitatively) in the original descriptions.

Genetics --The petition relies upon a published reanalysis of mitochondrial DNA (mtDNA) genetic data gathered after the original listing that provides a quantitative test of the subspecies boundaries used by the FWS. The reanalysis uses modern techniques and also identifies scientific shortcomings in the original research. This study analyzes all genetic data across the range of the SWWF. The reanalysis reveals a gradual genetic transition from one geographic location to another and does not support the subspecies limits of the SWWF (or any other potential geographic unit). In the case of a valid subspecies, there should be a sharp genetic breaks with no overlaps. The petition includes an illustration that compares the sharp breaks and lack of overlap that occurs among subspecies of the spotted owl (*Strix occidentalis*) with an illustration of the genetic pattern of the SWWF. The comparison demonstrates the spotted owl subspecies are clearly differentiated with non-overlapping distributions whereas the differentiation of SWWF fails this test.

The petition also relies on an analysis of all available willow flycatchers' mtDNA sequences in Genbank[5] that had not been previously analyzed in concert. The sequences represent breeding willow flycatchers from all subspecies (including SWWF) and represent a large fraction of the known breeding range across North America. The resulting phylogeny showed no significantly supported groupings that could be equated with geographic or subspecific groupings, and hence, establishes that no subspecies of willow flycatcher are genetically supported based on mtDNA.

Thus the genetic analysis of willow flycatchers generally, and SWWF specifically, shows that the subspecies boundary is merely an arbitrary division along a gradual genetic cline. This finding is consistent with the statement found in FWS-cited research that, "…*separation of the SWWF is a policy, not a biological determination*". Under the ESA, listing determinations must be based solely on the best scientific and commercial data available, and not on other nonscientific considerations.[6] **The data and analysis included in the petition demonstrate that subspecies are not supported by genetic data**.

Ecological Differences

The petition also includes data and analysis that examines whether the occurrence of willow flycatchers in riparian areas of the arid southwest might be associated with significant ecological distinctiveness, and whether such distinctiveness could be sufficient to support of SWWF as a subspecies. The analysis uses correlative ecological niche models. The results of the analysis are that the SWWF and *E. t. adastus* are using common environmental features as often as one would expect by chance – hence the species in general likely has a broad ecological tolerance. **The SWWF in particular does not show a significant ecological divergence that would support a subspecies designation.**

Vocalizations

The vocal characteristics of birds vary geographically and these can be used to corroborate subspecies boundaries. Differences in vocalizations first led to realization that the willow flycatcher was a distinct species from the alder flycatcher (*Empidonax alnorum*). Analysis of geographic variation in the song of male willow flycatchers representing population samples attributed to *E. t. extimus* and *E. t. adastus* found potential diagnostic vocal differences between the two subspecies. However, these findings are compromised by several observations. First, the author himself notes that his data were consistent with "moderate introgression of *extimus* genes into the *adastus* gene pool". For subspecies to remain distinct, there cannot be more than a few individuals dispersing from one subspecies to another, and "moderate introgression" far exceeds this minimal level. Second, several samples did not group geographically with subspecies limits, thus undermining the potential diagnostic value of the vocalizations. Third, there is a sampling gap that could mean that identified potential vocal differences might not remain if recordings of singing males were obtained from the intermediate areas. Lastly, there is no attempt to evaluate differences with respect to other alleged subspecies to the west (*E. t. brewsteri*) or east (*E. t. traillii*). One cannot evaluate only two of four geographic boundaries and expect to make a valid scientific determination as to the distinctiveness of an entire subspecies from the remaining subspecies. In other words, if differences do not exist to the east and west of the assumed SWWF population boundaries, the existence and distribution of willow flycatcher subspecies cannot be established. **Hence, the vocal data follow the morphological and genetic data in failing to provide support for the distinctiveness of the SWWF**.

Summary of Taxonomic Distinctiveness

The FWS accepted descriptions of the subspecies of willow flycatcher, including the SWWF, despite a marked lack of consensus in the literature. Modern taxonomic assessment tools such as colorimeters and statistical genetic analysis have shown the original descriptions were erroneous. Therefore, existing subspecies of the willow flycatcher, including SWWF, are not biologically valid as entities that are eligible to be listed under the ESA. Valid taxa are discrete entities that have independent, or nearly so, evolutionary histories. The ESA is intended to protect these distinct elements of biodiversity. Unfortunately, subspecies often fail to meet this fundamental requirement because, as with the SWWF, they are merely arbitrary divisions of gradual patterns of morphological variation.

Neither molecular, ecological, vocal, nor morphological data support the SWWF as a subspecies. Each of the prior studies used to justify listing, the recovery plan, and status reviews, assumed that decades old subspecies limits were valid. Post-listing studies cited as support for the SWWF in fact failed to test the hypothesis that the SWWF was a valid taxonomic unit. Instead, these studies relied on a few samples from within the "core" of a subspecies to "confirm" subspecies *per se*, while ignoring intermediate samples, thereby providing an invalid test of subspecies limits. This petition relies on data and analysis, as required by the ESA, to test the subspecies hypothesis. **The petition demonstrates, based on this data and analysis the inaccuracy of the original subspecies classification of the SWWF.**

Threats Identified in the Listing are Not Supported by Data

While the SWWF clearly does not qualify for listing under the ESA because it is not a valid subspecies, the petition also examines the threats identified by the FWS to support its findings that the SWWF is threatened. In its listing determination, the FWS declared that listing was warranted because the "Southwestern" willow flycatcher was threatened by:

- Serious population decline,
- Extensive loss of riparian habitat,
- Brood parasitism by brown headed cowbirds,

- Livestock grazing,
- Exotic tamarisk, and
- Lack of adequate protective regulations.

In the 20 years since listing, the FWS has determined that brood parasitism and invasive exotic Tamarisk are not threats to the species. Using data as required by the ESA, this petition demonstrates that

- Populations and range of the SWWF are increasing, not decreasing;
- Riparian habitat within the SWWF range is increasing, not decreasing;
- Livestock grazing coexists with increasing flycatcher populations; and
- Existing regulatory mechanisms are adequate and available to protect the SWWF and its habitat in the absence of the protections of the ESA.

In 1995 much of the data and analysis used in this petition were not available. The FWS made their listing determination using the limited scientific information then available and speculation based on anecdotal evidence. The ESA requires that listing be based solely on the best data available. The Supreme Court has ruled that surmise and speculation do not meet that standard.[10] In the intervening 20 years since listing, new data and analyses regarding the SWWF has become available. This new information shows the SWWF is not facing the threats that were believed to exist in 1995.

Populations of the SWWF are Increasing, Not Decreasing

This petition includes information showing that willow flycatchers have substantially increased in both their numbers and in breeding locations across the Southwest. The petition includes a chart documenting that SWWF populations substantially exceed the populations estimated in the listing petition. It is difficult to know exactly what populations were extant at the time of listing, but an examination of the data in the comments provided to the FWS at that time of listing, document much higher populations than those acknowledged in the listing petition.

SWWF Habitat is Increasing, Not Decreasing

At the time of listing, the FWS erroneously believed that large scale losses of riparian vegetation along southwestern rivers and streams had occurred, particularly the cottonwood/willow riparian habitats used by the SWWF. However, the works cited by the FWS to support this belief were statements of opinion, with no supporting data. The petition details the cited documents' lack of data supporting their assertion.

In their seminal text on long-term changes in riparian vegetation in the Southwest, The Ribbon of Green (University of Arizona Press 2007), hydrologists Robert H, Webb and Stanley A. Leake and botanist Raymond M. Turner have debunked the claim that Arizona has lost 90 percent of its riparian habitat. As the authors note in their introduction, this myth has been traced to a single paper on changes in cottonwood galley forests adjacent to a segment of the lower Colorado River. Prior to The Ribbon of Green, no one has attempted to systematically assess long-term changes in riparian vegetation along major rivers and streams in the region.

The photographic record presented in *The River of Green*, show that riparian vegetation was sparse overall prior to 1900. Webb et al. also show that a period of floods were mainly responsible for lack of riparian woody vegetation along Arizona's rivers and streams. The FWS, by contrast, relied on Herbert Brown's 1902 collection of 30+ willow flycatcher nests near Yuma (and particularly at the confluence of the Colorado and Gila rivers), as an example of the effects of habitat loss subsequently caused by human activities. The historical record assembled by Webb et al. demonstrates the error in the 1995 listing determination.

The photographic evidence collected and analyzed by the researchers is confirmed by early accounts of the locations along the lower Colorado. The petition documents the lack of habitat for SWWF and for the species itself along the lower Colorado River. Firsthand accounts describe reeds and dead trees along the banks of the river and confirm that during pre-settlement times and up until the Hoover Dam was completed in 1935, cottonwood/willow and other riparian habitats available to breeding willow flycatchers were localized, ephemeral in occurrence, and subject to eventual, certain destruction by periodic devastating flood events.

The new information and data presented by Webb et al. and other researchers demonstrate that the original listing determination errs in asserting with no supporting data that SWWF in the Southwest prefer "natural" over "man-altered" stream flow conditions. In fact, the data support a conclusion that regulated flows have helped to protect and ultimately increase woody riparian vegetation along the lower Colorado and other major rivers in the Southwest. Moreover, fewer than 44% of all flycatcher territories in the Southwest are found in the "90% native vegetation" habitats the FWS associates with "natural" hydrologic regimes. Compounding this error is the fact that a substantial part of the "90% native vegetation" habitat the FWS considers to be the product of a "natural" hydrograph clearly is not. Rather, suitable SWWF habitat, such as the habitat found on the U Bar Ranch in the Cliff-Gila Valley in western New Mexico, is the result of a human-altered hydrologic regime geared to livestock production and farming. [11]

Although evidence on the extent and history of riparian vegetation like that provided for Arizona is not available for southwestern California, New Mexico, or Utah, observations of increasing numbers of breeding willow flycatchers within those states show that habitat suitable for breeding "Southwestern" willow flycatchers are currently increasing, not decreasing, throughout the remainder of the Southwest as well.

Exotic Species are Not a Threat to the SWWF

In the original listing determination, the FWS identified the tamarisk, Russian olive and other exotic woody riparian species as a threat to the SWWF. Today, we know that this was incorrect. Fifty percent of all known willow flycatcher territories in the Southwest occur in mixed native/exotic (tamarisk) riparian habitats associated with human-altered hydrologic regimes. Moreover, large breeding colonies of SWWF at Roosevelt Lake in Arizona and along the Rio Grande in New Mexico inhabit tamarisk-dominated riparian habitats.

Existing Suitable Habitat Far Exceeds That Necessary For "Recovery"

New information and data showing that SWWF populations, ranges, and riparian woodland habitat are expanding also indicate that the SWWF is not threatened with extinction. Perhaps the clearest example of the expansion of habitat suitable for the SWWF since 1995 is the critical habitat rules that FWS has issued. The petition provides an examination of the SWWF critical habitat identified and adopted by the FWS, which demonstrates that the available habitat exceeds that needed for recovery by several orders of magnitude (Table 3).

The Recovery Plan for the SWWF requires roughly 2.7 acres of riparian habitat for each nesting SWWF territory, and provides that 1,950 flycatcher territories are needed to delist the species. This means that a minimum 5,265 acres of habitat would be necessary to support sufficient territories. In its most recent critical habitat designation for the SWWF, the FWS identified more than 500,000 acres of riparian land along 2,000 miles of rivers, streams and reservoirs in the southwest that currently possess the physical and biological features essential for the conservation of the SWWF. In its 2013 critical habitat designation, the FWS identified some 300,000 acres of habitat along 800 miles of streams in the Southwest as being protected under various land management or conservation plans. Even assuming conservatively that each flycatcher territory requires 5 acres of suitable habitat, FWS's own rule making documents show that there is sufficient existing riparian habitat to support over 100,000 SWWF territories. **These data demonstrate that the SWWF is not threatened by past or future loss of habitat.**

Livestock Grazing Coexists with Increasing Flycatcher Populations

The petition includes a discussion of the Cliff-Gila Valley in western New Mexico to demonstrate that livestock grazing does not pose a threat to the SWWF or its habitat. There, the largest population of willow flycatchers known to occur in primarily native riparian habitat in the Southwest, is found in the midst of working cattle ranches and related agricultural activities. In fact, SWWF are found nesting in riparian growth along irrigation ditches used to water pastures and fields. Data trends measured over time document increasing SWWF populations and demonstrate that anthropogenic activities have not resulted in significant cowbird parasitism or population declines. Instead, these land uses have created and maintained habitat for the SWWF. Thus, the primary threats to the SWWF are shown to be largely nonexistent.

Existing Regulatory Mechanisms are Adequate to Protect SWWF and its Habitat

The petition documents the multiple mechanisms that exist and can be used to protect the SWWF in the absence of an ESA listing. These protections exist at the federal state and local levels. Each of these federal and local laws is sufficient to address any real threats to the species. The River Network has compiled and posted a general list of nearly twenty laws can be used to protect watersheds generally, and riparian areas specifically[9]. Applicable laws include the Clean Water Act (CWA), the Migratory Bird Treaty Act (MBTA), the National Forest Management Act (NFMA) and the Federal Land Policy and Management Act (FLPMA). The petition details the specific mechanisms which provide more than adequate authority to protect the species and its habitat.

Conclusion

The FWS identification of the SWWF as a spate subspecies of the willow flycatcher was a classification error, unsupported by credible scientific data. New data and information developed since the listing, confirm that the SWWF is nothing more than the widespread willow flycatcher. The threats to the species identified by the FWS in the final listing document were based on insufficient data. Recent data and information developed since 2000 show that riparian habitat suitable for the SWWF has been increasing since construction of the Hoover Dam in 1935. Therefore, this petition requests that the SWWF be removed from the list of threatened and endangered species because the original listing was based on error. The SWWF is not a valid subspecies or distinct population segment, and the best scientific and commercial data do not support the existence of the threats identified in the original listing petition.

PETITION

Petitioner, the Center for Environmental Science, Accuracy, and Reliability (CESAR), Building Industry Legal Defense Foundation, California Building Industry Association, California Cattlemen's Association, New Mexico Business Coalition, New Mexico Cattle Growers Association, New Mexico Farm & Livestock Bureau, New Mexico Wool Growers, Inc. and Pacific Legal Foundation requests the United States Fish and Wildlife Service (FWS) remove the "Southwestern" willow flycatcher (*Empidonax traillii* "*extimus*") (SWWF) from the list of endangered species under the United States Endangered Species Act, 16 U.S.C. §§ 1531, *et seq.* (Act), due to significant new interpretations and data that demonstrate original data error. This petition is filed under 5 U.S.C. § 553(e) and 50 C.F.R. § 424.14.

This petition demonstrates that:

- *E. t. extimus* is not a valid subspecies of the willow flycatcher.
- None of the threats identified in the original listing for *E. t. extimus* exist to such an extent as to threaten the continued existence of the species in the foreseeable future.

This petition:

- Includes **new** data demonstrating the SWWF is not a distinct subspecies.
- Includes **new** data demonstrating the SWWF is far more widespread than estimated in the original listing determination.
- Includes **new** data demonstrating the habitat of the willow flycatcher in the southwest is not being reduced or degraded, but has in fact been expanding.
- Includes **new** data demonstrating that the Brown-headed Cowbird (*Molothrus ater*) is not the threat to the SWWF as originally claimed in the listing.
- Includes **new** data demonstrating that Tamarisk (salt cedar) is not a threat to the species as originally claimed in the listing.

The petition addresses two failings in the listing of the SWWF:

1. The mischaracterization of southwestern populations of the willow flycatcher as a subspecies (e.g., SWWF), and
2. The mischaracterization of the threats facing the putative subspecies SWWF.

The petition is organized to address each of these failings separately. First, the Taxonomy section of the petition provides new data and analysis refuting the FWS determination that the SWWF is either a subspecies, or distinct from willow flycatchers generally. Second, the Threats section of the petition provides a detailed examination with data and analysis demonstrating that the threats identified in the 1995 listing were based on data error. With the completion of both discussions, there are ample and conclusive data demonstrating that the 1995 listing of the SWWF was based on data error.

SECTION I. Biology and Taxonomy of the "Southwestern" Willow Flycatcher

1. General Review

a. Biology

The willow flycatcher (*Empidonax traillii*) 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. It hunts small insects by taking them on the wing or gleaning them from foliage. It nests in dense shrubbery, preferably near slow moving water. The listing document describes its habitat as occurring:

> "*. . . 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).*"[7]

In the listing rule, the FWS goes on to state that the riparian habitats are rare, small and/or linear. The FWS also states that the riparian habitats of the SWWF are "*separated by vast expanses of arid lands*". Of course, because the bird migrates hundreds of miles, the separation is not a barrier.

b. Taxonomy

Until the late 1950s, the willow flycatcher was not recognized as a separate species, instead being considered part of the widespread Alder Flycatcher. Stein (1963) proposed that there were two song types given by breeding males, and that these corresponded to two different species, the Alder Flycatcher and the willow flycatcher. Later, the American Ornithologists' Union (AOU) (1973) formally recognized these two species. Species status was subsequently confirmed by molecular genetic analysis of individuals bearing the two song types. It was recognized that the two species are distinct genetically, and that individuals can be readily assigned to species based on DNA sequences. However, the species are extremely similar morphologically, and in the Birds of North America species account for the willow flycatcher, Sedgwick (2000) wrote: *"As are most members of the genus* Empidonax, *willow flycatcher is difficult to identify in the field, and without vocal cues is nearly impossible to distinguish from Alder Flycatcher, whose habitats often overlap those of the willow".* Novitch *et al.* (2015)[8] found that many specimens in museums identified by experts were in fact misidentified.

c. Conclusions of Petition: The "Southwestern" Willow Flycatcher is Not a Valid Subspecies

The ESA regulations state:

> "*In determining whether a particular taxon or population is a species for the purposes of the Act, the Secretary shall rely on standard taxonomic distinctions and the biological expertise of the Department and the scientific community concerning the relevant taxonomic group . . .*"

A 2015 study that applies modern analytical techniques to data used in the listing as well as new data demonstrates that the SWWF is not distinguishable from willow flycatchers generally.[12] This paper, coupled with the obvious errors in the original listing, demonstrates that the SWWF does not meet genetic, morphologic or ecological distinctness tests. In the following paragraphs, this petition identifies the data errors in the original listing, reviews the data and analyses and demonstrates that the FWS taxonomy, which is the foundation of the listing determination, is in error.

2. Review of the Scientific Data Available During Listing

a. Background

Willow flycatchers in the southwest have long posed classification difficulties for taxonomists because of their historically small numbers (and thus small sample sizes available for analysis), their scattered locations of occurrence, their wide tolerance of elevational differences, and their virtually indistinguishable appearance from other subspecies. Although the SWWF was described in 1948 in The Auk, the official publication of the American Ornithologists' Union (AOU), it was not included in that society's last formal subspecies list in 1957. The AOU Checklist is considered the definitive source for the taxonomy of North American birds. It is not clear whether the AOU rejected the SWWF as valid, or excluded it for some other reason, but the AOU is recognized as the formal taxonomic authority for North American birds. The AOU has not issued an official position on any subspecies since 1957 by either accepting or rejecting any subspecies. Instead, all checklists subsequent to the 1957 edition have deliberately excluded subspecies. The AOU checklist committee may revisit the subspecies of North American birds at some future date. In any case, the AOU has not recognized the SWWF as a subspecies of willow flycatcher.

Not willing to wait for the AOU to revisit subspecies boundaries, on November 21, 1991, the FWS recognized the "Southwestern" willow flycatcher ("*extimus*") (56 FR 225 at p. 58811) as one of five subspecies[13] of the willow flycatcher in 1991. (60 FR 38, p. 10694). The FWS based that finding on "a majority opinion" of its authorities that *E. t. extimus* is a valid subspecies (see: AEM, 1995). The FWS designation of the SWWF is not based on the recognized scientific authority of the AOU, but on a selected series of published studies that have not been evaluated by the AOU.

This petition examines the available data and analyses of morphology, ecology, and genetics to ascertain whether there is sufficient evidence to support the validity of the SWWF as a distinguishable group (either as a subspecies or a distinct population segment) within the willow flycatcher species generally.

At this juncture it is important to reiterate the ESA requirement that listing determinations be based "***solely*** *on the best scientific and commercial* ***data*** *available*".[14] The following discussion relies solely on existing data as they examine the question of whether the SWWF qualifies as a subspecies.

The listing determination contained exaggerated claims regarding the support for the subspecies in both the pertinent scientific community and the literature. The listing determination did not make clear that the AOU has not formally accepted the SWWF, instead allowing the reader to infer AOU support by ambiguous language. As discussed earlier, the AOU, the final scientific arbiter in such questions, cannot be cited as an authority for either position. Therefore, this petition focuses on examination of the support the FWS cited in the listing rule, and in subsequent data regarding the validity of SWWF. This examination highlights the significant errors made by the FWS in citing these works.

b. Literature Cited Admits Differences in Color Are Not Distinguishable by Population

FWS claimed in the final rule (60 FR at p. 10696) that "*extimus*" is distinguished from other willow flycatcher subspecies by subtle differences in color and morphology. At the time of the listing, color charts were the basis used for making color distinctions, and were acknowledged to have significant limitations. Nevertheless, they were the only available technology. In the listing rule, the FWS relied on selective characterization of three researchers, Unitt (1987), Hubbard (1987) and Browning (1993), to support a conclusion that there are identifiable color and morphological differences diagnostic to SWWF. However, no such support exists. The paragraphs and quotations below illustrate the extent to which the FWS mischaracterized the citations.

Unitt (1987) could not, in fact, separate "*extimus*" from other purported willow flycatcher subspecies based on color, and states:

> "*I saw no consistent difference in color between* extimus *and* traillii *and cannot confirm Aldrich's (1951) statement that '*campestris*' (i.e.* traillii*) is 'somewhat more greenish' than* extimus*" (140).*"

FWS claimed in its final rule (60 FR at p. 10696) that Browning (1993) also found "*extimus*" to be distinguishable from other alleged subspecies of willow flycatcher by color. Browning's use of Munsell Color Charts as the basis for determining color values (pale vs. dark of the crowns and backs of most specimens) compromises the scientific rigor and validity of his conclusion. This is because, as Browning (1993 at p. 247), himself admitted, his use of Munsell Color Charts, "*present many of the same problems*" as did Smithe's 1975 color standard. In addition, Browning did not consider quantitatively the degree of color change that accompanies the age of the specimens or time of year they were collected, as colors change both over time in museums, owing to pigment degradation, and seasonally owing to feather wear (see Paxton *et al.* 2010).

The problems referenced by Browning apply to both Munsell Color Charts and Smithe's 1975 color standard, which consist of swatches of color that are used to match to parts of bird specimens to establish plumage color. Today, this method has been superseded by use of color spectrophotometers, which were not available to earlier ornithologists such as Browning (see discussion of Paxton *et al.* below). Thus, several problems render color description by use of these color swatches dubious:

- Color swatches do not match actual colors;
- Color swatches do not match plumage colors of willow flycatchers; and
- Color swatches do not have the same texture, gloss, and colorants as the plumage being compared (*Id.*).

Browning (1993) admits that his use of Munsell Color Charts is compromised because "many" of these negative criteria are met and, therefore, the results of the comparison are inapposite. This means that in the case of the SWWF, the Munsell Color Charts are not an appropriate methodology for comparing color. Use of an inappropriate methodology invalidates both Browning's conclusions and the FWS's reliance on his data on plumage coloration to support the SWWF as a subspecies

Hubbard (1999) further illustrates that color is not a reliable diagnostic indicator of subspecific allegiance among willow flycatchers, stating:

> "*[t]he fact is that identifying these taxa is quite difficult, even for trained taxonomists working in the laboratory under the best protocols and conditions. This difficulty stems from a number of factors, the major one being the pervasive subtlety of the plumage-color characters by which these* ***alleged subspecies*** *mainly differ. Not surprisingly, these differences are difficult to describe in words, which is exacerbated by the fact that none of the available classification systems accurately portrays the range of plumage coloration observed in this flycatcher (e.g., Browning 1993).*" [Emphasis added.]

Hubbard (1987) offers only a qualified endorsement of that taxonomic arrangement and recommends further study (AEM, 1995). Further, as shown above, Hubbard (1987) disagrees with the FWS by concluding that none of the available subspecies classification systems accurately portrays the range of plumage coloration observed in this flycatcher. In addition, it should be noted that unless specimens are in the exact same stage of molt and feather wear (e.g., collected at the same time of year), color comparisons are invalid. Therefore, the three citations used by the FWS to support diagnostic color differences for SWWF do not in fact provide scientific evidence in support of its validity.

c. Populations Are Not Distinguishable in Morphology

In the final rule and in its 2002 Recovery Plan for the SWWF, the FWS incorrectly stated that Hubbard's (1987) unpublished paper confirms the existence of "*extimus*" based on subtle differences in color and morphology. We have already addressed the lack of support from Hubbard (1987) with respect to color. The same is true with respect to morphology. In point of fact, there are no valid studies of the morphology of willow flycatchers, including the SWWF, that started with a large pool of geographically dispersed specimens and attempted to determine quantitatively if there were morphological gaps that corresponded to purported subspecies limits. All existing studies instead assumed that published subspecies limits were valid and conducted morphological comparisons using these putative limits, a circular process that cannot provide a valid test. Unitt (1987) could not separate the alleged "*extimus*" subspecies from other alleged Willow Flycatchers subspecies based on morphological differences and use of the 75% rule.[15] Again, according to Unitt (1987 at p. 140),

> "*The sharpest distinctions in size and proportion among the subspecies of* E. traillii *are the functions of wing and tail lengths. In males, the greatest difference is in the wing-tail difference between extimus and traillii, but in even that character the 75% rule is satisfied in only one direction of comparison. In females, traillii might be distinguishable from the three western subspecies in both wing-tail difference and wing/tail ratio. The 75% criterion is met in both directions when traillii is compared to brewsteri, and in one direction when traillii is compared to extimus or adastus. However, the sample for female traillii is so small (n = 4) that any conclusion drawn from it can be considered only tentative.* ***Therefore if subspecies exist in* E. traillii *they must be defined on a basis other than size or ratios of wings and tails****.*" [Emphasis added.]

It is clear that none of the researchers was able to articulate a basis for finding the subspecies morphologically distinct based on factors such as size, appendage size and appendage shape. Thus, the FWS mischaracterized and inappropriately relied on these data to define distinctness and support listing the SWWF as a subspecies.

d. Inconsistent Range Descriptions Further Undermine the Validity of SWWF

Given the lack of data supporting either color or morphological differences, we focus on published disagreements over the ranges of putative subspecies. Again, the data are as contradictory here as in the question of appearance. In particular, different authors claim rather different range limits for the alleged western subspecies, which should not occur if they were distinct in the first place.

As stated by Hull (AEM 1993):

> "*For example, Phillips (1948) states the range of* adastus *as extending into 'southern Colorado', 'eastern Arizona', and even so far south in Arizona to be 'near Patagonia.' (Phillips 1948 pgs 510-511). For the* brewsteri *subspecies range, Phillips has this bird extending to 'southern Colorado' and 'northeastern Arizona.' (Ibid. pgs 511, 512). Finally, for the* extimus *subspecies, Phillips extends the range to 'central-eastern Arizona' and to the 'upper San Pedro River.' (Ibid. pg 513). As is clear, these alleged subspecies of willow flycatchers have ranges that are greatly overlapping thus rendering their division indistinguishable. Phillips (1948) even recognizes this point when he states that '[b]reeding birds from northeastern Arizona, southwestern Colorado, and much of New Mexico . . . show great individual variation, and are thus intermediate between* extimus *and* brewsteri*.' (Ibid. pg 514). In effect, Phillips cannot even distinguish or separate the range of the willow flycatcher subspecies and this is the man who first tried to recognize separate subspecies. The range of the willow flycatcher subspecies is further clouded by Aldrich (1951) who differs with Phillips when he states that 'my concept of its (*extimus*) range is somewhat different from that of Phillips.' (Aldrich 1951 pg 195). Aldrich goes on to extend the range of the* extimus *subspecies into the Great Basin region and also into the Great Plains 'assigned by Phillips to* brewsteri*.' (Ibid. pg 195). The confusion in the range of the alleged willow flycatcher* extimus *subspecies is compounded by Unitt (1987) who disagrees with both Phillips and Aldrich. Unitt states that "[P]hillips (1948) and*

> *Aldrich (1951) included southern California in the breeding range of* brewsteri*, but my study shows that instead* extimus *occupies this area." (Unitt 1987 pg 144). The confusion is even recognized by the FWS who state in reference to its range in Utah that "because of possible intergradations with* E. t. adastus*, the exact limits are not well defined and clinal gradation may exist between the two subspecies." (FR Vol. 48 No. 140 pg 34398)."*[16]

The point here is that if the putative subspecies were morphologically distinctive (i.e., valid), as opposed to author-specific arbitrary divisions of clinal variation, their ranges would be far better known. The fact is that their lack of distinctiveness precludes identification of their ranges. Without adequate knowledge of ranges, it becomes impossible to determine whether the subspecies is threatened with extinction "throughout all or a significant portion of its range," as the Endangered Species Act requires.

3. Scientific Data and Analysis Developed Since Listing

In the nearly 20 years since the SWWF endangered listing, additional research has developed that clarifies the taxonomic status of the SWWF. In their subsequent publications addressing SWWF, the FWS relies on Paxton et al. (2000, 2008 and 2010) for support of the alleged SWWF subspecies. These examinations of willow flycatchers compare putative subspecies of willow flycatchers. One measured color of crown and back (Paxton *et al.* 2010) and another examined genetics (Paxton *et al.* 2008). A third examined coloration, genetics, vocalizations and ecological characteristics (Zink 2015). This petition examines the Paxton *et al.* (2008, 2010) work as well as new research, Zink (2015), as-of-yet not considered by the FWS.

a. Paxton *et al.* (2008)

Paxton *et al.* (2008) examined mitochondrial DNA (mtDNA) and Amplified Fragment Length Polymorphisms (AFLPs) within and among two putative subspecies of the willow flycatcher, *E. t. adastus* and *E. t. extimus* (SWWF). The samples came from seven breeding sites in Arizona, four sites in New Mexico, seven sites in Colorado, and seven sites in Utah. Irrespective of differences in putative subspecies ranges by various authors, the study sampled exclude about half the SWWF range and three quarters of the *E. t. adastus* range.[17] Paxton (2000) and Busch *et al.* (2000) further explored AFLPs within and among the hypothesized subspecies.

i. No Distinct Genetic Boundary in the North, Other Boundaries Not Examined

Paxton *et al.* (2008) found no distinct genetic boundary between SWWF and adastus at the northern boundary. Instead, they identified a "region of overlap" existing between these putative subspecies, and noted that this region of overlap will likely widen and contract over time. Paxton *et al.* (2008) only researched the northern boundary of SWWF's geographic occurrence, and the work failed to examine boundaries between SWWF and the other alleged willow flycatcher subspecies recognized by the FWS to the east and west (e.g., *E. t. traillii, E. t. brewsteri*). Since the boundaries with the remaining putative subspecies were not examined, and there are no data confirming those boundaries, it is purely speculative to state that Paxton *et al.* (2008)[18] "establishes" that SWWF is genetically distinct. Nonetheless, the FWS has asserted that the SWWF is genetically distinct from all the other "subspecies" of willow flycatcher that the FWS also recognizes (76 FR at p. 50544).[19]

What Paxton *et al.* (2008 at p. 1) actually state is that:[20]

> "*delineating a precise boundary that would separate the two subspecies ['*extimus*' and '*adastus*'] is made difficult because (1) we found evidence for a region of*

> *intergradation along the boundary area, suggesting **the boundary is not discrete**, and (2) the boundary area is sparsely populated, with too few extant breeding populations to precisely locate a boundary."* [Emphasis added.]
>
> . . .
>
> "*The candidate boundary that accounted for the most genetic variation was situated generally near the currently recognized subspecies boundary, but should be more biologically meaningful because it incorporates the landscape features that may be driving separation of the subspecies. Even so, we caution that using any narrow boundary line as an indicator of subspecies identity could be misleading because **biologically the boundary is a region of intergradations** rather than a discrete line" (Id.)*. [Emphasis added.]

Further, according to Paxton *et al.* (2008 at p. 17):

> "*This study examined the possible location of the northern boundary of the southwestern Willow Flycatcher* (E. t. extimus) *in the four corner states. The genetic markers indicated a strong mitochondrial and nuclear DNA frequency differences among core (only) samples from the subspecies, with breeding sites clustering into two groups separated approximately along the currently recognized boundary; however, **the geographic pattern of the molecular markers indicated that a distinct genetic boundary line between the subspecies does not exist**. Thus, the boundary between the two subspecies should be thought of as a region of genetic overlap as previous work based on museum skins and song variation also suggested."* [Emphasis added.]
>
> . . .
>
> "*Given that the molecular genetic data suggests [sic] that **there is no biological basis for a distinct boundary**, the final decision of where to place the boundary, for the purpose of Endangered Species Act management, will ultimately be a policy-based choice."*

Thus, Paxton *et al.* (2008) conclude that no biological basis exists for a distinct boundary between the alleged subspecies and that any boundary would be a policy choice rather than based on scientific data. This should be the end of the discussion. Paxton *et al.* (2008) has demonstrated that the data fail to establish a reliable genetically-based rule that can be used to differentiate between the SWWF and other willow flycatchers.[21] Here, the scientific data show that because there is no biological basis for a distinct boundary between SWWF and "*adastus,*" there is no biological basis for their separation as either separate subspecies or separate and distinct populations by the FWS. There has been no molecular-genetic research of the alleged boundary between SWWF and "*brewsteri*" to the northwest in California, and between SWWF and "*traillii*" to the east. Therefore, there are no data to support a conclusion that SWWF is a genetically distinct subspecies. The boundaries identified by the FWS for SWWF and neighboring "subspecies" of willow flycatcher are speculative and based on surmise, as no data are available to support them.

b. Paxton *et al.* (2010)

Paxton *et al.* (2010) undertook to identify distinctions in putative willow flycatcher subspecies by quantitatively measuring coloration of the crown and back of a series of live-trapped and released specimens (insuring that the data cannot be replicated) for lightness, saturation and hue using a spectrophotometer, which circumvents some of the problems of making visual comparisons of standardized color swatches with museum specimens. Here again, the sampling fails to include large portions of the two ranges; half the SWWF range and three quarters of the *E. t. adastus* range were excluded. Paxton *et al.* (2010) again assumed the existence of the subspecies the study was supposed to verify. In this, their work perpetuated any subspecies errors existing in the original subspecies descriptions as well as in the studies by Unitt 1987 or Browning 1993. Paxton *et al.*

(2010) assumed subspecies boundaries (which are weak at best, as described earlier) and simply looked for confirming evidence, stating:

> "*Because this study was intended to distinguish among established taxonomic units, we grouped breeding sites a priori into one of the four subspecies based on geographic ranges delineated via morphological studies (Unitt 1987, Browning 1993).*"

This circular, result-driven approach used by Paxton *et al.* (2010) undermines that study's support for subspecies distinctiveness. Although Unitt (1987) used statistical analysis of character variation, he did not test the hypothesis of the existence of subspecies, instead looking for confirming evidence by comparing pre-existing subspecies limits. (Browning (1993) did not perform statistical tests.) Although Paxton *et al.* (2010 at p. 129) state that it is important to "*assess the degree to which the patterns are consistent with the established taxonomic relationships*", in fact they failed to do so by accepting rather than testing, the validity of subspecies boundaries.

Thus, Paxton *et al.* (2008, 2010) made no assessment of assumed taxonomic boundaries using either the genetic or plumage color. As noted earlier in this petition, the subspecies definitions of the willow flycatcher used in the original listing do not appear to be supported by data. Paxton *et al.* (2010) adopt these definitions uncritically, without testing them, and thus perpetuates any existing errors. Paxton *et al.*'s (2010) approach undermines the credibility of their findings by accepting, rather than testing, an *a priori* assumption.

Paxton *et al.*'s (2010) findings are further undermined by their failure to analyze *any* willow flycatchers from New Mexico, thereby excluding a significant part of the range of *extimus*. Moreover, beyond this important omission, Paxton *et al.'s* (2010) results are far from conclusive. According to Paxton *et al.* (2010 at p. 128):

> "*We used a colorimeter to measure plumage coloration of 374 adult willow flycatchers from 29 locations across their breeding range in 2004 and 2005. We found strong statistical differences among the mean plumage coloration values of the four subspecies; however, while individuals tended to group around their respective subspecies' mean color value, the dispersion of individuals around such means overlapped. Mean color values for each breeding site of the three western subspecies clustered together, but the eastern subspecies' color values were dispersed among the other subspecies, rather than distinctly clustered. Additionally, sites along the boundaries showed evidence of intergradations and intermediate coloration patterns.*"

Thus, Paxton *et al.* (2010) cannot separate subspecies of willow flycatcher by use of a colorimeter, which is notable because they measured the very same characteristics used to describe the subspecies in the first place. It is also apparent from this statement that the "boundaries" between putative subspecies are merely gradations in changes in color patterns rather than diagnostic breaks that would allow non-arbitrary subspecies limits. Nowhere does Paxton provide a reliable basis for differentiating SWWF from other willow flycatcher subspecies generally that is supported by data.

In summary, Paxton *et al.* (2008, 2010) perpetuate the errors made in the original subspecies delineation by failing to test for distinctiveness and, instead, looking for confirming data. Importantly, this goal was accomplished by deleting samples from intermediate localities, and only using samples from "core" areas. This *priori* bias eliminated consideration of the most important data and ensured that the data used to compare the putative subspecies would support the desired conclusion. It is straightforward to realize that if intermediates along a gradient are excluded from comparisons, the ends of the gradient will appear to be different, but only as an artifact. Thus, Paxton *et al.*'s (2008, 2010) results merely confirm a statistical artifact, and their conclusion has no biological significance. Neither study provides clear, confirming data that subspecies of willow flycatcher can be reliably differentiated based on coloration or genetics.

c. Zink (2015)

In a recently completed paper, Zink (2015) examined the available data on SWWF. Zink (2015) reanalyzed both the molecular-genetic and the morphological (coloration) data from Paxton *et al.* (2008 and 2010), and vocalization data from Sedgwick (2001).[22] The results demonstrate there is no statistically valid morphological, genetic or vocal basis for designating the SWWF as a distinct subspecies of willow flycatcher. Zink also examined the potential ecological distinctiveness of Willow Flycatcher subspecies using niche modeling techniques. The models demonstrate that there is no evolved ecological distinctiveness of the SWWF, and therefore no ecological basis for claiming that the SWWF is distinct as a subspecies or a distinct population segment.

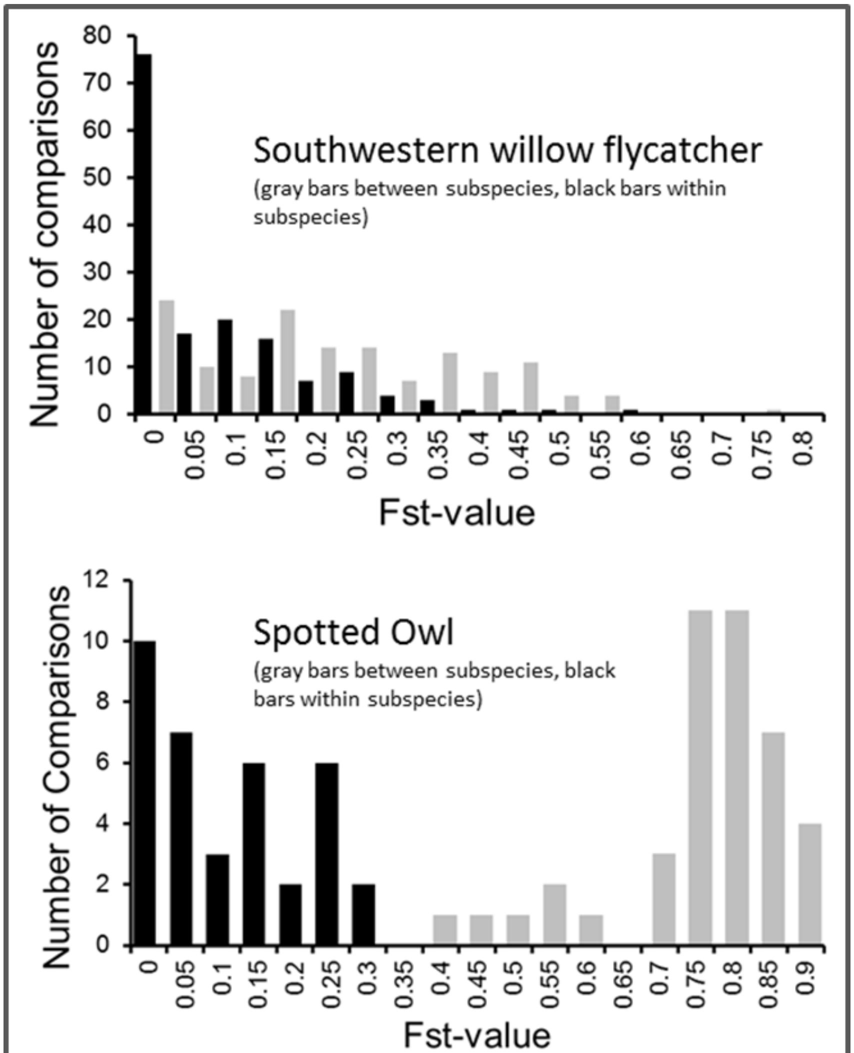

Figure 1. Comparison of genetic differentiation (Fst, which ranges from 0 to 1, with 0 indicating absence of genetic differentiation) within and between subspecies of the SWWF and the Spotted Owl. Note that the values within and between subspecies of Spotted Owl do not overlap, indicating strong

i. Genetic Differences

Zink (2015) reanalyzed the genetic data collected by Paxton *et al.* (2008). Zink (2015) pointed out significant departures by Paxton *et al.* (2008) from standard procedure in mapping subspecies. Typically, subspecies are mapped by latitude and longitude, whereas Paxton *et al.* (2008) mapped them by latitude and elevation. Zink (2015) mapped the haplotypes by the standard criteria of latitude and longitude, showing a gradual transition in mtDNA haplotype frequencies between the SWWF and the other putative subspecies *E. t. adastus*; whereas Paxton *et al.* (2008) claimed there was a sharp genetic break. Zink (2015) showed that the pattern of genetic variation is gradual, rather than there being two distinctive subspecies (*adastus* and *extimus*). Further, a comparison of the distribution of genetic distances estimates within and between subspecies was overlapping, whereas the two distributions should be non-overlapping if the subspecies were genetically distinct.

Comparison (Fig. 1) of genetic variation within and between subspecies of the SWWF and the spotted owl (*Strix occidentalis*) illustrates this point. Unlike the spotted owl subspecies, which are clearly differentiated with non-overlapping distributions, SWWF and *E. t. adastus* lack genetic differentiation. Thus, the SWWF subspecies boundary is merely an arbitrary division of a genetic cline. This finding is consistent with Paxton *et al.*'s (2008) finding that separation of the SWWF is a policy, not a biological determination. The ESA does not contemplate listings based on policy, but rather listings based solely on the best scientific data available. Zink (2015) and Paxton *et al.* (2008) have demonstrated that the SWWF subspecies is not supported by the available genetic data.

Zink (2015) also performed an analysis of all available mtDNA sequences in Genbank that were not heretofore analyzed in concert. The sequences represent breeding willow flycatchers from all subspecies and represented a large fraction of the known breeding range. The resulting phylogeny showed no significantly supported groupings that could be equated with geographic or subspecific groupings and, hence, establishes that no subspecies of willow flycatcher is genetically supported based on mtDNA.

ii. Morphological Differences

Zink (2015) also re-analyzed the colorimeter data of Paxton *et al.* (2010) in an attempt to identify coloration differences that might support the original definition of SWWF (which was based in large part on coloration). Zink (2015) noted that Paxton *et al.* (2010) assumed the existence of the subspecies rather than tested for their distinctiveness, thus failing to provide a test of the validity of the subspecies boundaries. Zink (2015) illustrates how the exclusion of intermediate samples of each subspecies resulted in an artifactual conclusion. Zink (2015) examined all the data finding a gradation of variation between subspecies without any breaks consistent with subspecies limits. This is consistent with the genetic data that support the existence of a genetic cline, rather than clearly defined subspecies.

iii. Ecological Differences

Zink (2015) postulated that occurrence of willow flycatchers in riparian areas of the arid southwest might be associated with significant ecological distinctiveness, and these could be sufficient and even replace the need for morphological or genetic support of SWWF as a subspecies. Zink (2015) tested the hypothesis using correlative ecological niche models[23] and data from the breeding bird survey[24] and Ornis2 (see http://portal.vertnet.org/search), omitting localities that might have been sampled when migrating males of other subspecies might have been singing on their passage through the range of extimus (e.g., Phillips 1948). The results of the analysis suggest that *E. t. extimus* and *E. t. adastus* are using common environmental features as often as one would expect by chance. Therefore, the willow flycatcher species in general has a broad ecological tolerance and the SWWF in particular does not show significant ecological divergence in climate niche dimensions that could be used in support of the subspecies.[25]

iv. Vocalizations

The vocal characteristics of birds vary geographically, and these can be used to corroborate subspecies boundaries. Sedgwick (2001) analyzed geographic variation in the song of male willow flycatchers representing population samples that he attributed to *E. t. extimus* and *E. t. adastus*. His main conclusion, that there were diagnostic vocal differences between these two subspecies, was biased for several reasons. First, Sedgwick (2001:366) himself noted that his data were consistent with "moderate introgression of *extimus* genes into the *adastus* gene pool". Second, several samples did not group geographically with subspecies limits. Third, there was a sampling gap in his study that could result in mistakenly assigning a gap in vocal characteristics to a sampling gap (as with other data sets). That is, the potential vocal difference might not remain if recordings of singing males were obtained from the intermediate areas. Lastly, there was no attempt to evaluate differences with other alleged subspecies to the west (*E. t. brewsteri*) or east (*E. t. traillii*). One cannot evaluate only two of four geographic boundaries and expect to make a decision as to the distinctiveness of a subspecies. Hence, given the nature of the data and sampling issues, Zink

(2015) concluded that the vocal data follow the morphological and genetic data in failing to provide support for the distinctiveness of the SWWF.

4. Summary of Taxonomic Distinctiveness

The subspecies of willow flycatcher, including the SWWF (*E. t. extimus*), were described using methods that involved few specimens from locations scattered throughout the range without the benefit of more modern taxonomic assessment tools such as colorimeters and statistical genetic analysis. Many existing subspecies were identified in this manner in the past. Although this was typical, it does mean the subspecies are biologically valid as entities that may be listed under the ESA. Valid taxa are discrete entities that have independent evolutionary histories. The ESA was designed to protect these distinct elements of biodiversity, and it is apparent that subspecies often fail to meet this requirement because they are arbitrary divisions of gradual patterns of morphological variation (Zink 2004). Neither molecular, ecological, vocal, nor morphological data support treating the SWWF as a subspecies. Each of the prior studies used to justify listing, recovery plan, and status reviews assumed that decades old subspecies limits were valid. The studies failed to test the hypothesis that the SWWF was a valid taxonomic unit, and instead used a small number of samples from within the subspecies' "core" to "confirm" subspecies *per se*, whilst ignoring intermediate samples. Zink (2015) demonstrates the flaws inherent in the approach and by testing the subspecies hypothesis, demonstrates that of the original subspecies designation of SWWF was erroneous.

SECTION II. Habitat And Population Threats Identified In The Listing Determination Do Not Exist

1. Analysis of Threats and Present and Historical Population Data

The ESA requires that listing be based on an evaluation of the threats to the species' continued existence based on the best scientific and commercial data available.[26] In the case of the SWWF the FWS determines that it is endangered by.[27]

- Serious population decline,
- Extensive loss of riparian habitat,
- Brood parasitism by brown headed cowbirds,
- Livestock grazing,
- Exotic tamarisk, and
- Lack of adequate protective regulations.

In the following paragraphs, this petition will demonstrate that the characterization of threats included in the original listing was based on speculation and surmise in the absence of data. Since listing, significant data have been collected that demonstrate:

- Populations were and are increasing throughout the SWWF putative range;
- Riparian habitat has been increasing during the past 70 years in the SWWF range;
- The FWS has determined that brood parasitism is not a threat;
- Populations in areas of historic and habitual livestock grazing have increased;
- The FWS admits exotic tamarisk are suitable habitat for SWWF; and

- Existing regulatory structures are adequate to protect the SWWF and its habitat in the absence of ESA protections.

The following paragraphs address each of the alleged threats, the support for their existence in the listing determination, and new data and analysis demonstrating that the threats do not exist and are in fact based on data error.

a. Data Refute FWS Speculation that Threatened Destruction, Modification, or Curtailment of SWWF Habitat or Range Exists.

The best scientific data available refute the FWS's claims that wide-spread continuing loss of riparian woody vegetation habitat is one of the primary threats faced by the SWWF. In fact, willow flycatchers have increased their range and population numbers in California, Nevada, Utah and southern Colorado since 1987, in Arizona since 1940, and in New Mexico from the 1880s on. Further, the available habitat was and is increasing throughout the range of the SWWF. The following discussion details the data that refute the FWS estimates and speculation used to justify listing the SWWF.

b. FWS Original Estimates of Large Scale Riparian Habitat Losses are Speculative.

In the original listing, the FWS found that large scale losses of southwestern riparian habitat have occurred, particularly cottonwood/willow forests along rivers and larger streams.[28] The FWS cited numerous sources in support of this claim. However, a careful review of the cited works demonstrates that, without exception, each of the cited works ultimately relies on speculation to reach its particular conclusion regarding the extent of riparian habitat loss. Moreover, many of these sources rely on no scientific data whatsoever, while others reach the conclusion. of wide-scale riparian habitat loss in spite of, or separately from, the data they actually do present. Table 1 provides a brief overview of the citations used, the supporting data, and the speculative nature of their conclusions. More detailed discussion can be found in Appendix A.

Table 1: FWS Citations Used to Supporting the Conclusion Riparian Habitat Is Declining

Citation	Supporting Data	Comments
Phillips et al. (1964)	None.	The conclusion regarding decline of riparian habitat is the opinion of the author with no identifiable data to support the conclusion.
Carothers (1977)	None.	Accepts riparian habitat loss as a fact with no analysis.
Johnson and Haight (1984)	None.	This is a section of a book on California riparian systems by Warner and Hendrix (Bengson, 1992). The publication does not include data or analysis.
Howe and Knopf (1991)	Data in the study contradict FWS findings. Data from increment cores taken from 144 Fremont cottonwoods at three riparian woodland sites along the Rio Grande in New Mexico demonstrate continued and/or expanding riparian habitat.	Data used in the document demonstrate riparian habitat is expanding, which contradicts the author's finding that riparian habitat is declining.
Hubbard (1987) and Unitt (1987)	Data contradict FWS findings and demonstrates increases in range and numbers of SWWF.	The data used in the Hubbard (1987) paper demonstrate expanding range and numbers, which contradicts the conclusion by Hubbard that populations are declining. Hubbard's unsupported opinion is later uncritically cited by Unitt.
State of Arizona (1990)	None.	Relies on a series of references which are not supported by data, but based on speculation.

c. New Data Demonstrate that Willow Flycatcher Riparian Habitat Has Been Increasing

As discussed above, the citations supporting the FWS's determination that willow flycatchers are endangered by wide scale loss of riparian habitats, primarily cottonwood/willow forests, across the Southwest are not based solely on the best scientific data available, but rather on speculation or unsupported opinion. Today however, new data demonstrate that riparian woodland habitat has increased over time and directly refute the FWS's assertions that Arizona's riparian woodlands have "*decreased by as much as 90%*," as the FWS final rule listing the SWWF inaccurately claims.

In their seminal text on long-term changes in riparian vegetation in the Southwest, *The Ribbon of Green* (University of Arizona Press 2007), hydrologists Robert H. Webb and Stanley A. Leake and botanist Raymond M. Turner have debunked the claim that Arizona has lost 90 percent of its riparian habitat. As the authors note in their introduction, this myth has been traced to a single paper on changes in cottonwood galley forests adjacent to a segment of the lower Colorado River (Webb *et al.* (2007 at pp. ix-x)). Prior to *The Ribbon of Green*, no one has attempted to systematically assess long-term changes in riparian vegetation along major rivers and streams in the region.

Using repeat photography at gaging stations and other locations with historic records, combined with research on historic reports, USGS flow data, and past floods and other significant events, Webb *et al.* (2007) document changes in vegetation along southwestern rivers and streams, at elevations below 5,000 feet, that in some cases go back 140 years. Based on inspection of 2,724 sets of repeat photographs, the authors show that woody riparian vegetation has increased – sometimes dramatically – on almost every river system in the Southwest since the early twentieth century (*Id.* at pp. 387-412). They explain: "In general, riparian vegetation has had either an increase (49 percent) or a large increase (24 percent) in comparisons involving all years . . ." (*Id.* at pp. 388). Furthermore, "[w]oody riparian vegetation had increases in density and biomass in 73 percent of the [photographic] views and no change in 15 percent of the views" (*Id.* at pp. 387). The only areas with overall decreases were at locations along the lower Colorado River where reservoirs are now present, the Santa Cruz River at Tucson, the Salt and Gila Rivers above their confluence, and the Mohave River downstream of Barstow, California (*Id.* at 388).

In terms of changes for selected woody riparian species, Fremont cottonwood increased in 59 percent of the views and decreased in only 24 percent of the views (*Id.* at p. 388). Black willow increased in 80 percent of the views, decreased in 10 percent and remained unchanged in 10 percent (*Id.* at 390). Coyote willow increased in 76 percent of the views, and seepwillow increased in 84 percent of the views (*Id.* at pp. 390, 393). Mesquite increased in 61 percent of the views (*Id.* at 393). Non-native tamarisk increased in 88 percent of the views, but these increases generally occurred in mixtures with native species. Only a few sites had dense stands consisting only of tamarisk, which are located at reservoir deltas and river reaches where salinity is high (*Id.* at pp. 393, 407).

Webb *et al.* (2007 at p. 407) also noted:

> "It is difficult to find evidence that cottonwood-willow stands were once extensive in the region with the exception of the Colorado River delta in Mexico. Within the United States, the only locations where such forests may have decreased would be at the Gila-Colorado confluence and upstream from the Salt-Gila confluence. The cottonwood-willow assemblage along the Santa Cruz River at Tucson appears to have been narrow and extended perhaps 10 river miles. Narrow bands of cottonwood-willow assemblages were submerged beneath reservoirs along the lower Colorado River. Abundant evidence suggests that this type of assemblage, or cottonwood along with other species such as Arizona ash, has increased, for example, along several reaches of the San Pedro River and its tributaries, Havasu Canyon, the Virgin River, the Gila River between Coolidge and Ashhurst-Hayden Dams, tributaries of the Santa Cruz River, the Bill Williams River, and the Mojave River."

Further, Webb *et al.* (2007) provide substantial evidence indicating that a period of regional storms characterized by intensive flood events accompanied by arroyo cutting and filling, began during the pre- and early settlement periods in Arizona and ended about 1940. These storms were mainly responsible for the relative paucity and/or localization of riparian woody vegetation observed along Arizona's rivers and streams during the 1863-1940 time period (*Id.* at p. 404-407).

Perhaps nowhere in the Southwest were flood events more intensive during the latter part of the 19th century and the early part of the twentieth century than on the lower Colorado River near Yuma. There, each of the massive flood events either radically altered or totally destroyed then-present streamside vegetation. This fact undermines the FWS's contention that willow flycatcher population declines along the lower Colorado is a result of wide-scale destruction of cottonwood/ willow forests by man. The FWS relied on Herbert Brown's 1902 collection of 30+ willow flycatcher nests near Yuma (and particularly at the confluence of the Colorado and Gila rivers) as an example of the effects of habitat loss subsequently caused by human activities. The historical record paints a far different picture.

The powerful and uncontrolled Colorado River routinely flooded, leaving devastation in its wake. On January 2, 1862, a flood severely damaged the town of Yuma and in January, 1874, the combined flows from the Gila and Colorado Rivers inundated about three quarters of that town. Two particularly devastating floods occurred in 1884. The first of these occurred on March 10-11, when levees broke at Yuma, resulting in the flooding of the town. The second one in June and July damaged the railroad bridge across the Colorado River. In 1891, the Colorado and Gila Rivers combined to flood Yuma yet again after protective levees broke twice (Webb *et al.* (2007 at p. 356)). These documented floods dramatically changed the landscape, including the nature of riparian vegetation along the lower Colorado and Gila Rivers.

As the twentieth century dawned, the Colorado was not yet through wreaking havoc on the town of Yuma and its attendant streamside vegetation. According to Webb *et al.* (2007 at p. 356):

> "*Devastating floods during the first decade of the twentieth century combined with failed attempts to divert the river for irrigation in California and Arizona led to a call for flow regulation of the Colorado River. Beginning in January 1905, the Colorado River had a series of floods downstream from its confluence with the Gila that damaged Yuma, destroyed bridges, destroyed a canal system to the Imperial Valley, and ultimately led to the filling of the Salton Sea. Notable flood peaks occurred in March 1905, April 1905, November 1905, and December 1906. Other significant floods prior to completion of Hoover Dam occurred in January 1916 and 1922.*"

As the foregoing indicates, suitable habitat for Willow Flycatchers on the lower Colorado River was ephemeral at best prior to the completion of Hoover Dam in 1935. By 1905, the suitable habitat at the locations where Brown had collected 30+ willow flycatcher nests in 1902, and which the FWS relied on in their listing determination, was largely destroyed. This loss of habitat was not due to riparian habitat destruction by man, as erroneously claimed by the FWS, but the naturally occurring, high-flow flood events documented by Webb *et al.* (2007).

Webb *et al.* (2007), Ohmart *et al.* (1977), and others (*e.g.,* Rosenburg *et al.* (1991)) and the FWS also overlooked the account of Hardy (1829) of conditions along the lower Colorado and Gila Rivers. Lieutenant R.W.H. Hardy, R.N., took the first sailing ship, the *Bruja*, up the Colorado River from the Sea of Cortez. Hardy made it upstream to half a league above the confluence of the Gila and Colorado Rivers before running aground and becoming stranded from July 21 to 28, 1827 (Hardy 1829 at p. 331, 360-363). Importantly, Hardy also spent a week exploring the country upstream and west of the Gila/Colorado confluence while his vessel remained aground. His journal specifically describes the areas he visited along the lower Colorado during this period by both date and location.

According to Hardy (1829 at p. 330-331):

> "*On the west side of the river there are forests of the thorny shrub called Mesquite, an inferior species of the Quebrahacha; and on the banks there was a profusion of stems and large branches of the willow, poplar, and acacia, which had been brought down by the flood, and were now permanently lodged in their present situations. On the eastern bank, where we were aground, there were also wrecks of these trees; but there was no other vegetation but a dwarf sort of reed. From the masthead nothing on this side was distinguishable, except the waters of the Rio Colorado and the Rio Gila, but an interminable plain; and to the westward rises the Cordillera, which extends from Cape San Lucas, on the southern extremity of Lower California. To the northward and eastward, there was a long row of lofty trees, which I concluded were growing on the banks of the Rio Gila; that stream falling into the Rio Colorado half a league below us. The point of land which divides the Rio Colorado*

> *from the Gila, I have named Arnold's Point; and the one on the opposite side of the same reach I have called Newburgh's Point."*

Hardy's 1829 account is important because it establishes that the cottonwood-willow vegetation in which Herbert Brown observed willow flycatchers breeding along the Colorado River near Yuma in 1902 was not there 75 years earlier. What cottonwoods did exist in the area in 1827 were lofty and growing in a long row on the banks of the lower Gila River some distance upstream of its confluence with the Colorado River.

Given the unregulated and highly variable flows of the lower Colorado River in the 19th and early 20th centuries, its record of devastating flood events (Webb *et al.* (2007 at p. 356)), and Hardy's (1829) pre-settlement journal descriptions, it is apparent that during pre-settlement times and up until the Hoover Dam was completed in 1935, cottonwood/willow vegetation and other woody riparian habitat for willow flycatchers were localized, ephemeral in occurrence, and subject to destruction by periodic flood events or desiccation during periods of low flow.

While the FWS states that most stream flow conditions where willow flycatchers occur in the Southwest are largely those with a "natural" hydrologic regime (76 FR at p. 50549), in fact less than 44% of all flycatcher territories in the Southwest are found in the "90% native vegetation" habitats the FWS associates with "natural" hydrologic regimes. Instead, 50% of all known willow flycatchers territories in the Southwest occur in mixed native/exotic (tamarisk) riparian habitats associated with human-altered hydrologic regimes. Moreover, the largest breeding colonies of willow flycatchers in the Southwest are now known to inhabit tamarisk-dominated riparian vegetation.

Compounding the FWS's error is the fact that a substantial part of the "90% native vegetation" habitat that the FWS considers the product of a "natural" hydrograph, like that found on the U Bar Ranch in New Mexico for instance, clearly is not a natural system (Dagget (2005)). Rather, the U Bar, and the Cliff-Gila Valley as a whole, is representative of extensive, long-term native riparian vegetation growth and perpetuation occurring within a man-altered, agricultural diversion-oriented, hydrologic regime geared to livestock production and farming.[29]

Finally, although detailed evidence on the history and current extent of riparian vegetation like that provided by Webb *et al.* (2007) for Arizona is not available for other states, the FWS's recent designation of critical habitat for the SWWF demonstrates that, at present, there are substantial amounts of riparian habitat suitable for the SWWF along rivers, streams and reservoirs throughout the Southwest.

Under the ESA, critical habitat consists of those areas of land that contain the physical and biological features that are essential to the conservation of the species.[30] When the FWS designates critical habitat, it may not include lands that might develop these features at some point; the features must exist at the time of designation.[31] After the SWWF was listed, in 1997, the FWS designated 599 miles of stream and river habitat in Arizona, California, and New Mexico as critical habitat.[32] At that time, no critical habitat was designated in Colorado, Nevada and Utah.

Fourteen years later, in 2011, the FWS proposed to revise the critical habitat for the SWWF. This time, the critical habitat included 2,090 miles of riparian habitat along rivers, streams and reservoirs in Arizona, California, and New Mexico, as well as Colorado, Nevada, Utah.[33] In total, some *535,000 acres of land* were identified as suitable SWWF riparian habitat – habitat that contains the physical and biological features essential for the conservation of the SWWF – a dramatic expansion of the amount of habitat available for SWWF as well as its overall range.

In the final rule, issued in 2013, the FWS excluded certain areas from the critical habitat under ESA Section 4(b)(2)[34], primarily because these areas are already protected under various land management and conservation plans[35]. The excluded areas totaled nearly 800 stream miles and included, for example, the middle and lower Colorado River segments, which were excluded based on the Lower Colorado River Multi-Species Conservation Plan and tribal management plans[36]. Other river and stream segments likewise were excluded based on habitat conservation plans, tribal management plans and similar conservation plans and strategies under which riparian habitat was being managed and conserved.[40] In other words, these area were *not* excluded because they lacked habitat for the SWWF.

Consequently, of the 2,090 stream miles proposed as critical habitat for the flycatcher – which, by law, must contain blocks of dense riparian vegetation suitable for the species' breeding and foraging requirements[38] – 1,227 stream miles were designated as critical habitat and another 860 stream miles were determined to be adequately protected under current land management or conservation plans. To put this amount of SWWF habitat in context, the FWS's 2002 Recovery Plan for the SWWF states that roughly 2.7 acres of riparian habitat is the territory size necessary for nesting SWWF.[39] The Recovery Plan also states that 1,950 flycatcher territories are needed to delist the species. A simple calculation demonstrates that a minimum 5,265 acres of SWWF habitat would be necessary to support that many territories. Even if that amount of habitat were increased by a factor of 10 to be conservative, the current amount of SWWF habitat in the Southwest far exceeds the amount of habitat needed to conserve the species, according to the FWS's own findings in its most recent critical habitat designation.

In sum, the best available scientific data establish that riparian habitat along watercourses in the Southwest has increased in most locations, and dramatically in some cases, resulting in substantial increases in riparian habitat suitable for willow flycatchers. Recent observations of increasing numbers of breeding willow flycatchers within the Southwest, discussed below, further shows that riparian habitat suitable for breeding willow flycatchers has increased since the listing determination throughout the remainder of the Southwest. Clearly, this species' habitat is not threatened with destruction, modification or curtailment at the present time.

TABLE 2: SWWF POPULATIONS – Listing Speculation and Data Comparison

STATE or AREA	LISTING RULE	CURRENT DATA
Middle Rio Grande	A maximum of 15 pairs of SWWF were **thought** to exist on the middle Rio Grande by Hubbard (1987) and the FWS (1995)	In 2012, 579 resident SWWF were documented in 347 territories, forming 232 breeding pairs (plus 115 unpaired males) along the middle and lower Rio Grande in New Mexico alone. The San Marcial reach of the middle Rio Grande was found to be by far the most productive, with 252 territories and 181 pairs, and more than 220 territories were also found to exist at Elephant Butte Lake in 2012
New Mexico	Hubbard's (1987) population **estimate** for SWWF in New Mexico as a whole – perhaps 100 pairs	Data supporting approximately 900 pairs of SWWF are known to breed currently in New Mexico
Arizona	Unitt's (1987 at p. 154-156) **speculations** that "[p]probably the steepest decline in the population levels of extimus has occurred in Arizona, although the species was always localized and uncommon," and, that "the population in Arizona cannot be more than a few dozen pairs and may be less."	In 2011, downstream from Coolidge Dam along the lower Gila River in Arizona, Graber *et al.* (2012) detected 183 SWWF pairs. More than 100 pairs were found to be nesting near the shoreline of Roosevelt Lake (Salt River Project, 2014)
Arizona	Unitt (1987 at p. 155) **speculated** that ". . . it is clear that *extimus* has been extirpated from much of the area from which it was originally described, the riparian woodlands of southern Arizona . . ."	As of 2007, 124 SWWF breeding areas and 459 SWWF territories were known to exist in Arizona, encompassing most of its river systems, and including 19 breeding sites and 171 pairs on the San Pedro River in southern Arizona alone (Durst *et al.* 2008).
Colorado	Colorado was not considered part of the range of "extimus" by Unitt (1987) or the FWS (1995)	As of 2007, 12 sites and 66 territories of alleged "extimus" flycatchers were known from the San Juan and San Luis Valley in Colorado.
Utah	Unitt (1987 at p. 154) stated that no recent information was available on the status of "*extimus*," and that the species was always rare in that region (citing a personal communication from Behle for support).	SWWF occur in southern Utah along the Virgin River (Paxton (2010)). How many of the 7 sites and 43 territories occupied by SWWF are actually located in Utah is unclear, however, because Durst *et al.* (2008) state that Nevada, Utah, and Colorado collectively have only 12% of known SWWF territories.
California	Unitt (1987 at p. 145) stated "[a]lthough the concept of the occurrence of extimus in California rests on a small number of specimens, there is little likelihood that this base can be added to soon," Unitt (1987 at p. 156) **estimated** that the known population of Willow Flycatchers in the California range of "extimus" in 1987 consisted of 87 pairs occurring at 10 sites.	As of 2007, population consists of at least 171 territories occurring at a total of at least 91 sites (Durst *et al.* 2008).

d. SWWF Populations Have Increased Dramatically

Scientific data (see Table 2) collected since 1993 overwhelmingly supports the conclusion that SWWF have substantially increased both their numbers and breeding locations across the Southwest over recent time (Moore and Akers, 2012; Graber *et al.*, 2012; Durst *et al.*, 2007). An examination of the history of SWWF colonization in the Cliff-Gila Valley provides evidence that this was the case in western New Mexico beginning as early as 1959.

i. New Mexico

Hubbard (1987 at p. 7-8) establishes that only 7 specimens of willow flycatchers exist for New Mexico during the 19th century (at least 6 of which were migrants grouped with "*adastus*"). Scientific collections from 1916-1918 first revealed that willow flycatchers were among New Mexico's avifauna. The first firm evidence that willow flycatchers might summer in New Mexico was obtained in 1925. The first reliable indication that willow flycatchers did indeed breed in New Mexico was obtained in 1944 from central New Mexico. By 1959 willow flycatchers were also found to be breeding in the Cliff-Gila Valley in western New Mexico as well.

In 1968, Hubbard (1987 at p. 14) recorded a personal high of 13+ singing males in the Cliff-Gila area during the breeding season (June 17-18 and July 2, 1968). In the period of May 15-22, 1981, J.C. Egbert (ms) counted 49 singing birds in the Cliff-Gila area, some of which may have been migrants (Hubbard 1987 at p. 14), and on June 2, 1983, G. S. Mills (*e.g.,* Montgomery *et al.,* 1985)) counted 53+ singing birds in the Cliff-Gila area (*Id.*). In 1987, Hubbard (1987 at p. 15) estimated that 10-18 breeding pairs of willow flycatchers occupied the Cliff-Gila Valley.

Willow flycatcher censuses of the U Bar Ranch portion of the Cliff-Gila Valley, conducted by Parker and Hull beginning in 1994, documented the population on this working cattle ranch to be a much larger and more stable breeding population than Hubbard (1987) estimated. Instead of 10-18 pairs, Parker and Hull (1994) verified at least 81 pairs of willow flycatchers in residency on the U Bar Ranch portion of the Cliff-Gila Valley in 1994. Although these important data were submitted to the FWS, the FWS excluded them and other 1994 data in listing the SWWF as endangered under the ESA (see: Parker AEM comments on final rule to Spiller, 1995 at p. 7-8). Over the next two decades, continuing monitoring surveys through 2013 documented an overall average of 149 pairs of breeding willow flycatchers on the U Bar each year (Shook, 2013), demonstrating that the FWS premise for their original rejection of these data was an error.

As shown above, there are no data to support a conclusion that willow flycatchers were residents of the Cliff-Gila Valley either prior to 1959 or during pre-settlement times. Instead, the best available data on the question support precisely the opposite conclusion. In 1861, Daniel Ellis Conner, then a young engineer and member of the Joseph Reddeford Walker party, described the Cliff-Gila Valley from Fort West Hill (located just northeast of the present-day Hwy. 180 bridge) as follows:

> "*Around this hill, for a distance of two to four miles, there was a rolling country studded promiscuously by small clumps of hills divided by sharp ravines and all covered with a fair growth of Gramma grass. But little timber was in sight either on this slope just described or on the distant mountain ranges. A few scattering clumps of scrubby oaks marked the ravines and hillsides while perhaps enough cottonwood trees to indicate the direction of the Gila River grew upon its banks, for there was but little bottom land on this river so high up.*"[37]

Thus, the best available data show that neither willow flycatchers nor their habitat existed in the Cliff -Gila Valley during pre-settlement times in 1861. All of that would begin to change with the development of irrigated agriculture in the Cliff-Gila Valley beginning in 1886.

In 1886, with the construction of irrigation ditches, head gates, and returns by the Lyons/Campbell Cattle Company, both the natural hydrograph and riparian community of the Gila River in the Cliff-Gila Valley became altered by man. Irrigated pasture replaced the native grasses of the valley floor, thus substantially reducing the potential for woody riparian vegetation destruction by fire. Moreover, protection of irrigation head-gates, ditches and returns provided a certain degree of protection from flooding while expanding the area of suitable riparian woody vegetation colonization well beyond the banks of the Gila and far into the valley.

However, destructive high flow flood events eventually necessitated the construction of levees by the Army Corps of Engineers along the upper Gila River to protect the agricultural infrastructure of the Cliff-Gila Valley. By 1951, considerable levee work was in place and by 1957; construction of these levies was completed for the most part (D. Hunt, pers. com. with D. Parker 1996).

In 1959, two years after completion of levee construction with the resulting channelization, willow flycatchers were first recorded as breeding in the Cliff-Gila Valley by Hubbard (1987). Thirty-five years later, in 1994, Parker and Hull (1994) found at least 81 pairs of breeding willow flycatchers in the Cliff-Gila Valley, some of which were found to be breeding far from the Gila River proper in stringers of riparian forest lining floodplain irrigation ditches. Over the ensuing twenty years, the Cliff-Gila Valley has supported an average of 149 pairs of willow flycatchers per year (Shook 2013).

Moreover, based on seven years of study, Brodhead *et al.* (2007) determined that the frequency of brood parasitism of these flycatchers by Brown-headed cowbirds in a grazed landscape was low and distance to summer grazing was not a significant factor influencing frequency. Since then, brood parasitism by Brown-headed cowbirds has been found not to be the significant threat to willow flycatchers that the FWS once believed it to be (Sogge, 2010; Recovery Plan, 2002; Brodhead *et al.,* 2007). Moreover, based on seven years of study of the Cliff-Gila Valley, Brodhead et al. (2007) determined that the frequency of brood parasitism of these flycatchers by Brown-headed cowbirds in a grazed landscape was low and distance to summer grazing was not a significant factor influencing frequency. The case history provided by the Cliff-Gila Valley is particularly important because it provides data that directly address the speculation regarding threats posed to the SWWF by the activities of man – most particularly, those pertaining to alteration of the natural hydrographs, pre-settlement conditions, levees (channelization), loss of riparian habitat, floodplain agriculture, livestock presence, diversion of surface water for irrigation, population trend, and cowbird parasitism.

It is also the case at Elephant Butte Lake on the Rio Grande that data demonstrate that anthropogenic activities have resulted in population increases. This fact directly refutes Hubbard (1987), who noted the loss or displacement of the population of SWWF due to the destruction of the species' riparian habitat.

According to Hubbard (1987 at p. 10):

> "*The few reliable data on the size of the breeding population of willow flycatchers in New Mexico have been gathered in the period between 1968 and 1983. During that 16-year period, the only local population that may have changed is at Elephant Butte Lake, where the estimated high count of 15 pairs in the 1970's has appeared to decline to zero in the 1980's. However, as indicated above, some of these birds may have been displaced upstream as old habitat was lost to rising waters.*"

Time has also proven both Hubbard (1987) and the FWS's final listing determination wrong about both wide scale habitat loss and precipitous population decline of willow flycatchers at Elephant Butte Lake and along the Rio Grande in central New Mexico.

Rather than the maximum of 15 pairs of willow flycatchers thought to exist on the middle Rio Grande by Hubbard (1987) and the FWS (1995), in 2012 alone, 579 resident willow flycatchers were documented in 347 territories, forming 232 breeding pairs (and 115 unmated birds on territory) along the middle and lower Rio Grande in New Mexico alone (Moore and Ahlers 2012). The San Marcial reach of the middle Rio Grande was found to be the most productive, with 252 territories and 181 pairs, and more than 220 territories were also found to exist at Elephant Butte Lake in 2012 (*Id.*). Almost all of these territories and those at San Marcial were located in tamarisk-dominated riparian vegetation where cowbird parasitism rates have also been found to be low (*Id.).*

Additionally, Hubbard's (1987) population estimate for willow flycatchers in New Mexico as a whole – perhaps 100 pairs – has also been proven incorrect. Today, approximately 900 pairs of willow flycatchers are known to breed in New Mexico – nine times more than Hubbard (1987) and the FWS (2005) previously estimated.

Moreover, the vast majority of these flycatchers occur in tamarisk-dominated riparian habitats found behind major water impoundments of major recreational use, such as at San Marcial and Elephant Butte Lake. Further, the largest known population of willow flycatchers occurring in native, cottonwood/willow/ boxelder riparian vegetation in New Mexico is that found on the U Bar Ranch, where floodplain irrigation and pasturing of livestock have been practiced since 1886.

As a result, the FWS's (1995) claims that water impoundments, diversions of water for agriculture, and livestock grazing are "other manmade factors" threatening the SWWF with extinction in New Mexico are contrary to the best scientific data currently available.

ii. Arizona

The same situation applies to Arizona, where despite the FWS's assertion that willow flycatchers are threatened by impoundments of surface water and water diversions, the recent growth of flycatcher populations and the discovery of new populations both above and below such impoundments have been, in fact, stunning in magnitude. These documented numbers and expanded locations of occurrence also directly refute Unitt's (1987 at p. 154-156) speculation that "*[p]robably the steepest decline in the population levels of* extimus *has occurred in Arizona, although the species was always localized and uncommon*," and that "*the population in Arizona cannot be more than a few dozen pairs and may be less".*

For example, in 2011, downstream from Coolidge Dam along the lower Gila River in Arizona (from Dripping Springs Wash to South Butte) – where no historical Arizona specimen records of willow flycatchers exist – Graber *et al.* (2012) detected 183 flycatcher pairs that had a total of 274 nesting attempts at 27 sites. Additionally, 202 nests were monitored by Graber *et al.* (2012) to determine flycatcher productivity. They estimated that 159 young flycatchers fledged from 82 nests, brown-headed cowbird parasitism was 10% (half of minimum thought by the FWS to trigger cowbird control activities, according to the FWS's 2002 SWWF Recovery Plan), and nesting substrate was documented for 262 nests, all of which were placed in tamarisk (*Id.*).

Similarly, at Roosevelt Lake, another large breeding population of willow flycatchers was discovered nesting in tamarisks (>90%) behind Roosevelt Dam during the 1990s. There, the population topped out at 209 territories in 2004 before inundation of the additional conservation space created by raising the height of the dam, which caused dislocation of more than 50% of those territories either upstream or to adjacent watersheds by 2006 (Ellis *et al.* 2008). According to Ellis *et al.* (2008), however, no difference in the consistently low rates of cowbird parasitism observed from 1996-2006 was found to exist between nests in non-inundated habitat (4.4%) and partially-inundated habitat (4.6%) during the inundation years of 2005-2006.

As at Elephant Butte Lake, changes wrought by inundation at Roosevelt Lake are proving to be ephemeral. According to Durst (2008), 75 territories were detected at Roosevelt Lake in 2007, a slight increase over the number detected in 2006 (71) (Sogge, *et al.* (2008)). However, by 2013, more than 100 SWWF pairs were found to be nesting near the shoreline of Roosevelt Lake (Salt River Project, 2014).

Similarly, on the lower Colorado River, both above and below Hoover Dam, populations and locations of breeding willow flycatchers continue to be identified (McLeod and Pellegrini, 2013). In 2012, along the Virgin and Colorado Rivers, beginning in Nevada and downstream to the Bill Williams River, McLeod and Pellegrini (2013) detected breeding or resident flycatchers at eleven sites within the Pahranagat NWR and at Mesquite, Mormon Mesa, and Muddy River, Nevada, and, at Topock Marsh and the Bill Williams NWR in Arizona. At Bureau of Reclamation Study Areas, McLeod and Pellegrini (2013) documented 46 willow flycatchers nesting attempts, while in Nevada Department of Water Study Areas, these researchers documented 34 flycatcher nesting attempts in 2012. Cowbird parasitism rates were found to be 15% at Reclamation Study Areas, and 19% at NDOW Study Areas, respectively (*Id.*). Additionally, McLeod and Pellegrini (2013) discovered a single pair of breeding willow flycatchers at a new location on the Virgin River, at Dumb Luck Bridge, in 2012. Thus, there is no indication that "*extimus*" has suffered precipitous population decline in Nevada. In fact, the data shows otherwise, and Unitt (1987 at p. 154) admits that he had no recent information from southern Nevada in the first place.

Further, as of 2007, 124 willow flycatcher breeding sites and 459 willow flycatcher territories were known to exist in Arizona, encompassing most of its river systems, and including 19 breeding sites and 171 pairs on the San Pedro River in southern Arizona alone (Durst *et al.* 2008). The latter reveals the extent of the inaccuracy of Unitt's (1987 at p. 155) speculation that "extimus *has been extirpated from much of the area from which it was originally described, the riparian woodlands of southern Arizona*".

That Unitt was specifically referring to the San Pedro River in southeastern Arizona is evidenced by his identification of Feldman as the type location for "*extimus*" in Arizona (Unitt 1987 at p. 149-150). Unmentioned by Unitt (1987), however, are the facts that the type specimen of "*extimus*" secured at Feldman (now Dudleyville) on the San Pedro was actually a bird collected by Monson during the migratory period, on May 30, 1940, and, that the only historic specimen of a willow flycatcher from the San Pedro River in the University of Arizona bird collection – secured by E. Jacot on the 111 Ranch, 9 miles south of Mammoth, on May 3, 1933 – was similarly collected during the migratory period. This bird was labeled as "*brewsteri*" prior to Phillips (1948), and then as "*extimus*" by Phillips.

Of the 34 specimens of willow flycatchers in the University of Arizona collection, Phillips placed 20 with "*brewsteri,*" 5 with "*adastus,*" and 9 with "*extimus".* Of the 9 birds grouped with "*extimus,*" only one bird, aside from those collected by Brown on the Colorado near Yuma, was a possible breeder. That bird was an adult male taken by Vorhies 15 miles south of the Indian Dam, San Xavier Mission, Tucson, on June 8, 1933. Two migrant birds taken by Monson (an adult male and an adult female) along Sonoita Creek, 2 miles southwest of Patagonia on August 8, 1940, are classified as "*brewsteri*" – not "*extimus*" – by Phillips, while a migrant bird collected by Brown at Tucson on September 10, 1884, is labeled by Phillips as an immature female "*extimus*". There are, however, no breeding records of willow flycatchers or any alleged subspecies from along the Santa Cruz River or its tributaries in southern Arizona. It is critical to recall Unitt's (1987) admonition that one can be sure that a bird seen prior to mid-June is an *extimus* if it is collected or seen at the nest.

As shown above, just because Phillips originally described "*extimus*" from a bird collected during the migratory period on the San Pedro River in 1940, it does not mean, as Unitt (1987) wrongly speculates, that "*extimus*" was once common throughout southern Arizona's riparian woodlands where it was "originally described". Instead, both the historic specimen records and the best scientific data currently available prove otherwise. Those data reveal that the locations from which Unitt (1987) and the FWS (1995) claim willow flycatchers have been "extirpated" – "the riparian woodlands of southern Arizona" along the San Pedro River – 171 breeding pairs of willow flycatchers at 19 breeding sites were recorded in 2007 (Durst *et al.* 2008). These numbers are, in fact, many times greater than those documented from the San Pedro River at any point in time in the past.[41]

Thus, contrary to Unitt's (1987) unsupported speculation of the opposite, the best scientific data available clearly show that willow flycatchers have increased both their numbers and locations of breeding occurrence on the San Pedro River over time and not just since listing.

iii. Utah

Similarly, willow flycatchers have been increasingly detected in southern Utah where Unitt (1987 at p. 154) stated that no recent information was available on the status of "*extimus,*" and that the species was always rare in that region (citing a personal communication with Behle for support). "Rare" is an understatement. In point of fact, Behle (1985, pers. com. with Dennis Parker 1993) identified only ***one*** historic locale of "Southwestern" willow flycatcher occurrence in Utah – along the Colorado River in southeastern Utah.

Today, willow flycatchers are known to occur during the breeding season in southern Utah along the Virgin River (FWS (2013, 78 FR at 334 *et seq.*, citing Paxton (2010)). How many of the 7 sites and 43 territories occupied by willow flycatchers are actually located in Utah is unclear, however, because Durst *et al.* (2008) state that Nevada, Utah, and Colorado collectively have only 12% of known "Southwestern" willow flycatcher territories. Nonetheless, as shown above, the best available scientific information establishes that willow flycatcher numbers and locations of breeding occurrence have increased substantially in southern Utah.

iv. Colorado

Moreover, although Colorado was not considered part of the range of "*extimus*" by Unitt (1987) and the FWS (1995) in its final rule, the FWS now includes southern Colorado within the range of "*extimus,*" citing Paxton (2000) and Paxton *et al.* (2007b) (= 2008 as cited herein) for support (76 FR 157 p. 50542 *et seq.*; 78 FR 2, p. 334 *et seq.*). As of 2007, 12 sites and 66 territories of willow flycatchers were known from the San Juan and San Luis Valley management units in Colorado (Durst *et al.* 2008).

Thus, as is also shown above, the best available scientific data do not establish a precipitous decline of willow flycatchers in Colorado, as previously assumed by the FWS. Instead, the available data indicate that the population is expanding in Colorado as well.

v. California

Similarly, the best available scientific data do not support either Unitt's (1987) or the FWS's claims that willow flycatchers have suffered recent, precipitous population declines in California, where past destruction of riparian habitats conducive to willow flycatchers has been documented. According to Unitt (1987 at p. 145), "[a]lthough the concept of the occurrence of *extimus* in California rests on a small number of specimens, there is little likelihood that this base can be added to soon". Again, however, the best scientific data available also prove that speculation wrong.

These data (Durst *et al.* 2008) indicate that, as of 2007, California supported roughly one-third of all known willow flycatchers territories (171), which occur at 91 different sites spanning two recovery units and nine management units (Owens, Kern, Amargosa, Mojave, Salton, Santa Ynez, Santa Clara, Santa Ana, and San Diego (including the Santa Marguerita River)).

Although Unitt (1987 at p. 156) estimated that the known population of willow flycatchers in the California range of "*extimus*" in 1987 consisted of 87 pairs occurring at 10 sites, we now know that this population is significantly larger, and consists of at least 171 territories occurring at a total of at least 91 sites (Durst *et al.* 2008). Thus, Unitt's (1987) speculation of continuing, precipitous decline of willow flycatchers in California is also directly refuted by the best scientific data currently available from that state as well.

Moreover, the best scientific information and data show that the areas supporting the majority of willow flycatchers in southern California today occur mainly upstream and downstream of impoundments or dams, such as the Kern River at Lake Isabella and the San Luis Rey River above Lake Henshaw. Further, the presence of up to 10 flycatcher territories detected on the Santa Ana River near Riverside in 2003 (Hoffman, 2004), combined with substantial, ongoing riparian woody vegetation regeneration in that area (primarily native), also combine to undermine Unitt's (1987 at p. 153) speculation that "*extimus*", "*is now absent from the Santa Ana River near Riverside".* That is, in the 20 years following Unitt's (1987) paper, the riparian vegetation has been increasing, resulting in additional habitat for SWWF, as discussed above, and facilitating population expansion.

In short, the best scientific information available reveals that willow flycatchers have not suffered precipitous population declines throughout the Southwest but, instead, have substantially increased both their locations of occurrence and population numbers across the Southwest during the past 20 years.

2. Existing Suitable Habitat Far Exceeds That Necessary For 'Recovery'

Data supporting the premise that SWWF populations, ranges, and riparian woodland habitat are expanding, overwhelmingly contradict the FWS version of the status of the SWWF and its habitat. In addition, examination of SWWF critical habitat identified and adopted by the FWS demonstrates that the available habitat exceeds that needed for recovery by several orders of magnitude (Table 3).

Critical habitat consists of those areas of land that contain the physical and biological features essential to the conservation of the species. When the FWS designates critical habitat, it may not include lands that may develop these features at some point, the features must exist at the time of designation. In 2011 the FWS proposed 535,000 acres along 2,090 miles of waterways in SWWF range as critical habitat. In 2013, the FWS actually designated 208,973 acres of critical habitat along 1227 miles of waterways in six western states. In making that designation, the FWS *excluded* more than 300,000 acres of habitat along 800 miles of streams. This habitat was excluded because it was already protected under various land management or conservation plans.

TABLE 3: Essential Habitat Available for SWWF based on Proposed and Final Critical Habitat Designations

YEAR	Miles of Waterways	Equivalent Acres
1997	599 miles in Arizona, California, and New Mexico	Estimated at between 102,016acres and 153,332 acres based on the ratios of the 2011 and 2013 designations
2005	737miles in five western states	120,824 acres
2011 (proposed)	2090 miles in six western states	535,000 acres
2013	1227 miles in six western states	208,973 acres

The 2002 Recovery Plan for the SWWF states that roughly 2.7 acres of riparian habitat is the territory size necessary for nesting SWWF. This same recovery plan notes that 1,950 flycatcher territories are needed to delist the species. A simple calculation demonstrates that a minimum 5,265 acres of habitat would be necessary to support that many territories. The most recent designation of critical habitat, which includes only those lands which contain elements essential to the conservation of the species, acknowledges over 535,000 acres of habitat exists, and that of that habitat 300,000 are already protected by law. These data demonstrate that the available essential habitat is 100 times greater than that required by the recovery plan.

Based on the FWS proposed critical habitat designations the available habitat containing the essential biological and physical elements for the conservation of the species ranges from 102,000 to 502,000 acres. This range represents from between 20 times and 100 times the necessary habitat to support recovery. The FWS's own documentation and regulatory proceedings demonstrate that there is sufficient essential habitat to support the species.

3. Existing Regulatory Mechanisms are Adequate to Protect the SWWF and its Habitat

In the absence of the ESA's protection of the SWWF from the threats identified in the listing determination, multiple protective mechanisms exist at both the state, federal and local levels. We note that each of these federal and local laws is sufficient to address any real threats to the species. The River Network has compiled and posted a general list of nearly twenty laws which can be used to protect watersheds generally, and riparian areas specifically.[42] Applicable laws include the Clean Water Act (CWA), the Migratory Bird Treaty Act (MBTA), the National Forest Management Act (NFMA) and the Federal Land Policy and Management Act (FLPMA). Below we detail the specific mechanisms which provide more than adequate authority to protect the species and its habitat.

Our analysis presumes that each of the agencies responsible for implementing these statutes fulfills its duty. The FWS has provided no data to demonstrate that this is not the case.

a. Riparian Habitat Protection

Two statutes at the federal level provide the primary regulatory authority over wetlands in the United States. First, Section 404 of the CWA regulates the discharge of dredged or fill materials into waters of the United States and, second, the River and Harbors Act (RHA) regulates the placement of structures in navigable waterways. Both statutes require an assessment of local and regional interests such as land use, economics, flood control, fish and wildlife, ecology, pollution, as well as the availability of alternatives, permanence of impacts, and cumulative effects. The FWS comments on many Section 404 permit actions and regards protecting the integrity of wetlands and their habitats as the primary function of Section 404. The Army Corps of Engineers (ACOE) is responsible for the enforcement of rules and regulations pertaining to both of these sections.[43]

The RHA and CWA charge the ACOE with primary responsibility for the federal regulation of development and alterations in wetlands, although other federal agencies are also involved. The EPA, FWS, Natural Resources Conservation Service, and the National Marine Fisheries Service (NMFS) can review applications for ACOE Section 404 permits and provide comments and recommendations to the ACOE. In fact, under the Fish and Wildlife Coordination Act, the ACOE is required to consult with the FWS and the NMFS and give full consideration to their recommendations in evaluating permit decisions. Additionally, under certain circumstances the EPA, FWS, and NMFS can elevate an ACOE district engineer's permit decision to the Assistant Secretary for review and reconsideration, and the EPA has the authority to veto an ACOE permit decision.[44]

Other programs such as the Conservation Reserve Program (CRP) and the Conservation Reserve Enhancement Program (CREP) provide landowners financial incentives to protect land and water bodies through maintenance of buffers, wetlands, and by planting cover crops.

These regulatory protections and incentives exist for SWWF habitat regardless of the listing of the species. Further, the FWS has implemented stringent protective regulations to protect other riparian species and their habitat in the Southwest under the ESA (such as Bell's vireo and native fishes, for example). These regulatory protections benefit virtually all, if not all, willow flycatchers habitat found in the Southwest, whether or not the SWWF is listed under the ESA

b. Migratory Bird Treaty Act (MBTA)

The MBTA[42] is a criminal environmental law that implements four international treaties and protects over 1,000 species of birds found in the United States and its territories, including willow flycatchers. See 50 C.F.R. § 10.13 (list of protected species). By delegation of authority from the Interior Secretary, the FWS administers the MBTA.

The MBTA provides that it is unlawful to kill, injure or capture a protected species of bird:

> "Unless and except as permitted by regulations . . . it shall be unlawful at any time, by any means, or in any manner to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell . . . offer to purchase, purchase . . . ship, export, import . . . transport or cause to be transported . . . any migratory bird, any part, nest, or eggs of any such bird, or any product . . . composed in whole or in part, of any such bird or any part, nest, or egg thereof."[43]

FWS regulations broadly define "take" to mean "pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect." 50 C.F.R. § 10.12. An unauthorized "take" of any one of the protected bird species constitutes a violation of the MBTA.

As stated, the MBTA is a criminal statute and imposes criminal penalties for violations. Under the general misdemeanor provision of the MBTA, a violator may be fined up to $15,000 and/or imprisoned for up to six months for an unauthorized take of a protected bird, regardless of intent.[44] Under the felony provision of the MBTA, anyone who "shall knowingly (1) take by any manner . . .

any protected bird with intent to sell, barter or offer to barter such bird, or (2) sell, offer for sale, barter or offer to barter, any protected bird" is subject to a felony violation and, under current sentencing guidelines, may be fined up to $250,000 ($500,000 for organizations) and/or imprisoned for up to two years.[45]

c. Protections on Federal Lands

In addition to the general protections for migratory birds, riparian habitat, and water quality afforded by the MBTA, RHA and CWA, there are two federal statutes that address federal lands specifically, namely the National Forest Lands Act (NFMA)[46] and Federal Land Policy and Management Act (FLPMA)[47]. These statutes allow implementation of protective measures needed to ensure the conservation of species found on federal lands, whether or not the species are protected under the ESA. The laws provide for a thorough and meticulous public and agency review of proposed management of the federal lands, and that review includes consideration and protection of species such as the SWWF.

For example, BLM Manual 6840 – Special Status Species Management[48] describes the authorities and requirements for conservation imposed on the BLM for management of listed species, species proposed for listing, and *any other* species determined to be in need of special management for conservation. A perusal of the manual and statutes makes it clear that the federal agencies have adequate authority to protect *any species* whether or not the species is listed under the ESA.

Similarly, the Threatened, Endangered & Sensitive (TES) Species Program is the Forest Service's dedicated initiative to conserve and recover plant and animal species that need special management attention and to restore National Forest and Grassland ecosystems and habitats. The Forest Service explains:

> ". . . Forest Service management also conserves habitat for some 3,500 "sensitive" species—species that need special management to maintain and improve their status on National Forests and Grasslands, and prevent a need to list them under the Endangered Species Act. "Keeping all the parts" is a central tenet of ecosystem management, and is a core principle that guides the Forest Service's management of the National Forest and Grassland ecosystems.
>
> The TES program involves a variety of activities conducted by the Forest Service and partners, including inventory and monitoring, habitat assessments, habitat improvements through vegetation treatments and structure installation, species reintroductions, development of conservation strategies, research, and conservation education. Working with other Federal and State agencies, academic institutions, private organizations and citizens is vital to leverage limited resources and achieve effective on-the-ground conservation accomplishments."[49]

In addition to the BLM and Forest Service, SWWF habitat is located within various "special status" federal land, including National Parks, National Monuments, Wildlife Refuges, National Recreation Areas and areas designated a wilderness. Within these areas, the SWWF and its habitat receive protection.

d. State Protection

Individual states have regulatory programs that serve to protect riparian habitats as well as other functions. Arizona's Water Protection Fund and the California Environmental Quality Act operate to protect the SWWF and birds generally as well as their habitat.

4. FWS Retracts the Existence of Other Natural or Manmade Factors Threatening SWWF

At the time of listing, the FWS believed that the presence of tamarisk was a significant threat to "Southwestern" willow flycatchers. However, today, data demonstrate that tamarisk support the largest known populations of willow flycatchers across the Southwest, and more than 50% of all willow flycatcher territories have been detected in riparian areas dominated by tamarisk.

These overwhelming numbers have caused the FWS to revise its position on tamarisk. The FWS's current position on tamarisk – that willow flycatchers do not show an inherent preference for native riparian vegetation but instead like tamarisk dominated riparian vegetation just as well – is summarized by Sogge *et al.* (2010 at p. 15) as follows:

> "*Despite suggestions that flycatchers breeding in salt cedar are suffering negative consequences and that removal of salt cedar is therefore a benefit (DeLoach and others, 2000; Dudley and DeLoach, 2004), there is increasing and substantial evidence that this is not the case. For example, Paxton and others (2007) found that flycatchers did not suffer any detectable consequences from breeding in salt cedar. This is consistent with the findings of Owens and others (2005) and Sogge and others (2006). Therefore, the rapid or large-scale loss of salt cedar in occupied flycatcher habitats, without rapid replacement of suitable native vegetation, could result in reduction or degradation of flycatcher habitat (U.S. Fish and Wildlife Service, 2002; Sogge and others, 2008).*"

Thus, by 2002, in its recovery plan for the "Southwestern" willow flycatchers, the FWS no longer recognized tamarisk as posing a significant threat to this "species," as it did in the 1995 rule listing the species.

Similarly, brood parasitism of willow flycatchers by Brown-headed cowbirds, identified as a significant range-wide threat to the existence of willow flycatchers by the FWS in its 1995 listing rule was, by 2002, no longer viewed as a significant threat to by the FWS. Again, according to Sogge *et al.* (2010 at p. 15):

> "***Although [brood] parasitism negatively impacts some Southwestern Willow Flycatchers populations, especially at small and isolated breeding sites, it is highly variable and no longer considered among the primary range wide threats to flycatcher conservation.***"

While the FWS continues to allege precipitous population decline and wide-scale loss of habitat pose threats of extinction to "Southwestern" willow flycatchers, and that these impacts are occurring because of the "other natural or manmade factors" of urban, recreational and agricultural development, fires, water diversion and impoundment, channelization, and livestock grazing during the flycatcher's breeding season, in reality, the best scientific data available, as stated previously, convincingly show that both willow flycatcher and the riparian habitat available to them are increasing, not decreasing, across the Southwest. Therefore, none of those activities or "other natural or manmade factors," identified by the FWS can be rationally viewed as causal agents for the existence of conditions that do not in fact exist.

Moreover, the data used in the case history of the Cliff-Gila Valley in New Mexico demonstrate and directly contradict the FWS's speculative findings relative to livestock grazing. There, the largest population of willow flycatchers known to occur in primarily native, cottonwood/willow/box elder association riparian habitat in the Southwest is found in the midst of a working cattle ranch and irrigated pastures (Dagget (2005 at pp. 37-43)). Data trends measured over time document increasing willow flycatchers populations and demonstrate that anthropogenic activities have not resulted in significant cowbird parasitism or population declines.

Similarly, the large populations of willow flycatchers found at man-made lakes – such as Elephant Butte in New Mexico, Roosevelt in Arizona, and Henshaw in California – directly refute the 1995 listing determination's assertion that the existence of these impoundments, their recreational use, or the diversion of water at these locations are "other natural or manmade factors" threatening the existence of willow flycatchers. The sheer numbers of flycatchers now found in the vicinities of these man-made reservoirs do not support the 1995 determination.

SECTION III. CONCLUSION

The SWWF does not qualify as a subspecies under any of the recognized systems available to taxonomists for the classification of wildlife species. As shown in Zink (2015), recent data demonstrate that there are no reliable ecological, morphological, or genetic distinctiveness measures that can differentiate between "Southwestern" willow flycatchers and other willow flycatcher populations. The original listing was predicated on incomplete data and incorrect assumptions regarding the distinctiveness of the subspecies. In reality, "Southwestern" willow flycatchers cannot be reliably differentiated from other willow flycatchers in the western United States. This error can be demonstrated today with new data and more sophisticated analytical tools, shown by Zink (2015). The fact that the subspecies was not listed by the American Ornithologists' Union in their 1957 official list of subspecies, despite its 1948 description in their own journal (*The Auk*), also speaks to its lack of scientific validity.

New data on historic and current riparian habitat availability, such as Webb *et al.*'s (2007) systematic review of changes in riparian vegetation along major rivers and streams in the Southwest, also demonstrate that the original listing was based on erroneous and incomplete data. New data and analysis demonstrate that woody riparian vegetation has increased on most rivers and streams, significantly increasing the amount of riparian habitat available to willow flycatchers. The FWS has acknowledged this clear trend in its most recent critical habitat designation, when it determined that 2,090 river miles of rivers and streams, containing 535,000 acres of riparian habitat, contain the physical features essential for the conservation of the SWWF. This is enough habitat to support tens of thousands of willow flycatchers.

The dramatic increase in SWWF habitat is further supported by recent data on SWWF populations. The data on breeding populations throughout the Southwest reveal much higher population sizes in far more locations than were erroneously thought to exist at the time of listing. These population levels are ultimately a measure of the suitability and availability of habitat. In addition, it is now established that tamarisk provides suitable habitat for SWWF, rather than posing a threat, and that brown-headed cowbirds do not pose a threat to the SWWF. Together, these new data show that the SWWF – assuming that may be classified as a separate willow flycatcher subspecies – should be delisted.

In short, the data and analysis included in this petition make it clear that the original listing of the SWWF was based on incomplete data, augmented by speculation, which in the ensuing 20 years has been demonstrated to be in error. Accordingly we petition the FWS to remove the SWWF from the list of endangered species because it was listed in error.

APPENDIX

Citations used in the original listing to support a conclusion that the SWWF is threatened by loss of habitat.

Phillips et al. (1964). Although the FWS cites this work to support the claim of extensive (and continuing) loss of riparian habitat, the work actually pertains to the birds of Arizona. It does not include nor purport to include any data at all related to the scientific investigation of riparian habitat decline. Thus, because Phillips *et al.*'s (1964) conclusions regarding such decline are not based on any quantifiable data, nor on any semblance of actual scientific research, they represent opinion alone. Therefore the conclusions are not scientific information, but merely speculation. Because speculation is not scientific data, Phillips *et al.* (1964) cannot be cited, as the FWS does, as a source of scientific evidence supporting its claim of wide-scale loss of riparian habitat. More recent scientific information, e.g., Webb *et al.* (2007), refutes this claim.

Carothers (1977). This document is an overview of the importance of preserving and managing riparian habitats found within a U.S. Forest Service General Technical Report of a symposium (RM-43:2-4). Carothers (1977) simply accepts the premise that riparian habitat is declining as fact and does not examine whether there is any factual or analytical support for the conclusion that riparian habitat is declining. More recent scientific information, e.g., Webb *et al.* (2007), refutes this claim.

Johnson and Haight (1984). This is an 8 page, regional perspective on riparian problems and initiatives in the American Southwest, found in a book on California riparian systems by Warner and Hendrix (Bengson, 1992). The publication does not include any scientific data or analysis supporting a conclusion of riparian habitat decline. More recent scientific information, e.g., Webb *et al.* (2007), refutes this claim.

Howe and Knopf (1991). The authors reach a conclusion of riparian decline despite, or separately from, the scientific data actually presented in their publication. The authors examine increment cores taken from 144 Fremont cottonwoods at three riparian woodland sites along the Rio Grande in New Mexico. They found that trees at two sites averaged 38.8 and 43.2 years of age and that all trees fewer than 26 years old at these two sites were root suckers from older trees whose primary trunks had decayed. At the third site, 75% of the trees were found to be between 5 and 25 years old. Thus, the data reveal that all of these cottonwoods were actually quite young (given that Fremont cottonwoods can easily live 75 years or more) and that many were as young as 5 and no more than 25 years of age. Based on the data demonstrating long term and continuing cottonwood presence, it is unclear how the authors reached the conclusion that decline of Rio Grande cottonwoods is imminent, as stated in the title of their work: "On The Imminent Decline Of Rio Grande Cottonwoods In Central New Mexico". While the FWS cites this work repeatedly, it fails to mention the salient fact that the scientific data actually presented in the work do not support but actually contradict the authors' speculation about "imminent" cottonwood decline.

Hubbard (1987) and Unitt (1987). Neither Hubbard nor Unitt included any scientific data or analysis of riparian habitat decline in New Mexico and California in support of their assertions about riparian habitat decline. Nonetheless, Unitt (1987 at p. 159) cites a personal communication from Hubbard for support of the claim that progressive loss of riparian habitat is occurring in New Mexico and then further speculates, in similar absence of scientific support, that "riparian habitat destruction is probably most responsible for the decline of extimus" (*Id.*). Hubbard (1987 at p. 2) states that:

> "*In New Mexico, the data suggest that the overall breeding range of the Willow Flycatchers has remained largely intact; however, some populations have declined or disappeared,*"

However, the data presented by Hubbard (1987) actually paints a far different picture of colonization of New Mexico by willow flycatchers over time. According to Hubbard:

> "*The Willow Flycatchers was first verified as occurring in New Mexico in 1886, while the first evidence of breeding there was obtained in 1925. In the period 1944-1986,*

> *Willow Flycatchers were reliably reported breeding or summering in the state in the Chama, Rio Grande (*sensu lato*), Zuni, San Francisco, Gila, and probably the lower Penasco drainages and near Bluewater Lake (McKinley Co.).*
>
> . . .
>
> "*Counts of Willow Flycatchers breeding in New Mexico are insufficient to document trends, except for a decline and/or displacement of the population at Elephant Butte Lake" (Id.* at p. 16-17*). "The first verified records of the Willow Flycatchers in New Mexico were obtained in 1886, when A. W. Anthony took 6 specimens (CNMH) at Apache (now Hachita) in Grant County. That same year, R. W. Barrell reported that the species summered at Carlisle, Hidalgo County in 1890 and at Cooney, Catron County in 1889 (Bailey 1928). However, given the difficulty of identification of the species and the lack of specimen verification, I regard Barrell's reports as requiring verification and thus not acceptable. The only other 19th century record of the Willow Flycatchers in New Mexico was of a specimen taken by A. K. Fisher at Ft. Bayard, Grant County, on July 27, 1897 (Bailey 1928)" (Id.* at p. 6-7*). "Two major collections made [in] New Mexico in the first part of the 20th century provided evidence that Willow Flycatchers were regular members of the state's avifauna. In 1916-1918, A. P. Smith took 12 birds at Las Vegas in the period May 5-June 4 (MCZ). In 1920, W. Huber took 5 birds in the Las Cruces area in the period July 27-August 28. Although these dates are suggestive of breeding, the specimens could just as well have been migrants" (Id. at* p. 7*). "The first firm evidence that the Willow Flycatchers might summer in New Mexico was obtained in 1925 in Rio Arriba County. . . . The first reliable indication that the Willow Flycatchers did indeed breed in New Mexico was obtained in 1944, when L.C. McBee (in Oberholser 1974) reported the species as nesting in Dona Ana County near the El Paso Country Club. . . . (cite missing). "In 1959, 2 additional areas for breeding Willow Flycatchers were recorded in New Mexico. One was at Cottonwood Gulch, McKinley County, where J. Sheppard reported that a pair raised a brood in the period June-August (AFN 13:466-467, 1959). . . . "The other 1959 breeding report was near Redrock, Grant Co., where I (Hubbard MS) found Willow Flycatchers rather commonly and feeding fledglings on July 18. Since then, Willow Flycatchers have been regularly present in summer in the Redrock and Cliff-Gila-Buckhorn areas. In fact, the lower Gila Valley has proven to be a breeding stronghold for this species in New Mexico, with summer specimens taken in at least 1963 (MVZ), 1968 (US), and 1975 (Del). In the nearby lower San Francisco Valley, the Glenwood-Pleasanton area (Catron Co.) has also proven to be a place of regular summer occurrence for the species – beginning with a nest discovered in 1966 by P. R. Snider (NMOS 66-2:35, 1966)."* (*Id.* at p. 7-8)

The data reported in Hubbard (1987) demonstrate that willow flycatchers have increased in both numbers and locations of occurrence in New Mexico over time (i.e., the 1886-1987 time period for which data exists). Nevertheless, Hubbard (1987 at p. 15) ignores the data, stating:

> "*[o]ver the long term, any speculation of population trends in Willow Flycatchers in New Mexico must be based on what has happened regarding breeding habitat for the species in the state. Using this approach, the conclusion is virtually inescapable that a decrease has occurred in the population of breeding Willow Flycatchers in New Mexico over historic time."*

The Hubbard (1987) conclusions regarding the decline of the SWWF have no factual basis. Nowhere does Hubbard provide data regarding the decline in breeding habitat. In fact, the reported clearly shows that an increasing number of willow flycatchers have been observed over time. The FWS erred in relying on Hubbard's (1987) speculation rather than the data showing increasing populations.

State of Arizona (1990). Speculation is the basis for the FWS's statement that "as much as 90% of major lowland riparian habitat has been lost or modified in Arizona". The FWS cites the State of Arizona (1990) for support. Review of the series of citations for this claim is instructive as to how speculation resulted in a spurious determination that wide-scale riparian habitat decline was a major reason for listing southwestern occurring willow flycatchers. Bengson (1992) summarizes the situation succinctly as follows: In October, 1990 the final report and recommendations of the Governor's Riparian Habitat Task Force stated,

> "*. . . according to most estimates, over 90% of the riparian areas along Arizona's major desert water courses have been lost, altered, or degraded as a result of man's activities . . .*"

The authorities for this statement are referenced as the State Comprehensive Outdoor Recreation Plan (SCORP; 1989); the Arizona Nature Conservancy (1987), and Warner (1979). These references support no such statement, as the following details. SCORP relied on the Arizona Nature Conservancy as its authority. The Arizona Nature Conservancy used Warner as its authority. Warner (1979) relied upon two further studies, which he misquoted. Those two studies were Ohmart (1977) and Lacey (1975). The Warner (1979) report is an in-house document prepared by the California Game and Fish Department to prepare for and assist in designing research on riparian areas in the central California desert; it was basically a compilation of data available on nearby geographic areas.

The Ohmart (1977) study, the first of Warner's (1979) references, was limited to a selected ten mile strip on the Colorado River near Yuma. Based primarily on diary references dated 1699 through 1877, Ohmart (1977) *postulated* a "dense" and "majestic stand" of such "celebrated splendid" cottonwood trees along the Colorado River. He mapped what that plant community may have been like in 1879. After describing the historic changes that have taken place along the Colorado River, Ohmart (1977) concluded that of the original 5,000 acres of cottonwood community, 2,800 acres of cottonwood and willow plant community still remained. There were, however, only 500 acres of "pure cottonwood". The balance of the original 5,000 acres had been taken over by salt cedar, less desirable, but still riparian vegetation. Ohmart (1977) attributes the demise of the cottonwood riparian community to the invasion of salt cedar and states that:

> "*. . . even without the dams it appears highly unlikely that the cottonwood communities could have maintained their dominance along the Lower Colorado River over the aggressive and fire-adapted salt cedar.*"

Ohmart further acknowledges that:

> "*. . . as we swim through a sea of qualitative data there is little quantitative information available . . .*"

The other Warner (1979) reference is Lacey (1974). Warner selectively cited one further report referenced by Lacey (1974), which is misquoted, and one independent study done by Lacey, the conclusions of which Warner misrepresents. Each report addressed a single selected geographic area and neither could be construed as having statewide application. The report (Haase 1972) is quoted by Lacey (1974) as saying that along the lower Gila River,

> "*when the total acreage of this exotic [salt cedar] is subtracted from the riparian total, only 5,285 acres of native riparian communities remain. This represents about 5% of the theoretical 1860 riparian base [of the lower Gila River].*"

When the original paper by Haase (1972) was reviewed, however, this quotation could be found. The closest Haase came to such a statement is that "*more than 50% of the area covered by floodplain plant communities was dominated by Tamarisk petandra [salt cedar]".* Salt cedar is a riparian plant, albeit non-native. Haase (1972) never mentioned anything about a "theoretical 1860 base". The study quoted by Warner)1979) from Lacey (1974) states that as to a 22-mile stretch of the San Pedro River from St. David to Cascabel Road,

> "*. . . riparian communities have declined from 10,690 acres in 1936 to 5,000 acres in 1972, nearly a 50% reduction.*"

This statement was made on the basis of Lacey's (1974) review of USGS aerial photos. What Warner did not mention is that the "riparian communities" referred to are not riparian communities generally but a specific subset of riparian communities; mesquite riparian communities. The balance of those acreages had been taken over by more competitive riparian species, but remained riparian habitat. Warner also failed to refer to any of the rest of Lacey's work, which cites several conflicting references. In all, it is clear that the Arizona report was the result of a series of increasingly careless characterizations of the state of riparian habitats in the Southwest. In any case, this myth has been thoroughly debunked by Weeb *et al.* (2007).

FOOTNOTES

1. 16 U.S.C. §§ 1531, et seq; 5 U.S.C. § 553(e) and 50 C.F.R. §424.14
2. ESA allows listing of only species, subspecies and distinct population segments.
3. C 16U.S.C. Section 1532(16)
4. Genbank is a repository for all genetic samples used by researchers. https://www.ncbi.nlm.nih.gov/genbank/
5. Federal agencies are prohibited from taking any action that adversely modifies or destroys critical habitat. This prohibition includes permitting activities and other ministerial duties.
6. C16 U.S.C. Section 1533 (b)(1)(A)
7. *See Bennett v. Spear*, 520 US 152, 176-77 (1997).
8. *See, e.g.,* Dan Daggett, *Gardeners of Eden* 37-49 (2005).
9. Federal Register / Vol. 60, No. 38 / Monday, February 27, 1995; p. 10694.
10. Novitch, N. R., M. Westberg, & R. M. Zink, in Press. Identification of migrant Alder Flycatcher and Willow Flycatcher specimens with comments on the species' migration through the Tuxtla Mountains, Veracruz, Mexico. Wilson J. Ornithology.
11. Zink, R. M. 2015, in press. Genetics, morphology, and ecological niche modeling do not support the subspecies status of the endangered Southwestern Willow Flycatcher (Empidonax traillii extimus). The Condor.
12. Generally, only four subspecies are recognized. In the referenced federal register notice, however, the FWS recognized five.
13. 16 U.S.C. § 1533(b)(1).
14. This rule states that 75% of a population with a defined character or characters, must lie outside 99% of the range of other populations without the character or characters.
15. AEM, 1993 at pp. 4-5.
16. In a different paper, Paxton et al. (2011:611) wrote that they had sequences from "316 individuals sampled at 91 sites on the breeding grounds" that represented 62 haplotypes. Although the haplotype sequences are in Genbank, the corresponding frequency of each in the breeding populations is unavailable. In fact, a search of Genbank (13 December 2013) found 88 haplotypes for E. traillii deposited by E. Paxton, but again, there is no corresponding information on their frequencies or distributions, although some are from wintering or migrant individuals from unknown breeding localities (Paxton et al. 2011).
17. 2007b as cited by the FWS but actually "(2008)".
18. The FWS Federal Register notices are inconsistent, in 1995 the FWS there were 5 recognized subspecies, in 2011 they reference 4 subspecies, with no explanation of the difference.
19. Emphasis added.
20. We note here that Paxton et al. (2008) conclude that such policy-based decision making is warranted under the ESA and base that conclusion not on the scientific data presented, but on acceptance and representation of two unproven assumptions as fact. While Paxton et al. are entitled to their opinion, that opinion has no weight in an ESA listing determination which must be based solely on the, 'best scientific and commercial data available'. Such policy-based decision making based on adoption of assumption and speculation is not science. Nor is its use contemplated by the plain language of the ESA. Such an approach not only squarely offends the

ESA's requirement that solely the best scientific data available be used as the basis of all ESA decision making, but is also counter to the U.S. Supreme Court's decision in Bennett v. Spear, which rejected the use of speculation as a surrogate for use of the best scientific data available.

21. Sedgwick, J. A. (2001). Geographic variation in the song of Willow Flycatchers: Differentiation between Empidonax traillii adastus and E. t. extimus. Auk 118: 366-379.

22. Peterson, A.T., Sobersón, J., Sánchez-Cordero, V., 1999. Conservatism of ecological niches in evolutionary time. Science 285, 1265-1267.

(Elith, J., S. J Phillips, T. Hastie, M. Dudík, Y. E. Chee, and C. J. Yates (2011). A statistical explanation of MaxEnt for ecologists. Diversity and Distributions, 17:43-57.)

23. www.pwrc.usgs.gov/bbs.

24. Warren, D. L., R. E. Glor, and M. Turelli (2008). Environmental niche equivalency versus conservatism: Quantitative approaches to niche evolution. Evolution 62:2868–2883.

(McCormack, J. E., A. J. Zellmer, and L. L. Knowles (2010). Does niche divergence accompany allopatric divergence in Aphelocoma jays as predicted under ecological speciation? Insights from tests with niche models. Evolution 64:1231–1244.)

25. 16 U.S.C. §§ 1533(a)(1), 1533(b)(1)(A).

26. Federal Register / Vol. 60, No. 38 / Monday, February 27, 1995 at p. 10694.

27. 60 FR 38 at p. 10707.

28. For a detailed discussion of the U Bar Ranch, see Dan Dagget, Gardeners of Eden: Rediscovering Our Importance to Nature, pp. 37-43 (2005).

29. 16 U.S.C. § 1532(5)(A). See also Alaska Oil and Gas Ass'n v. Salazar, 916 F.Supp.2d 974, 998-1003 (D. Alaska 2013).

30. Several courts have weighed in on this issue. For example, see Cape Hatteras Access Preservation Alliance v. Dep't of Interior, 344 F.Supp.2d 108, 122-23 (D.D.C. 2004).

31. Final Determination of Critical Habitat for the Southwestern Willow Flycatcher, 62 Fed. Reg. 39129 (July 22, 1997).

32. 76 Fed. Reg. 50542, 50561-62 (August 15, 2011).

33. 16 U.S.C. § 1533(B)(2).

34. 78 Fed. Reg. 344, 347, 385-87 (table), 389 (Jan. 3, 2013).

35. Id. at 373-74.

36. Id. at 389-462.

37. See Alaska Oil and Gas Ass'n, 916 F.Supp.2d at 998-1003, and Cape Hatteras Access Pres. All., 344 F.Supp.2d at 122-23.

38. U.S. Fish and Wildlife Service, Southwestern Willow Flycatcher Recovery Plan 80-81 (2002).

39. Conner (1956 at p. 45)

40. Notably, Webb et al. (2007 at pp. 274-277)) evaluated changes in riparian vegetation along the San Pedro River and determined that woody riparian vegetation has increased significantly along that river. They also noted that the "increases in riparian vegetation [along the San Pedro River] are so large that they have been documented with satellite imagery" (Id. at p. 226). These increases in riparian vegetation during the past several decades may explain the dramatic increase in recent SWWF observations.

41. http://www.rivernetwork.org/rn/cwa/other-laws.
42. Procedural Guidance for Evaluating Wetland Mitigation Projects in California's Coastal Zone. California Coastal Commission. September, 1995; http://www.coastal.ca.gov/web/weteval/wetitle.html.
43. 16 U.S.C. § 703 et seq.
44. 16 U.S.C. § 703(a).
45. 16 U.S.C. § 706(a).
46. 16 U.S.C. § 706(b).
47. 16 U.S.C. §§ 1600-1614. This statute is also called the Forest and Rangeland Renewable Resources and Planning Act.
48. 43 U.S.C. §§ 1701-1787.
49. Available at http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.43545.File.dat/6840.pdf.