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**Petition to Delist  
the Navasota Ladies'-tresses  
(*Spiranthes parksii*)  
in Accordance with Section 4 of the  
Endangered Species Act of 1973**

Petitioned by

**American Stewards of Liberty  
and  
Dr. Steven W. Carothers**

Prepared by

**SWCA Environmental Consultants**

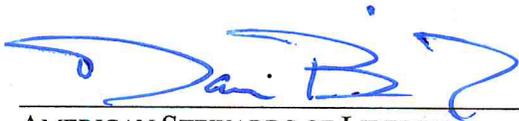
FINAL May 2015





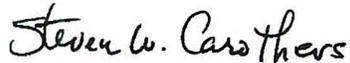
## SIGNATURES

WE, THE PETITIONERS, RESPECTFULLY SUBMIT THIS PETITION TO DELIST THE FEDERALLY ENDANGERED NAVASOTA LADIES'-TRESSES (*SPIRANTHES PARKSII*) TO THE U.S. FISH AND WILDLIFE SERVICE FOR CONSIDERATION PURSUANT TO SECTION 4 OF THE ENDANGERED SPECIES ACT OF 1973, AS AMENDED.



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## 1.0 PETITIONED ACTION

The Petitioners respectfully submit this petition to delist the federally endangered plant, Navasota ladies'-tresses (*Spiranthes parksii*), to the U.S. Fish and Wildlife Service (USFWS) for consideration pursuant to Section 4 of the Endangered Species Act of 1973, as amended (ESA).

The orchid *S. parksii* has been known to science since the mid 1940's, with the first collection of specimens in 1945 and an official species description published in 1947 (Correll 1947). The USFWS listed *S. parksii* as an endangered species (i.e., a species in danger of extinction throughout all or a significant portion of its range) in 1982 (47 Fed. Reg. 19539). In the agency's final listing rule, the USFWS stated that *S. parksii* is "primarily threatened due to extremely low numbers, urbanization, and possible over-utilization" (47 Fed. Reg. 19539).

In the more than three decades since the 1982 listing, a substantial amount of new scientific and commercial information has become available that demonstrates the species is not at risk of extinction and that the original listing was in error. Sufficient conservation for the species is in place so that neither the existence nor the magnitude of the once perceived potential threats to the species indicates that *S. parksii* is at risk now or in the foreseeable future. Therefore, the protections of the ESA were not originally and are not currently warranted for *S. parksii*. Furthermore, molecular analyses by numerous researchers using a variety of different markers and methods, including work that has been published in peer-reviewed scientific journals, have failed to support the taxonomic position of *S. parksii* as a distinct species apart from the local form of the co-occurring *S. cernua*. As such, the best available scientific and commercial information suggests that *S. parksii* may not even be a valid taxon eligible for listing. The Petitioners request that the Secretary of the Interior (Secretary), acting by and through the USFWS, evaluate this petition to delist *S. parksii* on the basis of the best available scientific and commercial data pursuant to Section 4 of the ESA.

Several of the Petitioners believe that species inappropriately receiving the protections of the ESA cause significant economic harm to landowners who are prevented from using their land and to local governments who need to provide necessary community services. Others believe that the objectives of the ESA are best served by focusing limited conservation resources on species that truly warrant the protections of the ESA. All Petitioners believe that *S. parksii* should no longer be listed as threatened or endangered under the ESA.

Pursuant to ESA section 4(b)(3)(A), the question USFWS must determine at this stage is "whether the petition presents substantial scientific or commercial information indicating that the petitioned action may be warranted." This is a relatively low-threshold burden of proof. For the purposes of this decision, "'substantial information' is that amount of information that would lead a reasonable person to believe that the measure proposed in the petition may be warranted." 50 CFR 424.14(b)(1).

## 2.0 SPECIES AND HABITAT DESCRIPTION

The species *S. parksii* is a terrestrial, perennial orchid known to primarily occur in the post oak savanna ecoregion of east-central Texas (Wonkka et al. 2012); although, occurrences have also been recorded from other Texas ecoregions (e.g., the Bastrop Lost Pines and the Southern Tertiary Uplands, both pine-dominated forest systems, and the Southern Blackland Prairie and San Antonio Prairie systems) (Griffith et al. 2004). At the time of listing, the species was only known from Brazos County, Texas. Today, the species has been documented from 13 Texas counties, including: Bastrop, Brazos, Burleson, Freestone, Fayette, Grimes, Jasper, Leon, Limestone, Madison, Milam, Robertson, and Washington counties (USFWS 2009). Figure 1 depicts the known range and ecosystem associations of *S. parksii* occurrences

documented as of 2014 and reported in the Texas Natural Diversity Database (TXNDD) administered by the Texas Parks and Wildlife Department (TXNDD 2014).

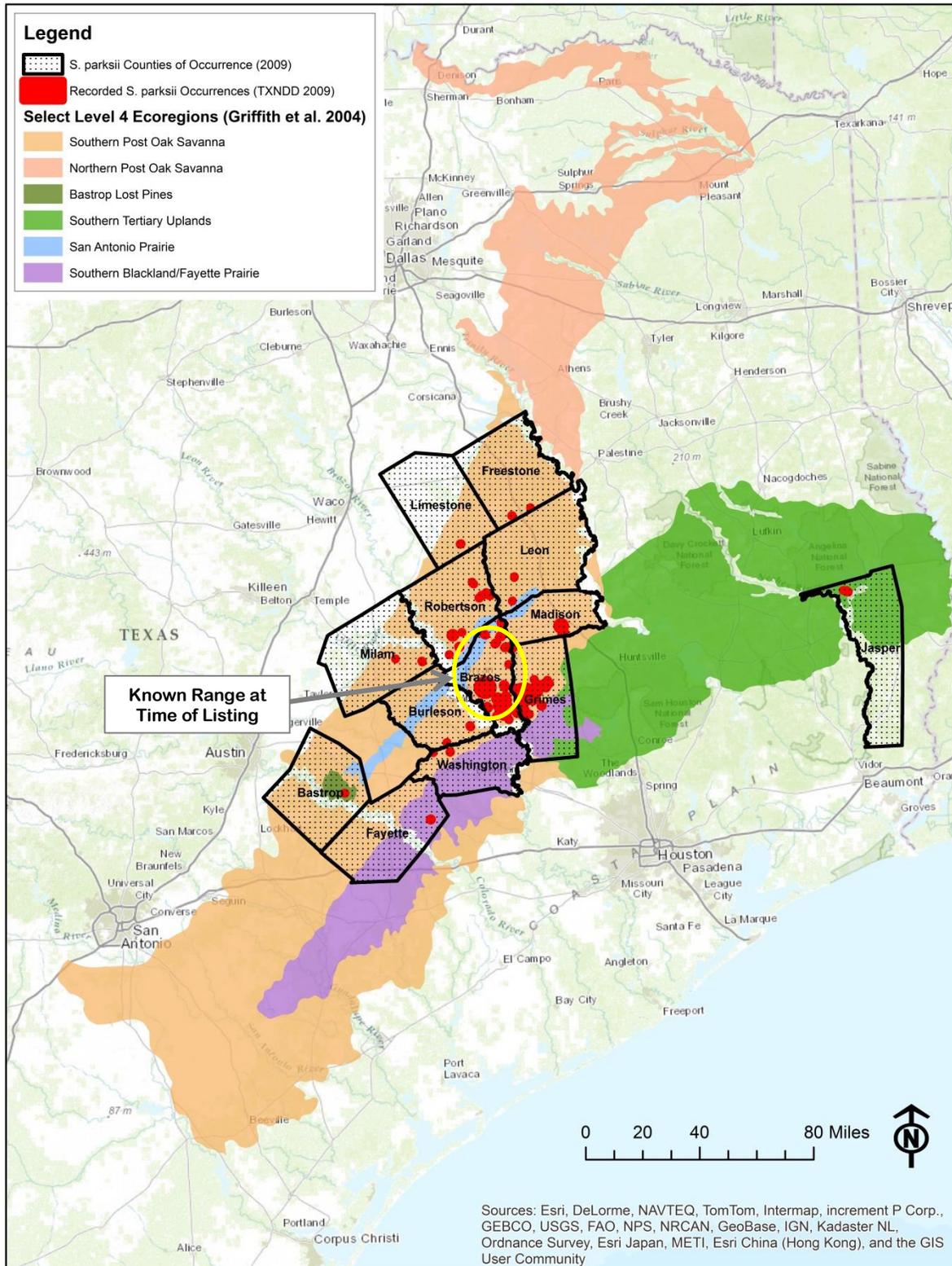


Figure 1. Range of known occurrences and associated ecosystems for *S. parksii*.

Habitat for *S. parksii* has most recently been described as “upland post oak woodland and savanna with grassland patches, often along the streambanks of upland tributaries of the Navasota and Brazos river drainages” (Wonkka et al. 2012). The USFWS characterizes *S. parksii* habitat as “ephemeral seeps with sandy soils, and found mainly in small clearings within post oak savanna in central east Texas” (USFWS 2009). Individuals have been observed growing, even in abundant numbers, in disturbed areas associated with game and cattle trails, roadsides, fencerows, and in power line rights-of-way (Thomas 2005), as well as in at least one area following vegetative clearing by a bulldozer (Nations 1987, USFWS 2009). Periodic vegetation disturbance is thought to be important to maintaining habitat conditions suitable for *S. parksii* (Wonkka et al. 2012).

Individuals of *S. parksii* may produce a leafless flowering stem in the fall that is 15 to 30 cm tall with a flowering spike that has several spiraled coils of small, white flowers (Wonkka et al. 2012). The flowering season for *S. parksii* typically extends for only a short period over several weeks in October and November. While not flowering, *S. parksii* may exhibit a basal rosette of one to five leaves, but the species also survives underground as fleshy tuberous roots without any surface leaves, stems, or flowers (Wonkka et al. 2012). Typically, flowering and fruiting occurs between September and November, leafy rosette production occurs after flowering between September and May, and the plant has no surface expression between April and September (Wonkka et al. 2012). The species *S. parksii* does not typically flower every year and individuals can persist for several years without producing flowering stems or rosettes (Wonkka et al. 2012). In a given year, only a small percentage of the total population flowers (USFWS 2009). This pattern of irregular flowering from one year to the next likely contributed to the erroneous conclusion published in the 1982 listing rule that *S. parksii* was in decline.

The species *S. parksii* may co-occur with several other species of the genus *Spiranthes*, mostly commonly with the very closely related and more widely distributed nodding ladies'-tresses (*S. cernua*). Morphologically, *S. cernua* is highly variable, but the woodland, open flowered form of *S. cernua* appears very similar to *S. parksii*. As leafy rosettes, the two species are visually indistinguishable. However, the flowering body of *S. parksii* exhibits a set of subtle characters that morphologically distinguishes this species from *S. cernua*, including “smaller, peculiarly curved flowers with short dorsal sepals and disposed in an open spiral” (cited in USFWS 2009 as Charles Sheviak, *in litt.* 2008).

### 3.0 SCIENTIFIC AND REGULATORY HISTORY

Table 1 summarizes the timeline of important scientific and regulatory events related to *S. parksii*. This chronology clearly demonstrates how little was actually known about the range, distribution, abundance, life history, taxonomy, and habitat or ecosystem associations of *S. parksii* at the time of listing.

**Table 1. Timeline of key scientific, conservation, and regulatory events related to *S. parksii*.**

<i>Date</i>	<i>Event</i>
1945	First scientific collection of <i>S. parksii</i> by Dr. H.B. Parks from a site in northeast Brazos County near the Democrat Bridge on the Navasota River; unreported number of individuals (Correll 1947). Dr. Parks also collected and curated, but misidentified as <i>S. cernua</i> , individuals of <i>S. parksii</i> at a second site described as “Navasota, 10 miles west of Navasota R. bridge on hwy no. 6” (Catling and McIntosh 1979).

1947	Formal species description for <i>S. parksii</i> published in the scientific literature (Correll 1947).
1945 – 1978	No documented collections or observations of <i>S. parksii</i> (Catling and McIntosh 1979). Luer (1975) reports that C. Luer and D.S. Correll “thoroughly searched” for <i>S. parksii</i> at the type locality in northeast Brazos County in two different years without success.
1975	<i>S. parksii</i> included by Secretary of the Smithsonian Institution on a list of plants considered to be endangered, threatened, or (as in the case of <i>S. parksii</i> ) extinct (47 Fed. Reg. 19539).
1976	USFWS publishes a proposed rule to determine 1,700 plants to be endangered, including <i>S. parksii</i> (47 Fed. Reg. 19539)
1978	Catling and McIntosh (1979) reported discovering the misidentified herbarium specimens of <i>S. parksii</i> collected by Dr. Parks in 1945. The species <i>S. parksii</i> is reported to be “rediscovered” in the field at two sites on private property in southeast Brazos County near Bryan-College Station with 20 individuals observed (Catling and McIntosh 1979).
1979	The species <i>S. parksii</i> is documented from four sites (one in northeast Brazos County near the type locality and three in southeast Brazos County near Bryan-College Station) with only nine individuals observed (Catling and McIntosh 1979).
1979	USFWS withdraws the proposed listing rule that included <i>S. parksii</i> due to inaction (47 Fed. Reg. 19539 )
March 31, 1980	USFWS commissions a status report on <i>S. parksii</i> (Mahler 1980).
June 18, 1980	USFWS publishes a new proposed rule to list <i>S. parksii</i> as endangered. The proposed rule references the range and population size of <i>S. parksii</i> as reported in Catling and McIntosh (1979) (47 Fed. Reg. 19539).
May 6, 1982	The species is <i>S. parksii</i> listed as endangered under the ESA without designated critical habitat. The range and population of <i>S. parksii</i> are as reported in Catling and McIntosh (1979) (47 Fed. Reg. 19539).
Fall 1982	Approximately 100 <i>S. parksii</i> individuals are documented at four sites in Brazos County (USFWS 1984). Walters and Wilson (1982) present the results of the first

	molecular study of <i>S. parksii</i> and report that <i>S. parksii</i> and the woodland form of <i>S. cernua</i> are electrophoretically identical.
Fall 1983	Surveys for <i>S. parksii</i> document 1,816 plants across 24 sites within Brazos, Burleson, Grimes, and Robertson counties, Texas. Two large population centers are reported: one in Brazos County and another located in Grimes County. Individuals are now known to occur in the Navasota River and Brazos River drainages (Wilson and Ajilvsgi 1983, USFWS 1984).
1984	USFWS publishes the first recovery plan for <i>S. parksii</i> that provides criteria for down listing based primarily on the protection and management of two “safe sites” for the species that contain a significant portion of the population (USFWS 1984). The 1984 Recovery Plan does not include criteria for delisting.
1993	USFWS receives a draft revised recovery plan for <i>S. parksii</i> prepared by Dr. H.D. Wilson. The draft plan contains similar recommendations for down listing criteria, but provides no criteria for delisting (Wilson 1993). This draft plan was not finalized.
2001	USFWS convenes a “conservation group” of individuals and organizations concerned about the recovery of <i>S. parksii</i> .
2003	USFWS convenes a formal <i>S. parksii</i> Recovery Team, with technical and implementation sub-teams.
2005	C. Walters submits a thesis to the Office of Graduate Studies of Texas A&M University investigating the genetic relationships among <i>S. parksii</i> and congeneric species (including <i>S. cernua</i> ) using amplified fragment length polymorphisms and polymorphic microsatellite loci. Walters (2005) reports that, based on the data, “ <i>Spiranthes parksii</i> is not distinguishable from sympatric <i>S. cernua</i> .”
2007	USFWS develops a draft Recovery Outline for <i>S. parksii</i> to replace the 1984 Recovery Plan (USFWS 2007). Dueck and Cameron (2007) publish the third genetic study of <i>S. parksii</i> finding no differences between <i>S. parksii</i> and the woodland, open flowered form of <i>S. cernua</i> . The authors suggest that <i>S. parksii</i> “may simply be an aberrant form of the more widespread <i>S. cernua</i> , contrary to accepted taxonomy” and that “ <i>S. parksii</i> may not warrant species status” (Dueck and Cameron 2007).
2008	Dueck and Cameron (2008) publish a follow up study confirming their preliminary findings from 2007. These authors report that “DNA sequence data and phylogenetic analyses demonstrate that <i>S. parksii</i> does not deserve species status,

2009	<p>but rather represents one of several local phenotypes of the widespread, polyploid, and highly variable <i>S. cernua</i>.”</p> <p>USFWS releases a 5-year Status Review for <i>S. parksii</i>. By this time, the known range of <i>S. parksii</i> encompasses approximately 23,100 square miles and the species is documented in 13 Texas counties. The known population size includes at least 3,651 individuals, most of which were within one of 24 protected sites. USFWS recommends no change in listing status for <i>S. parksii</i>; however, USFWS reduces the recovery priority number for <i>S. parksii</i> from 2 to 8C.</p>
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## 4.0 DELISTING CRITERIA, PROCESS, AND HISTORICAL PRECEDENTS

Delisting a species from the protections of the ESA may occur as a result of achieving recovery, species extinction, or new analysis that otherwise indicates that the original listing was in error. Since 1967, 59 species have been delisted (51 domestic and 8 foreign species). Of these, 19 were delisted because the original data were found to be in error, 30 have been recovered, and 10 have gone extinct (USFWS 2015).

### 4.1 Recovery and Relationship to Recovery Plans

The Policy and Guidelines for Planning and Coordinating Recovery issued by the USFWS in 1990 defines recovery as “the process by which the decline of an endangered or threatened species is arrested or reversed, and threats to its survival are neutralized, so that its long-term survival in nature can be ensured. The goal of this process is the maintenance of secure, self-sustaining wild populations of the species” (USFWS 1990:1). While there is a regulatory basis for the development of recovery plans, there is no requirement that recovery plans be implemented. **It is also important to recognize that neither the ESA nor the USFWS regulation establishes that recovery plans act as the sole determinant of a species’ progress towards achieving recovery.**

For example, in its final rule to delist the Lake Erie water snake in 2011, the USFWS states that “recovery plans are intended to provide guidance to the USFWS, States, and other partners... they are not regulatory documents and cannot substitute for the determinations and promulgation of regulations required under 4(a)(1) of the Act” (76 Fed. Reg. 50681). In regard to implementation of recovery plans, the USFWS identifies that “there are many paths to accomplishing recovery of a species, and recovery may be achieved without all criteria being fully met” (76 Fed. Reg. 50681). Moreover, “the determination to remove a species from the Federal List of Endangered and Threatened Wildlife is ultimately based on an analysis of whether a species is no longer endangered or threatened” (76 Fed. Reg. 50681). Therefore, a species may be delisted on the basis of recovery even if the specific recovery criteria identified in the species’ recovery plan have not been met.

Other examples of species that have been delisted on the basis of recovery not necessarily defined by strict adherence to published recovery plan criteria include the following:

- **Columbian White-tailed Deer (*Odocoileus virginianus leucurus*), Douglas County distinct population segment (68 Fed. Reg. 43647)** - In 2003, the Douglas County distinct population segment of the Columbian white-tailed deer (distinguished in the 1983

revision to the recovery plan) was delisted due to recovery. Prior to listing, the species had declined by 1970 to just two known populations representing approximately 400–500 individuals. Largely as a result of conservation efforts and regulations on hunting, by 2002, the species increased to over 6,000 known individuals (68 Fed. Reg. 43651). This represents a population increase of 1,417.5% (based on a starting value of 400 known individuals). Despite this population increase, there remained only two known populations of the species at the time of delisting, and the range of the delisted population segment included only one county in Oregon. The basis for delisting the distinct population segment was the establishment of secure habitats. The recovery plan “did not define secure habitat to include only publically owned lands; rather, it provided further guidance on secure habitat by stating that local entities, including planning commissions, county parks departments, and farm bureaus could secure habitat through zoning ordinances, land-use planning, parks and greenbelts, agreements, memoranda of understanding, and other local jurisdictions” (68 Fed. Reg. 43651). They additionally encouraged conservation organizations to contribute through “easements, leases, acquisitions, donations, or trusts” (68 Fed. Reg. 43651).

- **Robbins’ Cinquefoil (*Potentilla robbinsiana*) (67 Fed. Reg. 54968)** - In 2002, the Robbins’ Cinquefoil was delisted due to recovery. This determination was based on the application of protective conservation actions and the addition of new viable populations. At the time of the listing in 1980, there was only one known population of the species that had been transected by development associated with the Appalachian Trail. Within that population, approximately 2,000 individual plants were known to occur. By the time the species was delisted, more than 14,000 individual plants were known to occur at two naturally occurring localities and two transplanted localities (67 Fed. Reg. 54968). This represents a known population increase of 600%. While the recovery plan initially called for four new transplant sites, it was later determined that only two of these sites needed to be viable. In response to comments received relating to the separation from the objectives outlined in the recovery plan, the USFWS iterated that “the objectives identified during the recovery planning process provide a guide for measuring the success of recovery, but are not intended to be absolute prerequisites, and should not preclude a reclassification or delisting action if such action is otherwise warranted” (67 Fed. Reg. 54972).
- **Aleutian Canada goose (*Branta canadensis leucopareia*) (66 Fed. Reg. 15643)** - In 2001, the Aleutian Canada goose was delisted due to recovery. In 1975, 790 individuals of the species were known to exist. By 1989, the population had increased to 5,800 known individuals (an increase of 634%). As a result of that increase, the species was down-listed to threatened. In 2000, there were 36,978 known individuals (an increase of an additional 537%) and the species was delisted (66 Fed. Reg. 15643). This represents a cumulative population increase of 4,580% from the time of listing. The species was determined to be recovered due to the discovery of new localities, the introduction of captive-bred individuals that led to an expanded range, and the elimination of threats like hunting by establishing closed hunting areas.

These are just a handful of examples where species have been delisted on the basis of recovery. In these cases, the USFWS determined that the threat of extinction and decline of the species had been reversed. In many cases, the conditions considered for recovery were different from those outlined in the initial recovery planning process as new scientific information became available. In all cases, some forms of perpetual protective measures were implemented in support of continued species security.

Consistent with these examples, not only has the known range and population size of the species greatly increased since the time of listing, but a substantial level of conservation has been achieved for *S. parksii*. These efforts have been accomplished through the establishment of permanent preserves dedicated to the protection and management of the species. When coupled with the knowledge of a significantly expanded range and known distribution of the species, questions about the taxonomic validity of the species, and evidence that the threats to the species may not be as severe as originally assumed, these conservation measures sufficiently assure the continued survival of the species and avert the risk of extinction in the foreseeable future.

## 4.2 Extinction

To date, 10 species have been delisted under the ESA due to extinction. While this is a warranted justification for the removal of a species from the protections of the ESA, it is not relevant to *S. parksii* and therefore not discussed further in this petition.

## 4.3 Original Data in Error

The third acceptable criteria for delisting are instances where the original data used to support the listing is determined to be in error. In such cases, **delisting may be warranted if the analysis of new information or a reanalysis of the original information indicate that the existence or magnitude of threats to the species, or both, do not support a conclusion that the species is at risk of extinction now or in the foreseeable future.** Examples of species that have been delisted on the basis of an erroneous listing include:

- **Pine Barrens treefrog (*Hyla andersonii*) (48 Fed. Reg. 52740)** - In 1983, the Florida population of the Pine Barrens treefrog was delisted due to a finding that the original data were in error. The USFWS stated “recent evidence indicates that the species is much more widely distributed than originally known” (48 Fed. Reg. 52740). At the time of the listing, there were only seven known localities of this species in Florida and the predominant threat was cited as “the present or threatened modification, or curtailment of its habitat or range” (48 Fed. Reg. 52741). By 1979, several more populations were identified, and by 1980 there were over 150 confirmed occupied locations for the species (an increase of at least 2,042%). The final rule noted that while the overall distribution of the species was relatively limited, the likelihood of discovering more known localities in consideration with the additional new sites discovered indicated that “the Florida population is relatively secure for the immediate future” (48 Fed. Reg. 52741).
- **Rydberg Milk-Vetch (*Astragalus perianus*) (54 Fed. Reg. 37911)** - In 1989, the Rydberg Milk-Vetch was delisted on the basis of erroneous data. At the time when this species was listed, there was only one known locality. The subsequent delisting was based on the discovery of 11 additional localities over nine years of research (an increase of 1,100%). This delisting was supported by the existence of regulatory mechanisms that minimized the impacts of the threats identified in the initial listing factors.
- **McKittrick pennyroyal (*Hedeoma apiculatum*) (58 Fed. Reg. 49244)** - In 1993, the McKittrick pennyroyal was delisted because of “the number of newly discovered populations and the remote and inaccessible nature of the habitat” (58 Fed. Reg. 49244). This species was at the time of listing and continues to be only known from two counties, one each in Texas and New Mexico. At the time of listing, there were 7 known localities of the species. At the time of delisting, there were 36 known populations of the species

(an increase of 414%) (58 Fed. Reg. 49245). The USFWS determined that since this plant species occurs in hard-to-reach habitats, it is likely that its distribution is even broader than the confirmed locations, and that its natural preferred habitat limits the likelihood of human-related impacts.

- **Utah (Desert) Valvata snail (*Valvata utahensis*) (75 Fed. Reg 52272)** – In 2010, the Utah Valvata snail was delisted on the basis of new information. At the time of listing in 1992, the species was believed to occur in only “a few springs and mainstream Snake River sites” at, isolated points along the Snake River. The species was delisted after data showed that the species range extended an additional 122 miles beyond the initially identified range (an increase in the known range of 118.5%). The USFWS determined that due to the increased range of the species, the listing factors would not contribute to the likelihood of the species being threatened with extinction in the foreseeable future. Among the threats discussed, impacts to its habitat from agricultural and industrial purposes were excluded as threats because “the species persists in these varied mainstem Snake River systems, including impounded reservoir habitats” (75 Fed. Reg. 52280). **This distinction is critical because despite the continued presence of previously perceived threats, the proven ability of the species to continue to thrive in those conditions supported delisting.**

Since listing in 1982, a significant amount of new scientific and commercial information has become available that demonstrates *S. parksii* occurs in significantly more locations and across a much wider range than originally believed. This new information documents an increase of more than 18,000 percent in the known population size and 4,000 percent in the known range since the time of listing. Given the vastly increased number of known localities occupied by the species, many of which are protected, the perceived threats believed to apply to the species are not of a magnitude or intensity that is likely to cause the extinction of the species now or in the foreseeable future. The circumstances of *S. parksii* are similar to those in the examples above, where the consideration of new populations or occupied sites prompted the USFWS to delist. This new information supports the conclusion that the protections of the ESA are no longer warranted for *S. parksii* since the existence or magnitude of threats to the species, or both, do not support a conclusion that the species is at risk of extinction now or in the foreseeable future.

## 5.0 JUSTIFICATION FOR THE PETITIONED ACTION

Herein, the Petitioners present and analyze the credible scientific or commercial information that would lead a scientifically accurate species status review to conclude that delisting of *S. parksii* may be warranted. The following assessment demonstrates how the original listing was in error, even given the information available at the time, and that information that became available subsequent to the listing decision continues to demonstrate that *S. parksii* is not now threatened and never was at risk of extinction in the foreseeable future. Therefore, the Petitioners believe that *S. parksii* should be delisted.

### 5.1 Original Listing in Error

USFWS listed *S. parksii* as endangered based on conclusions regarding the status of the species derived from information that was not sufficient to make such conclusions. In the final listing rule, the USFWS perpetuated a pattern of “enhancing” the importance of this limited information (i.e., “low population size” in an early publication becomes “*extremely low* population size” in a later publication). This error in analysis led the USFWS to make largely unsubstantiated, yet very strong assertions about the range, distribution, and population size of *S. parksii* as a species that were simply not supported by the facts available at the time. The USFWS also failed to provide actual evidence in the final listing rule that the

hypothesized threats to the species were real, even without such threats being “intensified” by the presumed (and inaccurate) critically imperiled status of the species. Rather, the information available to the USFWS should have indicated that the range and distribution of the species was likely to be larger than described in the listing rule, since each of the known sites were discovered by only casual searches of a few locations by a few individuals who had the ability to recognize the species. Similarly, it was known at the time that members of the *Spiranthes* genus of orchids did not regularly produce flowering stems and that individual plants could persist entirely underground for many years. Therefore, the inability to observe individuals of *S. parksii* at the few sites and upon the few occasions that qualified individuals looked for the species, particularly when identification involved close observation of particular flowering parts on individual plants, should have also not been surprising or necessarily alarming.

The following discussion reviews the chronology of information that the USFWS relied upon to make the 1982 listing decision. We highlight where this information was misinterpreted or misapplied by the USFWS and others to justify the erroneous decision to list *S. parksii* as endangered.

### **5.1.1 Species Discovery and Early Publications (1945 – 1980)**

Dr. H.B. Parks, the curator of the S.M. Tracy Herbarium at College Station, Texas, collected a previously undescribed orchid (now known as *S. parksii*) from a site along the Navasota River near the Democrat Bridge in northeast Brazos County, Texas, in 1945. The Democrat Bridge site was characterized by USFWS in the 1984 Recovery Plan as “a well known collecting locality on the floodplain of the Navasota River in northern Brazos County, Texas.” Catling and McIntosh (1979) reported discovering additional curated specimens of *S. parksii* collected by Dr. Parks in 1945 but misidentified as *S. cernua*. These additional specimens were collected from a site described as “Navasota, 10 miles west of Navasota R. bridge on hwy. no. 6” (Catling and McIntosh 1945). This location description places the second collection site in southwest Brazos County. Therefore, in 1945, the *S. parksii* had actually been collected from two sites approximately 28 miles apart within Brazos County. The number of individuals of *S. parksii* observed at these sites was unreported.

D.S. Correll published a scientific description of this new orchid in 1947, based on the Democrat Bridge collections by Dr. Parks, for whom the species is named. In this publication, Correll notes that the genus *Spiranthes* “is a highly technical genus and, from a taxonomic standpoint, is one of the most difficult among the orchid genera in the United States” (Correll 1947). Nevertheless, the specimens collected by Dr. Parks were given species status in Correll (1947) on the basis of distinctive morphology. However, this “distinctive” form may not actually be so distinctive given that *S. parksii* specimens collected from southwest Brazos County by Dr. Parks in 1945 were included on herbarium sheets with collections of *S. cernua*.

Early on, *S. parksii* was described as endemic (meaning “restricted or peculiar to a locality or region”) to Brazos County, Texas (Correll 1947, Correll and Johnston 1970); although, inspection of the location descriptions for the 1945 collections demonstrate that both sites are located at the edge of the Brazos County line. The first published note that *S. parksii* may be restricted to a particular area occurred in the *Native Orchids of North America North of Mexico* (Correll 1947). However, Correll (1947) did not reference any supporting material, such as survey reports or other distribution data, to justify this statement of presumed endemism to Brazos County, Texas. While unknown at the time due to the misidentification of *S. parksii* as *S. cernua*, this description of the species’ narrow range “along the Navasota River” was also inaccurate, because *S. parksii* had been collected in 1945 from a second site located 10 miles west of the Navasota River, placing it near the banks of the Brazos River at the edge of Brazos and Burleson counties.

After the 1945 collections by Dr. Parks, observations of *S. parksii* were not documented again until 1978 (Catling and McIntosh 1979). Luer (1975) reported that C. Luer and D.S. Correll “thoroughly searched” for *S. parksii* at the type locality in northeast Brazos County in two different years without success. In 1978, botanists from the University of Toronto “had an opportunity to explore the Post Oak Savanna northwest of Navasota” in southeast Brazos County and documented 20 flowering individuals of *S. parksii* between two sites that were approximately “a few hundred yards” apart (Catling and McIntosh 1979, Mahler 1980). Catling and McIntosh (1979) noted that “local residents reported that it had been a dry summer and perhaps for this reason *Spiranthes* spp. were not easily found.” At the end of this publication documenting the “rediscovery” of *S. parksii*, Catling and McIntosh (1979) concluded with an unfounded and off-hand presumption that *S. parksii* is a rare species: “In view of the general rarity of the plant, it seems desirable to document any future discoveries with photographs, measurements and detailed field notes rather than a large series of collected specimens.” However, all of the reported observations of *S. parksii* from the field up to 1979 were collected from opportunistic and casual searches of a very limited area over very limited time period. This level of effort was clearly insufficient, lacking both standardized methodology and statistical rigor, to make claims about the abundance of *S. parksii* as a species. Even the authors themselves make note that weather conditions preceding the 1978 findings were not conducive to abundant flowering by this genus of orchid.

The USFWS commissioned a status review of *S. parksii* by Dr. W.F. Mahler (a botanist and plant taxonomist with Southern Methodist University [SMU] in Dallas, who was also the editor and publisher of a botanical journal and head of the SMU herbarium) that was completed in 1980 (47 Fed Reg. 19539). Mahler (1980) reported that *S. parksii* was known from 20 plants in two localities in 1978 and nine plants across four localities in 1979. No citation was given for the source of the 1979 occurrence data or the methods or level of effort associated with this data. The four localities referenced for the 1979 occurrences included three sites in southeastern Brazos County that were “within the general area of the 1945 and 1978 collections discovered by Catling” (i.e., the two closely spaced sites associated with the “rediscovery” of the species and the location of the 1945 misidentified collection). As for the fourth locality, Mahler (1980) stated that “the northeastern population is in the general vicinity of the original type locality.” Mahler (1980) characterized this abundance and distribution information as the “current population” of the species. He noted that “all known populations occur in the southeastern and northeastern portion of Brazos County,” but did not otherwise qualify that this information was based on extremely limited searches for the presence of the species.

Mahler (1980) also perpetuated the ideas that *S. parksii* is “an endemic to Brazos County” and “one of the rarest and least known orchids of North America.” Indeed, Mahler later strengthened his statement about the presumed abundance of *S. parksii*, stating not just that the species is one of the rarest and least known of the North American orchids, but that “this species is the least known and rarest of the North American orchids” (emphasis added) (Mahler 1980). None of these statements was accompanied by a source citation or other supporting information. Mahler (1980) went on to state that “with the small number of plants known, the species is in a precarious position for survival” and that “with the low number of individual plants observed over the past two years, any simultaneous habitat disturbance could result in extinction of the species.” The author did not explain how he was able to draw such strong or stark conclusions about the status of the species as a whole from such limited information, thereby misleading the USFWS to conclude that the “best available science” warranted listing *S. parksii* as endangered with extinction. Mahler (1980) clearly erred in its interpretation and presentation of the best available information.

The information available at the time of the 1980 status review simply did not provide sufficient evidence that the species was endemic to Brazos County, was the rarest of the North American orchids, or (because of this presumed limited range and small number of observed individuals) was in a precarious position for survival. Nor was there a shred of data to indicate that the population was declining in abundance or

experiencing a range contraction – in fact the opposite was true. The documentation of *S. parksii* during a few opportunistic collecting trips clearly demonstrates the opposite: that the species was likely to occur in many other sites and that the limited number of occurrence records was instead the result of very limited search effort. Therefore, Mahler's statement that *S. parksii* was on the brink of extinction and recommendation that the species should be listed as endangered were based on inappropriate conclusions drawn from too small a dataset. Mahler's status review prepared on behalf of the USFWS reflected an enthusiastic botanists' lack of understanding of the true status of the species that once serious data collection began would show *S. parksii* populations to be far more widely distributed with stable population numbers that flowered when climatic conditions were appropriate and remained dormant when conditions were not.

It is evident that the earliest primary literature regarding this species espoused inaccurate and unfounded claims about the so-called restricted range and rarity of *S. parksii*. These claims were put forward as the primary basis for suggesting that *S. parksii* may be endangered with extinction, since evidence of actual population decline or range contraction at that time was entirely lacking.

### **5.1.2 Listing Decision (1975 – 1982)**

The history of regulatory action leading to the eventual listing of *S. parksii* as endangered with extinction began in 1975 with the inclusion of the species on a list of plants thought to be endangered, threatened, or extinct by the Secretary of the Smithsonian Institution (47 Fed. Reg. 19539). In 1975, the only distribution and abundance information available on *S. parksii* would have been the original type locality collection from the Democrat Bridge site and the unsuccessful attempts at relocation of the species from this site reported in Luer (1975). The only information about the occurrence of *S. parksii* in the field was derived from only a few reported visits to a single locality (e.g., the type locality) over a period of 30 years (Correll 1947, Luer 1975). The life history of similar species demonstrated that individuals of this genus did not consistently exhibit leaves, stems, or flowers at the surface (Wells 1981, Wilson 1993). The available information at the time was therefore insufficient to draw conclusions about the persistence of *S. parksii* at the type locality itself, let alone for the entire species.

Nevertheless, the USFWS used this list of plants that were presumed to be endangered, threatened, or extinct to publish a proposed listing rule for *S. parksii* and approximately 1,700 other plants in 1976 (41 Fed Reg. 24523). This proposed rule was not finalized within two years, as was required at the time by the ESA, and the USFWS withdrew the proposed listing rule that included *S. parksii* in 1979 (47 Fed Reg. 19539). Approximately six months later, the USFWS published another proposed rule to list *S. parksii* as endangered based on the "sufficient new information" contained in the 1980 status review that was prepared by Mahler on behalf of the agency (42 Fed. Reg. 32373, 47 Fed. Reg. 19539). The USFWS finalized the proposed rule in 1982 and listed *S. parksii* as endangered under the ESA.

The final listing rule prefaced the decision to list by noting supplemental information about *S. parksii*, including that *S. parksii* "is endemic to Brazos County, Texas," that "the species was thought to have become extinct," and surveys only documented the presence of 20 individuals in 1978 and nine individuals in 1979 after "efforts to relocate the species in the late forties and fifties were unsuccessful" (47 Fed. Reg. 19539). The USFWS went on to state that "the extremely small total population size makes *Spiranthes parksii* highly vulnerable to extinction." As described above, none of the information on the species at the time of listing was sufficient to conclude that the species was limited in range to Brazos County or had an "extremely small total population size." These statements made by USFWS to support the proposed listing did not represent the best available science; rather they were misrepresentations and clearly inappropriate exaggerations of a very limited set of facts.

The USFWS concluded in the final listing rule that “after a thorough review and consideration of all available information,” *S. parksii* was an endangered species throughout all or a significant portion of its range (47 Fed. Reg. 19541). However, in its analysis of the five listing factors, it is clear that the USFWS relied on unsubstantiated statements about the range, distribution, and population size of *S. parksii* to reach this conclusion.

***Listing Factor 1 – Present or threatened destruction, modification, or curtailment of its habitat or range.***

With respect to the present or threatened destruction, modification, or curtailment of its habitat or range, the USFWS noted that *S. parksii* “occurs in Brazos County, Texas, as two very small populations on private land comprising 20 plants in total.” The USFWS mentioned that “additional potential habitats for this species were searched without success” and concluded that “two very small populations represent the entire known range of the species.” As described above, this characterization of the range, distribution, and population size of *S. parksii* was inappropriate and unsubstantiated, even given only what was known at the time.

The USFWS went on to state that the larger of the two known populations of *S. parksii* (e.g., those individuals occurring at the collection of three sites in southeast Brazos County, Texas) was “on the outskirts of the College Station-Bryan urban area” and opined that “expanding urbanization threatens to destroy this population unless proper planning for this species takes place.” Again, these statements by the USFWS were unsubstantiated. Mahler (1980) notes simply that this southeastern population is “adjacent to current urban development,” but provided no analysis to document this “fact.” While the final listing rule more accurately characterized the location of this collection of sites relative to the actual urban area associated with the cities of College Station and Bryan, the USFWS instead made a new unsubstantiated statement about the anticipated growth of this urban area. The USFWS provided no information to justify why it believed that the College Station-Bryan urban area would expand into the area containing the southeastern population of *S. parksii*.

For the second *S. parksii* “population” in northeast Brazos County, Texas (e.g., the site located in the vicinity of Democrat Bridge), Mahler (1980) stated that this was “a large tract of privately owned land used for ranching and hunting.” Neither Mahler (1980) nor the final listing rule explained how *S. parksii* habitat at this site was threatened with destruction or modification. Mahler (1980) did not reference any threat of habitat destruction at this northeastern site. The USFWS suggested that the lack of formal protections for *S. parksii* at this ranchland site was of itself a demonstration that the habitat was threatened with destruction or modification. But, the fact that the species was documented on an “unprotected” site subject to a long-history of ranching and hunting clearly demonstrated that formal “protection status” of the land was not necessary to maintain suitable habitat conditions.

Neither Mahler (1980) nor the USFWS provided any information that would suggest the owners of the lands containing known *S. parksii* populations actually intended to develop them or in any other way change their use in the foreseeable future. Indeed, in the agency’s response to comments, the USFWS noted that “one owner was reached who supported the listing.” Presumably, this landowner had no plans to develop or otherwise change the use of the site, since listing could interfere with such activities. The USFWS failed to provide any evidence that the habitats on these lands were indeed threatened. The mere presumption that lack of formal habitat protection for *S. parksii* does not equate to the “present or threatened destruction, modification, or curtailment of its habitat or range.” Therefore, the USFWS’s conclusions regarding this listing factor was (and continues to be) simply unfounded.

***Listing Factor 2 – Overutilization for commercial, sporting, scientific or educational purposes.***

With respect to overutilization of the species, the USFWS indicated that *S. parksii* was potentially threatened by this listing factor while providing no supporting information for this statement whatsoever. The USFWS's entire analysis of this listing factor involved only simple statements that *S. parksii* "is currently little known to the general public," that "the taking of specimens for scientific study is minimal," and that "commercial and private taking by the public is a potential threat." Mahler (1980) even said with regard to overutilization that there is "none at this time." The USFWS jumped to a conclusion that overutilization by commercial and private parties is a threat to the species without providing any evidence that such activities were occurring or were even likely to occur. In its response to a commentor who questioned the extent of the threat posed by collecting, the USFWS simply opined that "the species *could* be desired for its rarity or due to the extensive interest in orchid cultivation" (emphasis added). Again, no information was provided to support this opinion.

### ***Listing Factor 3 – Disease or predation.***

The USFWS stated that there "is no evidence that either disease or predation is a contributing factor to the endangered status of the species."

### ***Listing Factor 4 – The inadequacy of existing regulatory mechanisms.***

Here the USFWS simply noted that "there is currently no State or Federal protection for *Spiranthes parksii*" and did not comment on whether or not the lack of such protections presented a threat to the species. Although, as noted above, the USFWS did suggest (without support) that the lack of protections contributed to the threat of habitat destruction or modification.

### ***Listing Factor 5 – Other natural or manmade factors affecting its continued existence.***

The USFWS suggested that accidental browsing, extended periods of drought, and natural population fluctuations could be additional threats to *S. parksii* in light of the species' small range, narrow distribution, and small population size. In this analysis, the USFWS restated yet again (and incorrectly) that *S. parksii* was endemic to Brazos County, Texas. But this time, the USFWS not only said that the species had a restricted distribution and a low population size, but that it had a "severely restricted distribution" and "extremely low population level" (emphasis added). Without any justification, the USFWS emphasized and amplified previously unsupported statements about the range, distribution, and population of the species to support its listing decision. Clearly, the USFWS did not conduct a "thorough review and consideration of all available information" when making this regulatory determination.

In the final listing rule, the USFWS declined to designate critical habitat for *S. parksii* on the basis that disclosing its locations to the public would contribute to the threat of overutilization by collectors. Mahler (1980) even stated that "since this is one of the least known and rarest of the North American orchids it *will* be sought by collectors if the exact locations are published" (emphasis added). How Mahler presumed to know with certainty that such collections would occur when the species was only known from private lands was not discussed.

It is important to note that the USFWS made no mention of the questions regarding the taxonomy of the species or that the species designation itself was not certain. At the time of the final listing rule, Luer (1975) had already published work that put the taxonomy of *S. parksii* in doubt: "Very possibly *Spiranthes parksii* represents an aberrant or polyploid form of var. *gracilis*, or a non-persisting hybrid of var. *gracilis* and *S. cernua*" (Luer 1975). This omission further illustrated how the USFWS failed to base its decision to list *S. parksii* on the best available information. Whether or not *S. parksii* was even a listable taxon should have been considered in the decision-making process.

## 5.2 Continued Listing Not Warranted

The USFWS prepared a 5-year Status Review for *S. parksii* in 2009. The purpose of a 5-year review is to ensure that listed species have the appropriate level of protection under the ESA. The reviews assess whether or not the status of a listed species has changed since the time of its listing or its last status review, and whether it should be classified differently or delisted. In the agency's 2009 5-year Status Review of *S. parksii*, the USFWS concluded that the reassessed status of the species warranted a change in the species' Recovery Priority number from 2 (the degree of threat is high in magnitude and immanent) to 8C (the degree of threat is moderate, there is a high potential for recovery, but there is potential conflict with economic activity). However, the USFWS also determined that a change in listing status was not warranted (USFWS 2009).

USFWS (2009) provided the following rationale for their decision to not change the listing status of the species. We rebut the USFWS's analysis and note how the USFWS erred in its assessment. As we describe below, the USFWS failed to adequately consider the extent to which the available information actually supported the continued listing of *S. parksii* as endangered with extinction in the foreseeable future. These points are more fully explored in following sections of this petition.

***The expanded known range and distribution reduces the degree of threat from immanent extinction, but almost all potential habitat faces significant threats from rapid urban and residential development.***

By the time of the 2009 5-year Status Review, the known population size of *S. parksii* expanded from a high count of 20 individuals to 3,651 individuals (USFWS 2009). Similarly, the known range of *S. parksii* expanded from approximately 590 square miles within a single county to more 23,100 square miles across 13 counties (USFWS 2009). This new information represented an increase of more than 18,000 percent in the known population size and 4,000 percent in the known range since the time of listing.

The demonstrated increases in known range and abundance far exceed that of other delisting precedents, and there is no evidence to suggest that full range, distribution, or population size of *S. parksii* is known or even well understood at the present time. The history of survey results indicate that the species is likely to occur in many other locations within and even beyond its current known range of 13 Texas counties. Furthermore, there is no evidence whatsoever that the species is or has been in decline.

Finally, the USFWS continues to overstate the threat of urban and residential development in east-central Texas, which is not surprising given that no robust or even credible review of land use trends in east-central Texas has been included or cited by USFWS in any of its publications. As we describe below, east-central Texas (or even just the College Station-Bryan area) is not and never has been a "national center for economic development," as claimed in USFWS (1984).

***While 24 reserves (19 with permanent protections) have been established for *S. parksii* that include a total of 3,207 known individuals, this protected population has little genetic diversity and very small effective size.***

The USFWS (2009) recognizes the substantial contributions to recovery made as a result of regulatory approvals or voluntary actions for the benefit of *S. parksii* since the time of listing. The 24 reserves established for the species include 502.1 acres of occupied *S. parksii* habitat (425.1 acres of which are under permanent protection) in four Texas counties. Essentially the entire known population of *S. parksii* currently recognized by the USFWS occurs within sites that are under some degree of protection for the benefit of the species (USFWS 2009). Therefore, the number, size, and distribution of *S. parksii* conservation lands are more than sufficient to secure the status of the species as currently known.

While the USFWS suggests that low genetic diversity and effective population size are somehow troubling for the continued survival of the species, the USFWS presents no evidence that genetic diversity is necessary for the perpetuation of a species that typically reproduces asexually. Since the typical mode of reproduction for *S. parksii* occurs asexually, most individual *S. parksii* plants are naturally clones of each other. To suggest that this lack of genetic diversity is a threat to the continued existence of the species is simply illogical.

***All populations of S. parksii are subject to a gradual decline in habitat quality due to natural succession of vegetation and increasing shrub cover.***

The presumption that natural vegetation succession threatens the status of the species is absurd and without any shred of support. The report cited by the USFWS to justify this claim (e.g., Tejas 2001) provides no documentation at all that “thicketization” leads to declines in *S. parksii* abundance and even provides examples of *S. parksii* found growing in forested or brushy conditions. The natural disturbance regime for vegetation communities in east-central Texas had been influenced by the activities of farmers and ranchers settled in the area for 100 years before *S. parksii* was even known to science. The species is adapted to weathering prolonged periods where flowering conditions are not ideal and Tejas Ecological Services (2001) actually documents how the species is more than capable of taking advantage of chance opportunities for favorable conditions.

***The taxonomic status of S. parksii is controversial, but the USFWS finds no evidence for synonymy with S. cernua and, therefore, continues to recognize S. parksii as a valid species.***

The USFWS deliberately minimized the importance of the peer-reviewed findings of Dueck and Cameron (2007, 2008) that were published in respected scientific journals, in favor of a consensus opinion of its hand-picked Recovery Team members documented only in the 5-year Status Review by a series of personal communications from telephone conversations and an informal review by Dr. Alan Pepper of Texas A&M University. In fact, the Dueck and Cameron findings do not stand alone and are consistent with all of the other molecular investigations of *S. parksii* that have attempted to clarify the notoriously difficult systematics of the *Spiranthes* genus. In this respect, the actions of the USFWS dismissing the evidence supporting the synonymy of *S. parksii* and at least one form of *S. cernua* are clearly biased in favor of maintaining regulatory control of a species that the best available science indicates is likely not even a valid taxon.

***The species S. parksii is an “edaphic endemic” that occurs in close association with the post oak savanna of east central Texas.***

The USFWS concludes its synthesis of the species’ status with a statement suggesting that continued listing (and the regulatory actions stemming from listing) is warranted from an ecosystem standpoint. USFWS (2009) states: “Finally we must consider the mandate of the ESA to conserve not just species, but the ecosystems upon which they depend. Much of the public concern over Navasota ladies’-tresses stems from an interest in conserving the post oak savanna ecosystem...the continued conservation of Navasota ladies’-tresses should be considered as an integral component of an ecosystem-scale effort to conserve the post oak savanna of east Texas.” Notwithstanding the fact that *S. parksii* is known to occur in other ecosystems, it is inappropriate for the USFWS to make listing decisions for a species on the basis of anything but the five listing factors.

The following discussion provides an updated assessment of the status, threats, and listing factor analysis for *S. parksii*.

### 5.2.1 Range, Distribution, and Population Size

Table 2 compares the known range, distribution, and population size of *S. parksii* at the time of listing and today. Most of the “current” information regarding *S. parksii* range, distribution, and population size is derived from the source documentation used by USFWS to prepare the 2009 5-year Status Review. Little new information has become available since 2009.

**Table 2. Change in Known Range, Distribution, Ecosystem Associations, and Population Size for *S. parksii*.**

<i>Population Parameter</i>	<i>1982 (Year of Listing)</i>	<i>2015 (Current Information)</i>
Known Range	Brazos County, Texas (USFWS 1982); approximately 590 square miles	13 Texas counties (USFWS 2009); approximately 23,100 square miles
Known Distribution	4 reported known occurrences (USFWS 1982)	141 reported known occurrences (Thomas 2005); although, USFWS (2009) reports occurrences at 37 discrete sites, many of which consolidate occurrences at nearby sites
Known Ecosystem Associations	Post Oak Savanna (USFWS 1982)	Southern Post Oak Savanna, Bastrop Lost Pines, Southern Tertiary Uplands (a pine forest system), San Antonio Prairie, and Southern Blackland Prairie (based on an analysis of TXNDD occurrence records and the Level 4 Ecosystem mapping from Griffith et al. 2004)
Known Population Size (high count)	20 individuals (USFWS 1982)	3,651 individuals (USFWS 2009); Thomas (2005) reports 5,024 individuals

In the fall of 1982, almost immediately following the final listing rule, botanists with Texas A&M University at College Station initiated more intensive surveys for the presence of *S. parksii* and documented approximately 100 individuals at the four known sites in Brazos County (USFWS 1984). Continuing this effort into 1983 and using a “concentrated team approach,” Wilson and Ajilvsgi (1983) documented 1,816 individual *S. parksii* plants across 24 sites within four Texas counties (Brazos, Burleson, Grimes, and Robertson) in two different river basins (Navasota and Brazos). The researchers described the 1983 flowering season as presenting “a bumper crop” of *S. parksii*, with “vast numbers” of both *S. parksii* and *S. cernua* in sites where only a few individuals had been documented the prior year. They attributed the change in documented numbers of individuals to cool, rainy weather in the winter of 1982/1983 and their ability to “better target sites that had a high potential to harbor the plant” (Wilson and Ajilvsgi 1983).

Therefore, in less than two years after USFWS listed *S. parksii* as endangered with extinction, having relied heavily on assertions that the species was endemic to Brazos County with a “severely restricted distribution” and an “extremely low population size”:

- the known range of the species expanded from a single county to four counties (it is now known from 13 counties) – *S. parksii* is not endemic to Brazos County;
- the species is not limited to the Navasota River Valley, but also occurs elsewhere in the Brazos River Valley;
- the number of known sites containing the species expanded from four to 24 – *S. parksii* does not have a severely limited distribution and simply looking for the species in other places turns up other occupied localities; and
- the number of documented individuals increased nearly 100-fold, from 20 to 1,816, with the recognition that only a small fraction of the total population was observable above ground in any given year – *S. parksii* does not have an extremely low population size and drastic swings in counted individuals between years do not imply a population decline.

This expanded knowledge of *S. parksii* occurred simply as a result of expanded searches for the species. We note that the level of effort applied during these post-listing surveys was not extensive: four teams of three to five volunteers spent portions of three days during the flowering period (described as late October into early November) canvassing accessible areas with potential habitat in Brazos, Burleson, Grimes, and Robertson counties. Wilson and Ajilvsgi (1983) did not employ standardized methods for selecting sites to search or for standardizing field protocols to search for individual plants within sites. The 1983 surveys simply launched a larger team of trained observers into the field over a broader area than had been searched before. Not surprisingly, Wilson and Ajilvsgi (1983) were able to document occurrences of *S. parksii* in each of the counties that they included in their search, and even identifying sites that contained “vast numbers” of *S. parksii* individuals. Furthermore, Wilson and Ajilvsgi (1983) noted that they observed “vast numbers” of *S. parksii* in areas where only a scattered few individuals had been observed in the prior year; confirming that the observable fraction of the population can vary greatly between years.

The 1983 surveys demonstrate that the primary rationale for listing *S. parksii* as endangered with extinction (e.g., that the species was exceptionally rare and range restricted) was faulty; a circumstance that the USFWS should have been able to predict had the agency actually conducted a “thorough review and consideration of all available information” during the listing process. A thorough review of this information should have lead the USFWS to conclude that almost nothing was known about *S. parksii* and that inferring the status of an entire species from a handful of casual plant collection field trips was not science, let alone decision-making based on the application of the best available science. Notwithstanding this error, the recovery planning process that followed continued to demonstrate a bias toward continuing the status quo of the listing even in the face of more and more evidence that the species does not meet the criteria for listing under the ESA.

To prepare the 1984 Recovery Plan for *S. parksii*, USFWS relied on Wilson and Ajilvsgi (1983) to describe the known population of *S. parksii* as including 1,816 documented individuals. However, the USFWS expanded on the 1983 survey report by noting that “the survey teams feel they may have missed as much as 75 percent of the plants occurring in known populations” (USFWS 1984). The USFWS provided an estimate of the total population size associated with the 24 documented occurrence sites as including as many as 5,448 individuals. This population estimate for these 24 sites was more than 250 times greater than the population estimate referenced in the listing decision. Nevertheless, the USFWS still asserted in the 1984 recovery plan that “the species is highly vulnerable”.

In the 1984 Recovery Plan, USFWS interestingly stated that the “rediscovery” of *S. parksii* by Catling and McIntosh (1979) “demonstrated that the plant is a unique inhabitant of upland Post Oak Savanna in

Brazos County.” Precisely how the rediscovery of the species demonstrated that it is a unique inhabitant of Brazos County is not explained, nor was it accurate given the information available to the USFWS as a result of the 1983 surveys by Wilson and Ajilvsgi (1983) that reported *S. parksii* from four Texas counties. While not substantively important, this statement is yet another example of the USFWS making unsupported statements about *S. parksii* that misinterpret the facts and show a clear bias for getting another species on the endangered species list. The USFWS does not acknowledge that this new information proves the error of most of the rationale for listing *S. parksii* just two years earlier (e.g., single-county endemic, severely restricted distribution, and extremely low population size).

Instead, we now know that *S. parksii* is currently known to occur across a range the approximate size of West Virginia, with thousands of known recorded individuals (USFWS 2009). The true population size must be substantially greater than the number of known recorded individuals since the observable population of *S. parksii* is exceptionally variable between years and individuals that flower in one year rarely flower again the following year. Individuals can only be identified in the field while flowering, the flowering season only lasts for a short period in the fall, the number of individuals producing flowering stalks is heavily dependent on weather conditions, and flowering stalks are subject to browsing by animals thereby reducing detection.

USFWS (1984) indicated that the early “intensive” surveys for *S. parksii* failed to document as many as 75 percent of the individuals that may have actually been present. Applying this rough detectability factor to the known population size, suggests that the population associated with known sites could well exceed 10,000 individuals. If considering that only 5 percent of the available habitat has been investigated for the presence of the species (Thomas 2005), the true population size may exceed hundreds of thousands of individuals. This may be particularly true if efforts to locate the species are launched outside of the post oak savanna ecosystem. The documented presence of *S. parksii* in pine forest and prairie habitats within east-central Texas certainly warrants additional investigation of these habitat types.

Not only is the known range, distribution, and population size of *S. parksii* vastly greater than at the time of listing, there is no evidence whatsoever that the population of *S. parksii* has in the past or is currently in decline. Surveyors continue to document new occurrences of the species at new project sites on a regular basis, lending credence to the observation by James Thomas of HDR, Inc. that “the pace of new *S. parksii* discoveries continues unabated.”

### **5.2.2 Conservation Efforts**

The 2009 5-year Status Review contains a summary of the existing conservation efforts for *S. parksii*, including the protection of 502.1 acres of *S. parksii* habitat at 24 sites across four Texas counties (Brazos, Grimes, Jasper, and Bastrop). These protected sites contained an estimated combined population of 3,207 individuals. Approximately 425 acres of these conservation lands at 19 sites have permanent protections. The Navasota Ladies'-Tresses Conservation Fund managed by the Lady Bird Johnson Wildflower Center contains \$235,450 to support additional land acquisition and conservation efforts, with another \$244,000 remaining to be collected. USFWS (2009) recognizes that “it is clear that significant progress has been made to recovery Navasota ladies'-tresses in the 27 years since the species was listed.”

### 5.2.3 Analysis of Listing Factors

The ESA does not identify a minimum population or range size that must be achieved and maintained to warrant delisting. A listing or delisting determination is to be based entirely on the risk of species extinction from any one or a combination of the five factors provided in the ESA.

In 2006, the USFWS made the controversial decision not to list the cerulean warbler. While conservation groups lead by the Southern Environmental Law Center and the National Audubon Society cited concerns that habitat had been lost and modified enough to warrant listing, the USFWS ultimately determined that listing was not necessary because “the species is unlikely to be in danger of extinction in the foreseeable future” (Parham 2006). This determination acknowledged that the population of the species is declining, however similarly determined that the rate of decline was slow enough that the species population would ultimately “number in the tens of thousands 100 years [from the time of the ruling]” (Parham 2006).

The example of the cerulean warbler and others enforces the application of the definitions and terms outlined in the ESA. “It is the Act’s definitions of endangered (i.e., “in danger of extinction throughout all or a significant portion of its range”) and threatened (i.e. “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range”) that provide the applicable standards for determining whether a species has “recovered” (Goble 2010:72). Critical to note is that the Cerulean warbler was shown to be declining but deemed not warranted for listing. In contrast, the known localities for *S. parksii* have increased substantially without any indication of species decline towards extinction, which should similarly support a determination that the protections of the ESA are not warranted. If the listing factors do not indicate that a species is likely to be threatened with extinction in the foreseeable future, the species should not be listed.

The Petitioners provide the following analysis of the listing factors as they apply to the *S. parksii* based on the best currently available scientific and commercial data, and in light of what is actually known about the species. This analysis conclusively shows that the listing factors when discussed in the specific context of *S. parksii* do not warrant the continued listing of the species. Previous actions by the USFWS, such as the decisions not to list the Cerulean warbler, support the petitioned action as consistent with the application of the ESA and similar consideration should be afforded *S. parksii*.

#### **Listing Factor A: The present or threatened destruction, modification, or curtailment of habitat or range**

USFWS (2009) states that the primary threats to the continued existence of *S. parksii* are habitat loss and modification. However, both the known range and the habitat associations of *S. parksii* have greatly expanded, not contracted, since the time listing as new occurrences of the species have been discovered in different localities. At listing, the species was only known from two general locations within Brazos County, Texas, and from habitat described in Mahler (1980) as “small openings of wooded uplands within the Post Oak Savanna.” The species is now known to occur in at least 37 distinct locations within 13 Texas counties. Similarly, the known habitat associations of *S. parksii* have expanded to other ecoregions (including prairies and pine forests) and the species not only occurs on uplands, but also the upper reaches of ephemeral streams and near seeps and swales (USFWS 2009).

An early attempt to model the extent of potential *S. parksii* habitat notes that the species has been observed in association with 15 different geological formations, 29 different soil series, and in areas with widely varying degrees of woody cover (most commonly between 20 percent and 80 percent woody cover) (Bai 2008). The network of first order ephemeral streams that support *S. parksii* habitat is vast and a common component of the landscape and *S. parksii* has been found as far as 1,000 feet away from such streams (Thomas 2005). While modeling results are not yet published, it is clear that potential habitat for

*S. parksii* is composed of relatively common landscape components and it is unlikely that available habitat for the species is limiting. Thomas (2005) suggested that less 5 percent of the available habitat for *S. parksii* has been thoroughly surveyed for the presence of the species.

Instead of emphasizing the massive expansions in the known range and distribution of *S. parksii* that directly contradict the analysis and conclusions published in the original listing rule, USFWS (2009) focused on poorly documented and out of date observations that “the rapid pace of urban and residential development continues to destroy and fragment this orchid’s potential habitat.” To support this statement, USFWS only cites an analysis of satellite images by Diamond and True (2000) suggesting a 5.8 percent loss of forest canopy within the post oak savanna ecoregion in the decade between 1987 and 1997, and an unspecified increase in urban land in areas with the highest known *S. parksii* density. This is clearly very cursory and an incomplete attempt at a threat assessment, since the data cited are 10 to 20 years old and so general as to lack any actual connection with *S. parksii* potential habitat or known occurrences. The USFWS failed to conduct an actual analysis of this threat based on the information available at the time, review the extent to which its prior assumptions about the threat of habitat loss to urban development actually materialized, or to demonstrate how generalized forest cover loss equates with “urban and residential development” that the agency now cites as the primary type of land use threatening the species.

The 2011 National Land Cover Dataset reports a net 6 percent loss in forest cover within the geographic area of the five ecoregions associated with *S. parksii* observations between 2001 and 2011. Most of the forest cover lost between 2001 and 2011 was not converted to urban or residential development, rather forest cover most commonly was converted to shrub/scrub cover or pasture/hay cover. Developed land uses within this area expanded by only approximately 20,600 acres (or less than 0.5 percent of the five occupied ecoregions) between 2001 and 2011, which can hardly be described as “rapid urban and residential development.”

As exemplified by the clearing of woodland cover from the 8-acre TXDOT SH6 Reserve for *S. parksii*, forest cover removal, when not converted to an incompatible land use, can actually stimulate *S. parksii* reproduction and enhance population (Tejas 2001). The species is also found in disturbed areas such as roadsides, utility rights-of-way, grazed pastures, and similarly disturbed areas (Thomas 2005). Therefore, there is no evidence that forest loss or even some types of development activities necessarily equate to habitat destruction or that losses of forest cover have occurred at level that would threaten *S. parksii* with extinction in the foreseeable future.

Finally, as we described above, there is no indication that vegetational succession significantly or permanently degrades the quality of *S. parksii* habitat. Such changes are a normal and natural part of the landscape to which *S. parksii* appears to be adapted with its ability to persist underground for prolonged periods. Nevertheless, occasional vegetation management within the *S. parksii* preserves is simple to accomplish and could be supported by the conservation funds held within the Navasota Ladies'-tresses Conservation Fund.

Therefore, there is no credible evidence that the present or threatened destruction, modification, or curtailment of *S. parksii* habitat or range threatens the existence of the species.

#### **Listing Factor B: Overutilization for commercial, recreational, scientific, or educational purposes**

USFWS (2009) reports no evidence that *S. parksii* is threatened by overutilization, and that commercial collection has not materialized as an actual threat to the species.

#### **Listing Factor C: Disease or predation**

USFWS (2009) reports “no diseases, pathogens, or parasites have been reported for Navasota ladies’-tresses.” However, the species is susceptible to herbivory by deer, rabbits, squirrels, and similar animals at both the basal rosette and floral stages; rooting by feral hogs may also affect the underground tubers. Wonkka (2010) attempted to explore the direct and indirect effects of herbivory on *S. parksii*. The study documented that herbivory occurs (mostly in the form of partial removal of material from individuals; not complete loss of the plant), but did not make any conclusions regarding the significance of herbivory on *S. parksii* population dynamics (Wonkka 2010). There is no evidence that populations of *S. parksii* are declining in abundance due to herbivory and the species appears able to cope with disturbances to its habitat and damage to itself. Furthermore, the USFWS believes that some amount of site disturbance is necessary to maintain habitat conditions favorable to *S. parksii*. Overall, USFWS (2009) and subsequent research fail to provide support for how herbivory and site disturbances by wildlife under more or less natural conditions threatens the existence of a species that is known to occur over a fairly broad area.

#### **Listing Factor D: The inadequacy of existing regulatory mechanisms**

With respect to listing factors involving the “inadequacy of existing regulatory mechanisms,” USFWS (2009) simply notes that plants are provided little protection on private lands under federal or state regulations. USFWS makes no mention of the *S. parksii* populations that are within sites protected for the benefit of the species (which include all of the known surviving individuals), nor does the agency attempt to estimate the extent to which *S. parksii* may occur on other protected lands such as state and local parks, preserves, natural areas, conservation/wildlife/agricultural easements, or similar areas. Therefore, it is clear that the USFWS did not adequately consider this listing factor in its analysis.

Since plants on non-federal lands receive little protection under the ESA, the continued listing of *S. parksii* does little to further the protection of the species. In fact, in 15 of the 17 ESA section 7 consultations, the USFWS did not conclude that the loss of *S. parksii* individuals or associated habitats was likely to jeopardize the continued existence of the species in the wild. Therefore, even the USFWS implicitly acknowledges that the status of the species is sufficiently secure that these losses were not significant to its long-term persistence.

Nevertheless, *S. parksii* occurs within 24 protected sites that encompass more than 500 acres. Protections at 19 of these sites and involving 425 acres of habitat are permanently established, securing the status of the species regardless of listing status. In addition, there are many public parks, preserves, forests, and natural areas within the currently known range of the species that are largely protected from future development and generally managed to maintain natural open space independent from the listing status of *S. parksii*. There is no documentation that these areas have been thoroughly, or even casually, searched for the presence of *S. parksii*, but given the historic pattern of increasing detections with increasing survey effort, it is reasonable to assume that *S. parksii* is likely to occur in at least some of these other protected lands.

#### **Listing Factor E: Other natural or manmade factors affecting its continued existence**

USFWS states that “known *S. parksii* populations tend to decline when the herbaceous understory is replaced by shrubs and trees, as process commonly called ‘thicketization’,” citing only a report by Tejas Ecological Services (2001) to support this statement. However, Tejas Ecological Services (2001) provides only one example of changing *S. parksii* abundance related to vegetation changes and this example provides no substantial information that a true decline in *S. parksii* abundance actually occurred or that any such decline was the result of “thicketization.”

The example provided in Tejas Ecological Services (2001) involves an 8 acre site eventually established as an *S. parksii* preserve where 150 *S. parksii* individuals were observed in habitat described as “dense post oak forest.” This site was bulldozed to remove the woodland vegetation shortly prior to its

establishment as a *S. parksii* preserve. Post-clearing surveys demonstrated a blooming population of more than 1,000 *S. parksii* individuals at this site, which Tejas Ecological Services (2001) assumes represents an expansion of the prior population due to the creation of favorable conditions (exposed soil and high light) for seed germination. Tejas Ecological Services (2001) then reports that “this site is developing a dense cover of tall grasses and shrubs and during a survey, by Dr. Fred Smeins in the fall of 2000, no blooming plants were found.” However, Tejas Ecological Services (2001) gives no indication of the survey methods or level of effort employed by Dr. Smeins to search for *S. parksii*, nor does Tejas Ecological Services (2001) describe the rainfall conditions prior to the fall 2000 blooming period that would have played a significant factor in the number of plants that would have bloomed. Indeed, Tejas Ecological Services (2001) notes that blooming of *S. parksii* appears to vary most in response to rainfall occurring eight to ten weeks prior to the flowering season. Therefore, Tejas Ecological Services (2001) provides no documentation at all that “thicketization” leads to declines in *S. parksii* abundance, and actually gives examples of *S. parksii* growing “under a canopy of post oak and *Carya texana* (black hickory) with a farkleberry and yaupon understory” and under “dense post oak forest.” The USFWS misrepresented the information presented in Tejas Ecological Services (2001) to support its baseless assertion that “thicketization” of post oak savanna decreases habitat quality and is therefore a threat to *S. parksii*.

Finally, the USFWS considers climate change in its review of “other natural or manmade factors affecting its continued existence,” but concedes that the agency does “not know whether the changes that have already occurred affected Navasota ladies'-tresses populations or distribution, nor can we predict how the species will be affected by the type and degree of climate changes forecast by a range of models” (USFWS 2009). Ultimately, the USFWS declines to identify climate change as a threat to the species.

#### **5.2.4 Genetic Studies and Taxonomic Issues**

The genus *Spiranthes* has long been known to be a “is a highly technical genus and, from a taxonomic standpoint, is one of the most difficult among the orchid genera in the United States” (Correll 1947). Even well before the final listing rule, scientists questioned the species status of *S. parksii*. Luer (1975) stated “very possibly *Spiranthes parksii* represents an aberrant or polyploid form of var. *gracilis*, or a non-persisting hybrid of var. *gracilis* and *S. cernua*.” Early molecular work presented at the annual meeting of the Botanical Society of America by Walters and Wilson (1982), only months after the species was listed as endangered, found “*S. lacera* var. *gracilis* and “robust” *S. cernua* to be phenotypically distinctive and well separated from *S. parksii* and “woodland” *S. cernua*, which are electrophoretically identical” and that this finding “indicates that phyletic/systematic affinities of *S. parksii* may lie with one element of the local *S. cernua* complex.” It was unconscionable for the USFWS to have proceeded with the listing of *S. parksii* without a better understanding of whether or not the taxon was even valid, particularly given the wide distribution and relative abundance of *S. cernua*.

Other researches have subsequently continued molecular investigations of the *Spiranthes* genus with the aim of better resolving the phylogenetic relationships among species. Various researchers have employed a number of different molecular markers, including nuclear genetic material, plastic genetic material, AFLP markers, and polymorphic microsatellites.

Walters (2005) published a master’s thesis investigating the genetic relationships among *S. parksii* and congeneric species using four amplified fragment length polymorphisms (AFLPs) and seven polymorphic microsatellite loci, noting that “this is the first known set of microsatellite primers developed specifically for use in *Spiranthes*.” Walter (2005) states that “AFLPs are well-suited for finding levels of variation and overall similarity between samples as well as identifying clones and even potentially hybrids.” The Walter (2005) states that they expected the two forms of *S. cernua* to “cluster together and form a separate group from *S. parksii*” (Walters 2005). However, Walters (2005) reports that, based on the data,

“*Spiranthes parksii* is not distinguishable from sympatric *S. cernua*.” This study also found distinct genetic separation between the woodland, open flower form of *S. cernua* (which is indistinguishable from *S. parksii* on the basis of their molecular markers) and the closed flower form of *S. cernua* (Walters 2005). In the case of *S. cernua*, Walters (2005) state that the data indicates the two forms of *S. cernua* are not simply different forms of the same species, but should instead be interpreted as “two genetically differentiated groups.” Since the molecular markers used by Walters (2005) were sufficient to identify strong genetic differences within *S. cernua*, the lack of observed genetic differences between *S. parksii* and the open flower form of *S. cernua* certainly place the validity of the *S. parksii* name in question. This pattern of results is not unique and is repeated in all other molecular studies of these species to date.

Independent from the work of Walters (2005), L. Dueck and Dr. K.M. Cameron were also investigating the species relationships within *Spiranthes* based on molecular evidence. Dueck is a master’s level research professional in molecular ecology at Savannah River Ecology Laboratory, a field outpost for the University of Georgia. Dr. Cameron is director of the Lewis B. and Dorothy Cullman Program for Molecular Systematic Studies and an Associate Curator at the New York Botanical Garden, with extensive publications on the molecular systematics of various plant families and a primary research focus on orchids. Their work published in 2007, using yet another set of molecular markers, found that *S. parksii* “may simply be an aberrant form of the more widespread *S. cernua*, contrary to accepted taxonomy. Cladograms from more than 3500 characters show that individuals of southern *S. cernua* form a monophyletic clade that includes *S. parksii* within it. Thus, based on our data and the phylogenetic species concept, *S. parksii* may not warrant species status, and its protection may be questioned” (Dueck and Cameron 2007). The authors published these findings in the journal *Lankesteriana*, which is the Lankester Botanical Garden's peer-reviewed scientific journal devoted to the publication of articles on botany, with special attention to epiphytic plants and orchid systematics, ecology, evolution and physiology.

In a 2008, Dueck and Cameron published a follow up study in the journal of Conservation Genetics to confirm the preliminary results from Dueck and Cameron (2007), this time specifically focusing specifically on *S. parksii* and *S. cernua*. Dueck and Cameron (2008) is another fully peer-reviewed technical paper, published in a scientific journal. Findings reported in Dueck and Cameron (2008) included:

- “Four DNA sequence segments (two chloroplast, one mitochondrial, one nuclear ribosomal) totaling 3191 base pairs were used separately and together to verify that *S. parksii* is nested within the same clade as *S. cernua*, and thus likely to be the same species.”
- “Our results concur with another recent investigation using AFLP and microsatellite data that also suggests *S. parksii* is not unique genetically.”
- “based on empirical data and the phylogenetic species concept, endangered *S. parksii* is merely an aberrant local phenotype of and a synonym for *S. cernua sensu lato*.”
- “Our DNA sequence data and phylogenetic analyses demonstrate that *S. parksii* does not deserve species status, but rather represents one of several local phenotypes of the widespread, polyploid, and highly variable *S. cernua*. There is no evidence to suggest that it represents an interspecific hybrid. Based on the phylogenetic species concept, we feel it best to treat *S. parksii* as a synonym of *S. cernua sensu lato*. Our results support similar findings by Walters (2005) using AFLP and microsatellite markers, and both of these genetic studies confirm earlier suspicions (Sheviak 1982, 1991; Sheviak and Brown 2002) that the unique flowers of *S. parksii* might simply be an example of peloria within *S. cernua*.”

These peer-reviewed and published technical findings prompted a strong response from the USFWS and the *S. parksii* Recovery Team that attempted to refute the conclusions of Dueck and Cameron (2008). The opinion of the Recovery Team is documented within the 5-year Status Review for *S. parksii* (USFWS 2009). The opinion of the *S. parksii* Recovery Team, as prepared by Dr. Alan Pepper (an associate professor within the biology department of Texas A&M University, with a focus on plant genetics), states that “the work of Dueck and Cameron (2008) is flawed, particularly in that they draw specific conclusions that are not directly supported by the evidence provided.” This is a particularly ironic argument in light of the history of regulatory decision making associated with *S. parksii*, whereby the listing and all subsequent analyses by USFWS rely largely on unsupported conclusions drawn from limited data. Indeed, the USFWS’s strong assertion (backed by the Recovery Team’s “expert” opinion) that there is currently no basis for synonymizing *S. parksii* with *S. cernua* is based on a rather limited and cherry-picked analysis supporting their preconceived bias for continued species status.

The USFWS states in the 5-year Status Review that: “The taxonomic status of *Spiranthes parksii* as a unique species is questioned by some systematists. However, most of the systematists familiar with this taxon who responded to our request for information concurred that there is currently insufficient evidence to justify synonymy of *S. parksii* with its close relative, *S. cernua*. This valid scientific debate is likely to continue, and may never reach a definitive resolution. We concur with the recovery team’s recommendation that *S. parksii* continue to be treated as a valid species.” In their decision making process, the USFWS inappropriately equates the unpublished, personal communications (primarily a collection of telephone conversations and emails) of a handful of Recovery Team members and a single “outside reviewer” to the peer reviewed, published, technical work of Dueck and Cameron (2007, 2008). Dueck and Cameron (2008) represents the best scientific and commercial information available and should carry substantial weight in any status review of the species.

The importance of this issue is highlighted by a comment from the Texas Natural Heritage Program to the USFWS in a review of the 1984 Recovery Plan that species status for *S. parksii* is the most important question to be answered, a point echoed in comments provided by the Texas Parks and Wildlife Department. These state entities remarked that “habitat should not be purchased until *S. parksii* is clearly verified as a distinct species” (USFWS 1984). The USFWS addresses these comments in its discussion on taxonomy in a comment response summary attached to the 1984 Recovery Plan. In its response, the USFWS notes that a detailed technical discussion of taxonomy is not relevant to the recovery plan; although, interestingly, the USFWS also says “the exact position of *S. parksii* in the genus is important to this recovery plan only insofar as it pertains to whether or not *S. parksii* is a valid and distinct species” (USFWS 1984). This question would seem to be of paramount importance given the regulatory burden placed on the community by the listing, the limited availability of funding for species conservation in general, and the USFWS’s opinion that actual delisting is not feasible.

## 6.0 SUMMARY

In the more than three decades since the 1982 listing, a substantial amount of new scientific and commercial information has become available that demonstrates the species is not at risk of extinction and that the original listing was in error. Sufficient conservation for the species is in place so that neither the existence nor the magnitude of the once perceived potential threats to the species indicates that *S. parksii* is at risk now or in the foreseeable future. Therefore, the protections of the ESA were not originally and are not currently warranted for *S. parksii*. Furthermore, molecular analyses by numerous researchers using a variety of different markers and methods, including work that has been published in peer-reviewed scientific journals, have failed to support the taxonomic position of *S. parksii* as a distinct species apart from the local form of the co-occurring *S. cernua*. As such, the best available scientific and commercial information suggests that *S. parksii* may not even be a valid taxon eligible for listing. The Petitioners request that the Secretary of the Interior (Secretary), acting by and through the USFWS,

evaluate this petition to delist *S. parksii* on the basis of the best available scientific and commercial data pursuant to Section 4 of the ESA.

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