PETITION TO LIST THE CANELO HILLS LADIES' TRESSES *Spiranthes delitescens* AS A FEDERALLY ENDANGERED SPECIES

Mr. Bruce Babbitt
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Kieran Suckling, the Greater Gila Biodiversity Project, the Southwest Center For Biological Diversity, and the Biodiversity Legal Foundation, hereby formally petition to list the Canelo Hills Ladies' Tresses (*Spiranthes delitescens*) as endangered pursuant to the Endangered Species Act, 16 U.S.C. 1531 et seg. (hereafter referred to as "ESA"). This petition is filed under 5 U.S.C. 553(e) and 50 CFR 424.14 (1990), which grants interested parties the right to petition for issue of a rule from the Assistant Secretary of the Interior.

Petitioners also request that Critical Habitat be designated concurrent with the listing, pursuant to 50 CFR 424.12, and pursuant to the Administrative Procedures Act (5 U.S.C. 553).

Petitioners understand that this petition action sets in motion a specific process placing definite response requirements on the U.S. Fish and Wildlife Service and very specific time constraints upon those responses.

Petitioners

Kieran Suckling is a Doctoral Candidate, endangered species field researcher, and conservationist. He serves as the Director of the Greater Gila Biodiversity Project and has extensively studied the status and natural history of *Spiranthes delitescens*. The Greater Gila Biodiversity Project is a non-profit public interest organization created to protect imperiled species and habitats within the Greater Gila Ecosystem of southwest New Mexico and eastern Arizona. Through public education, Endangered Species Act petitions, appeals and litigation, it seeks to restore and protect the integrity of the Greater Gila Ecosystem.

The Southwest Center For Biological Diversity is a non-profit public interest organization dedicated to protecting the diverse life forms of the American Southwest and northern Mexico.

The Biodiversity Legal Foundation is a non-profit public interest organization dedicated to the preservation of all native wild plants and animals, communities of species, and naturally functioning ecosystems in this country. Through visionary educational, administrative, and legal actions, the BLF endeavors to encourage improved public attitudes and policies for all living things.

ABSTRACT

The Canelo Hills Ladies' Tresses (*Spiranthes delitescens*) is limited to four small populations in the mountains of southeast Arizona. At least one of the four is in decline. All are in danger of extinction due to stochastic events. *S. delitescens*' cienega habitat is one of North America's most endangered communities. These marshy, mid-elevation, wetlands have all but disappeared under the abuse of two hundred years of overgrazing, draining, pumping, diverting, and impounding.

TAXONOMY

Scientific Name: A *Spiranthes* population was discovered in southeast Arizona at O'Donnell Cienega, Santa Cruz County, in 1968 by P.S. Martin and was subsequently identified as *S. graminea* (Mason 1971, Luer, 1975). *S. graminea*, a bog orchid, ranges from Mexico to Nicaragua. It is abundant in the mountains of central Mexico but had not previously been found in the United States. Sheviak (1990) has since determined that the O'Donnell population, two others in Santa Cruz County, and one in adjacent Cochise County, are members of a morphologically and cytologically distinct species: *Spiranthes delitescens* Sheviak.

Common Name: Madrean Ladies'tresses, Canelo Hills Ladies' tresses

DESCRIPTION

Technical: "Herb, erect, slender, 240-475 mm tall (rarely shorter), glabrous below, pubescent above. Trichomes 2- to 5-septate, usually tapered toward the apex, of two types, non-capitate one often acicular, capitate ones with glands mostly about the same diameter as their stipes. Roots tuberously thickened, about 5 mm in diameter. Leaves persisting past anthesis, linear-lanceolate to oblanceolate, the larger to 180 mm long and 15 mm wide (rarely wider), basal and cauline, the latter 5-10 in number and only gradually reduced upward to sheathing bracts 9-17 mm long, the lower half of the stem consequently leafy. Spike rather open to dense, with three flowers per cycle, 20-70 mm long (rarely longer), 13-18 mm in diameter. Floral bracts acuminate to attenuate, the lowermost 8013 mm long. Flowers tubular, abaxially curved, becoming open with wider-spreading lateral sepals, perianth 6.5-8.0 (-9.9) mm long, white with the center of the lip creamy or very pale yellow. Sepals usually connate basally (the connation below the lip averaging 1.1 mm, up to 2.5 mm but sometimes absent), lanceolate, acute, the lateral curving outward throughout their lengths and usually directed somewhat downward, their apices wide-spreading. Petals for most of their lengths associated with the dorsal sepal, linear to linear-oblanceolate, obtuse, the apices spreading. Lip 5.8-7.9 mm long, oblong, the apex broadly expanded with extensive transverse pleats, smooth to obscurely verrucose below, basal calli stout, 0.4-1.4 mm long. Column slender; rostellum elongate, deeply bifid" (Newman 1991).

Non-technical: *S. delitescens*, in bloom, is approximately 50 cm tall. Five to ten grass-like leaves, 18 cm long and 1.5 cm wide, extent basally from the stem. It may have up to 40 white flowers. It's column is slender, erect, and the rostellum elongate and bifid.

GEOGRAPHIC RANGE

Spiranthes delitescens is known only from four locations, all in southeastern Arizona: three in Santa Cruz County and one in adjacent Cochise County. Sheviak (1990) suspects that the species also

occurs in Mexico but notes that researchers have not yet found it there. It probably once occurred throughout southeast Arizona.

NATURAL HISTORY

Phenology: Orchid seed germination and establishment requires an endomycorrhizal association of 1 to 15 years with Basidiomycete fungi prior to leaf emergence (Summerhayes, 1951; Hadley and Pegg 1989). Mature plants commonly remain underground from 1 to 5 years before re-emerging or dying (Inghe and Tamm 1988). Due to slow seedling development and the subterranean propensity of mature plants, orchid life-history stages are commonly described as flowering, dormant and absent rather than by age class (Wells, 1967; Mehrhoff, 1989).

S. delitescens is probably perennial, though no dormant underground structures have yet been identified (Sundt and McClaran 1988 in Newman 1991). Flowers form in July and August, fruits mature approximately 3 weeks later in mid to late August. Each dispersed capsule releases hundreds of seeds, probably via wind (Sundt and McClaran 1988 in Newman 1991). Flowering rarely occurs in consecutive years.

Plants at O'Donnell and Turkey Creek had a similar propensity to remain in dormant states (57 to 77%). McClaran and Sundt suggest an average life span of 3 to 4 years, slightly lower than the average life span of *S. spiralis*.

Habitat: *S. delitescens* is endemic to the mid-elevation cienegas of southeast Arizona. All four known populations are restricted to marshy wetlands between 4,600 and 4,950 ft. These areas are characterized by gentle gradients, slow flowing water, and small drainage areas making them less susceptible to damaging floods. Soils are finely grained and highly organic. *S. delitescens* grows both in saturated soil and surrounding drier areas. Uplands are semi-arid oak woodlands.

Flowering occurs in July when temperatures range from 60 F at night to 100 F during the day. The majority of the area's 15 to 20 inches of precipitation falls in July (Newman 1991).

FIGURE 1. *Spiranthes delitescens* (from Sheviak (1990).

Ecology: Many *Spiranthes* species have an affinity for habitats that are grazed, mowed, or otherwise modified so as to limit dense herbaceous cover. Turkey Creek, which is grazed, has shorter plants and less biomass than O'Donnell Cienega, which is ungrazed. McClaran and Sundt (1992) believe declines in flowering at the latter and relatively more consistent flowering in the former may be the result of grazing.

Periodic, cool burning, late spring fires may also have played an important historical role in reducing vegetative density. There is some difference of opinion, however, as to whether and to what extent, cienegas and marshes burned naturally on a regular basis (see Newman 1991). The effect of fire is also unclear. Following an April 1979 prescribed burn at O'Donnell Cienega, the *S. delitescens* population increased from 40 to 196 non-dormant plants. Plants increased in both burned and unburned areas, however, and may have been affected by other factors. A May 1986 fire resulted in a decrease of non-dormant plants from 97 to 8. This fire may have been set too late in the spring while the orchid was in an advanced growth stage. A late March fire in 1992 resulted in increases in non-dormant plant numbers.

Bidens ferulaefolia, Carex chihuahuensis, Eleocharis macrostachya, Equisetum spp., *Juncus balticus*, *Poa pratensis*, *Ranunculus macranthus*, and *Typha* spp. are the most common species associated with *S. delitescens* (Newman 1991, McClaran and Sundt 1992).

THREATS TO THE SPECIES

PRESENT OR THREATENED DESTRUCTION, MODIFICATION, OR CURTAILMENT OF HABITAT OR RANGE:

Cienegas may be the most endangered habitat in the American Southwest and northern Mexico. While always restricted in distribution and extent, they have all but disappeared since the invasion of North America by European invaders. Frank Crosswhite, editor of *Desert Plants*:

> "Cienega sites were the first to be usurped by land-hungry Hispanics and Anglos alike who developed large herds of cattle to devour the vegetation and drink the water. Overgrazing made the cienega locations among the most mistreated sites on earth. A variety of misfortunes brought about either knowingly or unconsciously by man have resulted in drainage, arroyo cutting and general destruction of these unique habitats" (Crosswhite 1985).

The Arizona Nature Conservancy estimates that only 15 of 50 Arizona cienegas described by early explorers still existed as of 1987 (Arizona Nature Conservancy, 1987). This 70% reduction in number is less than the total habitat loss as it does not consider the reduced size and degraded condition of those cienegas that have survived.

The most extensive study documenting the loss of cienegas in southeast Arizona, where they previously reached their highest numbers, was done by Hendrickson and Minckley (1985) and published as a special issue of *Desert Plants* entitled "Cienegas- Vanishing Climax Communities of the American Southwest." That entire document is incorporated here by reference. Comparing their watershed maps showing historic and current cienegas, we estimate cienega habitat loss to be upwards of 95%.

In addition to grazing pressures, draining, groundwater pumping, surface water diversion, and impoundments have resulted in the disappearance of cienegas and marshy habitats. Flooding, which has been correlated in intensity and probability with overgrazing, also threatens *S. delitescens* habitat.

Dredging and other habitat modification may result in the loss of critical fungal population needed to form obligate mycorrhizal associations (Newman 1991).

OVERUTILIZATION FOR COMMERCIAL, RECREATIONAL, SCIENTIFIC, OR EDUCATIONAL PURPOSES:

Orchids, especially rare orchids, are a highly prized among plant collectors. *Spiranthes delitescens'* very limited numbers and populations make it vulnerable to any level of collecting.

DISEASE OR PREDATION:

Many *S. delitescens* inflorescences are damaged during the summer. Grasshoppers may be responsible for broken stalks and chewed capsules (Newman 1991).

Eating and trampling by livestock is threat during the summer months when non-dormant plants are exposed.

Newman (1991) believes competition for light and other resources has the greatest influence on survivorship and fecundity. Johnson grass (*Sorghum halapense*), an exotic species, is spreading into the marshy meadow at one site and may be a danger to the orchid. *Equisetum* spp., aggressive natives, may also pose a significant threat. Other native graminoids, especially *Eleocharis*, may be problematic competitors as well.

INADEQUACY OF EXISTING REGULATORY MECHANISMS:

As a member of the Orchid family, *S. delitescens* is protected by the Arizona Native Plant Law which regulates collection. Populations are not protected against habitat loss or modification.

All known populations occur on private land. The Turkey Creek population may extend into the Coronado National Forest which does not have a management plan for the species. O'Donnell Cienega is owned by The Arizona Nature Conservancy and managed primarily for the benefit of *S. delitescens.*

Critical Habitat Designation Recommended

Petitioners strongly recommend the designation of critical for *Spiranthes delitescens* coincident with its listing. Its demise is clearly and overwhelmingly related to the loss of its cienega habitat. Critical habitat should be designated in all areas where it is currently located and in key unoccupied areas where restoration is necessary for the conservation of the species.

Please respond to: Kieran Suckling, Box 742, Silver City, NM 88062 phone: (505) 538-0961.

Respectfully submitted,

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Dated this day of May, 1993

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APPENDIX A

SPIRANTHES DELITESCENS POPULATIONS

1. TURKEY CREEK, Canelo Hills, Santa Cruz County, T22S, R18E, SE1/4 Sec. 4: cienega immediately north of AZ Hwy 83 crossing and in permanently marshy, hummocky meadow along east side of creek.

Privately owned, possibly on adjacent Coronado National Forest as well.

This largest and most widespread population is spread out over a 5 ha stretch of the creek. It has been used as a cattle pasture for over 100 years. In the last 5 to 10 years, the owners have removed the cattle from the immediate orchid area during the August flowering season (McClaran and Sundt 1992).

The population appears to have been "essentially stable" between 1987 and 1989. Flowering plants are more conspicuous than at nearby O'Donnell Cienega, and may benefit from grazing which reduces the biomass and height of other species in the habitat. Numbers of plants have ranged from the hundreds to the thousands (Newman 1991).

2. O'DONNELL CIENEGA, Canelo Hills, Santa Cruz County, T21S, R18E, Sec 32 & 33: cienega. Owned by The Arizona Nature Conservancy and managed as the Canelo Hills Preserve.

This 2 ha cienega is 2.25 km northwest of Turkey Creek Cienega. It was bought by The Nature Conservancy in 1969, which excluded grazing by cattle and horses for the first time in 100 years (Gehlbach 1981). Casual visitors are not permitted in the immediate area of *S. delitescens*.

Censuses have been conducted since 1978, but varying survey techniques between 1978 and 1986 complicate demographic assessment (see Table 1).

TABLE 1. Non-dormant *S. delitescens* Plants Observed at O'Donnell Cienega 1978-1991 (Newman 1991).

Year	No. of Plants	Plant State (if recorded)
1978	40	
1979	196	
1982	30	
1983	30	
1984	30	
1986	8	non-flowering
1988	80	
1990	1	flowering
1991	1	non-flowering

A prescribed burn was conducted in 1979 to counter observed declines. Flowering plants increased that summer but their relation to the burn is unclear as plants increased in number both within and outside of the burn area. Declines were again observed between 1980 and 1983 leading to another prescribed burn in 1986. No flowering plants were found that summer in the burned area and only 8 non-flowering were found in entire cienega (McClaran and Sundt 1992). The proportion

of flowering plants declined between 1987 and 1988, and again between 1988 and 1989. None of the emerging plants were in a flowering state and none of the presumed dormant plants had flowered the previous year. McClaran and Sundt concluded:

> "In relation to other orchids, the propensity of *S. delitescens* to enter and remain in the vegetative state, and the lack of new flowering plants at O'Donnell are unusual and suggestive of declining populations."

S. spiralis also enters and remains in a dormant state on the order of 50%, but emergent flowering plants are common (Wells 1967). Only declining populations of *Isotria medeoloides* also had fewer flowering than dormant plants and displayed a propensity toward dormancy (Mehrhoff 1989).

3. SHEEHY SPRING, San Rafael Valley, Santa Cruz County, T24S, R17E, Sec 12, 4,700 ft.: wet, boggy area just north of a small pond. Owned by the Sharpe [Greene] Ranch within the San Rafael de la Zanja Grant.

The species was "abundant" in 1984, but "very restricted within a larger area of seemingly suitable habitat" (Sheviak 1990).

4. BABOCOMARI CIENEGA, Babocomari Creek, Cochise County, T20S, R18E, 1.25 mi. north of Sec. 18: cienega above dam and in marshy areas along old railroad bed. Owned by Babocomari Ranch within Ignacio del Babocomari Grant.

APPENDIX B:

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