

Carex specuicola

Navajo Sedge

Status Report

2004

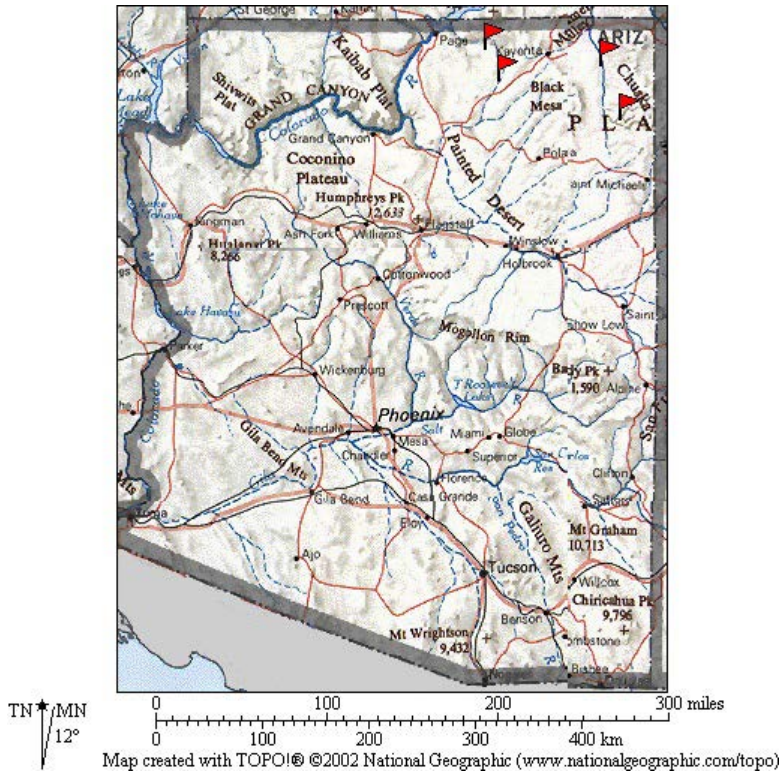


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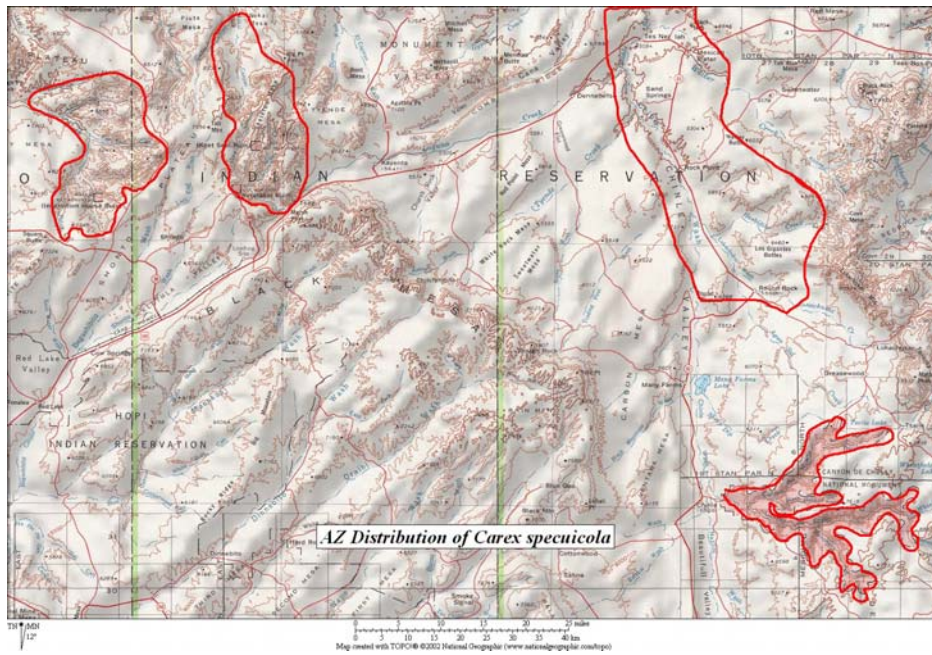
INTRODUCTION

Navajo Sedge, *Carex specuicola*, was federally listed as threatened on May 8th, 1985 (50 FR 19370-19374). It occurs almost exclusively on Navajo Nation lands between the area north and west of Inscription House, Coconino County, AZ, and Canyon de Chelly National Monument, Apache County, AZ. A few scattered populations are also known from the Chinle and San Juan drainages in San Juan County, Utah. Navajo Sedge is also listed as threatened (Group 3) on the Navajo Endangered Species List. Because Navajo sedge is only known to occur in hanging gardens of the Navajo Sandstone Formation, this species is very sensitive to water development projects, which currently and historically have occurred all over the Navajo Nation, including the Inscription House area, designated as critical habitat in 1985.

At the time of listing in 1985 only 1 population (EOR #001, 3 sub-populations) was known to exist in the Inscription House area in Arizona. The Navajo Natural Heritage Program has been tracking this species for nearly 20 years, meaning that we actively seek new information about the species' abundance and distribution. However, no monitoring has taken place and most survey work done by our personnel occurred in the late eighties and early nineties, during which time most of the known populations were discovered prior to this report. During 1999, we resurveyed 4 of the known populations in the Inscription House area. At that time two of these four sites had no longer any sedge growing in the habitat described. The other two locations, formerly described the sedge as being the dominant plant, had only a few plants growing in them. This discovery led us to be concerned about the other populations in this area, currently considered the center of the Navajo Sedge populations. Furthermore, two of the three sub-populations designated as critical habitat in 1985 are known to be impacted by livestock. No monitoring or resurveys have been done on these populations since critical habitat was designated. Of the 7 major steps for recovery outlined in the Navajo Sedge Recovery Plan (1987), only one has been partly accomplished (inventory of potential habitat). The focus of this study was to resurvey known sites to evaluate their current status and to survey potential habitat for new populations of *Carex specuicola*



Distribution of *Carex specuicola* in Arizona and the Navajo Nation



Map detail

TECHNICAL DESCRIPTION

Carex specuicola J.T. Howell (Navajo Sedge)

Family: Cyperaceae

Synonyms: none

Plant Description:

Perennial grass-like plants with a dried persistent leaf base; leaves narrow, 1-3 mm wide, 12 – 30 cm long. Flowers inconspicuous with female flowers located above the male flowers; flowers grouped into 2-4 short spikelets 8- 20 mm long, clustered at the end of a long thin stalk, 2-3 times the length of the leaves. Scales pale brown with hyaline margins and a conspicuous green midvein.

Similar Species:

Carex specuicola is unusual in having both two-branched styles with lenticular achenes, and three-branched styles with trigonous achenes. It can be distinguished from *Carex aurea* by its strongly flattened perigynia and by having the female flowers located above the male flowers.

Phenology:

Flowering and fruit set occur from spring to summer, but most of the reproduction appears to be vegetative.

Habitat:

Typically found along seeps and springs in hanging gardens, on vertical sandstone cliffs and alcoves of Navajo Sandstone. Rarely along stream sides. Known populations occur from 4600ft to 7200ft.

Vegetation community: Great Basin Desertscrub and Great Basin Conifer Woodland community (Brown 1994).

Dominant associated species: *Mimulus eastwoodiae*, *Aquilegia micrantha*, *Epipactis gigantea*.

Associated sensitive and rare species: *Zigadenus vaginatus*, *Platanthera zothecina*, *Cisium rydbergii*, *Primula specuicola*.

General Distribution:

Northern Arizona, San Juan Co, Utah.

Responsible Agencies:

USFWS, NPS, Navajo Nation

STATUS

Carex specuicola was designated Threatened in 1985 pursuant to the U.S. Endangered Species Act of 1973 (Federal Register Vol. 50, No. 89, 50CFR 17).

This species is also protected as a Threatened species by the Navajo Nation under Navajo Tribal Code Title 17, Subchapter 507 (Navajo Endangered Species List G3, Resources Committee Resolution, No. RCMA-31-01, 2001).

Critical Habitat: The U.S. Fish & Wildlife Service designated critical habitat for Navajo sedge for the three sites from which the plant was known in Coconino Co, AZ, at the time of listing on May, 8, 1985. Critical habitat locations are all on the Navajo Nation, and are 40 x 50 m rectangular areas with their long axes in the direction of seep/spring flow centered at the following points: 1) latitude 36°39'53"N, longitude 110°47'18"W; and 2) latitude 36°40'18"N, longitude 110°47'55"W; and 3) latitude 36°40'18"N, longitude 110°48'15"W.

GENERAL ASSESSMENT

METHODS

Surveys for *Carex specuicola* were conducted over a period of 4 years, during August and September from 2000 through 2003. In addition to re-surveying known populations, appropriate habitat was surveyed north and south of Navajo Mountain, the Tsegi watershed canyon complex, and the Chinle drainage south to Canyon de Chelly National Monument. The objective was to determine the distribution of *Carex specuicola* on the Navajo Nation with special emphasis on Arizona distributions. Survey focus was on estimating population sizes and parameters, biotic and abiotic habitat characteristics as well as potential threats. Survey boundaries were determined by potential habitat. Herbarium surveys were conducted at Northern Arizona University (ASC), the Navajo Nation Herbarium (NAVA), and the Museum of Northern Arizona (MNA).

Results

As of 2004, 39 populations of *Carex specuicola* have been located on the Navajo Nation, containing 52 hanging gardens (including Canyon de Chelly National Monument). Forty hanging gardens had extant populations of Navajo sedge. Population centers remain the Navajo Creek drainage in northern Coconino Co. and the Tsegi watershed in northern Navajo Co., AZ. Isolated populations have also been found in the Chinle Wash drainage in San Juan Co, UT, and Apache Co., AZ, including Canyon de Chelly National Monument. Detailed information can be made available upon request from the Navajo Natural Heritage Program.

Thirty-five of the thirty-nine reported sites were visited by D. Roth between 2000 and 2003. Eleven new sites were found as a result of this survey. The four remaining reported sites came from herbarium specimens only, without reference to abundance, vigor or threats to the sites. Four of previously known 24 sites (pre 2000) could not be relocated, either due to a mapping error or perhaps the gardens had dried out and were no longer apparent (Table 1.). Thirty-nine of forty-nine visited hanging gardens (80%) are accessible to livestock; seven of which had been heavily impacted by grazing and trampling activities. Eighteen of the visited hanging gardens (37%) also showed signs of drought stress, such as high mortality rates, no water discharge/dry soils, and sloughing off of vegetation mats. At eight of the previously known hanging gardens *Carex specuicola* was no longer found. Two of those sites appear to be miss-identifications and only another species of *Carex* was found on site. Only one of the 3 subpopulations designated as critical habitat is not impacted and threatened by livestock although it is partially accessible to livestock.

THREATS

A. Habitat Destruction or Modification:

Navajo sedge habitat is potentially threatened by water development projects such as ground water pumping and capping of well sites.

B. Disease or Predation: Eighty percent of the visited hanging gardens containing Navajo sedge were accessible to livestock. At ca. 23% of these livestock impact was considered medium or heavy. No signs of disease or predation by other vectors was observed.

C. Over utilization for commercial, sporting or scientific purposes:

None known

D. Inadequacy of existing regulatory mechanisms:

Despite the fact that this species is protected by the Endangered Species Act and is listed as threatened on the Navajo Nation Endangered Species List, known populations, including those within critical habitat continue to be highly susceptible to unregulated grazing practices. One out of three subpopulations composing critical habitat has been all but eliminated by 2004 (12 plants remain). Two of the three populations are highly susceptible to livestock damage by grazing and trampling.

E. Other natural or manmade threats

Drought & global climate changes and potential associated drying of seep and spring areas. By 2004, 37% of visited *Carex specuicola* sites showed signs of drought stress, such as high mortality rates, no water discharge/dry soils, and sloughing off of vegetation mats.

CONCLUSION & RECOMMENDATIONS

Although more populations of *Carex specuicola* are now known since its listing in 1985, the range of the species remains limited. Almost 20 years following the listing of Navajo Sedge, the species has not moved toward recovery. *Carex specuicola* habitat is highly susceptible to a variety of threats and no protective measures are in place at any of the known locations. It is palatable to livestock and grows in a habitat that attracts livestock. Livestock grazing on reservation lands remains uncontrolled.

This report concludes one of the 7 objectives listed in the recovery plan (inventory potential habitat). The other six objectives listed still need to be accomplished to achieve the recovery of the species. The remaining six are as follows:

1. Permanently protect all known habitats according to the steps outlined in the recovery plan.
2. Census and monitor known populations and establish permanent monitoring plots at these sites.
3. Develop and implement a habitat management plan.
4. Develop formal documentation outlining long-term hydrological potential of the existing and potential habitat of *Carex specuicola*.
5. Reintroduce *Carex specuicola* onto several protected sites within its inferred historic range.
6. Demonstrate long-term stability of populations and habitat.

Considering the results of this study and the impacts observed on known *Carex specuicola* populations, monitoring several sites should be a priority in the future. Of particular importance appears to be the documentation of hydrological changes observed in the hanging gardens in the Inscription House area and the initiation of research regarding the cause of the drying of the hanging gardens. Monitoring the impacts of livestock on *Carex specuicola* should be a priority throughout the known range of this species. Protection of habitat and a habitat monitoring plan can be achieved by developing a long term monitoring plan documenting hydrological changes, population fluctuations and threats.

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Table 1. Status of 39 Element Occurrence Records on the Navajo Nation 2000 - 2003

SURVEYS			STATUS								
EOR #	First	Last	NF	NR	P	AB	V	S	G	A	X
1A	1980	2002			X	H	N	W	H	X	N
1B	1980	2002			X	VL	N	D	M	X	N
1C	1980	2002			X	M	V	W	L	P	N
2	1986	2003		X							
3	1990	2003		X							
4	1991	2003	X						H	X	N
5	1990	2000			X	M	V	D	L	P	N
6	1990	2000			X	H	V	W	L	X	N
7	1990	2003			X	H	V	D	L	X	N
8	1989	2003	X						H	X	X
9A	1991	2003			X	M	V	D	L	X	N
9B	1991	2003			X	VL	N	D	L	X	N
9C	1991	2003	X					d	L	X	N
10	1991	2003			X	H	V	W	H	X	X
11A	1989	2000			X	H	N	W	H	X	X
11B	1989	2000			X	H	N	D	N	N	N
12	1992	2003			X	H	V	W	M	X	X
13A	1989	2000			X	L	N	d	H	P	N
13B	1989	2000			X	L	N	D	L	P	N
14A	1989	1999			X	M	N	D	N	N	N
14B	1989	1999	X						N	N	N
14C	1989	1999	X						N	N	N
15	1991	2003			X	H	V	W	L	X	N
16	1995	2000			X	NI	V	W	L	X	N
17	1995	2000			X	L	N	W	H	X	X
18	1989	2003		X							
19	1989	2003			X	L	N	D	L	P	N
20A	1989	2003			X	L	N	D	L	P	N
20B	1989	2003	X					d	L	P	N
20C	1989	2003			X	L	N	D	L	P	N
21A	1989	2003			X	H	N	D	M	P	N
21B	1989	2003			X	NI	N	D	L	X	N
21C	1989	2003		X							
22	1997	1997			X	NI	V	W	L	P	N
23	1995	2003	X								
24	1999		X								
25	1992	2000			X	VL	N	D	M	X	N
26	2000	2000			X	NI	V	W	L	P	N
27	2000	2000			X	M	V	W	L	P	N
28	2000	2000			X	H	V	W	L	P	N

29	2000	2000	X	M	V	W	L	P	N
30	2000	2000	X	H	V	W	L	P	N
31	2000	2000	X	VL	N	W	L	P	N
32	1994	1994	X	NI	NI	NI	NI	X	NI
33	2000	2000	X	VL	N	W	L	P	N
34A	2000	2000	X	H	V	W	L	X	N
34B	2000	2000	X	VL	N	W	L	X	N
35	2002	2002	X	L	NI	NI	NI	X	NI
38	2002	2002	X	H	V	W	L	P	N
39	2002	2002	X	H	V	W	L	P	N
40	2002	2002	X	L	N	D	L	X	N
41	2001	2001	X	NI	NI	NI	NI	NI	NI

Key:

EOR# = element occurrence record number

First = year site was first surveyed

Last = year site was last surveyed

NF = previously known population site where *Carex specuicola* was no longer found

NR = site not relocated, either due to mapping error or perhaps the garden has dried out and is gone

P = presence: extant (X), absent (blank)

V = vigor: vigorous (V), not vigorous (N), no information (NI)

AB = abundance: > 250 plants (H), 100 - 249 plants (M), 50 - 99 plants (L), 1 - 49 plants (VL), no information (NI)

S = status of seep: wet (W), drying (D), dry (d), no information (NI)

G = grazing/trampling impacts: heavy (H), medium (M), light (L), no information (NI)

A = livestock access: accessible (X), partially accessible/ difficult to access (P), no information (NI)

X = invasive species noted: yes (X), no (N), no information (NI)

Appendix I. *Carex specuicola* habitats and condition.



1. Example of healthy hanging garden



2. Inscription House Ruin spring site



3. Inaccessible portion of the Inscription House Ruin spring site.



4. Example of drying of the vegetation mat along walls.

