



ARIZONA GAME AND FISH DEPARTMENT  
HERITAGE DATA MANAGEMENT SYSTEM

Plant Abstract

Element Code: PMCYP03CQ0

Data Sensitivity: Yes

**CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE**

NAME: *Carex specuicola* Howell

COMMON NAME: Navajo Sedge

SYNONYMS:

FAMILY: Cyperaceae

AUTHOR, PLACE OF PUBLICATION: J.T. Howell, Leaflets of Western Botany 5(9): 148-149. 1949.

TYPE LOCALITY: USA, Arizona, Coconino County, near Inscription House.

TYPE SPECIMEN: HT: CAS-342553. J.T. Howell 24609, 23 June 1948. IT: GH, LL, NY, US.

TAXONOMIC UNIQUENESS: There are approximately 490 species in the genus *Carex*, with about 50-60 species in Arizona.

DESCRIPTION: Perennial grass-like plants, with a reddish-tinged base with dried persistent leaves; plants are loosely cespitose. Narrow leaves that droop downward, are 12-20 cm (5-8 in) long and 1-3 mm wide. Erect flower stems are 25-46 cm (10-18 in) long, and distally finely scabrous. Inconspicuous flowers have female flowers situated above the male flowers. Flowers grouped into 2-4 short pedunculate spikelets 8-10 mm long (Roth 2001 reports 8-20 mm long), clustered at the end of a long thin stalk, 2-3 times the length of the leaves; terminal spike usually gynecandrous, consisting of a few pistillate flowers at summit of an otherwise staminate spikes (when perigynia fall at maturity, spikes appear to be wholly staminate). Pistillate scales are light brown, somewhat hyaline, margins hyaline, often broadly so, shorter than and narrower than perigynia, midvein broad and lighter than body. The perigynia ascending, pale yellow to light brown, strongly flattened, broadly elliptic or obovate, with 2 or 3 stigmas, apex abruptly beaked, distal margins papillose, serrulate; beak bidentate, finely papillose and serrulate. Achenes nearly filling body of perigynia. Plant base reddish-tinged with dried persistent leaves (Howell 1949 in Phillips et al. 1981). (Phillips et al. 1981; FNA 1993+; Roth 2001, revised 2005).

AIDS TO IDENTIFICATION: This species is unusual in having both two-branched styles, with lenticular achenes, and three-branched styles with trigonous achenes. In addition, female flowers are located above the male flowers. *Carex specuicola* most closely resembles *C. heteroneura* (different nerve sedge), however, it differs by the strongly papillose and serrulate perigynia and beaks. (Phillips et al. 1981; Roth 2001, revised 2005).

**ILLUSTRATIONS:** Photo of plant and habitat (Utah Native Plant Society 2003-2005, in <http://www.utahrareplants.org>)  
Line drawing (Utah Native Plant Society 2003-2005, in <http://www.utahrareplants.org>)  
Line drawing of habit, perigynia, terminal spike (USFWS 1987)  
Line drawing (in Falk & Jenkins et al., 2001)  
Color photos of plant and habitat (Sue Rutman in Falk & Jenkins et al., 2001)  
Color photo of flower spike (B. Hevron in Falk & Jenkins et al., 2001)  
Color photo of Isotype specimen (NY-11337, NYBG, in <http://207.156.243.8/emu/vh/specimen.php?irn=535241>.)  
Color photo of Isotype specimen (US-2006386, in <http://ravenel.si.edu/botany/types/fullRecords.cfm?myFamily=>)  
Color photo (<http://arizonaes.fws.gov/images/Navajo%20Sedge%20Photo%20a.jpg>)  
Color photos of spike and plant (Joyce Maschinski, in CPC at [http://ridgwaydb.mobot.org/cpcweb/CPC\\_ViewProfile.asp?CPCNum=789](http://ridgwaydb.mobot.org/cpcweb/CPC_ViewProfile.asp?CPCNum=789))  
Color photos of plant and habitat (in Roth 2004).  
Line drawing (in FNA 1993+, <http://www.efloras.org>)

**TOTAL RANGE:** Endemic to the Navajo Nation, Coconino, Navajo, Apache counties, and San Juan counties, Utah. The State of Utah Natural Resources (accessed 2003) reports Kane County as part of their range in Utah. Potential distribution on the Navajo Nation includes Northern Arizona and southeastern Utah, especially in hanging gardens of the San Juan River drainage and Lake Powell (Roth 2001, revised 2005).

**RANGE WITHIN ARIZONA:** Northern Arizona from the Navajo Creek drainage in Coconino Co., east to the Tsegi Canyon Watershed and the east side of Shonto Wash south of Shonto in Navajo Co., south to the Rock Point/Mexican Water and Canyon de Chelly National Monument, Apache Co.

## **SPECIES BIOLOGY AND POPULATION TRENDS**

**GROWTH FORM:** Perennial graminoid.

**PHENOLOGY:** Flowering and fruit set occur from spring to summer, but most of the reproduction appears to be vegetative. Although suitable habitat can be identified year round, positive identification is only possible during the flowering/fruited season from late June through September (Roth 2001, revised 2005).

**BIOLOGY:** Locally common within habitat. Forms very dense rhizomatous clumps so that determining individual plants is not possible (Phillips et al. 1981).

**HABITAT:** Shady seep-spring pockets and hanging gardens, on vertical pink-red Navajo Sandstone cliffs and alcoves, from 4,600-7,200 ft (1403-2196 m) elevation. Found within Juniper-Pinyon woodland (Phillips et al. 1981).

**ELEVATION:** 4,600 - 7,240 ft (1403 - 2208 m). Falk & Jenkins et al. (2001) reports an elevation range from 4,400 to 7,000 ft (1342-2135 m). NatureServe (2005) and Utah Rare Plant Society (2003-2005) report the elevation range from 5,700-6,000 ft (1740-1830 m).

**EXPOSURE:** 80-90% slope, northwest to northeast to south aspects, generally in shaded to partially shaded habitats.

**SUBSTRATE:** Moist sandy to silty soils of the Navajo or Wingate sandstone. Sandstone and sandy shale rock outcrop of Shepard-Rock outcrop Association (Phillips et al. 1981).

**PLANT COMMUNITY:** Great Basin Desertscrub and Great Basin Conifer Woodland within the Colorado Plateau, including pinyon-juniper woodland. Dominant associated species include *Aquilegia micrantha* (Bluff City columbine), *Epipactis gigantea* (giant helleborine), and *Mimulus eastwoodiae* (Eastwood monkeyflower), and orchid. Associated sensitive and rare species include: *Cirsium rydbergii* (Rydberg's thistle), *Platanthera zothecina* (Alcove bog-orchid), *Primula specuicola* (cave primrose), and *Zigadenus vaginatus* (sheathed deathcamas). (Roth 2001, 2005). Other species that may be associated with this plant include: *Abies concolor* (white fir), *Adiantum capillus-veneris* (southern maidenhair-fern), *Agrostis semiverticillata* (water bentgrass), *Amelanchier utahensis* (Utah serviceberry), *Astragalus sesquiflorus* (sandstone milk-vetch), *Castilleja exilis* (= *C. minor* ssp. *minor*), *Cirsium* sp. (thistle), *Clematis* sp. (Virgin's-bower), *Coleogyne ramosissima* (blackbush), *Cornus sericea* (silky dogwood), *Equisetum hyemale* (rough horsetail), *Habenaria* sp. (orchid), *Heterotheca villosa* (hairy false golden-aster), *Hordeum jubatum* (foxtail barley), *Juniperus* (juniper), *Mimulus guttatus* (common large monkeyflower), *Phragmites communis* (common reed), *Pinus edulis* (two-needle pinyon pine), *Pinus ponderosa* (Ponderosa Pine), *Pseudotsuga menziesii* (Douglas-fir), *Quercus gambelii* (gambel oak), *Q. turbinella* (shrub live oak), *Rhus trilobata* (sumac), *Rosa* sp. (rose), *Solidago velutina* (= *S. sparsiflora*, sparse goldenrod), *Symphoricarpos* sp. (snowberry), *Taraxacum* sp. (dandelion), and *Yucca*. (Roth 2001, revised 2005; SEINet accessed 2005).

**POPULATION TRENDS:** Appeared in 1981 to have good overall reproductive success (Phillips et al. 1981). At the time of listing (USFWS 1985), it was estimated that the three known populations contained fewer than 700 plants. Formerly known only from a few localities in the Navajo Creek drainage in Coconino County, however, recent surveys have documented Navajo sedge in other drainage systems in Apache and Navajo counties. Recently, a population was found in San Juan County, Utah, and the State of Utah Natural

Resources (accessed 2003) reports Kane County as part of their range in Utah. Navajo sedge might be located in the general regional area of Arizona and Utah, in seep-springs on canyon walls of Navajo sandstone or other similar eolian sandstone formations. (USFWS, accessed 9/9/2003).

Per Roth (2004, Status Report), “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.... 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.” For additional discussion, see Roth’s 2004 status report.

## **SPECIES PROTECTION AND CONSERVATION**

<b>ENDANGERED SPECIES ACT STATUS:</b>	LT with critical habitat (USDI, FWS 1985) [C1 USDI, FWS 1980] [PE USDI, FWS 1976] [PTN-E, 1975 Notice of Review]
<b>STATE STATUS:</b>	Highly Safeguarded (ARS, ANPL 1999) [Highly Safeguarded (ARS, ANPL 1993)]
<b>OTHER STATUS:</b>	Category 3 (NNDFW, NESL 2005) [Category 3 (NNDFW, NESL 2001)] [Category 3 (NNDFW, NESL 1994)]

**MANAGEMENT FACTORS:** Due to the restricted habitat of this species, it is very vulnerable to water diversion projects, groundwater pumping, capping of well sites, and over-grazing of accessible sites (USFWS 1985, Falk & Jenkins et al. 2001, and CPC 2003). Eighty percent of the visited hanging garden sites visited from 2000-2003, were accessible to livestock. Of these sites, about 23% had medium to heavy livestock impact. Drought and global climate changes, and potential associated drying of seep and spring areas also pose a threat to populations of this species. 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. (Roth 2004).

**PROTECTIVE MEASURES TAKEN:** Some populations are protected by the inhabitation of sheer cliff habitats. “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.”

**SUGGESTED PROJECTS:** Surveys for suitable potential habitats in the rest of the Navajo Nation not covered by the 2004 Status Report, are needed. Documentation needed 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. Need to permanently protect all known habitats according to the steps outlined in the recovery plan. 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. Reintroduce *Carex specuicola* onto several protected sites within its inferred historic range.

**LAND MANAGEMENT/OWNERSHIP:** BIA - Navajo Nation; NPS – Canyon de Chelly National Monument. Possibly NPS – Glen Canyon NRA.

## **SOURCES OF FURTHER INFORMATION**

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#### ADDITIONAL INFORMATION:

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