ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM

Plant Abstract **Element Code:** PDAPO09012
Data Sensitivity: Yes

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Cycladenia humilis* Benth. var. *jonesii* (Eastw.) Welsh & Atwood
COMMON NAME: Jones cycladenia, Jones waxy dogbane, Jones' waxy dog bane
SYNONYMS: *Cycladenia jonesii* Eastwood
FAMILY: Apocynaceae

AUTHOR, PLACE OF PUBLICATION: *Cycladenia humilis* Benth. var. *jonesii* (Eastwood) S.L. Welsh & N.D. Atwood, Great Basin Naturalist 35(4): 333. 1975 [1976]. *Cycladenia jonesii* A. Eastwood, Leaflets of Western Botany 3(7): 159-160. 1942.

TYPE LOCALITY: San Rafael Swell, Emery County, Utah, USA.

TYPE SPECIMEN: HT: CAS-154331. M.E. Jones s.n., 19 May 1914. IT: CAS, NY, US.

TAXONOMIC UNIQUENESS: *Cycladenia humilis* var. *jonesii* is the only member of its genus in Arizona. This genus consists of only one species with 3 varieties. *C. humilis* var. *humilis* and *C. humilis* var. *venusta* occur in California. *C. humilis* var. *jonesii* is endemic to the Colorado Plateau in Utah and Arizona. Research published in 2015 support the distinctiveness of *C. humilis* var. *jonesii* and suggest that its species status be reinstated, and Arizona populations treated as a distinct variety from Utah populations (Brabazon 2015). This change has not been confirmed.

DESCRIPTION: A perennial herb from subterranean woody rhizomes; erect stems 11-36 cm (4.33-14.17 in.) tall, glaucous. Main foliage leaves are pale green, covered in a whitish to bluish waxy coating, 3.5-9.5 cm (1.4-4.0 in) long and 2.0-6.5 cm (1-3 in) wide, glabrous and glaucous, opposite, orbicular, wide-oval or elliptical. They have palmate venation, with short clasping petioles; lowermost leaves reduced to subamplexicaul bracts, enlarging upwards. Flowers pink to rose purple, funnel shaped, with 5 petals, 2-6 clustered on smooth leafless pedicels, 8-28 mm long; pedicels 5-25 mm long. Calyx hairy, lobes unequal, lanceolate, obtuse, 5-10 mm long and 15 mm wide; lobes oblong at apex. Filament hairy, 3 mm above tube. UNPS (2003-2005) reports "Corolla rose purple, dimorphic, either 23-28 mm long by 19-31 mm wide, or 18-21 mm long by 13-19 mm wide." Fruit follicle 6 cm (2.4 in) long and 1 cm wide, smooth, splitting along a seam; seeds have fluffy tuft of hair. (Welsh 1978, ADA 1994, Falk & Jenkins et al. 2001, UNPS 2003-2005).

AIDS TO IDENTIFICATION: Ascending pink to rose purple flowers; stems slim and usually leafless; leaves mostly basal, broad pale green with short broad clasping petioles. In flower it is unmistakable, but its leaves can resemble those of *Asclepias cryptoceras* (Humboldt milkweed) or *Astragalus asclepiadoides* (bird milk-vetch) (UNPS 2003-2005).

ILLUSTRATIONS: Line drawing of species (Cronquist et al. 1984: 31)
Line drawing (Welsh 1970)
Line drawing (Welsh and Thorne, 1979)
Line drawing (USFWS 1992)
Line drawing (Kaye Thorne, *in* Kelly and McGinnis, 1994)
Color photo (USFWS, *in* Kelly and McGinnis, 1994)
Color photo (Hughes 1997)
Color photo (Franklin *in* Utah Division of Wildlife Resources)
Color photo (*In* Center for Plant Conservation)
Color photo and line drawing (Falk & Jenkins et al., 2001)
Color photos of plant and habitat (C. Delmatier, *in* Utah Native Plant Society 2003-2005)
Color photo (T. Clark, *in* Utah Native Plant Society 2003-2005)
Color photo of Isotype (US-1369405, USNH)
Color photo of Isotype (NY-298028, NYBG)

TOTAL RANGE: Known from a few areas in and around the Canyonlands region of southeastern Utah and in northern Arizona, including Emery, Garfield, Grand, and Kane counties in Utah, and Coconino County in Arizona. Some sites are separated by over 160 km. Historically from Pipe Springs, Mohave County, Arizona.

RANGE WITHIN ARIZONA: Vermillion Cliffs and Moccasin Mountains, Coconino County.

SPECIES BIOLOGY AND POPULATION TRENDS

GROWTH FORM: Herbaceous perennial.

PHENOLOGY: Flowering mid-April to early June. Fruiting May-June.

BIOLOGY: This plant is a perennial of unknown longevity that appears to persist mostly by clonal reproduction via the spreading of rhizomes. Sexual reproduction occurs infrequently; while flowers and seed pods are commonly observed, no wild seedlings have been documented (USFWS 2021). A paucity of pollinators was noted as a possible reason for low fruit production. The frequent abortion of fruit, and a decrease in fruit set over the flowering season suggest the possibility of limited resources being responsible for low fruit production. Water emendation did not increase fruit production in this study. The soil that this taxon is found on is poor in nutrients, and may be a limiting factor. Jones' Cycladenia

may also have a low ability to colonize nearby suitable habitat, as populations sometimes inhabit only a small area within seemingly extensive habitat with the same geologic members and similar soil, aspect, slope, and vegetation (Sipes and Tepedino 1996).

Due to low seed production, seeds that are difficult to germinate, and an unknown pollinator, this species was investigated for its potential for *ex situ* conservation (Pence et al. 2017). *In vitro* cultivation appears to be a suitable method for propagating plants, either for research or restoration efforts. Cryopreservation of shoot tips from *in vitro* culture (obtained from both germinated seeds and new growth from mature plants) was also successful, demonstrating that germplasm preservation of tissue is possible for this species (Pence et al. 2017).

Recent genetic work indicates that the Northern California population is the center of origin of *Cycladenia* in the western United States (Brabazon 2015). Furthermore, shared genetic haplotypes from scattered populations point toward a larger distribution in the past, and that the current distribution is the result of habitat constriction. Ecological niche modeling, a lack of gene flow between California and Utah/Arizona populations, and consistent morphological characters within the same population support the elevation of *Cycladenia jonesii* to species level, and the Arizona populations in particular as a variety under this species (Brabazon 2015). Arizona plants were found to be genetically homogenous, which places these plants at a higher risk than plants within populations that are genetically heterogeneous, especially if current climate change models prove true.

HABITAT: Gypsiferous, sandy silty soil on clay hills that form the steep side slopes and bases of mesas in canyons; within Great Basin Desertscrub or Juniper-Pinyon Woodland communities.

ELEVATION: 4,000 – 6,600 ft. (1,220 – 2,030 m)

EXPOSURE: Typically found on steep slopes, though may be found on a variety of slopes, including the tops of mesas.

SUBSTRATE: Appears to be restricted to gypsiferous, sandy, silty, saline clay soils within the Cutler, Chinle, Moenkopi, and Summerville Formations. On the Chinle Formation in Arizona.

PLANT COMMUNITY: Sparsely vegetated plant communities of mixed desert scrub, juniper, or wild buckwheat-Mormon tea. Associated species include: *Amelanchier utahensis* (Utah serviceberry), *Atriplex* sp. (saltbush), *Brickellia oblongifolia* (narrow-leaf Brickell-bush), *Chrysothamnus* sp. (rabbit-bush), *Coleogyne ramosissima* (blackbush), *Cryptantha* sp. (cat's-eye), *Enceliopsis nudicaulis* (panamint sunray), *Ephedra torreyana* (Torrey's Mormon-tea), *Eriogonum corymbosum* (crispleaf wild-buckwheat), *Chamaesyce fendleri* (Fendler's broomspurge), *Gaillardia spathulata* (western blanket-flower), *Pleuraphis jamesii* (James' galleta), *Juniperus osteosperma* (Utah juniper), *Oryzopsis asperifolia* (white-grained

mountain-ricegrass), *Pinus edulis* (two-needle pinyon pine), *Purshia stansburiana* (Stansbury cliffrose), and *Wyethia scabra* (rough mule's ears).

POPULATION TRENDS: Stable or slightly declining. Total range-wide species numbers were estimated at 3,567 individuals (79,196 stems) across 20 populations in Utah and Arizona in 2021 (USFWS 2021).

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: LT (USDI, FWS 1986)
[PE USDI, FWS 1976]

STATE STATUS: Highly Safeguarded (ARS, ANPL 1999)
[Highly Safeguarded (ADA, ANPL 1993)]

OTHER STATUS: Bureau of Land Management Sensitive (USDI, BLM AZ 2017)

MANAGEMENT FACTORS: Lack of pollinator activity, seed production, and germination of seeds is a major concern. Arizona population genetically homogenous. Due to the arid climate and harsh soils, the ecosystem where this taxon is found is a fragile one that recovers very slowly from surface disturbance. This species is vulnerable due to its rarity. Threats include damage from off-road vehicles and bicycles, oil and gas leases, mining claims, mineral exploration (especially Uranium), and possible future development. Federal agencies have reduced, but not eliminated threats from OHV and mountain bike use, grazing, and extractive activities (USFWS 2008). The species is believed to be paleoendemic, therefore future climate change may cause future contractions in range and population size. This factor is compounded as the species relies almost exclusively on rhizomatous spread and may struggle to migrate to favorable habitat if conditions change (NatureServe 2020).

CONSERVATION MEASURES TAKEN: Draft Recovery Plan establishing recovery criteria was published in January, 2021 (USFWS 2021). Recovery strategy will focus on conservation of known populations, primarily through habitat protection. Monitoring plots have been established for most, if not all, of the populations of this plant. Utah State University has been conducting pollination, reproductive ecology, and genetics research on some of the populations of this taxon in Utah.

SUGGESTED PROJECTS: Yearly monitoring efforts should continue, as well as the search for new populations in suitable habitat. Traffic in areas of known habitat should be limited to existing roads, while some areas may need to be fenced to control off-road vehicle activities. Energy resource and mining activities should not occur in areas where known populations exist. Projects looking into sexual reproduction limitations within this species are warranted.

Recovery actions and delisting criteria are outlined in the Draft Recovery Plan. Priority 1 actions include maintaining or expanding populations on Federal and State lands and

monitoring existing and additional populations range wide. Priority 2 actions include developing collections of seeds and tissues to preserve genetic diversity and augment populations, to conduct research into biology and life history of Jones cycladenia, and to survey for additional populations. Priority 3 actions include maintaining conservation efforts through communication and collaboration between agencies, partners, and stakeholders, and development of a range-wide strategy for population augmentation and introductions.

LAND MANAGEMENT/OWNERSHIP: BLM - Arizona Strip Field Office; NPS - Glen Canyon National Recreation Area; Private. In Utah: BIA – Ute Tribal Lands; BLM – Moab and Price Field Offices, and Grand Staircase Escalante National Monument; NPS – Glen Canyon NRA and Capitol Reef National Park; State Lands.

SOURCES OF FURTHER INFORMATION

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ADDITIONAL INFORMATION:

In all, there are eight known populations of this taxon. Because the Jones' Cycladenia has a disjunct distribution pattern and its nearest known relatives are found in California, it is believed to be a Tertiary relict. If this is true, this plant may be poorly adapted for the present climactic regime of the Intermountain West. Recent genetic testing failed to reject the hypothesis that current populations are relicts from a more widespread distribution in the past (Brabazon 2015). It is also possible that this taxon has lost its original pollinator, causing fruit production to be episodic (FWS 1986, Sipes and Tepedino 1996).

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