

RECOVERY OUTLINE

for the

Jones Cycladenia

(*Cycladenia humilis* var. *jonesii*)

December 2008



National Park Service: John Spence

I. INTRODUCTION

This document lays out a basic background on Jones cycladenia (*Cycladenia humilis* var. *jonesii*) and preliminary course of actions for recovery. It serves to guide recovery efforts and inform consultation and permitting activities until a comprehensive recovery plan for the species has been finalized and approved.

- **Listing and Contact Information**

Scientific Name:	<i>Cycladenia humilis</i> var. <i>jonesii</i>
Common Name:	Jones cycladenia
Listing Classification:	Threatened rangewide
Effective Listing Date:	June 4, 1986 (51 FR 16526, May 5, 1986) ¹
Lead Agency, Region:	U.S. Fish and Wildlife Service, Region 6
Lead Field Office:	Utah Ecological Services
Contact Biologist:	Heather Barnes, 801-975-3330, Heather_Barnes@fws.gov
Cooperating Offices:	U.S. Fish and Wildlife Service, Region 2
Cooperating Biologist:	Mima Falk, 520-670-6150, Mima_Falk@fws.gov

II. RECOVERY STATUS ASSESSMENT

A. BIOLOGICAL ASSESSMENT

Taxonomy: The genus *Cycladenia* consists of one species *Cycladenia humilis* treated as having two varieties in California (var. *humilis*, var. *venusta*) (Hickman 1993) and a third variety, Jones cycladenia (*Cycladenia humilis* var. *jonesii*) found in Utah and Arizona. The closest taxonomic relative to Jones cycladenia is thought to be *Mandevilla*, a neotropical genus (Wolf et al. 1992).

Genetic research is underway in Utah and California to assist with future taxonomic treatment of the family Apocynaceae (L. Johnson, Brigham Young University, pers.

¹ No recovery outline or recovery plan was prepared at the time of listing.

comm., 2007; L. Johnson, pers. comm., 2008). Results of genetic work are anticipated in 2009 (L. Johnson, pers. comm., 2008).

Description, Habitat, and Life History: Jones cycladenia is a long-lived herbaceous perennial in the Dogbane family (Apocynaceae) which grows 4 to 6 inches (10 to 15 centimeters) tall. It occurs between 4,390 to 6,000 feet (1,338 to 1,829 meters) elevation in plant communities of mixed desertscrub, juniper, or wild buckwheat-Mormon tea. It is found on gypsiferous, saline soils of Cutler, Summerville, and Chinle Formations. It has orbicular, wide-oval or elliptical leaves and produces pink or rose-colored, trumpet shaped showers that resemble small morning glories from mid-April to early June.

Jones cycladenia is rhizomatous (having a long underground stem system that cannot be viewed above ground and which additionally may disintegrate over time) (Sipes et al. 1994). It overwinters as subterranean rhizomes (roots). Several to a hundred above-ground stems (or ramets) could be a single genetic individual (or genet) (Wolf et al. 1992).

We have little to no information about age of individual plants, years to reproductive adulthood, survivorship, mortality, or fecundity rates (Spence and Palmquist in draft; Wolf et al. 1992). Fruit and seed production is believed extremely limited (Sipes and Tepedino 1996). Its possible pollinators may have been lost or may be migratory and appear episodically (Sipes and Tepedino 1996). No seedling germination events have been documented (Sipes et al. 1994; Sipes and Tepedino 1996; D. Clark, Interagency Plant Team Leader, pers. comm., 2007; T. Clark, Capitol Reef National Park, Biological Science Director, pers. comm., 2007; K. Ivory, Bureau of Land Management (BLM), Price Field Office, Endangered Plant Species, pers. comm., 2007; J. Spence, Glen Canyon National Recreational Area Botanist, pers. comm., 2007).

Distribution, Abundance, and Trends: At the time of listing, Jones cycladenia (*Cycladenia humilis* var. *jonesii*) was found in Emery, Grand, and Garfield Counties in Utah and known historically from a fourth indeterminate site named Pipe Spring, in the vicinity of Mohave County, Arizona, and Kane County, Utah (51 FR 16526, May 5, 1986). This historic site has since been relocated near Pipe Springs National Monument, Arizona (Sipes et al. 1994, Table 1 appendix).

Today, Jones cycladenia is known from 26 sites. A “site” is a uniquely named occurrence, distinct from other named occurrences by distance or landscape structure, such as elevation, slope position, or characteristics of intervening habitat. These 26 sites are located in 5 areas, which we are referring to here as “complexes.” The five Jones cycladenia complexes include: Joe Hutch Creek, San Rafael, Moab, and Greater Circle Cliffs in Utah, and Pipe Springs in Arizona. Table 1 lists each of the complexes, their location, land managers, and the number of documented sites per location.

At the time of listing, known Jones cycladenia populations were estimated to contain 7,500 individuals. This estimate is now presumed high. Accurate population estimates

for Jones cycladenia are complicated by the species' clonal life history. We now estimate the species has 25,000 ramets (or above-ground stems), but that these stems represent approximately 1,100 genets (or individuals). This estimate is based on a 1995 range-wide estimate of ramets (Sipes and Tepedino 1996) and genetic results which indicate there are 22.1 ramets per genet (Sipes et al. 1994). The recovery plan and future Section 7 consultations should address the fact that observed numbers of ramets represent a substantially smaller set of unique individuals.

Only three sites within two of the five known complexes are being routinely monitored. The Purple Hills location (within the Greater Circle Cliffs complex) has been monitored every 1 to 4 years since 1992. Demographic data collected included colony health, flowering rates, and fruit and seed output (Spence and Palmquist In draft). Surveys in 2007 and 2008 have shown a 250 percent increase in the number of ramets over the long-term (1992 to 2006) mean (J. Spence, pers. comm., 2008). Both sites within the Pipe Springs Complex have been monitored since 1993 and includes data collection on the number of visible above-ground stems (ramets); and numbers of plants with and without reproductive attributes (flowers or fruit) (Hughes 2006). Other sites have been regularly visited, although they lack a formal monitoring program. For example, the San Rafael sites are regularly visited (every 1 to 2 years). Similarly, low elevation portions of the Moab complex also have been seen fairly regularly (every 2 to 4 years), while harder to reach areas (such as those that are farther up canyons and on steep slopes) are visited less regularly. Population monitoring of a few, more highly visited areas may disproportionately influence perceived recovery progress.

Much of the habitat considered to be suitable for Jones cycladenia has not been surveyed and many sites have not been revisited in the past 10 years (Spence and Palmquist in draft; Welp and Fertig, pers. comm. 2002). The recovery plan should address the limited understanding of the occupied range and unsurveyed potential habitat needs. Further searches for Jones cycladenia could result in new finds that would have important implications on the species' status (Spence and Palmquist 2007). Potential habitat, as identified by known soil types, within the species' range should be addressed during Section 7 consultation and land sales and leasing.

TABLE 1. Known complexes, locations, County, State, land ownership, and number of sites per location for Jones cycladenia.

COMPLEX			# OF SITES PER LOCATION
LOCATION	COUNTY, STATE	LAND MANAGEMENT	
Joe Hutch			
Un-named	Grand County, UT	Tribal	1
San Rafael			
Spotted Wolf Canyon	Emery County, UT	BLM (Price Field Office)	1
Greasewood Draw	Emery County, UT	BLM (Price Field Office), Utah State Lands (School & Institutional Trust Lands Administration)	1
Moab			
Onion Creek	Grand County, UT	BLM (Moab Field Office)	1
Castle Valley	Grand County, UT	BLM (Moab Field Office)	1
Greater Circle Cliffs			
Wolverine Basin	Garfield County, UT	NPS (Grand Staircase-Escalante National Monument)	2
Silver Falls Canyon	Garfield County, UT	NPS (Grand Staircase-Escalante National Monument)	2
East Choprock Bench	Garfield County, UT	NPS (Glen Canyon National Recreation Area)	2
Deer Point	Garfield County, UT	NPS (Capital Reef National Park, Grand Staircase-Escalante National Monument)	2
Purple Hills	Garfield County, UT	NPS (Glen Canyon National Recreation Area)	1
Moody Canyons	Garfield County, UT	NPS (Glen Canyon National Recreation Area)	8
Escalante River	Garfield County, UT	NPS (Glen Canyon National Recreation Area)	2
Pipe Spring			
Woodbury Canyon	Mohave County, AZ	BLM (Arizona Strip Field Office)	1
Potter Canyon	Mohave County, AZ	BLM (Arizona Strip Field Office)	1
TOTAL NUMBER OF DOCUMENTED SITES			26

Source: D. Clark, pers. comm., 2007; T. Clark, pers. comm., 2007; K. Ivory, pers. comm., 2007; J. Spence, pers. comm., 2007

B. THREATS ASSESSMENT

At the time of listing, Jones cycladenia was known from three sites with low numbers (51 FR 16526, May 5, 1986). It was thought to be a Tertiary relict, poorly adapted to the present-day arid climatic regime (51 FR 16526, May 5, 1986). Jones cycladenia's ecosystem was thought fragile, easily degraded and slow to recovery (51 FR 16526, May 5, 1986). Ongoing and potential anthropogenic impacts to habitat included: off-highway vehicle (OHV) use; oil, gas, and mineral exploration, including uranium mining and tar sands; and livestock grazing (although the rule notes the probability of grazing causing serious damage was low) (51 FR 16526, May 5, 1986). Habitat disturbance was thought to be reducing seedling establishment. Jones cycladenia also suffered from inadequate State and Federal regulatory mechanisms.

The variety's threatened status has prompted Federal land managers to implement protective measures to limit impacts from OHV and mountain bike use, cattle grazing, and extractive activities. While these threats have been managed to reduce anthropogenic impacts, these issues remain an ongoing and long-term concern. Specifically: mountain biking and OHV use occurs near sites in Moab and San Rafael complexes; cattle grazing occurs at sites in the San Rafael complex; and uranium mining and tar sands extraction are foreseeable threats in the both the San Rafael and Greater Circle Cliffs complex (both complexes are within Designated Special Tar Sands Areas; see <http://ostseis.anl.gov/index.cfm>).

Recently BLM provided a record of decision on the Oil Shale/Tar Sands Programmatic Environmental Impact Statement. No areas within the Circle Cliffs Designated Special Tar Sand Area were made available for leasing; however, areas within the San Rafael Special Tar Sands Area are available for application for leasing.

Since listing, a number of other biological limiting factors have come to light. Preliminary research (1988 to 1993) has shown that the plant has, at best, low fruit production and seed set, likely due to a complicated pollination system and inadequate pollinator abundance (i.e., pollinators may have been lost or may be migratory and appear episodically) (Sipes and Tepedino 1996). No seedling germination events have been documented (Sipes et al. 1994; Sipes and Tepedino 1996; D. Clark, pers. comm., 2007; T. Clark, pers. comm., 2007; K. Ivory, pers. comm., 2007; J. Spence, pers. comm., 2007). Genetic research at San Rafael (the Spotted Wolf Canyon site), Moab (two separate sites at Onion Creek and Castle Valley) and Greater Circle Cliffs complexes (one site at Deer Point, one site at Silver Falls Canyon, and one site at Purple Hills) indicates that these sites of Jones cycladenia are genetically distinct and not inbred, but may face other genetic limitations, such as genetic bottlenecking or genetic drift (Sipes et al. 1994). Several researchers have concluded that an ongoing lack of population recruitment may result in a permanent loss of genetically-important individuals or occupied sites (Sipes et al. 1994; Sipes and Tepedino 1996; Spence and Palmquist in draft). The species' fractured distribution could further complicate issues associated with limited natural reproduction, dispersal constraints, and genetic risks (Spence and Palmquist in draft; Sipes et al. 1994)

As a Tertiary relict, Jones cycladenia may be impacted by global climate change. Various emissions scenarios suggest that by the end of the 21st century, average global temperatures may increase 0.6 to 4.0°C (1.1 to 7.2°F) with the greatest warming expected over land (Intergovernmental Panel on Climate Change (IPCC) 2007). It is very likely that hot extremes, heat waves, and heavy precipitation will increase in frequency (IPCC 2007). Since 1991, overall mean temperatures have increased 1.5°C (2.7°F) in the Greater Circle Cliffs area (Spence and Palmquist 2007). Increased temperatures could result in the need for the species to colonize cooler, higher elevation sites.

Other factors reported since the time of listing include: natural predation (Spence and Palmquist in draft; Sipes et al. 1994); and relations to fragile cryptobiotic crusts in some locations (Sipes et al. 1994).

Each of the above issues should be considered during Section 7 consultation and will be evaluated and addressed in the upcoming recovery plan.

III. PRELIMINARY RECOVERY STRATEGY

A. RECOVERY PRIORITY NUMBER WITH RATIONALE

Jones cycladenia is assigned a recovery priority of 12C. This ranking indicates that: (1) Jones cycladenia’s status as one of four varieties within *Cycladenia humilis*; (2) it faces a moderate degree of threat; (3) it has (at present) a low potential for recovery; and (4) it is in conflict with development activities or other forms of economic activities. The moderate degree of threat is linked to biological constraints that the species faces, such as genetic diversity, number of unique individuals, and ability to colonize unoccupied areas, as well as man-influenced threats, such as recreational vehicles, cattle-grazing, tar sands oil extraction, and global warming. A number of these threats are related to

Degree of Threat	Recovery Potential	Taxonomy	Priority	Conflict
High	High	Monotypic Genus	1	1C
		Species	2	2C
		Subspecies/DPS	3	3C
	Low	Monotypic Genus	4	4C
		Species	5	5C
		Subspecies/DPS	6	6C
Moderate	High	Monotypic Genus	7	7C
		Species	8	8C
		Subspecies/DPS	9	9C
	Low	Monotypic Genus	10	10C
		Species	11	11C
		Subspecies/DPS	12	12C*
Low	High	Monotypic Genus	13	13C
		Species	14	14C
		Subspecies/DPS	15	15C
	Low	Monotypic Genus	16	16C
		Species	17	17C
		Subspecies/DPS	18	18C

development activities or other forms of economic activities. This species low recovery potential is primarily based on our limited knowledge of distribution and a poor understanding of the species biology including factors driving maintenance and expansion. Topics where data is missing are global warming and pollinator relationships for sexual reproduction. Advancement in these two areas of research and/or an increase in known occupied sites could favorably influence the recovery priority number. Therefore, this recovery priority number will be reviewed during the recovery planning process and annually by the Service as new data are made available.

B. RECOVERY VISION

Recovery of the Jones cycladenia is currently envisioned as follows: viable Jones cycladenia populations that persist on conserved habitat across the species' historical range. We anticipate that additional survey work will document the existence of new populations. All populations on Federal lands should be managed for the variety's protection. Threats to the species, primarily natural constraints, climate change, and human-caused habitat loss, will be sufficiently understood and if needed, sufficiently abated to ensure a high probability of survival at least 100 years into the future.

C. INITIAL ACTION PLAN

The recovery effort should build on ongoing conservation efforts. Specific actions that will be undertaken early in the process include the following:

Surveys and Monitoring

- Evaluate all known habitat components through a geographic information system database and conduct surveys for additional populations in areas containing habitat characteristics, particularly in Utah.
- Continue ongoing monitoring efforts.
- Expand monitoring programs to include a larger and more representative sample of occupied sites (rather than the easiest sites to visit).

Threats Abatement

- Identify sites in urgent need of habitat conservation, set protection priorities, and implement protective measures. As research improves our understanding of the species' needs, adjust management accordingly.
- Where not possible to prevent oil and gas and mineral leasing at occupied sites, limit impacts of these activities through early planning and coordination.

Research

- Continue and expand research into Jones cycladenia's life history and ecology. We believe it is essential to determine the role of sexual reproduction in Jones cycladenia populations including whether the species' pollinator has been lost. If the pollinator still exists, research should identify the pollinator's biological requirements so future conservation efforts address pollinator needs.
- Investigate Jones cycladenia's response to climate change.
- Coordinate with genetic and taxonomic experts in Arizona, California, and Utah to resolve outstanding taxonomic issues.

IV. PREPLANNING DECISIONS

A. PLANNING APPROACH

A recovery plan will be prepared for *Cycladenia jonesii* var *humilis* pursuant to Section 4(f) of the Endangered Species Act. The recovery plan should include objective, measurable criteria which, when met, will result in a determination that the species be removed from the Federal List of Endangered and Threatened Plants. Recovery criteria should address all threats meaningfully impacting the species. The recovery plan also should estimate the time required and the cost to carry out those measures needed to achieve the goal for recovery and delisting. The scope of the plan will be single species.

Plan preparation will be under the stewardship of Utah Field Office-Ecological Services. Currently Heather Barnes, Region 6, is lead botanist for the Jones cycladenia; Mima Falk, Region 2, will coordinate recovery planning activities for Arizona (see above contact information). Other Federal agency personnel involved with the species will be integrally involved in the planning effort. Our field office biologists will coordinate with the Regional endangered species offices as planning proceeds. At the present time this species does not warrant the appointment of a recovery team. The Service will coordinate recovery efforts with an informal network of experts and involved parties. Periodically, meetings among these parties may be convened for the species with the purpose of sharing information and ideas about advancing Jones cycladenia recovery.

B. INFORMATION MANAGEMENT

- **General**

All information relevant to recovery of the Jones cycladenia will be housed in administrative files found at the Utah Ecological Services field office in West Valley City, Utah. The lead botanist will be responsible for maintaining a full administrative record for the recovery planning and implementation process for the species, and copies of new study findings, survey results, records of meetings, comments received, etc., should be forwarded to her.

- **Reporting Requirements**

Information needed for annual accomplishment reports, the Recovery Report to Congress, expenditures reports, and implementation tracking should be forwarded by all individuals and offices involved in the Jones cycladenia recovery effort to Heather Barnes. Copies of the completed reports can then be disseminated to all contributors upon request.

C. RECOVERY PLAN PRODUCTION SCHEDULE

Internal review draft:	October 2009
Public review draft:	February 2010
Public comment period:	April 2010
Final plan:	July 2010

D. STAKEHOLDER INVOLVEMENT IN THE RECOVERY PROCESS

Stakeholders

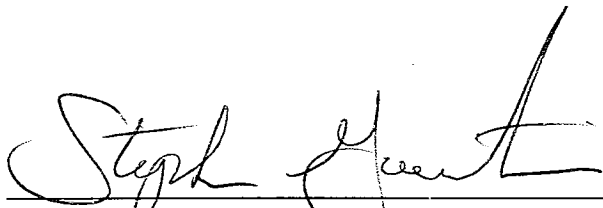
- Public land managers with Jones cycladenia populations on their lands including representatives of BLM (Price, Moab, and Arizona Strip Field Offices), and National Park Service (Capitol Reef National Park, Grand Staircase – Escalante National Monument, Glen Canyon National Recreation Area);
- Tribal, private, and State landowners, such as and Utah State Lands (School and Institutional Trust Lands Administration) and the Uinta and Ouray Indian Reservation, which may have or have potential for Jones cycladenia populations on their lands;
- Town/county officials for Emery, Garfield, Grand, and Uintah Counties in Utah, and Mohave County in Arizona;
- Representatives of Utah and Arizona State conservation programs;
- Conservation organizations such as The Nature Conservancy and Center for Plant Conservation and cooperating institutions;
- Mining or Energy organizations;
- Livestock users or organizations;
- Federal research agencies, such as the U.S. Geological Survey; and
- Academic researchers.

Stakeholder Involvement Strategy

Early in the recovery planning process, a meeting of individuals working with the Jones cycladenia will be held to exchange status information and identify recovery issues. The information emanating from this discussion will provide the initial draft for the recovery plan. As necessary, Tribal, State, and local agencies will be asked to participate; however, the Service's Utah Field Office knows of no State or local agencies or Tribal officials currently involved in Jones cycladenia or likely to have interest in participating on an ongoing basis in the recovery effort, particularly with regard to monitoring and regulatory protection of the species. Regardless, efforts will be made, as warranted, to contact such agencies or officials.

When needed, additional meetings and/or conference calls will be held to discuss particular issues, and stakeholders will be invited to participate when relevant for the purposes of recovery planning. Advantage will be taken of all opportunities to interact with stakeholders in a productive and meaningful way. Stakeholders also may be asked to contribute directly in developing implementation strategies for planned actions.

Approved:

A handwritten signature in black ink, appearing to read "Stephen Hunt". The signature is written in a cursive style with a large, sweeping initial "S".

Regional Director, U.S. Fish and Wildlife Service

Date:

12/30/08

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