A Guide to the threatened and endangered vascular plants of the Lake Mead National Recreation Area

James S. Holland
National Park Service

Wesley E. Niles
University of Nevada, Las Vegas

Charles L. Douglas
University of Nevada, Las Vegas

Dennis R. Schramm
National Park Service

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A GUIDE TO THE
THREATENED AND ENDANGERED VASCULAR PLANTS OF THE
LAKE MEAD NATIONAL RECREATION AREA

LAME Technical Report No. 4
January 1980

by

James S. Holland, Wesley E. Niles and Dennis R. Schramm

NATIONAL PARK SERVICE/UNIVERSITY OF NEVADA, LAS VEGAS
Charles L. Douglas, Unit Leader
Senior Research Scientist
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LAKE MEAD NATIONAL RECREATION AREA

by

James S. Holland¹, Wesley E. Niles² and
Dennis R. Schramm¹

LAME Technical Report No. 4
January 1980

Wesley E. Niles² and Charles L. Douglas³
Project Directors

¹National Park Service, DSC, P.O. Box 25287, Denver, Colorado 80225
²Department of Biological Sciences, University of Nevada, Las Vegas 89154
³Coop. Nat'l. Park Resources Studies Unit, Univ. of Nevada, Las Vegas 89154
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INTRODUCTION

GUIDE OBJECTIVES

This illustrated guide was prepared to provide the botanical community, land managers, and other interested persons with a reference that describes and locates the twelve plant taxa currently being considered by the Fish and Wildlife Service for threatened or endangered status in or around the Lake Mead National Recreation Area. The guide is intended to assist managers of government agencies in determining the presence of these species and in defining management programs for their protection. The guide should be consulted prior to any construction project. If a potential conflict is identified, an onsite evaluation should be conducted early in the planning process. This publication is also presented as an effort to stimulate interest in learning more about the distribution and biology of the candidate species.

BACKGROUND OF THE FEDERAL ENDANGERED AND THREATENED PLANT SPECIES LIST

The Endangered Species Act of 1973 (P.L.93-205) authorized the Smithsonian Institution to prepare a list of possible threatened and endangered plant species in the continental United States. An "endangered" species is defined as "any species which is in danger of extinction throughout all or a significant portion of its range. A "threatened" species is "any species which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range."

The Smithsonian Institution submitted a report to Congress on December 15, 1974 summarizing recommendations for preserving threatened and endangered plants and providing a list of threatened and endangered species. It was suggested that preservation of native habitats was the best method to ensure the survival of endangered species, that continued study was necessary to reevaluate the proposed status of the species, and that special efforts were necessary to protect species threatened by commercial or private exploitation.

The second part of the Smithsonian Report includes five lists: Commercially Exploited Species, Extinct Species, Endangered Species, Threatened Species, and Hawaiian Species in three categories. The first two lists, Exploited Species and Extinct Species, have no official status under the law. Exploited Species must necessarily be categorized as threatened or endangered. Extinct Species must be reevaluated to determine, where possible, if man caused their extinction, and if so, they must be classified as threatened or endangered to preserve them if they are rediscovered. Several species listed in the Smithsonian Report as extinct have since been rediscovered. These have either proved to be truly endangered or problems of taxonomic definition.
The lists contained in the Smithsonian Report were republished in the Federal Register on June 1, 1975 (House Document 94-51). The list of Exploited Species was not included.

A revised list was published in the Federal Register on June 16, 1976 as a proposed rule and included only those species proposed as Endangered. An addendum list consisting of Extinct and Commercially Exploited Species was included. The proposed Threatened list has not been revised since the Smithsonian Report.

The species proposed as Threatened in this guide are plants which were included on the 1975 Review of Status list. The species proposed as Endangered in this guide were included on the 1976 list, with the exception of *Arctomecon californica*.

During the month of February 1979 a workshop was held in Reno, Nevada, sponsored by the U.S. Fish and Wildlife Service and the Northern Nevada Native Plant Society. It was the consensus of those in attendance that *Arctomecon californica* be proposed as Endangered on State and Federal lands within its range. This recommendation for listing as an endangered species was submitted to the Washington Office of the U.S. Fish and Wildlife Service in June 1979. Critical habitat was not included in this recommendation due to collecting pressures for horticultural uses.

Since publication of the 1976 list, 22 species have received final rulemaking, (20 endangered and two threatened) conferring legal protection on Federal lands. None of these plants occur in Nevada or Arizona. Three species occurring in Ash Meadows, Nye County, Nevada were recently withdrawn from the proposed list until critical habitat can be proposed and an economic impact statement prepared.

In November 1979, all candidate and proposed species lists will expire as outlined in the 1978 amendments to the Endangered Species Act. A new listing of proposed taxa will be published in the Federal Register at that time. Two taxa, *Linanthus arenicola* and *Phacelia anelsonii*, have been recommended for delisting. All other taxa included in this report will appear on the November 1979 proposed list.

It is anticipated that many additional changes will be made in the proposed list as more is learned about the distribution and biology of the proposed species. The Northern Nevada Native Plant Society, in cooperation with the Nevada State Museum and the U.S. Fish and Wildlife Service, has prepared a supplemental listing of those species deserving protection and/or deletion. It is hoped this guide will provide a starting point for the revisions needed in the Federal list.

**GUIDE ORGANIZATION**

Plant taxa treated in this report are referred to by their scientific names since common names are not always available or consistent. The taxa are arranged alphabetically by genus and alphabetically by species within a genus. Information for each species is presented under the eight major headings described on the following page.
SYNONOMY: A listing of all scientific names referable to the same species, as well as the publication(s) in which the synonym(s) appear.

STATUS: The species status as proposed in House Document 94-51 (The Smithsonian Report), the Federal Register, June 16, 1976 (U.S. Fish and Wildlife Service), or on State lists.

ORIGINAL LITERATURE CITATION: The publication in which the species was described. This may serve as a good source for a technical description of the taxon and a discussion of its taxonomic position within a genus.

DESCRIPTION: A technical description of the species, as well as an analysis of closely related taxa. Key characteristics are provided to assist the field botanist in identification.

DISTRIBUTION/HABITAT: The species entire range is presented, as well as its known and potential habitat locations in the Lake Mead National Recreation Area.

MANAGEMENT OPTIONS: A presentation of all known threats to the species; including preliminary steps that should be taken to understand and eventually preserve the species (in every instance monitoring and mapping is recommended). Any extant taxonomic problems are outlined so that they may be studied and eventually resolved.

REFERENCES: A listing of regional flor as and other publications that might be helpful in either taxonomic or ecological analyses.

COLLECTIONS: Documented locations where the taxa have been collected, and where voucher sheets have been deposited.

ACKNOWLEDGEMENTS

In addition to the directors and curators of the herbaria cited below, the authors wish to express their appreciation to Dr. Janet Hohn and Dr. Stephen S. Talbot (U.S. Fish and Wildlife Service), Mrs. Margaret Williams (Northern Nevada Native Plant Society), Dr. Arthur M. Phillips (Museum of Northern Arizona), and Ms. Margaret Kurzius, botanical illustrator (University of Nevada, Las Vegas).

ALPHABETICAL LIST (BY ACRONYM) OF HERBARIA CONSULTED

ARIZ University of Arizona; Tucson, Arizona.
BRY Brigham Young University; Provo, Utah.
CAS California Academy of Science; San Francisco, California.
DS Dudley Herbarium; Stanford, California.
DVNM Death Valley National Monument; Death Valley, California.
DX Dixie College; St. George, Utah.
F Field Museum of Natural History; Chicago, Illinois.
CANDIDATE THREATENED AND ENDANGERED SPECIES OF THE LAKE MEAD NATIONAL RECREATION AREA, ARIZONA/NEVADA

Twelve plant taxa are currently being reviewed as candidates for threatened or endangered status by the U.S. Fish and Wildlife Service. Those species occurring in or near the Lake Mead National Recreation Area, Nevada/Arizona, are:

- **Arabis gracilipes** Threatened
- **Arctomecon californica** Endangered*
- **Astragalus geyeri var. triquetrus** Endangered*
- **Astragalus nyensis** Endangered*
- **Coryphantha vivipara var. rosea** Threatened
- **Cryptantha insolita** Endangered*
Eriogonum viscidulum  Endangered*
Linanthus arenicola  Threatened
Opuntia basilaris var. treleasei  Threatened
Penstemon bicolor  Threatened
Phacelia anelsonii  Threatened
Rosa stellata  Threatened

*Arctomecon californica, Astragalus geyeri var. triquetrus, Astragalus nyensis, Cryptantha insolita and Eriogonum viscidulum were recommended as "Critically Endangered" in February 1979 by a workshop on threatened and endangered plants sponsored by the Fish and Wildlife Service and the Northern Nevada Native Plant Society. These recommendations were forwarded to the State of Nevada Division of Forestry and on February 14, 1979, NRS 527.270 became a final rulemaking, protecting these plants on state and private lands.
**ARABIS GRACILIPES** Greene

**SYNONOMY:**

- *Arabis arcuata* (Nutt.) Gray
  - var. *longipes* Wats. in Gray

- *Arabis perennans* Wats.
  - var. *longipes* (Wats.) Jeps.

**STATUS:**

Candidate Threatened (House Document 94-51, 1975)

**ORIGINAL LITERATURE CITATION:**


**DESCRIPTION:**

Herbaceous perennial; 6-9 dm high; usually with a single stem, simple or branching above; leaves oblanceolate, 4-6 cm long, with forked trichomes; cauline leaves lanceolate with sagitate bases; flowers pink, 1 cm long; siliques pendulous, glabrous, 4-8 cm long and 2 mm wide.

*Arabis gracilipes* is closely related to *A. perennans* and *A. fendleri* but is easily separated from them by the robust habit, numerous large cauline leaves, very long filiform pedicels and usually solitary stems (Kearney & Peebles 1969).

**DISTRIBUTION/HABITAT:**

*Arabis gracilipes* is known only from the state of Arizona, however it is widely distributed throughout Mohave, Gila, Coconino and Yavapai counties. It is reported from a variety of locations and habitats but is seldom collected. It has been identified in many Arizona localities, and until recently all of these were south of the Grand Canyon and the Colorado River.

During the inventory of the Lake Mead National Recreation Area *A. gracilipes* was identified from several areas on the Shivwits Plateau. In the vicinity of Mt. Dellenbaugh (at 7,000 feet) it was found to be locally common in rocky areas with *Artemisia*, *Juniperus* and *Pinus ponderosa*.

Historically, *A. gracilipes* has been reported from hot sandy canyons from near Fort Mohave, Arizona, just south of the Lake Mead National Recreation Area boundary. Surveys within the southern portions of the recreation area failed to identify this species.
MANAGEMENT OPTIONS:

A. gracilipes has a wide distribution and occurs in a variety of habitats. The localities identified in Lake Mead are isolated but are subjected to intense grazing pressures. It is recommended these areas be monitored and populations mapped and evaluated in grazing analyses.

REFERENCES:


COLLECTIONS:

Type Collection:

ND Wilson s.n.; May 1893; Flagstaff (Coconino Co.), Arizona; (Photo in GH).

Additional Collections:

US MacDougall 60; June 1898; about Mormon Lake; Coconino County, Arizona. DUP:GH

RM Nelson 10244; April 1924; hot sandy canyons near Williams; Coconino County, Arizona. DUP:GH,M

SACT Loomis 6928; April 1930; Williams to Ashfork; Coconino County, Arizona.

GH Lemmon 4184; April 1884; Fort Mohave; Mohave County, Arizona. (Type of A. arcuata var. longipes).
SACT  Harrison 7883; May 1931; rim of Pueblo Canyon, Sierra Ancha; Gila County, Arizona.

NY  Stone s.n.; April 1934; 6 miles west of Prescott; Yavapai County, Arizona.

BRY  Galoway; 7 June 1936; 6,200 feet; in dry rocky cliffs, 10 miles east of Panaca; Lincoln County, Nevada.

UNLV  Niles & Leary 2163; 4 June 1977; 6,000 feet; nearly the dominant herb with Pinus edulis and Juniperus, 2.9 miles west of junction at Tuweep Road and road to Nixon Spring, near Mt. Trumbull; Mohave County, Arizona.

UNLV  Leary & Leary 2211; 16 June 1977; 6,800 feet; fairly common in open juniper-sagebrush areas on the north slope of Mt. Dellenbaugh, Shivwits Plateau; Mohave County, Arizona.

UNLV  Holland 731; 28 June 1975; 6,000 feet; erect perennial, with Senecio multilobatus, Aquilegia chrysantha and Acer negundo; in Green Springs Canyon, 5 miles east of Mt. Dellenbaugh, Shivwits Plateau; Mohave County, Arizona.

UNLV  Holland & Niles 609; 8 June 1975; 6,000 feet; with Acer negundo, Aquilegia chrysantha and Ptelea angustifolia; in Green Springs Canyon, 5 miles west of Mt. Dellenbaugh, Shivwits Plateau; Mohave County, Arizona.
Figure 1. Occurrence of *Arabis gracilipes* Greene in LAME and contiguous areas. Diagonal lines on regional map insert indicate state counties in which the species/variet/ subspecies has been reported to occur.
Plate 1. *Arabis gracilipes* Greene. Habit, mature plant; xl (ca. 1 m high).
Figure 2. *Arabis gracilipes* Greene. Plant, x1/2; basal leaf, x2; cauline leaf, x2; flower, x5; siliqua, x2.
ARCTOMECON CALIFORNICA Torr. & Frem.

SYNONOMY:
None

STATUS:
State Endangered (Nevada Revised Statutes 527.720, February 14, 1979)

ORIGINAL LITERATURE CITATION:

DESCRIPTION:
Perennial herb, 3-4 dm high, with stout taproot and rather numerous basal leaves; leaf blades cuneate-obvate, shallowly 3-toothed at the apex, shaggy villous, narrowed at the base to a petiole about as long as the blade; flowers several to many; petals six, yellow, 1.5 cm long; capsule upright, 6 ribbed, dehiscing apically. Flowering from April through May, with fruits maturing as early as mid-May.

DISTRIBUTION/HABITAT:
Arctomecon californica is known from southeastern Nevada and northwestern Arizona where it occurs in gypsum-rich soils derived from the Muddy Creek geologic formation. Associated species (also edaphically specialized) include Ephedra torreyana, Encelopsis argophylla var. grandiflora, Petalonyx parryi, Phacelia palmeri, Lepidium fremontii, Psorothamnus fremontii and Anulocaulis leisolenus. Larrea-Ambrosia associations surround these edaphic islands.

Generally, Arctomecon californica occurs at elevations from 1,300 to 1,900 feet. Extensive populations have been located in the Muddy Mountains near the Valley of Fire State Park, just south of the Anniversary Mine, and along interstate highway 15 near Lamb Boulevard, Las Vegas. Isolated populations occur in the Vegas Valley at Flamingo and Tropicana Avenues near the University of Nevada and north of Las Vegas near Craig Road. Each of the Vegas Valley populations is jeopardized by urban development and it is anticipated that, in this area, suitable habitat will continue to be diminished or totally eliminated.
Those populations occurring in Lake Mead are best developed near Blue Point Springs and Stewart Point. Impact to the species may occur in these areas, however the populations and suitable habitats are quite widespread and there is no additional development proposed for these areas. Other populations occur on public lands adjacent to the recreation area. These areas extend from Frenchman Mountain into the Gold Butte area. Additional localities include the lower Grand Canyon from Rampart Cave to Pierce Ferry.

**MANAGEMENT OPTIONS:**

*Arctomecon californica* has an unusually wide distribution for a species proposed for endangered status. Existing threats to the species include the impacts of grazing, mining, trampling, collecting and off-road vehicle use. The isolated populations within the Las Vegas Valley occur in areas where development is inevitable, thus reducing the total distribution significantly. It is believed that the lands in this area are privately owned with the exception of one area along interstate 15 near Lamb Boulevard exit ramp. Here plants occur on Federal lands. Also in this same area, plants have been observed north of interstate highway 15 on lands managed by the Department of Defense (Nellis Air Force Base Bombing and Gunnery Range).

Currently, gypsum deposits are being mined near Lake Mead for use in the construction of wallboard. Depending on demand this operation could expand; however not all disturbed lands are being utilized at this time.

Because of the spectacular appearance of *Arctomecon* in flower, many plants are collected for cultivation. Areas along Lake Mead Boulevard have been denuded where it once occurred in abundance (Janish 1977). Also, with the increasing cost of water in southern Nevada, many homeowners are attempting to landscape with native species. Attempts at transplanting *Arctomecon* have proven unsuccessful.

One of the most serious threats to this species is the use of the area for off-road vehicles (ORVs). Only a single locality was identified where tire tracks were not evident. *Arctomecon* is not a genus which is tolerable to disturbance and this type of use is increasing. The low rolling clay-gravel hills of the area present few barriers to this type of recreation use.

Southern Nevada only recently has attracted national interest in the possibility of locating deposits of oil and gas. Currently all lands in northeastern Clark County are under lease application. Seismic exploration has been completed on BLM lands surrounding the Lake Mead National Recreation Area. Mobil Oil Company is currently drilling to a depth of 17,000 feet on Mormon Mesa.
The impacts of grazing must also be mentioned. The public land in this area is divided into grazing allotments and this use is managed by BLM, including the lands within the recreation area. These areas are classified as ephemeral range and therefore have no calculated animal unit months (AUM) designated. It is not known whether A. californica is palatable, however wild horses have been observed foraging on A. merriamii. Probably more severe is the impact of trampling from feral burro populations concentrated in the Bitter Springs Wash and Echo Bay areas along the Overton Arm of Lake Mead. These areas are also habitat for isolated and local stands of A. californica. Feral horses and burros are currently being studied in southern Nevada and have been observed within the known habitat. Careful monitoring of these activities is recommended and population control of these exotic elements should be considered.

It should be noted that one of the better stands of A. californica was observed in the Muddy Mountains just south of the Anniversary Mine. This mining operation is owned by Stauffer Chemicals and is located just outside the Lake Mead National Recreation Area boundary. The mine was established for borates (colemanite). Longwell (1965) describes these reserves to be of minable quantities. The only other known reserves of calcium borates in the United States are currently being mined in Death Valley National Monument, California. Calcium borates are utilized in the production of textile and industrial fiberglass, providing strength for many glass products.

REFERENCES:


COLLECTIONS:

Type Collection:

GH Fremont; in 1884; Las Vegas.

Additional Collections:

GH Coville & Funston 1889; 1 May 1891; 750 m; Vegas Valley; Lincoln (Clark) County, Nevada.

GH Tidestrom 9050; 19 April 1917; 610 m; scattered colonies on mesa north of Las Vegas; Clark County, Nevada.

GH Tidestrom 9082; 23 April 1917; 840 m; on slopes of Muddy Range, northeast of Las Vegas, Nevada.

GH Brandegee; 6-7 May 1917; in gypsum clay along the railroad west of Las Vegas, Lincoln (Clark) County. DUP:UCLA

UCLA Munz 12970; 20 May 1933; dry loose slopes, Frenchman Mountain, northeast of Las Vegas, Nevada.

GH Maguire & Maguire 4830; 5 April 1934; in gravelly volcanic soils; Valley of Fire; Clark County, Nevada.

GH McKelvey 4136; 3 May 1934; Telephone Relay Station, 3-4 miles south of Las Vegas; Clark County, Nevada.

GH McKelvey 4150; 4 May 1934; 1,500 ft.; in gypsum clay on descent to St. Thomas and to north of Muddy Mountains, Valley of Fire; Clark County, Nevada.

GH Maguire 12582; 11 May 1936; in desert 10 miles southeast of Las Vegas; Clark County, Nevada.
UCLA Clokey 5808; 3 May 1937; 640 m; open field northwest of Las Vegas, Nevada. DUP:NESH

GH Clokey 5837; 23 April 1938; 635 m; desert flat west of Las Vegas; Clark County, Nevada (topotype)
DUP:UCLA,NESH

UNR Train 1640; 8 May 1938; 2,000 ft.; gravel hummocks near city dump; 2 miles southeast of Las Vegas, Nevada.

GH Clokey 8347: 19 April 1939; 640 m; gravelly desert; Larrea belt; two miles west of Las Vegas; Clark County, Nevada. DUP:UCLA,UNR

UNR Maguire 18083; 5 May 1939; desert vicinity of Las Vegas; Clark County, Nevada.

BRY Tanner s.n.; 4 May 1941; Sheep Island and Rogers Spring; 2 miles south of old town of St. Thomas; Clark County, Nevada.

UNLV Powers 18; May 1966; 2,000 ft.; in sandy soils and slightly rolling ground at Stewart's Point, Echc Bay; Clark County, Nevada.

UCLA Thompson 3567; 25 April 1969; with Atriplex and shadscale in sandy soils at the intersection of Commerce and Cheyenne Roads; 4 miles north of Las Vegas along north 5th Street; Clark County, Nevada.

BRY Higgins & Atwood 1859; 25 April 1969; 5 miles northeast of Las Vegas; Clark County, Nevada.

BRY Atwood 2387; 4 April 1970; north of Las Vegas on U.S. Highway 91-93 at mile post 38; Clark County, Nevada.

UNLV Holland & Schramm 867a; 26 March 1976; 2,200 ft.; with Ambrosia dumosa and Enceliopsis argophylla, near road to Anniversary Mine, 2 miles north of West End Wash; Clark County, Nevada.

UNLV Holland & Schramm 867; 7 April 1976; 1,900 ft.; occasional near road to Johns Mansville Gypsum Plant, 1 mile north of Lake Mead Blvd.; Clark County, Nevada.

MNA Phillips 76-263; 6 October 1976; 2,750 ft.; open slopes at Vulcher Cave, Vulcher Canyon, lower Grand Canyon, mile 274-L; Mohave County, Arizona.

UNLV Leary 1506; 24 March 1977; 1,600 ft.; locally common with Enceliopsis argophylla and Petalonyx parryi, near entrance to Lake Mead National Recreation Area, east of Frenchman Mountain; Clark County, Nevada.
OBSERVATIONS:

Holland & Burke; 14 April 1979; 2,000 ft.; locally common in red gypsum clays, 7.5 miles west of Devils Throat on the North Narrows Road; Clark County, Nevada. (T17S;R69E;Sec15).
Figure 3. Occurrence of *Arctomecon californica* Torr. & Frem. in LAME and contiguous areas. Diagonal lines on regional map insert indicate state counties in which the species/variet/subspecies has been reported to occur.
Habit, ca. x1/2.
Figure 4. *Arctomecon californica* Torr. & Frem. Plant, x1/2.
SYNONOMY:

Astragalus triquetrus Gray

Phaca triquetra (Gray) Rydb.

STATUS:

Candidate Threatened (House Document 94-51, 1975)
Proposed Endangered (Federal Register, June 16, 1976)
State Endangered (Nevada Revised Statutes 527.270, February 14, 1979)

ORIGINAL LITERATURE CITATION:


DESCRIPTION:

Spreading annual, up to 2 dm high; leaflets 7-9, oblanceolate or elliptic, mostly retuse, 4-15 mm long, pubescent on both sides, flat; flowers minute, 8 mm long, white; fruit triangular in cross-section, 1 cm long. The flowering period appears to begin in mid-April and extend into late May. Fruit was observed as early as the third week in April.

DISTRIBUTION/HABITAT:

"The var. triquetrus is one of the rarest desert milk-vetches, known only from the Arizona Strip near Beaver Dam, from the now inundated type-station, and from the Valley of Fire near Crystal. It has been collected only seldom and in very small quantity, and nothing is known at present of potential variation within it... In the context of the section, var. triquetrus is strongly marked and may perhaps deserve its original specific status" (Barneby 1964).

Astragalus geyeri var. triquetrus is restricted to sandy flats and washes with Larrea in areas where sand accumulates along the Muddy and Virgin Rivers. Plants have been observed in many sandy pockets from interstate highway 15 to the confluence of the two rivers.

The majority of the population's known distribution occurs outside the boundary of the recreation area on private lands or public lands administered by the Bureau of Land Management. Areas of suitable habitat have been surveyed in the vicinity of Overton Beach and along the boundary near the Valley of Fire State Park. Additional surveys in the Middle Point area at the mouth of the Virgin River revealed suitable habitat but no plants were located.
MANAGEMENT OPTIONS:

*Astragalus geyeri* var. *triquetrus* has been collected only three times previous to the 1979 season when it was observed to be locally common. The location of this species represents the combination of above average precipitation and a thorough review of the literature of the rare plants of southern Nevada.

It is important to point out that only a small portion of the total distribution of this species is located within the recreation area boundary. Most of the habitat for *Astragalus geyeri* var. *triquetrus* occurs on public lands administered by the Bureau of Land Management. It is important to coordinate NFS efforts in the management of this species. If a recommendation for a status change is in order, it should be accomplished through an interagency effort.

Because the habitat for this species includes areas of deep sand along the Virgin and Muddy Rivers, the use of off-road vehicles for recreation and access present the major threat. The plant is relatively inconspicuous and not often collected. It is recommended that additional study be initiated to decide its taxonomic status. If additional collections are warranted for these studies, it is recommended that the scientist notify the land managing agency of his work so that they may keep abreast of any changes.

During the 1979 season *Astragalus geyeri* var. *triquetrus* was observed to be common in sandy soils within the Valleys of the Virgin and Muddy Rivers. Because of the wide distribution and lack of serious impacts it does not appear special management is necessary at this time. It should be noted that this is an annual species and that it may not germinate each year. Based on the number of times it has been collected, very few scientists are aware of its existence. It is suggested that informal consultation with Fish and Wildlife Service be arranged and a biological opinion rendered on the status of this species.

REFERENCES:


COLLECTIONS:

Type Collection:

UC Palmer; Spring 1877; southeastern borders of Nevada, at the confluence of the Muddy River with the Virgin River.

Additional Collections:

CAS Eastwood & Howell 9000; 8 May 1941; in sandy soils, 5 miles east of Crystal.

NY Peebles & Parker 14,678; April and May; 2,000 ft.; Beaver Dam in sandy soil; extreme Southern Nevada and adjacent Arizona.

UNLV Holland, Tiehm, Williams & Williams 2268; 12 April 1979; 1,500 ft; in sandy soils with Larrea, Ambrosia, Amphipappus, Oryzopsis and Krameria, 4.7 miles south or downstream from the Riverside Bridge; Clark County, Nevada. (T14S;R69E;Sec2)

UNLV Holland & Burke 2285; 14 April 1979; 2,400 ft; in deep red sands at St. Thomas Gap in the southern extension of the Virgin Mountains, 1 mile north of the road to Grand Wash Bay, occasional with Penstemon thurberi, Dalea neomexicana and Oryzopsis hymenoides; Clark County, Nevada. (T17S;R67E)

OBSERVATIONS:

The following represent localities where Astragalus geyeri var. triquetrus have been identified but not collected by the authors.

1. Five miles east of Crystal, just north of the abandoned highway, found in an isolated pocket where sand accumulated on an eastern exposure; with Ambrosia dumosa, Oryzopsis hymenoides and Hilaria rigida; occasional to common. (T15S;R65E;Sec2)

2. In a large area of blowing sand, 0.8 miles east of state highway 12, on Whipple Avenue in Logandale, Moapa River Valley; locally common. (T15S;R67E;Sec2)

3. In sandy soils just east of the Overton Airport at the base of the Mormon Mesa; occasional to common. (T16S;R68E;Sec6)

4. In an isolated area of red sand, 1 mile south of the Brandlewood Gun Club and 5 miles east of the Overton Airport along the Lake Mead National Recreation Area boundary in the Virgin River Valley; uncommon. (T15S;R68E;Sec36)
5. In the Valley of the Virgin River, 0.3 miles downstream from the Riverside Bridge, on the west bank; uncommon. (T14S;R69E;Sec12)

6. In a large sandy wash, 2.4 miles east of the Riverside exit of interstate highway 15; locally common. (T13S;R70E;Sec26)
Figure 5. Occurrence of *Astragalus geyeri* Gray var. *triquetrus* (Gray) Jones in LAME and contiguous areas. Diagonal lines on regional map insert indicate state counties in which the species/variet/ subspecies has been reported to occur.
Astragalus geyeri Gray var. triquetrus (Gray) Jones

Boundary of Grand Canyon National Park

NEVADA

CLARK COUNTY

ARIZONA

MOHAVE COUNTY

EXPLANATION

- Lake Mead National Recreation Area Boundary
- Campground
- Landing Strip
- Spring
- Primary Roads

The map indicates the boundary of Grand Canyon National Park and the adjacent Lake Mead National Recreation Area.
Plate 3. *Astragalus geyeri* Gray var. *triquetris* (Gray) Jones. Habit, ca. x1/2.
Figure 6. *Astragalus geyeri* Gray var. *triquetrus* (Gray) Jones. Plant x1; fruit x2; flower x5.
ASTRAGALUS NYENSIS Barneby

SYNONOMY:

Astragalus nuttallianus DC.
var. pilifer Barneby

STATUS:

Candidate Endangered  (House Document 94-51, 1975)
Proposed Endangered  (Federal Register, June 16, 1976)
State Endangered    (Nevada Revised Statutes 527.270, Feb. 14, 1979)

ORIGINAL LITERATURE CITATION:

West. Bot. 8:195.

DESCRIPTION (after Barneby, 1964):

Prostrate, slender annual, hirsute throughout; stems 1-17 cm long,
loosely ascending; leaves equally pubescent on both sides, 14 cm
long, with 7-13 crowded leaflets 2-7 mm long; racemes 1-4
flowered; flowers whitish, up to 6 mm long; fruit compressed-
triquetrus, with sulcate dorsal faces, with 12-14 ovules.

This taxon in our area is easily mistaken for Astragalus
nuttallianus var. imperfectus, a milk vetch that occurs throughout
southern Nevada. Astragalus nyensis is separated by its appressed
vestiture, acute (never retuse) leaflets and minutely strigulose
or glabrous, long persistent pod that is more abruptly incurved
just above the base.

The Nye County Milk-vetch, despite its interest for the specialist,
can lay no claim to prettiness. When in full flower the tiny,
whitish or dimly roseate corollas are almost concealed by foliage,
and even the fruits, because of their short, common peduncle and
mask of spreading-incurved hairs, do not stand out from the leaves
to a casual glance.

DISTRIBUTION/HABITAT

Astragalus nyensis typically occurs on alluvium and gravelly
flats below calcareous desert mountains, 2,000 to 4,000 feet.
It is known from several localities in Clark, Lincoln and
southern Nye counties, Nevada.
MANAGEMENT OPTIONS:

Astragalus nyensis was first collected by M.E. Jones in 1906 at Indian Springs in the east foothills of the Spring Mountains. It was described by Barneby as Astragalus nuttallianus var. piliferus in 1942, based on collections of Ripley and Barneby in May 1941 from the foothills of the Spotted Range in Nye County, Nevada. Additional collections from Moapa, Spring Mountains and Las Vegas were reported during a similar time frame, however the exact dates are not available.

During the spring of 1978 Astragalus nyensis was again discovered at the type locality on what is now the Nevada Test Site. In 1979 populations were located at two points along the Virgin River in areas just northeast of the Lake Mead National Recreation Area. These collections have provided valuable ecological data and confirm Barneby's theory of its wider distribution.

Rhoads and Williams (1977) stated that "it is possible that the species has been extirpated from the Nevada Test Site... and A. nyensis has not been observed at NTS or elsewhere since the initial collection in 1941." Cochrane (1979) reports that the species has been relocated at the type locality. The recent collections from the Virgin River Valley are the first sightings of the species in locations other than the type locality since 1941. It is important therefore, that these lands managed by BLM be protected until additional locations can be identified.

Although Astragalus nyensis went without being rediscovered for almost 40 years, the 1979 collections illustrate variability in the habitat requirements. In the Virgin River Valley plants were observed in wash systems and substrates composed of clays and gravels. This differs from the rolling calcareous hills of the type locality.

Suitable habitat has been identified within the Recreation Area at the mouth of the Virgin River, although no plants have been located. It is recommended that this area be protected until such time that studies of the distribution of this taxon can be completed.

REFERENCES:


COLLECTIONS:

Type Collection:

CAS Ripley & Barneby 3430; 14 May 1941; 3,200 ft; alkaline gravelly slope in the foothills on the Spotted Range; Nye County, Nevada.

Additional Collections:

POM Jones s.n.; May 1906; Indian Springs; Clark County, Nevada.

POM Jones s.n.; Moapa; Clark County, Nevada

NA Train 1719; Lee Canyon; Clark County, Nevada.

CAS Eastwood & Howell 8966; May 1941; near Las Vegas; Clark County, Nevada.

UNLV Holland & Cochrane 1910; 3,200 ft; rare in compacted calcareous alluvium at edges of desert pavement and along washes, 0.5 miles southeast of gravel pit road (5-08 road) on west side of old Indian Springs Road; with Larrea, Ambrosia and Polygala; southern Frenchman Flat drainage. (Verified by Barneby, 1978) DUP:NTS,NY

NTS Cochrane & Timbrook 1085; 9 May 1978; rare in compacted calcareous alluvium at edges of desert pavement and along washes; 0.6 miles southeast of gravel pit road (5-08 road) on old Indian Springs Road; in Larrea, Coleogyne and Krameria. (Verified by Barneby, 1978) DUP:NY,UNLV

UNR Williams, Tiehm & Holland; 12 April 1979; 1,500 ft; in wash gravels of a lower bench, 0.3 miles downstream from the Riverside Bridge, along the western bank of the Virgin River; Clark County, Nevada. (Verified by Barneby, 1979) DUP:NY

UNLV Holland, Williams & Tiehm; 12 April 1979; 1,800 ft; in wash gravels with Acacia, Encelia and Astragalus amphioxys; 2.4 miles east of the Riverside exit on interstate highway 15; Clark County, Nevada. DUP:RENO
Figure 7. Occurrence of *Astragalus nyensis* Barneby in areas contiguous to LAME. Diagonal lines on regional map insert indicate state counties in which the species/variety/subspecies has been reported to occur.
Astragalus nyensis Barneby
Figure 8. *Astragalus nyensis* Barneby. Plant, x1; fruit, x2 1/2; flower, x5.
CORYPHANTHA VIVIPARA (Nutt.) Britt. & Rose
var. ROSEA (Clokey) Benson

SYNONOMY:

Coryphantha rosea Clokey

STATUS:

Candidate Threatened (House Document 94-51, 1975)

ORIGINAL LITERATURE CITATION:

   Tucson.

DESCRIPTION:

Plants depressed-globose to ovoid, solitary or branching, up to
2 dm tall with a dense covering of spines partially obscuring
the stem; central spines 10 to 12, white with red tips, 3/4 to 1
inch in length; radial spines 12-18, white, 5/8 to 1 inch in
length; flowers produced at the apex of the stem, magenta to
purplish, petals lanceolate, 3 to 5 cm in diameter.

Benson (1969) separates the variety rosea by its ovoid stem
with 10-12 long central spines. All other varieties have fewer
and shorter central spines. Spine diameter and flower color are
also utilized in separating the varieties, but these characters
are difficult to quantify and determine without a good over-all
familiarity with the genus.

DISTRIBUTION/HABITAT:

There are four varieties of Coryphantha vivipara within the
northwestern portion of Arizona and southern Nevada. Of these,
only the variety arizonica has been collected within the Lake
Mead National Recreation Area, in the vicinity of Mt. Dellenbaugh.

Coryphantha vivipara var. rosea is distributed mainly in Nevada,
in the counties of Clark, Nye, Lincoln, Eureka and White Pine.
Collections have been made, however, in the vicinity of the
New York Mountains in San Bernardino County, California and in
Mohave County, Arizona in the Arizona Strip Country and near
Peach Springs on the Hualapai Indian Reservation. This variety
is usually found above 5,000 feet in association with Artemisia,
or Coleogyne or pinyon-juniper, normally in limestone-rich soils.
Suitable habitat is located on the Sanup or Shivwits Plateau
region of Lake Mead National Recreation Area.
MANAGEMENT OPTIONS:

During the inventory of the botanical resources of the Lake Mead National Recreation Area, attempts to locate Coryphantha vivipara var. rosea were unsuccessful. Until such time as it is located within the recreation area boundaries, no special management is necessary.

REFERENCES:


COLLECTIONS:

Type Collections:

UC Clokey 8038; 24 June 1935; 2,400 m; gravel slope and bottom with Cercocarpus ledifolius and Pinus monophylla between Kyle Canyon and Deer Creek, Charleston Mountains; Clark County, Nevada. DUP:ARIZ,BH,F,GH,ILL,MICH,MO,NY, OSC,PH,POM,RENO,SMU,UC,UO,US,UTC

Additional Collections:

POM Jaeger s.n.; 21 June 1926; 7,000 ft; in pinyon belt, Charleston Mountains.

DS Clokey 7209; 1,900 m; ridge along Lee Canyon with Juniperus utahensis; Charleston Mountains, Clark County, Nevada. DUP:POM
UC Clokey 7208; 6 June 1936; 2,400 m; Kyle Canyon to Deer Creek; with Cercocarpus and Pinus monophylla, Charleston Mountains; Clark County, Nevada.

UC Clokey 7595; 30 June 1937; 2,670 m; ridge south of Deer Creek, top of ridge, Charleston Mountains; Clark County, Nevada.

UC Clokey 7596; 13 July 1937; 2,670 m; ridge south of Deer Creek with Cercocarpus ledifolius, Charleston Mountains; Clark County, Nevada.

UC Clokey 8035; 3 June 1938; 1,850 m; Cold Creek, Charleston Mountains; Clark County, Nevada.

UC Alexander 609; 25 May 1939; 6,000 ft; Charleston Park, Charleston Mountains; Clark County, Nevada.

POM Wolf 9648; 27 May 1940; 6,000 ft; Keystone Canyon at mines, New York Mountains; San Bernardino County, California.

UC Alexander & Kellogg 1719; 14 June 1940; 7,800 ft; Hidden Forest, Sheep Mountains; scarce at this altitude; Clark County, Nevada.

UNLV Williams 475; 4 June 1964; 5,000 ft; road to Red Rock Summit, Charleston Mountains; pinyon-juniper woodland; Clark County, Nevada.

POM Munz & Everett 17451; 31 May 1952; 5,000 ft; Cedar Canyon between New York Mountains and Providence Mountains; San Bernardino, California.

US Reveal 1201; 8 June 1968; occasional, Rainier Mesa road. ca. 3 miles from Pahute CP, on low ridge north of Twin Peaks (near Plot 63), east Forty-Mile Canyon drainage, in Artemisia nova; Nye County, Nevada.

US Beatley 5910; 19 June 1968; 6,400 ft; common, vicinity of Plot 63; north of Twin Peaks, below west face of Rainier Mesa, Black Rainier Mesa Road, south Belted Range, east Forty-Mile Canyon drainage, in Artemisia nova; Nye County, Nevada.

US Reveal 1577; 17 July 1968; 6,100 ft; infrequent in sands of upper foothills, ca. 2.5 airline miles northeast of Scrugham Peak, extreme south end of Pahute Mesa, east of Buckboard Mesa Road, west Forty-Mile Canyon drainage, in Artemisia-pinyon-juniper; Nye County, Nevada.

POM Bowker s.n.; 1969; 4,000 ft; Lincoln County, Nevada.
US Beatley 9090; 13 June 1969; 6,800 ft; occasional, flatrock area along Plateau Road, east Pahute Mesa, south Cold Flat drainage, in Artemisia nova; Nye County, Nevada.

POM Farwig & Girard 7 & 9; 18 May 1970; 7,000 ft; 3 miles from entrance to Hunt's Canyon (going east), at base of slope of first and second buttes near Hunt's Ranch, Monitor Mountains; Nye County, Nevada. (Annot. by Bercon)

NTS Beatley 15754; 21 June 1975; 6,600 ft; west slope below Bald Mtn., central Groom Range; Lincoln County, Nevada.

NTS Williams 193; 17 June 1976; 4,700 ft; off the south side of Road 8-01, 2.0 miles east of Rainier Mesa Road, south of Quartzite Ridge, rare on a gentle, south-facing bajada in rocky, reddish soil under Hymenoclea salsola, north Yucca Flat drainage in Coleogyne-Lycium; Nye County, Nevada.

NTS Cochrane 587; 1 June 1977; 5,100 ft; occasional on saddle south of Radio Tower at end of 6-04 Road, on dolomite of Bonanza King Formation, southwest Yucca Flat drainage in Coleogyne; Nye County, Nevada. DUP:POM

NTS Cochrane 661; 21 June 1977; 6,750 ft; very common with Opuntia erinacea var. erinacea and Trifolium andersonii ssp. beatleyae, in small valley northeast of pond and on southwest side of 7,100 foot mountain near middle of Gold Meadows, in Artemisia-pinyon-juniper; Nye County, Nevada. DUP:UNLV

POM Cochrane 660; 23 June 1977; 6,000 ft; occasional on east slope of Trail Ridge with Sclerocactus polyancistrus, ca. 00.5 miles north of U20L and U20K in area of vegetation damaged by testing, north Pahute Mesa, in pinyon-juniper; Nye County, Nevada.

NTS Cochrane 710; 23 July 1977; 6,540 ft; rare on open hilltop just north of pass between east and west Cat Canyons, Timber Mountain, in pinyon-juniper, Forty-Mile Canyon drainage; Nye County, Nevada. DUP:POM

OBSERVATIONS:

Williams; 13 May 1976; 6,050 ft; on red argillite hill south of Stockage Wash Road, just north of Capt. Jack Spring volcanic tuffs, northeast Yucca Flat drainage, north Eleana Range, with Arabis dispar; Nye County, Nevada.

Williams; 9 June 1976; 2.5 miles northeast of Pahute Mesa Road on Plateau Road, north Pahute Mesa, with Astragalus beatleyae; Nye County, Nevada.
Williams; 9 June 1976; 3.1 mile northeast of Pahute Mesa Road on Plateau Mesa; with *Astragalus beatleyae*; Nye County, Nevada.

Williams; 15 June 1976; 6,000 ft; in flower, in small valley bottom northwest from 16-04 Road, 3.6 miles north of junction with Mid-Valley Road, north Shoshone Mountain, on loose "shale" slope, northeast exposure; Nye County, Nevada.

Cochrane; 13 April 1977; 6,200 ft; several plants in Coleogyne and pinyon-juniper, on hill northeast of junction of Rainier Mesa Road and G Tunnel Road, below southeast Rainier Mesa; Nye County, Nevada.

Cochrane; 28 April 1977; 5,100 ft; few plants seen on dolomite hill north of road north of 5380 foot peak, just east of Area 12 Camp, east slope of Rainier Mesa, with *Mammillaria tetrancistra*; Nye County, Nevada.

Cochrane; 11 May 1977; 5,700 ft; few plants in argillite soils near mine at end of dirt road 0.5 miles west of summit near Tippipah Springs on Buckboard Mesa Road, Forty-Mile Canyon drainage; Nye County, Nevada.

Cochrane; 13 May 1977; 6,200 ft; one large plant seen in Tunnelbed volcanic tuff, head of Grouse Canyon, east Eleana Range; Nye County, Nevada.

Cochrane; 3 June 1977; common on sparsely vegetated knolls of whitish volcanic tuff just north of 16-04 Road near disturbed area, 4.2 miles west of Mid-Valley Road, in pinyon-juniper; Nye County, Nevada.

Cochrane; 3 June 1977; 6,550 ft; scattered in volcanic flatrock at end of 16-04 Road, top of mountain above Area 16 tunnels, Shoshone Mountain; Nye County, Nevada.

Cochrane; 12 June 1977; 6,450 ft; common, plants mostly in clumps, on flatrock ridge between two canyons (side canyons of Silent Canyon), 1.1 mile north of Pahute Mesa Road on Road 20-16c, north of Area 20 Camp, Pahute Mesa; Nye County, Nevada.

Cochrane; 16 June 1977; 6,700 ft; scattered plants in mid-Gold Meadows, north of Rainier Mesa; Nye County, Nevada.

Cochrane; 23 June 1977; 6,600 ft; few plants on volcanic flatrock on top of cliffs, 2.6 miles south of Pahute Mesa Road on telephone pole road, ca. 1.0 mile west of 19-03 Road, Pahute Mesa; Nye County, Nevada.
Cochrane; 24 August 1977; scattered on hill west of Pahute Mesa Road and south of Airport Road; seen along poleline road entered through 18-9c barricade, and 50 ft. southeast of CETO Plot 61, also 3 miles west of Pahute Mesa Road on Airport Road in desert pavement, and 0.2 miles south on Airport Road from junction with 18-03 Road, east of road 1/4 mile, Forty-Mile Canyon drainage; Nye County, Nevada.

Cochrane and Ackerman; 1 May 1977; scattered in Las Vegas Range from Peek-a-Boo Canyon to Quartzite Peak; Clark County, Nevada.
Figure 9. Occurrence of Coryphantha vivipara (Nutt.) Britt. & Rose var. rosea (Clokey) Benson in areas contiguous to LAME. Diagonal lines on regional map insert indicate state counties in which the species/varietY/subspecies has been reported to occur.
Plate 5. Coryphantha vivipara (Nutt.) Britt. & Rose
var. rosea (Clokey) Benson. Plant, ca. x3.
Figure 10. *Coryphantha vivipara* (Nutt.) Britt. & Rose var. *rosea* (Clokey) Benson. Plant, xl.
CRYPTANTHA INSOLITA (Macbr.) Pays.

SYNONYM:

Oreocarya insolita Macbride

STATUS:

Probably Extinct (House Document 94-51, 1975)
Proposed Endangered (Federal Register, June 16, 1976)
State Endangered (Nevada Revised Statutes 527.270, Feb. 14, 1979)

ORIGINAL LITERATURE CITATION:


DESCRIPTION:

Biennial or short-lived perennial from a slender root; stems one to several, erect and rather stout, up to 4 dm high; leaves clustered at the base, spatulate, obtuse, 3 to 5 cm long, abundantly setose and coarsely strigose, dorsal pubescence subtomentose and sparsely setose and pustulate; inflorescence confined to the upper 1/4 or 1/2 of the stem; calyx densely hirsute, conspicuously setose, sepals acute and linear, 4 mm long; corolla white, tube about 3 mm long, shorter than the sepals; lobes equal to tube in length; nutlets broadly ovate, margins acute, ridged dorsally, tuberculate and slightly roughened.

Cryptantha insolita appears very similar to, but is morphologically distinct, from C. virginensis, primarily by the appressed vestiture of the leaves and the absence of bristles.

DISTRIBUTION/HABITAT:

Cryptantha insolita is known only from two collections in the Vegas Valley and the habitat, for the most part, is unknown. Soils in the area immediately north of Las Vegas are extremely alkaline with gypsum outcrops common. The vegetation in this area consists of a small number of widely dispersed shrubs. The most common of these are Atriplex confertifolia, Ephedra torreyana, Arctomecon californica, Psorothamnus fremontii and Lepidium fremontii.

Along the Overton Arm of Lake Mead, areas of similar soils and vegetation types have been identified. Surveys of these areas failed to locate C. insolita. Cryptantha virginensis, a species closely related to C. insolita, was located.
MANAGEMENT OPTIONS:

Failure to locate C. insolita within the recreation area suggests no special management is needed on NPS lands. The areas of suitable habitat within the recreation area coincide with the distribution of Arctomecon californica. In the preservation of habitat for Arctomecon, lands will be protected for C. insolita, should it be located there.

REFERENCES:


COLLECTIONS:

Type Collection:

GH Goodding 2286; 2 May 1905; collected in Clark County, Nevada, at Las Vegas.

Additional Collections:

CAS Ripley and Barneby 4294; 1 May 1942; 2,000 ft; alkaline clay hills in north Las Vegas; Clark County, Nevada.
Figure 11. Occurrence of Cryptantha insolita (Macbr.) Pays. in areas contiguous to LAME. Diagonal lines on regional map insert indicate state counties in which the species/variet/ subspecies has been reported to occur.
ERIOGONUM VISCIDULUM J.T. Howell

SYNONOMY:
None

STATUS:
Candidate Endangered (House Document 94-51, 1975)
Proposed Endangered (Federal Register, June 16, 1976)
State Endangered (Nevada Revised Statutes 527.270, Feb. 14, 1979)

ORIGINAL LITERATURE CITATION:

DESCRIPTION:
Annual, 0.5-4 dm high; stems and branches minutely glandular;
leaves basal, blades 0.5-3 cm long and wide, thinly floccose-
tomentose below to glabrous above; inflorescence open and diffuse;
peduncles slender, 9.5-2.5 cm long, glabrous; involucres turbinate,
flowers whitish-yellow, maturing rose, sparsely hirsute in some;
achenes light brown, 1.7-2 mm long.

DISTRIBUTION/HABITAT:
Eriogonum viscidulum was reported only from the type locality
prior to the initiation of this study. During the 1979 field
season, numerous populations were observed from the type locality
at the Riverside Bridge on the Virgin River south to the
vicinity of Overton Beach. The habitat requirements are quite
restrictive: areas of deep sand with Prosopis glandulosa,
Psorothamnus fremontii and Larrea tridentata. Additional surveys
are continuing along the Overton Arm of Lake Mead, from Middle
Point to the confluence of the Muddy and Virgin Rivers.

MANAGEMENT OPTIONS:
As mentioned, Eriogonum viscidulum was known from only a single
locality. This was under private ownership and being impacted
quite heavily. The additional localities identified in this
report are supported by voucher specimens deposited at the
University of Nevada, Las Vegas. These specimens have been
verified by Reveal.

Because of the new localities identified in this report, management
should include additional monitoring and mapping of these populations,
aso as continued surveying for additional locations.
REFERENCES:


COLLECTIONS:

Type Collection:

BRY Reveal & Mathews 2153; 3 June 1969; 0.3 miles west of the Virgin River Bridge at Riverside; Clark County, Nevada.
DUP:ARIZ,CAS,CH,K,NY,OKL,RENO,RM,RSA,US,UTC,WIS

Additional Collections:

UNLV Holland, Niles & Schramm 1877; 21 April 1978; locally common in red sands with Prosopis, Psorothamnus, Sphaeralcea, Larrea, and Eriogonum trichopes, 0.3 miles below the Riverside Bridge along the northern bank of the Virgin River; Clark County, Nevada.

UNR Holland, Williams & Tiehm; 12 April 1979; 1,400 ft; in the Virgin River drainage, 1 mile south of the gun club, with Ambrosia, Larrea and Sphaeralcea in sandy soils. (T15S;R68E;Sec36)

UNLV Holland; 11 May 1979; 1,500 ft; uncommon in sandy soils, 2 miles south of state highway 12, along state highway 41a, Lake Mead National Recreation Area; Clark County, Nevada. (T17S;R68E;Sec33)

UNLV Holland; 11 May 1979; 1,500 ft; locally common in areas of deep sand with Oryzopsis, Ambrosia and Hilaria, 1.5 miles west of Overton Beach, Lake Mead National Recreation Area. (T17S;R68E;Sec21 & 22)

OBSERVATIONS:

Holland, Williams & Tiehm; 12 April 1979; 1,500 ft; Virgin River drainage, 1/4 mile west of the Virgin River, 4.7 miles downstream from the Riverside Bridge on the east side of the river; Clark County, Nevada. (T14S;R69E;Sec28)
Figure 12. Occurrence of *Eriogonum viscidulum* J.T. Howell in LAME and contiguous areas. Diagonal lines on regional map insert indicate state counties in which the species/variet/ty/subspecies has been known to occur.
Habit, ca. x1/2.
Figure 13. *Eriogonum viscidulum* J.T. Howell. Plant, x1; flowers, x20.
LINANTHUS ARENICOLA (Jones) Jeps. & Bail.

SYNONOMY:

Gilia arenicola M.E. Jones

Linanthus mohavensis Mason
Mason 1938. Madroño 4:158.

STATUS:

Candidate Threatened (House Document 94-51, 1975)

ORIGINAL LITERATURE CITATION:


DESCRIPTION:

Small erect annual, 1-8 cm high, compactly branched; leaves mostly
3-5 cleft above their base, 3-12 mm long; flowers vespertine,
 solitary and sessile in forks of cymes or at tips of branches;
calyx 4-5 mm long, sinuses 2/3 filled with membrane: corolla yellow, sometimes with purple throat, 5-7 mm long; stamens included;
seed brownish, with bordered whitish angles (Munz 1974).

DISTRIBUTION/HABITAT:

Widely distributed in sandy soils from northern Death Valley east
to the Nevada Test Site, south to the Virgin River and the Kelso
area of San Bernardino County, California.

MANAGEMENT OPTIONS:

Linanthus arenicola is a species of wide distribution and although
uncommon, is not threatened with extinction or endangerment. At
workshops sponsored by the Northern Nevada Native Plant Society
and Nevada State Museum, this taxon has been recommended for
deletion from its previous threatened classification. Therefore,
Linanthus arenicola does not require special management.

REFERENCES:

Beatley, J.C. 1977. Threatened Plant Species of the Nevada Test
Site, Ash Meadows and Central-Southern Nevada. U.S. Energy
Research and Development Admin. COO-2307-12.

No. 3) NPS Cooperative Studies Unit, University of Nevada,
Las Vegas.


COLLECTIONS:

Type Collection:

UC Jones 10,447; 2 May 1906; in sand at Needles; San Bernardino County, California. DUP:RSA.

Additional Collections:

RSA Jones; 2 May 1906; 3,000 ft; Kelso; San Bernardino County, California.

DS Ferris, Scott & Bacigalupi 4008a; 17-24 March 1924; 2,900 ft; Emigrant Wash, Panamint Mountains; Inyo County, California.

UC Mason 8294; 30 April 1935; Poison Canyon, southwest of Trona; San Bernardino County, California.

UC Mason 11726; 15 April 1938; Poison Canyon, southwest of Trona; San Bernardino County, California.

UC Mason 12251; 23 March 1940; gravel wash, Poison Canyon, southwest of Searles Lake; San Bernardino County, California.

DVNM Shanteau 38; 14 March 1941; 3,000 ft; Ubehebe Crater; Inyo County, California. DUP:UC

CAS Eastwood & Howell 9512a; 15 May 1941; southwest of Columbus Salt Marsh; Esmeralda County, California.

CAS Ripley & Barneby 3634; 26 May 1941; 4,900 ft; 10 miles south of Calloway (Currant); northeastern Nye County, Nevada.

UC Mason 14,250; 11 April 1952; lava bed just east of Dagget; San Bernardino County, California. DUP:RSA

SJSA Sharsmith 7571; 13 April 1968; deep sands, near Cronise Valley; 10 miles southwest of Baker; San Bernardino County, California.
NTS Beatley 5577; 25 April 1968; 3,100 ft; scattered plants in large population of Cryptantha circumscissa, near well J-12 Road, (Plot 7) western Jackass Flats, in sandy soil below Calico Hills; Nye County, Nevada. DUP:DS,US

NTS Beatley 8215; 1 May 1969; 3,460 ft; occasional plants below south face of Skull Mountain (Plot 4) sandy soils: Nye County, Nevada. DUP:RENO,US

NTS Beatley 8219; 3 May 1969; 3,235 ft; occasional plants in loose sands about 2 miles north of Frenchman Flat playa, east of Nye Canyon Road (Plot 28); Nye County, Nevada. DUP:US

UNLV Niles 1196; 9 April 1972; in deep sand southeast of Boulder City, near municipal golf course, 2,400 ft; Clark County, Nevada.

NTS Beatley 15615; 28 April 1975; 3,200 ft; one plant in Larrea-Ambrosia northwest of well B-5 and west of Diamond Road (Plot 23); Nye County, Nevada. DUP:US

UNLV Holland, Schramm & Niles 1885; 21 April 1978; 1,500 ft; 4.5 miles south of the Riverside Bridge, in red sands with Amphipappus, Ambrosia, Hilaria and Larrea; Clark County, Nevada.

UNLV Holland 1817; 16 April 1978; 2,400 ft; in sandy soils with Ambrosia, Larrea and Hilaria, 1/2 mile south of Boulder City; Clark County, Nevada.

UNLV Holland & Pinzl; April 1979; 1 1/2 miles south of Cottonwood Cove with Asclepias, Krameria and Acacia, occasional in sandy soils; Clark County, Nevada.
Figure 14. Occurrence of *Linanthus arenicola* (Jones) Jeps. & Bail. in LAME and contiguous areas. Diagonal lines on regional map insert indicate state counties in which the species/variet/subspecies has been reported to occur.
Linanthus arenicola (Jones) Jeps. & Bail.
Plate 7. *Linanthus arenicola* M.E. Jones.
Habit, ca. x3.
Figure 15. Linanthus arenicola (Jones) Jeps. & Bail.
Plant, x1; fruiting calyx, x5; flower, dissected longitudinally, x5; leaf, x5.
**SYNONOMY:**

Opuntia treleasei Coulter  
var. kernii Griffiths & Hare  

Opuntia treleasei Coulter  

**STATUS:**

Candidate Endangered (House Document 94-51, 1975)  
Proposed Endangered (Federal Register, June 16, 1976)

**ORIGINAL LITERATURE CITATION:**


**DESCRIPTION:**

Succulent perennial branching mostly from the base, with flattened beavertail-like stems, 1-3 dm long, blue-green to yellow-green with many eye-spots on stems filled with tuffs of small spinelets and 1 to 5 long straight spines; flowers magenta in color.

This variety is very similar to Opuntia basilaris var. basilaris, differing in the composition of the areoles. Opuntia basilaris var. treleasei is distinguished by the presence of long spines and the stems are not pubescent but papillose (with small soft surface projections somewhat nipplelike).

**DISTRIBUTION/HABITAT:**

In recent correspondence, Dr. Benson has stated, "The occurrence of Opuntia basilaris var. treleasei along the Colorado River in Mohave County, Arizona is based on a collection at the University of California Herbarium at Berkeley. Often with a rare plant or one that is unusual in its occurrence, I have been purposely vague in stating localities in order to prevent too easy finding of the plants and extermination of them. In this case the information is meager. There are two specimen sheets which probably are based on fragments of the same collection by Jack Whitehead in April and May of an unknown year, probably in the 1940's. There is no particular doubt of the identity of the specimen, but the locality is given as only northwestern Arizona near the Colorado River. Thus the collection was made from Mohave County."
County, Arizona and doubtless below Lake Mead, because by the
time Jack Whitehead would have been in the area Boulder Dam would
have been built. This still leaves the question of where the plant
was collected uncertain."

Opuntia basilaris var. treleasei is reported from "sandy soils of
flats and low hills in grasslands at 400 to 1,000 feet; northwestern
corner of Arizona near the Colorado River, in the San Joaquin Valley
in Kern County, California, and in the Turtle Mountains of the
eastern Mohave Desert" (Benson 1969).

"According to old photographs taken about 1910 the cactus once
densely covered areas as large as forty acres with plants bearing
cerise flowers about 1 dm in diameter. Such patches were already
gone by the 1930s and in all likelihood they never can be restored"
(Benson 1978). A small part of the largest colony which encompasses
an area ca. 4 miles long by up to 0.5 miles wide (Twisselmann
1967) is within the boundaries of the Nature Conservancy San Ridge
Wildflower Preserve. Another small population may be found in
Kern River State Recreation Area, east of Bakersfield.

MANAGEMENT OPTIONS:

Three localities have been identified in Mohave County, Arizona
by the Bureau of Land Management in their Final Environmental
Statement for grazing in the Cerbat/Black Mountain Management Unit
(1978). These localities, including Willow Beach, have not been
verified by the authors and voucher collections have not been
verified by the authority. Consultation with Dr. Lyman Benson
has been initiated as to the location of this taxon in Arizona.
His response to our inquiry verified the collection made by Jack
Whitehead in northwestern Arizona but provides little in addition.
It should be noted that habitat between 600-3,000 feet in this
general area has been examined by the USFWS and the authors. No
specimens have been located. Until this variety of Opuntia
basilaris can be identified and field areas located, no special
management can be proposed.

REFERENCES:

Abrams, L. 1951. Illustrated Flora of the Pacific States, Stanford
Univ. Press, Stanford.


Press, Stanford.

Britton, N.L. and J.N. Rose. 1937. The Cactaceae. Dover Publica-

U.S. Nat. Herb. 3:434.


COLLECTIONS:

Type Collection:

<table>
<thead>
<tr>
<th>Collection</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>MO Trelease s.n.</td>
<td>in 1892; Caliente in the Techachapi Mountains; Kern County, California (this collection has been misplaced).</td>
</tr>
</tbody>
</table>

Additional Collections:

<table>
<thead>
<tr>
<th>Collection</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>POM Benson 3594</td>
<td>22 May 1932; 600 ft; Edison Greenhorn Mountains; Kern County, California. NEOTYPE</td>
</tr>
<tr>
<td>POM Ferris &amp; Bacigalugi 8948</td>
<td>16 April 1932; 8 miles southeast of Bakersfield at the base of Tehachapi Pass; Kern County, California.</td>
</tr>
<tr>
<td>POM Wolf 4359</td>
<td>20 October 1932; 900 ft; 1 mile southwest of Edison, upper San Joaquin Valley; Kern County, California.</td>
</tr>
<tr>
<td>POM Benson 15710</td>
<td>23 March 1957; 500 ft; Niles Street, east Bakersfield, 1/4 mile west of Bend to Kern Canyon; Kern County, California.</td>
</tr>
<tr>
<td>POM Bonner s.n.</td>
<td>May 1959; Turtle Mountains near Colorado River south of Needles; San Bernardino County, California.</td>
</tr>
</tbody>
</table>
Figure 16. Occurrence of Opuntia basilaris Engelm. § Bigel. var. treleasei (Coult.) Touney in LAME. Diagonal lines on regional map insert indicate state counties in which the species/variet/subspecies has been reported to occur.
Opuntia basilaris Engelm. & Bigel.
treleasei (Coult.) Tourney
Figure 17. *Opuntia basilaris* Engelm. § Bigel. var. *treleasei* (Coult.) Toumey. Habit; stem section, x1.
In our area this species is apparently represented by populations that exhibit either cream (yellow) or pink (rose) flower color. These color forms have been accorded subspecific designation. Other than flower color there are apparently few morphological features separating these taxa. For this reason they are treated together in this report and represented by a single illustration and photograph.

**PENSTEMON BICOLOR** (Brandegee) Clokey & Keck

subsp. **BICOLOR**

**SYNONOMY:**

Penstemon palmeri Gray  
var. **bicolor** Brandegee  

Penstemon pseudospectabilis Jones  
subsp. **bicolor** (Bdg.) Keck  

**STATUS:**

Candidate Threatened (House Document 94-51, 1975)

**ORIGINAL LITERATURE CITATION:**


**PENSTEMON BICOLOR** (Brandegee) Clokey & Keck  
subsp. **ROSEUS** Clokey & Keck

**SYNONOMY:**

Penstemon palmeri Gray  
var. **bicolor** Brandegee  

Penstemon pseudospectabilis Jones  
subsp. **bicolor** Keck  

**STATUS:**

Candidate Threatened (House Document 94-51, 1975)

**ORIGINAL LITERATURE CITATION:**

DESCRIPTION:

Perennial herb, up to 1.5 m high; leaves thick and coriaceous, moderately glaucous, serrate with prominent, often caudate teeth; inflorescence strongly glandular-pubescent; corolla abruptly but moderately inflated above the tube, sometimes viscid pubescent within, usually sparsely villous across the base of the lobes of the lower lips; 4.5-7 mm long with large lobes; staminode exerted and prominently bearded with long yellow hairs (Clokey and Keck, 1939).

Brandegee (1916) placed the yellow and pink forms together; however, Clokey and Keck (1939) determined that they were both morphologically and geographically separable. Brandegee's type sheets at the University of California, Berkeley, represent both the yellow and pink forms. The yellow flowered form was mentioned first in Brandegee's description, thus it is treated as the typical form. The rose colored form is treated as subspecies roseus.

As collection data show the two forms occur together in some localities, thus they are not always geographically separable. Morphologically the two forms apparently differ only in flower color.

Clokey and Keck (1939) stated that Brandegee's pink-flowered form differed from the yellow-flowered form only in flower color, somewhat less glandular calyces and somewhat less glaucous leaves.

Clokey (1951) in his Flora of the Charleston Mountains states that "Penstemon bicolor with coarse stems arising from only the base of the plant and with thick glaucous leaves, could readily be mistaken from a distance, when not in bloom, for Penstemon palmeri. The relationship of Penstemon bicolor is apparently with Penstemon pseudospectabilis Jones ssp. connatifolius (A. Nels.) Keck and with Penstemon clutei A. Nels. These are taxa with distributions from southeastern California eastward to southern New Mexico."

In regard to the above statement by Clokey, one should not dismiss the possibility of localized hybridization between P. bicolor and other penstemons (e.g., P. palmeri). Unsubstantiated field observations suggest that this may indeed be taking place in southern Nevada where the ranges of the two species overlap.

DISTRIBUTION/HABITAT:

Penstemon bicolor ssp. bicolor and ssp. roseus are, at least in some habitats, sympatric. The pink flowered form may grow independently of the yellow flowered form. However, field observation indicates that the yellow flowered subspecies is usually found in association with the pink form.

Populations of Penstemon bicolor are found in a wide area of Clark County, Nevada extending into Mohave County, Arizona. The stands are usually local and concentrated in wash gravels or disturbed
roadsides. In and around the Recreation Area plants have been reported from the vicinity of Nelson, east of Lake Mohave and south of Moapa. Surveys of these areas confirmed the first locality, however the population south of Moapa was not relocated. It is hypothesized that this stand occurs on the alluvial fans and in washes of the Muddy Mountains.

MANAGEMENT OPTIONS:

Only a single stand of Penstemon bicolor ssp. roseus is confirmed within the recreation area boundary and at present is jeopardized only by feral burro populations. Careful monitoring of this population is recommended until the complex has been reviewed taxonomically and USFWS can prepare a biological opinion on its status.

REFERENCES:


COLLECTIONS: Penstemon bicolor (Brandegee) Clokey & Keck

Subsp. bicolor

Type Collection:

UC Brandegee; May 1915; Goodsprings; Clark County, Nevada.

Additional Collections:

POM Clokey 5847; 2 May 1938; 850 m; gravelly wash, Larrea belt, Goodsprings; Clark County, Nevada. DUP: UNR, UC
UC Clokey 8136; 20 May 1938; 1200 m; eroded soil, Larrea belt, fan below Kyle Canyon, Charleston Mountains; Clark County, Nevada.

UC Clokey 7696; 20 May 1937; 1,670 m; juniper belt, Kyle Canyon, Charleston Mountains; Clark County, Nevada. DUP: CAS

UC Clokey 8140; 17 May 1937; 800 m; Larrea belt, gravelly wash below Mountain Springs, Charleston Mountains; Clark County, Nevada. DUP: CAS

UC Clokey 8138; 7 June 1938; 1,050 m; gravelly wash, Good Springs, Charleston Mountains; Clark County, Nevada.

UC Train 1673; 11 May 1938; 4,200 ft; flower with creamy white lower lip striped red, on gravel bench, east slope of Kyle Canyon, 6 miles above junction with Las Vegas highway; Clark County, Nevada.

COLLECTIONS: Penstemon bicolor (Brandegee) Clokey & Keck subsp. roseus Clokey & Keck

Type Collection:

UC Clokey 5850; 14 May 1938; 600 m; eroded slopes near Nelson (Eldorado Canyon); Clark County, Nevada. DUP: RSA, UNR

Additional Collections:

RSA Jones; 30 April 1907; 3,000 ft; Eldorado Canyon near Nelson; Clark County, Nevada.

UC Pierson 11509; 20 April 1935; plants abundant and very showy with purple-red flowers in coarse gravelly terrain in open rolling desert, 18 miles south of Las Vegas along U.S. highway 91; Clark County, Nevada.

UC Train 1503; 27 April 1938; 3,800 ft; 2 miles west of Nelson, Eldorado Canyon, Opal Mountains; Clark County, Nevada.

UC Clokey 8137; 13 May 1938; 1,300 m; eroded soil in fan below Larrea belt fan below Kyle Canyon, Charleston Mountains; Clark County, Nevada.

RSA Clokey 5850; 14 May 1938; 600 m; eroded slopes in Larrea belt near Nelson; Clark County, Nevada. DUP: POM, UC, UNR

UC Clokey 8139; 7 June 1938; 1,050 m; Cottonwood Springs; Clark County, Nevada.

POM Munz; 8 May 1940; 3,000 ft; in limestone wash, 28 miles south of Las Vegas on Los Angeles highway; Clark County, Nevada.
UC Clokey 8488; 18 April 1949; 1,950 m; wash south of Cottonwood Springs, in Larrea belt, Charleston Mountains; Clark County, Nevada.

RSA Munz 16332; 18 April 1949; 1,300 m; dry was in limestone on Los Angeles highway, 18 miles south of Las Vegas; Clark County, Nevada.

UC Gullion 475; 5 May 1953; in edge of sandy wash among high desert shrub vegetation, flowers deep lavender; Opal Mountains west of Nelson; Clark County, Nevada.

UNLV Johnson; 17 April 1969; foothills of the Charleston Mountains; Clark County, Nevada.

UNLV Bradley 76; 25 April 1960; 1 mile west of Boulder City; Clark County, Nevada.

UNLV Berg 57; 2 April 1961; 1 mile west of Boulder City; Clark County, Nevada.

UNLV Brown 51; 12 April 1961; 1/2 mile west of Searchlight; Clark County, Nevada.

UNLV Bostick 3094; 11 May 1968; 3,500 ft; in crevices apparently grazed by bighorn sheep; west face of Black Mountain; Clark County, Nevada.

UNLV Niles & Bostick 1961; 3 May 1969; 2,200 ft; corolla tube brownish, throat-light yellow; bottom of sandy wash on west side of McCullough Mountains, 24 miles from McCullough Summit; Clark County, Nevada.

UNLV Holland 96; 5 April 1974; 2,800 ft; in coarse gravels with Larrea and Ambrosia in Bootleg Canyon, River Mountains; Clark County, Nevada.

UNLV Leary 1749; 11 May 1977; 3,500 ft; with Encelia and Aristida at pass west of Nelson, Eldorado Mountains; Clark County, Nevada.

UNLV Holland 1239; 1 May 1976; 3,400 ft; with Chrysothamnus paniculatus, Hymenoclea salsola and Bebbia juncea within the town of Nelson; Clark County, Nevada.

UNLV Holland & Schramm; May 1976; 3,000 ft; in roadside gravels, 2 miles north of interstate 15 on U.S. highway 93; Clark County, Nevada.
Figure 18. Occurrence of Penstemon bicolor (Brandegee) Clokey & Keck in LAME and contiguous areas. Diagonal lines on regional map insert indicate state counties in which the species/variet/ subspecies has been reported to occur.
Penstemon bicolor (Brandegee) Clokey & Keck
Plate 8. Penstemon bicolor Clokey & Keck
subsp. roseus Clokey & Keck.
Inflorescence, flowers ca. x2 1/2.
Figure 19. Penstemon bicolor (Bdg.) Clokey & Keck.
Plant, x1/2; flower, x1 1/2.
PHACELIA ANELSONII Macbride

SYNONOMY:
None

STATUS:
Candidate Threatened (House Document 94-51, 1975)

ORIGINAL LITERATURE CITATION:

DESCRIPTION:
Erect annual up to 5 dm high; stems terete, usually simple, covered with brownish stipitate glands, leafy throughout; leaves pinnately cleft, narrowly to broadly oblong, up to 8 cm long; inflorescence racemose to paniculate, usually terminal on the upper half of the stem, sometimes on leafy lateral branches; individual cymes 1-5 cm long, setose to glandular pubescent; sepals oblong to spatulate 3-6 mm long, 1-2 mm wide, setose to glandular, 1-2 mm longer than the capsule; corolla rotate to campanulate, light violet or white, 6 mm long and wide; stamens included, anthers yellow; style included and shorter than the stamens, cleft 2/3 its length, glandular and puberulent at the base; capsule oval, to 3.7 mm long, glandular spotted throughout; seeds light brown, margins entire (Atwood 1976).

DISTRIBUTION/HABITAT:
Commonly in shaded places at the base of sandstone and limestone cliffs or among rocks and in sandy to gravelly washes 2,000 to 5,000 feet, restricted and local (Atwood 1976). It has been found in Lincoln and Clark Counties, Nevada, and in Washington County, Utah, and as far west as Inyo and San Bernardino Counties, California.

MANAGEMENT OPTIONS:
This taxon has not been located within the recreation area, however it has been identified in the granitic soils of the Gold Butte area. It is widely distributed but its occurrence is localized and rare. Additional survey work is required throughout the range of this species. Until such time as it is located in the Recreation Area, no special management is necessary.

REFERENCES:


COLLECTIONS:

Type Collection:

RM Goodding 635; 28 April 1902; rich soil under cliffs, Meadow Valley Wash; Lincoln County, Nevada.

Additional Collections:

POM Jones; 28 April 1904; 3,700 ft; Meadow Valley Wash, mile 16, Nevada.

POM Jones; 29 April 1940; 4,400 ft; Caliente, Nevada.

UC Train 1499; 26 April 1938; 4,000 ft; Eldorado Canyon, Opal Mountains.

RSA Jaeger; 20 May 1938; 5,200 ft; Tenfel Canyon, 17 miles north of Darwin on the Saline Valley Road, pinyon-juniper belt; Inyo County, California.

RSA Ripley & Barneby 2937; 14 April 1939; 4,400 ft; Beaver Dam Mountains; Washington County, Utah. DUP:CAS

DX Pendleton & Hardy; 14 April 1949; Castle Rock; Washington County, Utah.

UC Ripley & Barneby 3475; 9 May 1941; 4,100 ft; LaMadre Mountain in Limestone Cliffs, Charleston Mountains; Clark County, Nevada.

RSA Ripley & Barneby 3475; 19 May 1941; 4,100 ft; Hiko; Lincoln County, Nevada.

RSA Ripley & Barneby 3496; 28 May 1941; 4,450 ft; near Caliente; Lincoln County, Nevada.

UC Cronquist 9958; 9 May 1954; 4,500 ft; in shallow soils on ledges on north facing granitic cliffs along a dry wash on the west side of the McCullough Mountains, 16 miles west of Searchlight; Clark County, Nevada. (T23S;R61E) DUP:BRY
BRY  Karren 16: 13 April 1962; 2,500 ft; Terry's Ranch, Beaver Dam Wash; Washington County, Utah. (T42S;R20W;Sec36)

UTC  Nish 9; 18 April 1963; 3,800 ft; Reber Wash, west slopes of the Beaver Dam Mountains; Washington County, Utah.

UTC  Nish 22; 24 April 1963; 3,000 ft; Terry's Ranch, west slope of the Beaver Dam Mountains; Washington County, Utah.

BRY  Wood 140; 7 May 1964; approximately 3 miles west of the Virgin River on Utah highway 15; Washington County, Utah.

BRY  Higgins 499; 24 April 1966; approximately 5 miles west of 91 along the Jackson Road, Beaver Dam Mountains; Washington County, Utah.

BRY  Welsh, Atwood & Matthers 9542; 10 April 1970; Castle Cliff, Beaver Dam Mountains; Washington County, Utah.

UTC  Shultz, Shultz and Lowery 1636; 10 May 1975; associated with pinyon-juniper; purple sage, live oak; on southwest facing slope in sandy soil between the Clover and Delmar Mountains, 9 miles south of turn-off to Elgin from Caliente; Lincoln County, Nevada. (T5S;R66E;Sec28)

BRY  Atwood 6577; 4 May 1976; Castle Cliffs, east side of the Beaver Dam Mountains; Washington County, Utah. (T42S;R17W;Sec26)

UNLV  Niles & Leary 1905; 26 May 1977; 3,700 ft; with Chrysothamnus teretifolius and Thamnosma in a granitic boulder pile, 1.2 miles southwest of junction of Scanton Ferry and Gold Butte Roads; Clark County, Nevada.
Figure 20. Occurrence of Phacelia anelsonii (Macbr.) Pays. in areas contiguous to LAME. Diagonal lines on regional map insert indicate state counties in which the species/viety/subspecies has been reported to occur.
Phacelia anelsonii Macbride

EXPLANATION
- Lake Mead National Recreation Area Boundary
- Camps
- Limiting Strip
- Springs
- In many Ponds
- Boundary of Grand Canyon National Park
  (Area was expanded in 1975 to include the
  area north of Colorado River near Arizony)
  was in the UVMRA)

LIFE ZONES
LAK MEAD NATIONAL RECREATION AREA
ARIZONA NEVADA
Figure 21. Phaecelia anelsonii Macbr. Plant, x1; flowers, dissected longitudinally, x5; seed, x10.
Lewis (1965) recognized two subspecies of Rosa stellata in his monograph of Rosa in North America. The Arizona collections were not addressed in this treatment but the differentiating character is the presence of stellate pubescence on the floral branches. Kearney and Peebles (1969) describe variable pubescence for the Arizona material and thus they may represent both subspecies as described by Lewis. The single Lake Mead population would most closely fit the description of Rosa stellata subsp. stellata. In the review of status report submitted to Congress in 1975 the taxon was not listed at the subspecific level, thus all subspecific taxa must be included.

ROSA STELLATA Wooton subsp. STELLATA

SYNONOMY:

Hesperhodos minutifolia Engelm.
     subsp. stellata (Wooton) Hurst

Hesperhodos stellata (Wooton) Boulenger

STATUS:

Candidate Threatened (House Document 94-51, 1975)

ORIGINAL LITERATURE CITATION:


ROSA STELLATA Wooton subsp. MIRIFICA (Greene) Lewis

SYNONOMY:

Rosa mirifica Greene

Rosa vernonii Greene

Rosa stellata Wooton
     var. mirifica (Greene) Cockerell

Hesperhodos minutifolia Engelm.
     subsp. mirifica (Greene) Hurst
Hesperhodos mirificus (Greene) Boulenger

STATUS:
Candidate Threatened (House Document 94-51, 1975)

ORIGINAL LITERATURE CITATION:

DESCRIPTION:
Much branched shrub, up to 60 cm high, armed with straight or slightly curved prickles; the young twigs often stellate-pubescent; leaves trifoliolate, leaflets wedge-shaped, 5 to 10 mm long and about as wide, toothed toward the apex, the teeth often glandular; flowers solitary and terminal on stout pedicels; sepals 15 mm long, lanceolate, caudate-acuminate at the apex, margins entire or serrulate, dorsally prickly and ventrally tomentose; petals ovate, rose-purple, 18-25 mm long and about as wide; fruit about 1 cm in diameter, with numerous prickles. Prominent field characters include the presence of dense prickles on the stem and fruit.

In Lewis' monograph, Rosa stellata subsp. mirifica is separated from the typical form by the absence of long stellate hairs on the floral branches. This subspecies is differentiated into two varieties by the angle of the floral branches and the presence of internodal bristles.

DISTRIBUTION/HABITAT:
Rosa stellata is reportedly widespread in southern New Mexico with isolated populations in western Texas and northern Arizona. The species is reported from five counties in southern New Mexico, two in western Texas and two in northern Arizona. The two subspecies occur sympatrically throughout their range but the var. erlansoniae is endemic to the Guadalupe Mountains of Texas and New Mexico.

The Arizona populations are restricted to limestone shelves and mesas in Coconino and Mohave Counties. Populations have been identified on both sides of the Grand Canyon at Dutton Point, Powell Plateau and Mesa Eremita at about 6,500 feet. Additional populations are reported from Kanab Canyon and Twin Point, the latter located within the Lake Mead National Recreation Area. Each of these have been identified on limestone substrate between 6,000 and 6,500 feet.
The Twin Point population, although not treated in the 1965 monograph, fits the description of Rosa stellata subsp. stellata. It covers approximately 500 sq. feet along the road four miles north of the Point. It occurs in a limestone-red clay soil, with individual plants as much as three feet in height, flowering in July. The plants occur with Pinus monophylla, Juniperus osteosperma, Artemisia tridentata, Coleogyne ramosissima, Polygala subspinosa and Hymenoxys cooperi. This stand is isolated, and surveys at Kelly Point failed to identify additional populations, however habitat is present in this area.

MANAGEMENT OPTIONS:

Rosa stellata as listed in the 1975 report submitted to Congress by the Smithsonian Institution does not qualify for its candidate threatened status. Two subspecies and one variety of this taxon have been described and it is unclear which may be nominated for protective status. The variety erlansoniae as described by Lewis (1965) is indeed a rare element and possibly may be the intent of the Smithsonian listing. However, because it is not clear of their intent, this report includes an analysis of the subspecific determinations. This step is being taken to recommend delisting Rosa stellata as cited in the Smithsonian Report.

When contacting the various states in which Rosa stellata occurs there was agreement that this species should be delisted. Bill Isaacs of the New Mexico Native Plant Protection Committee stated "Rosa stellata is relatively widespread...in no sense is it threatened." However, Dr. Arthur Phillips of the Museum of Northern Arizona stated "The Kanab Canyon population is almost certainly an undescribed subspecies." The Twin Point collections have been sent to Dr. Phillips for inclusion in his analysis and pending his results, recommendations may be formulated.

In the event that it is another subspecies and the Twin Point collection is the same, this population should be further monitored and mapped.

REFERENCES:


COLLECTIONS: Rosa stellata Wooton subsp. stellata

Type Collection:

UC Wooton s.n.; 30 April 1893; 5,500 ft; on rocky hillside, near the Cueva in the Organ Mountains; Dona Ana County, New Mexico.

Additional Collections:

US Wooton & Standley; 10 July 1897; Ash Canyon, San Andres Mountains; Dona Ana County, New Mexico. DUP:NEB

US Wooton s.n.; 23 September 1912; Ash Spring, San Andres Mountains; Dona Ana County, New Mexico.

UNLV Holland 690; 27 July 1975; 6,000 ft; with Juniperus, Artemisia and Agave in limestone on road to Twin Point, 10 miles south of road to Mt. Dellenbaugh, Shivwits Plateau; Mohave County, Arizona.

COLLECTIONS: Rosa stellata Wooton subsp. mirifica (Greene) Lewis

Type Collection:

US Wooton 193; 22 July 1897; 6,000 ft; two miles west of the Maescaloero Agency, White Mountains; Otero County, New Mexico.

Additional Collections:

MO Barlow s.n.; 12 August 1911; head of Rio Fresnal, Alamo National Forest; Otero County, New Mexico.

US Slater s.n.; August 1915; near Cloudcroft Alamo National Forest; Otero County, New Mexico.
GCNP Hawbecker 778; 12 June 1935; 6,500 feet in pinyon habitat, Mesa Eremita, South Rim Grand Canyon National Park; Coconino County, Arizona. (Annotated by Kearney 1945)

BRY Riffey 15505; 24 May 1958; 4,500 ft; head of the S.B. Trail, Grand Canyon; Coconino County, Arizona.

COLLECTIONS: Rosa stellata Wooton (not identified to variety)

GCNP Bryant & Cooper 2482; 17 July 1947; 7,500 ft; dry ledge overlooking the canyon, Dutton Point, Pwell Plateau, Grand Canyon National Park; Coconino County, Arizona.

UNLV Holland 690; 27 July 1975; 6,000 ft; with Juniperus, Artemisia and Agave in limestone on road to Twin Point, 10 miles south of road to Mt. Dellenbaugh, Shivwits Plateau; Mohave County, Arizona.

WTS Higgins 6893; 22 May 1973; between High Rolls and Cloudcroft on rocky hillside in oak-pinyon association, Fresnal Canyon, Sacramento Mountains; Otero County, New Mexico.

NMC Wooton; 26 May 1905; in Fillmore Canyon, Organ Mountains, (Fort Bliss Military Reservation); Dona Ana County, New Mexico.

NMC Hershey; 26 October 1935; 8,000 ft; in Karr Canyon, Sacramento Mountains, Lincoln National Forest; Otero County, New Mexico.

NMC Hinricks, Knight & Atkinson; 2 May 1949; Rock Hills at Rope Springs, San Andres Mountains (White Sands Proving Grounds); Otero County, New Mexico.

UNM Anonymous; June 1936; Mescalero Apache Indian Reservation, Forman Party Grazing District Number 5; Lincoln County, New Mexico. (T15S;R16E;Sec1)

UNM Dunn & Lint; 27 July 1948; 6,000-7,000 ft; on northeast slope of Oscura Peak, Oscura Mountains (White Sands Proving Ground); Socorro County, New Mexico.

US Wooton; 10 July 1897; 6,000 ft; White Mountains; Lincoln County, New Mexico.

BRY Higgins 6893; 22 May 1973; between Hi Rolls and Cloudcroft in oak-pinyon vegetation; Otero County, New Mexico.

BRY Higgins 7323; 19 June 1973; in limestone with pinyon-juniper in Dark Canyon; Lincoln National Forest; Guadalupe Mountains; Eddy County, New Mexico.
BRY Higgins 9223; 28 April 1974; 4,000-7,800 ft; along ridge road southwest of Dark Canyon; Lincoln National Forest; Guadalupe Mountains; Eddy County, New Mexico.

BRY Gierisch 4388; 8 June 1978; 5,200 ft; Kanab Creek Overview; Mohave County, Arizona. (T38N;R3W;Sec30)

MNA Phillips; 1979; small population in Kanab Canyon; Mohave County, Arizona.
Figure 22. Rosa stellata Wooton. Plant, x1; stem section, x15. Regional map shows state counties in which the species/variet/subspecies has been reported to occur.