PARISH'S DAISY
Erigeron parishii Gray

Author: Andrew C. Sanders, Herbarium, Department of Botany and Plant Sciences, University of California, Riverside, CA 92521-0124

Management Status: Federal: Threatened
California: S2.1, G2 (CDFG, 1998)
CNPS: List 1B, RED code 2-3-3 (Skinner and Pavlik, 1994)

General Distribution:

Parish's daisy is endemic to southern California and is restricted to the dry calcareous (primarily limestone) slopes of the San Bernardino Mountains, with a few collections from generally granitic areas at the east end of the San Bernardino Mountains and in the Little San Bernardino Mountains. The substrate at the sites where the species was collected away from the major carbonate deposits has often not been clearly specified and needs clarification. Most of the populations are on lands within the boundary of the San Bernardino National Forest. This species is reported by Nesom (1993) only from Cushenbury Canyon on the north slope of the San Bernardino Mountains, but specimens exist documenting its occurrence in many other nearby areas. There are reported to be 50 occurrences (USFWS, 1997) but many of these probably represent reports of different parts of single populations. Specific localities include: mouth of Marble Canyon (BLM land); Arctic Canyon, Bousic Canyon, Furnace Canyon, Grapevine Canyon, Cactus Flat (head of Cushenbury Canyon); Cushenbury Spring; Horsethief Flat, near Blackhawn Canyon, limestone outcrop 1.5 mi. (2.5 km) NE of Baldwin Lake, 6200 ft. (1890 m); 8 miles (13.3 km) S of Warren's Well [= site of Yucca Valley Airport], and E of Long Canyon, 3600 ft.(1100 m). The latter two localities are in the Little San Bernardino Mountains.

There have been, over the years, a number of reports and collections that indicate that this species occurs in the Eastern Mojave Desert in the vicinity of the Ivanpah Mountains but these have all, upon examination, proved to be errors, usually based on the vaguely similar *Erigeron concinnus* (H. & A.) Torr. & Gray [=*E. pumilus* var. *concinnoides*] and the species has never been reported from that area by any major flora (e.g., Nesom, 1993; Munz, 1974). It has also been erroneously reported from other areas based on the related *E. utahensis* (USFWS, 1997), which occurs on limestone slopes in the Providence Mountains (Nesom, 1993).

The Cactus Flat locality is somewhat dubious in that the habitat is not typical (largely or entirely granitic instead of calcareous) and it is based only on an old Marcus Jones collection. It is probable that Jones was camped at Cactus Flat and collected the *Erigeron* in the carbonate either below in Cushenbury Canyon, above in the Lone Valley area, or around Blackhawk Mtn. Jones is fairly notorious for generalized localities based on the site where he stayed and collected out from (e.g., Barstow, Blythe, etc.) and he is responsible for highly dubious records from a number of locations. There are also comparable problems with the Little San Bernardino Mountains locality, in that two of the three collections are by Edmund Jaeger. Jaeger had a life-long habit of intentionally misplacing or blurring collection sites slightly in order to protect the identity of his favored camping localities (P. Roos, pers. comm.). One of his Parish's daisy specimens, in fact, is merely labeled "Joshua Tree National Monument", but is generally presumed to be from the same

site as his more precisely located specimen taken four days earlier. There is a more recent reported collection by P. Leary from the same area, which means that the species probably does occur, although the identity of the Leary specimen (presumably located in the herbarium at Univ. of Nevada, Las Vegas) seems not to have been confirmed. A search for the species in the late 1980s failed to find the Little San Bernardino Mountains locality and did not find any suitable habitat (either suitable washes or carbonates) in the area where it was reported. At least some people think the species was erroneously mapped (K. Barrows, pers. com., 1997). The CNDDB (CDFG, 1989) reports this locality as having the plant "growing out of a steep slope beneath pinyon pine" which is a somewhat unusual habitat for the species given the its preference for washes and loose soil elsewhere, but the plant does occur on dry slopes in the San Bernardino Mountains. The most serious peculiarity of this site is that there is no carbonate rock reported in the area (Dibblee, 1967a), and the labels of the collected specimens do not specify substrate.

Distribution in the West Mojave Planning Area:

Parish's daisy barely enters the WMPA along the north foot of the San Bernardino Mountains from the vicinity of Gordon Quarry on the west to the Terrace Springs/Round Mountain area on the east. It also occurs in the Pioneertown/Burns Reserve area at the eastern foot of the range, and reportedly in the Little San Bernardino Mountains in the western end of Joshua Tree National Park. There is also a reported location at Rattlesnake Canyon, E of Terrace Springs, but this needs confirmation. All known locations along the north side of the San Bernardino Mountains appear to be within one mile (1. 6 km) of the San Bernardino National Forest boundary, except perhaps for the site at Rattlesnake Canyon, if that is confirmed. Reported localities within the WMPA include: 0.25 mi. (0.5 km) NW of Cushenbury Springs on the outwash fan of Marble Canyon, 4080 ft., T.3N R.1E Sec 11; 1.1 mi. (2 km) NE of Cushenbury, 4680 ft. (1425 m), T.3N R.1E Sec 12; 0.6 mi. (1 km) SE of Cushenbury Springs, 4320 ft. (1320 m), T.3N R.1E Sec 11; mouth of Bousic and Furnace Canyons, elev. 4320-4600 ft. (1400 m), T.3N R.1E Sec 7; outwash fan NW of Arctic Canyon, 4200 ft., T.3N R.1E Sec 8; and lower Arrastre Creek. Anomalous locations in granitic areas include: 8 miles (13.3 km) south of Warren's Well [= site of Yucca Valley Airport], east of Long Canyon, 3600 ft. (1100 m), T.1S R.5E Sec 35 [apparently somewhere south of the present Black Rock Campground]; Rattlesnake Canyon, south of Old Woman Spring, 3800 ft.(1160 m), T.3N R.3E [this is a granitic area with no carbonates reported in the immediate vicinity (Dibblee, 1967c) but there is limestone a few miles west at Round Mountain/Terrace Springs and this species has been reported from near Terrace Springs -- it may be that the locality is slightly misplaced]; and north of [UC] Burns Pinyon [Ridge] Reserve, NW of Yucca Valley, 4140 ft. (1260 m).

Natural History:

Parish's daisy is an herbaceous perennial with a long simple tap root that extends for some distance (perhaps 50 cm) into the loose carbonate alluvium, which the species favors. This species was first described by Asa Gray in 1884 from specimens collected by S.B. Parish (#1251) at Cushenbury Springs in May 1881 (Ferris, 1960; Krantz, 1979). Though, oddly, the second edition (apparently unaltered) of the original description (Gray, 1888) merely says "rocky cañons, borders of the Mojave Desert, S.E. California, *Parish.*" Later authors must be relying on additional information derived from the label on the type specimen, since their locality descriptions are more expansive than the original description.

The stems are erect or ascending and may be either numerous or rather few on each plant, but on mature plants are typically at least 20 in number. The stems tend to be faintly zig-zag rather than straight. They arise from a somewhat woody base that usually bears the remains of previous years branches. The plants are 3-12 in. (7-30 cm) tall and have the stems and foliage covered with a conspicuous, loose, whitish to grayish appressed pubescence. This pubescence is particularly thick and persistent on the stems and these often stand out as whiter than the leaves. The older leaves appear to gradually lose pubescence so that they are often greener than the rest of the plant. The pubescence is often described as silvery-white. The leaves are slender and entire.

The flower heads are solitary on bracted, almost leafy, peduncles, but there are commonly 2-4 peduncles per stem. The total number of heads on a mature plant can easily equal 50 in a given season. The heads bear lavender ray flowers and yellow disk flowers.

The method of pollination is unknown for Parish's daisy, but is certainly by insects, based on the conspicuously colored flowers. Likely candidates include bees, butterflies or long-tongued flies, based on the known pollinators of other composites of similar general flower structure. Seed dispersal is unstudied as is the relative importance of seeds versus possible vegetative spread in the maintenance and expansion of populations, though seedlings have been reported at several sites (Krantz, 1979) and are probably the predominant mode of reproduction. Flowering is reported to occur from May to July (Krantz, 1979), but the peak of flowering seems to be from mid May to mid June. At least in some years a few plants continue flowering into July and some even into August (M. Provance, pers. com., 1998). Flower heads have been found to be attacked by insect larvae [Tephritid flies?] but the extent and effect of such damage is unknown, though reported to be "not widespread" (Krantz, 1979).

Habitat Requirements:

Parish's daisy is largely restricted to carbonate substrates, but has been found on other rock types occasionally. Plants appear to be most commonly found either along washes on the canyon bottoms or on loose alluvial deposits on adjacent benches, but are also regularly found on steep rocky slopes. It appears that the Pioneertown site is primarily granitic, but along the washes where the species occurs there are reported to be some carbonate materials washed down from higher elevations (K. Barrows, pers. com., 1997). This is not certain and needs to be confirmed. There is limestone in the general vicinity (Dibblee, 1967b). It may be that the apparent carbonate preference is based on reduced competition from other plants on this substrate. Certain non-carbonate sites that are otherwise ecologically favorable could thus support the species. Two of the collections that appear to be from granitic areas are old (old collections are more frequently inaccurate or vague in their site data than more recent ones) and do not specify the substrate at the site where the plant was collected. However, there are recent reports of this species on non-calcareous, decomposed granite, slopes within the carbonate region on the north slope of the San Bernardino Mountains (M. Provance, pers. comm., 1998). These reports are very few, however. All sites where the soil was actually tested have been found to have strongly alkaline soils, regardless of predominant origin (M. Provance, pers, comm., 1998). This implies that even the granitic areas may have been somewhat influenced in their soil chemistry by drift from adjacent carbonate slopes.

Parish's daisy occurs, based on available specimens, at elevations from 3700-6600 ft. (1125 - 2012 m), though Nesom (1993) gives a range of 800-2000 m (2625-6560 ft.). The low

end of the range given by Nesom seems definitely to be in error as that elevation (2625 ft.) would put the species far out onto the flats of the Mojave Desert, where it has never been collected.

Population Status:

This species is naturally of rather restricted distribution and is probably largely confined to a very specific substrate that is not of wide occurrence within its range. That particular substrate (limestone) has become economically valuable in recent years and so many populations have been destroyed or damaged by limestone mining.

Parish's daisy is clearly declining, much habitat has been destroyed by limestone mining, but is still among the more common of the carbonate endemics of the San Bernardino Mountains. This species was reported to be "abundant on stony hillsides at Cushenberry Springs" by Hall (1907), which suggests a change in abundance over the past 90 years, but this is obviously not conclusive since the precise meaning of "abundant" in Hall's mind is unknown. It is possible that Hall never actually saw the plant at this site, since he notes that as of the date he wrote only Parish had collected it. He may have based his description of daisy abundance on notes on one of Parish's collections or on discussions with Parish (whom he knew personally). If Hall had seen it himself, at a suitable season, it seems likely he would have collected the plant.

Parish's daisy seems better able to recover after disturbance than some carbonate endemics. There is considerable need for clarification of its distribution and substrate preference at the eastern end of the San Bernardino Mountains (Pioneertown area) and in Joshua Tree National Park. These are areas where the reported occurrence is based on just a few specimens, often very old or poorly located (especially with respect to substrate). There were fewer than 25 occurrences of this species known prior to its listing as threatened by the USFWS, with a total of ca. 16,000 individuals reported. But, that occurrence total has since been increased to ca. 50 (USFWS, 1997). There are several problems with both the original estimate and this expansion based on the newer "occurrence" estimate. The largest problem is that it is not at all certain that the various reported occurrences actually represent separate populations or that some of the individuals reported in one "occurrence" are not also reported again in another.

Threats Analysis:

The major threat, in fact the only significant one, to Parish's daisy is the ongoing mining of limestone by a series of large mining operations on the north side of the San Bernardino Mountains (pers. obs.; USFWS, 1994; Krantz, 1988). Virtually the entire range of this species is under claim by one mining company or another (USFWS, 1997) and there is the threat that, even though currently much of the population is on public lands, these mining claims will eventually be patented and move into private hands where protective management of this species will be much more difficult.

There has been some low density residential development in the Pioneer town area that poses a threat to this species, and more locally there are threats from sand and gravel mining, off-highway vehicles (USFWS, 1997), and other recreational activities. It has been reported that there is a substantial threat from gravel mines near the mouth of Cushenbury Canyon, but this is not yet obvious.

An indirect affect, associated with limestone mining and processing, is the spread of fine limestone dust over large areas in the vicinity of the mine and processing plant at the mouth of Cushenbury Canyon. This dust covers many areas, including the plants growing in these

locations. After moistening, this dust seems to harden into a cement-like coating. This dust is now effectively controlled, but a limited current problem may persist.

Biological Standards:

The most important issue in the protection of this species is clearly the need for the establishment of reserves that support adequately large populations of this species and that are protected from limestone mining. Exactly what would constitute "adequately large" still needs definition. There are no significant populations that are currently in protected status. The size of populations at the Burns Pinyon Ridge Reserve and in Joshua Tree National Park are completely unknown, but are apparently either very small or highly restricted in geographic extent such that they are very rarely observed. Even in the Bighorn Wilderness there are pre-existing mining claims that could be operated, if they are shown to be valid and if the value of the minerals is economically sufficient.

Literature Cited:

California Department of Fish and Game (CDFG). 1989. Database Report, Natural Heritage Division, Natural Diversity Data Base, Sacramento, California..

California Department of Fish and Game (CDFG). 1997. Special Plants List , Natural Heritage Division, Natural Diversity Data Base, Sacramento, California..

Dibblee, T.W. Jr. 1967a. Geological Investigations of the Joshua Tree Quadrangle [15'], U.S. Geological Survey, Misc. Geol. Invest. Map I-516.

Dibblee, T.W. Jr. 1967b. Geologic Map of the Morongo Valley Quadrangle [15'], San Bernardino and Riverside Counties, California, U.S. Geological Survey, Misc. Geol. Invest. Map I-517.

Dibblee, T.W. Jr. 1967c. Geologic Map of the Old Woman Springs Quadrangle [15'], San Bernardino County, California, U.S. Geological Survey, Misc. Geol. Invest. Map I-518.

Ferris, R.S. *In:* L. Abrams and R.S. Ferris (eds.). 1960. Illustrated Flora of the Pacific States, Washington, Oregon and California, Vol. IV, Bignoniaceae to Compositae, Stanford Univ. Press, Stanford, California.

Gray, A. 1888. Synoptical Flora of North America, The Gamopetalae, Vol. I, Part II, and Vol II, Part I, 2nd ed., Smithsonian Miscellaneous Collections # 501, Smithsonian Institution, Washington, D.C.

Hall, H.M. 1907. Compositae of Southern California, Univ. of California Publ.Bot. 3 (1):1-302, 28 Dec. 1907.

Krantz, T.P. 1979. A Botanical Investigation of Erigeron parishii. Unpublished report [prepared for U.S. Forest Service].

Krantz, Tim 1988. Limestone Endemics of Big Bear Valley, Fremontia 16(1):20-21.

Munz, P.A. 1974. A Flora of Southern California. Univ. of California Press, Berkeley, California.

Nesom, G.L. 1993. Erigeron in: Hickman, J.C. (Ed.). The Jepson Manual: Higher Plants of California. Univ. of California Press, Berkeley, California.

Skinner, M.W. and B.M. Pavlik (eds.). 1994. Inventory of Rare and Endangered Vascular plants of California. Special Pub. No. 1 (5th ed.). California Native Plant Society, Sacramento, California.

U.S. Fish and Wildlife Service (USFWS), 1997. San Bernardino Mountains Carbonate Plants Draft Recovery Plan, USFWS Region 1, Portland, Oregon.