THIRTY NEW LOCALITIES FOR *ERIOGONUM JONESII*

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This study was supported by a grant from the University of Arizona Herbarium who awarded this project through Endangered Species Act Section 6 funding from the U.S. Fish and Wildlife Service. It allowed us the opportunity to survey for the rare plant *Eriogonum jonesii* S. Watson. We here list thirty new localities (Table 1) and show them on a map in Figure 1, along with four previously known localities.

Table 1. Location and descriptions of *Eriogonum jonesii* sites.

Site	Latitude	Longitude	Number of Plants	Association*	Geology
k002	35.906372	-113.932915	25–100	Colram	Sandstone
k005	35.905757	-113.949709	25–100	Yucbre/Colram	Sandstone
k006	35.907270	-113.948802	100+	Pinmon-Yucbre/Colram	Limestone
k008	35.910642	-113.947143	25–100	Colram	Limestone
k009	35.911915	-113.948143	100+	Pinmon/Erijon/Muhpor	Obscured
k013	35.920640	-113.917621	100+	Junost	Obscured
k015	35.909009	-113.929635	100+	Pinmon-Junost/Aripur	Limestone
k019	35.920913	-113.938472	100+	Colram-mixed shrub	Limestone
s2	36.540992	-113.742610	25–100	Yucbre/Colram	Sandstone
s02	36.559245	-113.766156	100+	Colram/Brorub	Sandstone
s03	36.512562	-113.662818	100+	Encvir-Gutsar/Brorub	Sandstone
s04	36.498327	-113.660634	100+	Pinmon-Junost/Gutsar	Sandstone
s05	36.479740	-113.674438	100+	Arttri	Limestone
s06	36.456590	-113.787906	100+	Gutsar-Erijon/Brorub	Limestone
s07	36.454586	-113.787440	25–100	Colram-Gutsar	Limestone
t002	35.910921	-113.975536	100+	Colram-Gutsar	Limestone
t004	35.902869	-113.976065	200+	Yucbac-Nolmic-Gutsar	Sandstone

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Table 1. Location and descriptions of *Eriogonum jonesii* sites.

Site	Latitude	Longitude	Number of Plants	Association*	Geology
t005	35.904717	-113.976057	1–24	Colram	Sandstone
t006	35.916130	-113.971677	100+	Colram	Limestone
t007	35.919337	-113.978500	100+	Pinmon/Colram-Gutsar	Limestone
t008	35.908968	-113.932414	25–100	Pinmon-Junost/Falpar	Limestone
t009	35.915269	-113.934906	1–24	Colram-Erimic	Limestone
t010	35.916118	-113.935957	25–100	Junost/Aripur-Muhpor	Obscured
t011	35.918587	-113.938541	100+	Colram-Erijon	Limestone
t012	35.901353	-114.019904	100+	Yucbre/Colram	Limestone
t013	35.902981	-114.019023	100+	Colram	Limestone and granite
t014	36.562551	-113.751103	25–100	Pinmon/Colram	Sandstone
t015	36.536287	-113.661421	25–100	Falpar-Erijon	Limestone
t016	36.536313	-113.669072	100+	Junost	Limestone
t017	36.484549	-113.688989	25–100	Pinmon-Junost/Colram	Limestone

* Plant associations follow the United States National Vegetation Classification System described in text. Plant codes are: Arttri: *Artemisia tridentata* Nutt.; Aripur: *Aristida purpurea* Nutt.; Brorub: *Bromus rubens* L.; Colram: *Coleogyne ramosissima* Torr.; Encvir: *Encelia virginensis* A. Nelson; Erijon: *Eriogonum jonesii* Cronquist; Erimic: *Eriogonum microthecum* Nutt.; Falpar: *Fallugia paradoxa* (D. Don) Endl. ex Torr.; Gutsar: *Gutierrezia sarothrae* (Pursh) Britton & Rusby; Junost: *Juniperus osteosperma* (Torr.) Little; Muhpor: *Muhlenbergia porter* Scribn. ex Beal; Nolmic: *Nolina microcarpa* S. Watson; Pinmon: *Pinus monophylla* Torr. & Frem.; Yucbac: *Yucca baccata* Torr.; Yucbre: *Yucca brevifolia* Engelm.

These new sites triple the known sites within Mohave County for this rare species and extend the westward range south of the Colorado River by 65 km. The westward range of *Eriogonum jonesii* also appears to coincide with the western edge of the Grand Wash Cliffs. In the Hidden Canyon corridor, the two closest sites were 700 m apart, while the next closest sites were 1.4 km apart. Sites within Grapevine Canyon occurred much closer to each other, with several sites within 150 m of each other. Although close together, these sites were considered separate from one another due to the terrain surrounding them and site-specific vegetation. For example, although sites t010 and k008 are within 150 m of each other, the two sites are dominated by different vegetation associations (Table 1). The terrain here offers small-scale vegetation differences with changes in aspect and elevation occurring within relatively short distances over the landscape.

Although *Eriogonum jonesii* is more common and widespread than previously known, we believe that it still deserves protection because it is certainly restricted to specific substrate types. Additionally, the Grapevine Canyon corridor is witnessing a high degree of vehicular traffic as the Diamond Bar Road is the entryway to the Grand Canyon Skywalk. Our observations in the field on geology, pollinators, vegetation type/fire and threats follow.

GEOLOGY

Two dominant substrate types occurred at *Eriogonum jonesii* sites: limestone and sandstone. Limestone was recorded at 18 of 30 sites, sandstone at 9 sites, and the geology at the remaining sites was obscured by soil. One site (t013) occurring at the western edge of the lower Grand Wash Cliffs contained limestone at the upper edge of the site while the lower portion consisted of granite. This was the only time *E. jonesii* was found growing with granite as the underlying geologic type.

POLLINATORS

Eriogonum jonesii appears to be visited by many insects. These were seen on flowers in well over half of the sites visited (20 sites out of the 30 sampled). Of the insects seen, bees, particularly honeybees (*Apis mellifera*), were present at the most sites (11 of 30 sites). Butterflies and tarantula hawks (*Pepsis* sp.) were also seen frequently and in high numbers (Fig. 2A).

VEGETATION TYPE/FIRE

The community in which *Eriogonum jonesii* occurred was described following the United States National Vegetation Classification System, a system intended to describe vegetation types at the national level (Grossman et al. 1998). Within this system, the lowest vegetation level described is the association, defined by naming the dominant or co-dominant plants within a specific area. The vegetation stratum is taken into account within this description, so site descriptions often have a tree, shrub, and/or herbaceous component to them (strata are separated by a '/', while co-dominant plants within the same stratum are shown by using a '-' within the name).

Of the community types *Eriogonum jonesii* was found growing in, the association with *Coleogyne ramosissima* was the most prevalent (18 sites had *C. ramosissima* as part of the association name) (Table 1). *Coleogyne ramosissima* (blackbrush) shrubland (Fig. 2D) is a common community type found in the geographic and corresponding elevation range of the areas we surveyed (Phillips 1975). This survey is the first to document *E. jonesii* within *Yucca brevifolia* (Joshua tree) woodland, placing it within the transition zone between the Mojave Desert and Colorado Plateau.

One of the more interesting facets regarding the ecology of *Eriogonum jonesii* we gleaned from this study is the frequency in which it occurs in previously burned areas (Fig. 2B). We found *E. jonesii* in denser patches where the total vegetation cover was not so high, and where the communities were in the process of recovery from fire. Several of the burned sites (s06, s07, t004, t006) contained a high percentage of *Gutierrezia sarothrae* coverage, in addition to a high number of *E. jonesii* individuals. *Gutierrezia sarothrae* is a native plant known to invade areas after disturbance events. Whether or

not *E. jonesii* was found at these sites in such dense numbers (or at all) before the fires is unknown, though it is clear that there is a correlation between the presence of *E. jonesii* and disturbed areas.

However, we also encountered sites (t011, t012, k002) with high *Eriogonum. jonesii* numbers within dense blackbrush stands. This suggests *E. jonesii* may be part of intermediary successional stages, and its presence may suggest a past disturbance event within the area.

THREATS

The main potential threats encountered at our survey sites are all anthropogenic-related. These potential threats include cattle, vehicular traffic, dust (Fig. 2C), and infestations of non-native species, chiefly *Bromus rubens* (Fig. 2B).

Of the potential threats to *Eriogonum jonesii* occurrences, *Bromus rubens* may be the most hazardous. Both *E. jonesii* and *B. rubens* occupy disturbed sites; in a scenario where a fire burns through a site where both species are established, it may be that *B. rubens* could out compete *E. jonesii* for space as *B. rubens* is a highly competitive annual that can occur in high densities (Brooks 2000).

Although cattle signs were present at approximately 25% of the newly described *E. jonesii* sites, the visible damage caused to plants was minimal.

ACKNOWLEDGMENTS

We thank the University of Arizona Herbarium and the U.S. Fish and Wildlife Service. We also thank Lake Mead National Recreation Area, Grand Canyon National Park, and the Bureau of Land Management for facilitating this study, Sharon Altman (University of Nevada Las Vegas) for helping with project logistics and formatting the figures, and Ryan Porter (University of Arizona) for assisting with the map.

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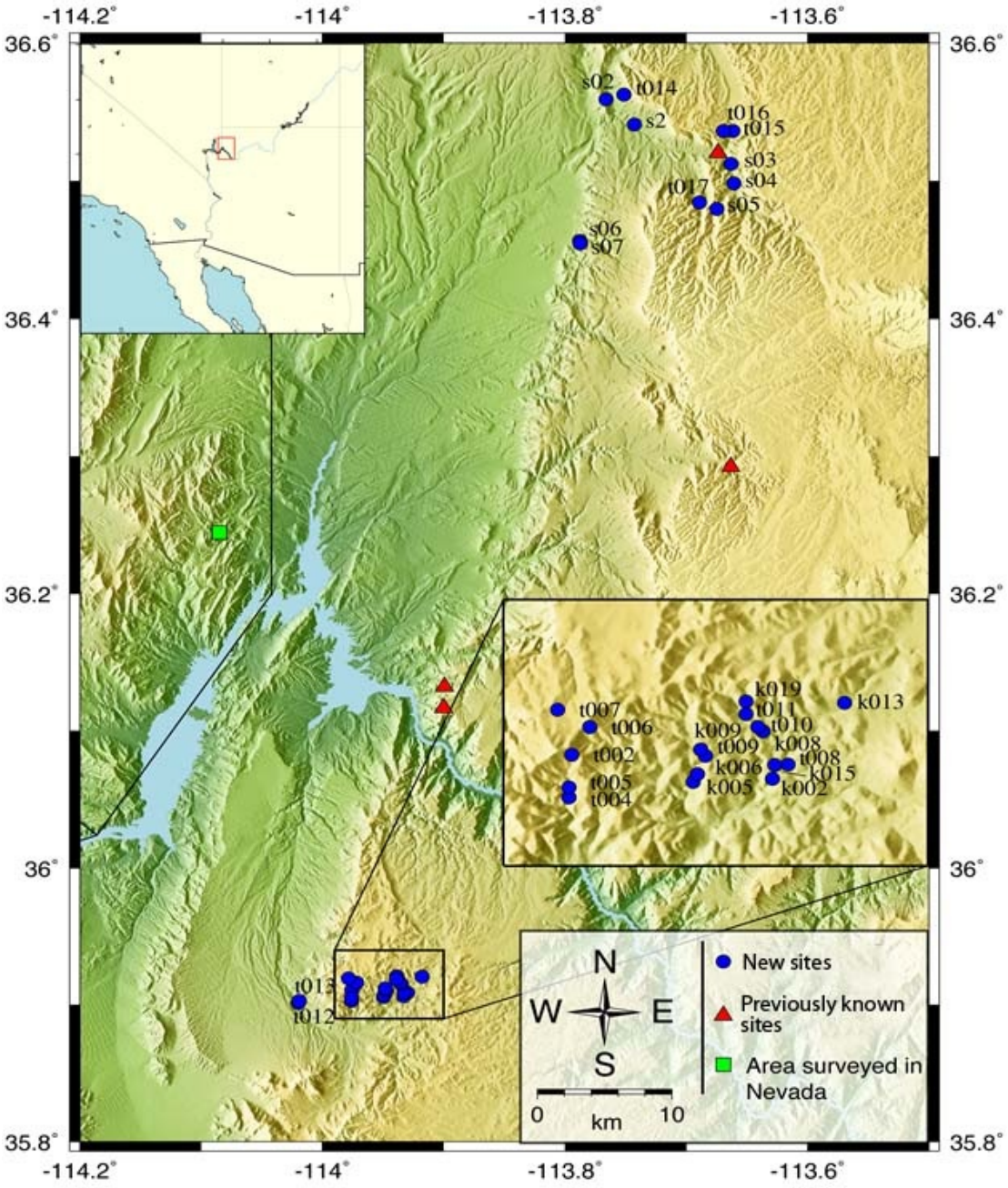

Figure 1. Map of the study area showing distribution of *Eriogonum jonesii*. Dot, new sites; triangle, previously known sites; square, locality in Nevada where no population was found.

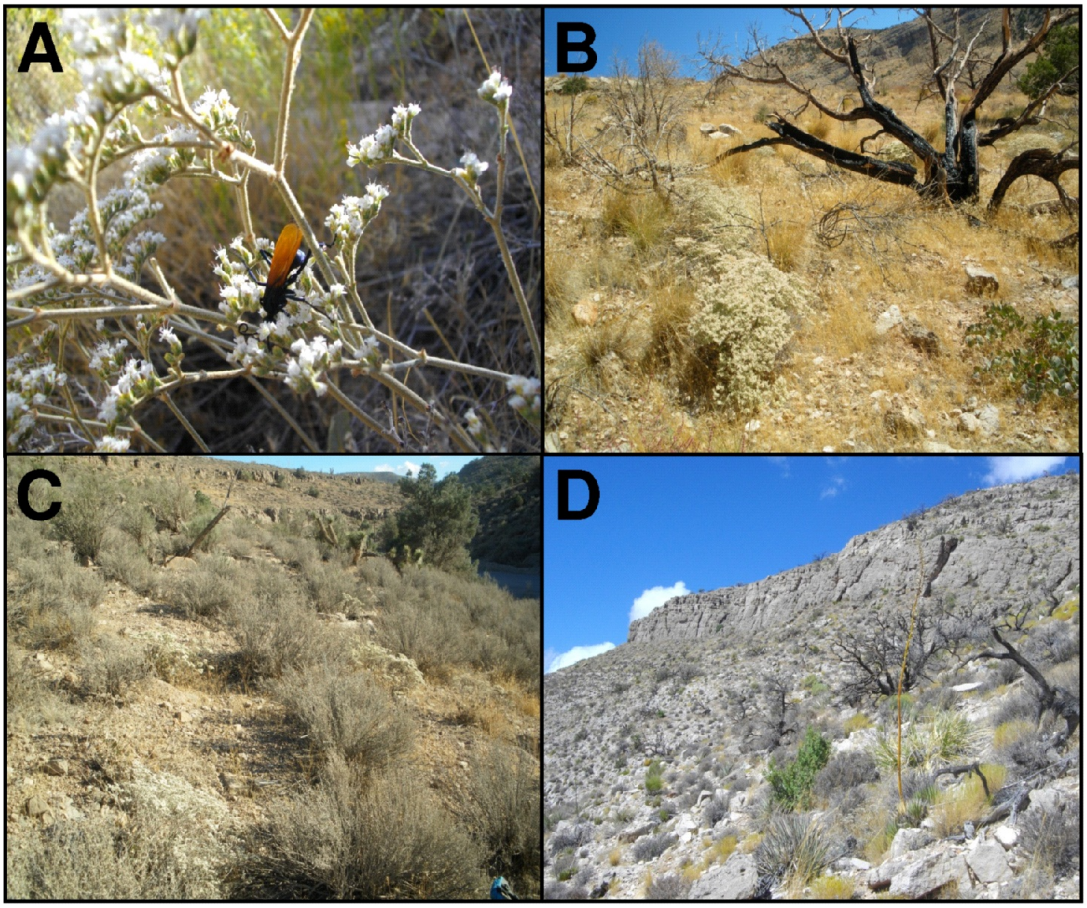

Figure 2. (A) Tarantula hawk visiting an *Eriogonum jonesii* inflorescence; (B) A burned site with *E. jonesii* and a high density of the annual invasive grass *Bromus rubens*; (C) Plants coated with dust along the Diamond Bar Road, which can just barely be seen in the background; (D) *E. jonesii* occurring in blackbrush shrubland in the lower Grand Wash Cliffs.