

Phacelia cloudcroftensis

(Cloudcroft scorpion-weed)

Status Report

2012



Daniela Roth

NM EMNRD – Forestry Division

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INTRODUCTION

Phacelia cloudcroftensis N.D. Atwood (Cloudcroft scorpion-weed) was described as a new species in 2007 from a single small population in Fresnal Canyon in the Sacramento Mountains of Otero County, New Mexico (Atwood 2007). In that same year the NM Department of Transportation killed the Fresnal Canyon population with an application of herbicides along the entire Highway 82 right-of-way. By 2009, only two individuals of *Phacelia cloudcroftensis* had reappeared in Fresnal Canyon and an additional three individuals were located in a tributary of Nogal Canyon near Bent, approximately 10 miles north of the Fresnal Canyon population (Sivinski 2009). Twelve adult plants and 25 seedlings were found within the Fresnal Canyon population in 2011 during a Native Plant Society survey effort (McGrath 2011). Additional areas were surveyed, but no new populations were found. Until 2012, this rare plant was therefore known from only two populations with very few individuals – one of which highly endangered by road maintenance projects, the other endangered by flood events. Additional field survey efforts were needed on the west slope of the Sacramento Mountains to study this species' distribution, abundance and habitat requirements to determine whether further actions are needed for the protection of this rare and possibly endangered plant.

Taxonomic Status and Description

Phacelia cloudcroftensis was first collected in the early 1960s by Helen Bobisud west of Cloudcroft in Otero County, NM. It was not described as a new species until 2007 (Atwood 2007). It was named for the town of Cloudcroft in the Sacramento Mountains.

Phacelia cloudcroftensis is a robust annual herb up to 8 dm tall (NMRPTC 1999). Cauline leaves are broadly lanceolate 3.8-10 x 1.4-4.6(5.5) cm, irregularly crenate-dentate or lobed, densely pubescent with dark stipitate to sessile glands and hirsute hairs. The lower and basal leaves are deeply lobed to pinnatifid. Inflorescences in cymes with 2 or 3 lateral branches; cymes elongate 8.5 to 15 cm in fruit. Corollas are tubular, pale blue or lavender, ca. 4-4.5mm long; stamens and styles are exerted 1-1.7mm. Capsules are oblong, 4.5-5 mm long, densely short-glandular; seeds 3, dark brown, 3.5-4.3 mm long, 1.2-1.7 mm wide, uniformly pitted, shallowly excavated from the upturned margins, ventral ridge usually corrugated on one side. Plants appear to germinate primarily in the spring (or possibly in response to monsoon rains during the summer) and flower from June through August to as late as September.

Phacelia cloudcroftensis is similar to, and geographically sympatric with, *P. texana*, but the corolla in *P. texana* is longer (greater than 4.5 mm) than in *P. cloudcroftensis* (less than 4.5 mm) (NMRPTC 1999). *Phacelia cloudcroftensis* is generally a taller, more robust plant of montane

habitats while *P. texana* is less robust and occurs in desert scrub and arid grasslands. Other montane scorpionweeds sympatric with *P. cloudcroftensis* are *P. alba* and *P. neomexicana*, but both of these have once or twice pinnately divided leaves while *P. cloudcroftensis* leaves are entire or are only pinnatisect near the base of the blade.

Habitat

Phacelia cloudcroftensis is known from disturbed sites in arroyo channels and along roads or trails, in mixed conifer forest down to upper piñon-juniper woodlands at elevations between 6,500 and 8,550 ft. It prefers limestone gravels derived from the San Andres and Yeso formations where it occurs on flat areas and along steep slopes, in open, exposed areas as well as under the shade of pine trees. It is associated with *Pseudotsuga menziesii* (Douglas fir), *Pinus ponderosa* (ponderosa pine), *Pinus edulis* (piñon), *Fallugia paradoxa* (Apache plume), *Cercocarpus montanus* (mountain mahogany), *Prunus virginiana* (chokecherry), *Quercus gambelii* (Gambel oak), *Rhus aromatica* (skunkbush), *Phacelia alba* (white phacelia), *Mentzelia rusbyi* (Rusby's blazing star), *Gaura mollis* (velvetweed), *Ulmus pumila* (Siberian elm), *Verbascum thapsus* (mullein), *Cirsium vulgare* (bull thistle), *Carduus nutans* (musk thistle), *Yucca baccata* (banana yucca), and *Philadelphus microphyllus* var. *argyrocalyx* (silvercup philadelphus).

The high Sacramento Mountains receive some of the largest amounts of rain and snow in New Mexico. Cloudcroft receives an average of 29 inches of rain, ranging between 19 and 39 inches over the last 17 years (WRCC 2012). Most precipitation falls as summer monsoon rains from July through September.

Conservation Status and Management

The New Mexico Rare Plant Technical Council has adopted the R-E-D code system which is a three-element ranking system giving information on rarity (R), endangerment (E), and distribution (D) of a species (NMRPTC 1999). *Phacelia cloudcroftensis* has a R-E-D code of 3-2-3, indicating that occurrences of the species are limited to one or a few highly restricted populations, or present in such small numbers that it is seldom reported (3), that the species is endangered in a portion of its range (2), and is endemic to New Mexico (3).

NatureServe (2012) ranks *P. cloudcroftensis* as a G1 species. The G1 (Global) rank indicates a species that is "Critically imperiled globally because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction. The New Mexico Natural Heritage Program has given *P. cloudcroftensis* a State ranking of S1 (critically imperiled in the state) for the same reason.

Phacelia cloudcroftensis is listed as a Forest Service Sensitive Species. The Forest Service defines sensitive species as those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density and habitat capability that would reduce a species' existing distribution (FSM 2670.5). Management of sensitive species "must not result in a loss of species viability or create significant trends toward federal listing" (FSM 2670.32).

Phacelia cloudcroftensis has been informally acknowledged as a "Species of Concern" by the US Fish & Wildlife Service (NMRPTC 1999). The Fish & Wildlife Service defines a Species of Concern as "A taxon for which further biological research and field study are needed to resolve their conservation status OR are considered sensitive, rare, or declining on lists maintained by Natural Heritage Programs, State wildlife agencies, other Federal agencies, or professional/academic scientific societies".

The State of New Mexico through its Energy, Minerals and Natural Resources Department-Forestry Division has also informally identified *Phacelia cloudcroftensis* as a "Species of Concern" (NMRPTC 1999). The EMNRD-Forestry Division defines a Species of Concern as "A New Mexico plant species, which should be protected from land use impacts when possible because it is a unique and limited component of the regional flora".

METHODS

The focus of this study was to survey known populations and potential habitats for *Phacelia cloudcroftensis* on the west slope of the Sacramento Mountains to determine the distribution and population densities of this species, as well as getting a better understanding of the habitat requirements and threats. Surveys were performed by radiating outward from known populations into accessible areas on Forest Service lands. Special emphasis was given to habitat types similar to the two known populations. Surveys were done by driving and walking, with special focus on targeting areas considered to be potential habitat. Occurrences were mapped in UTM's (NAD 83), with a Garmin eTrex Vista GPS. When occurrences were located habitat characteristics, population size, phenology, and potential threats were documented. Surveys took place during July and August of 2012.

Phacelia cloudcroftensis 2012 Survey Routes and Populations

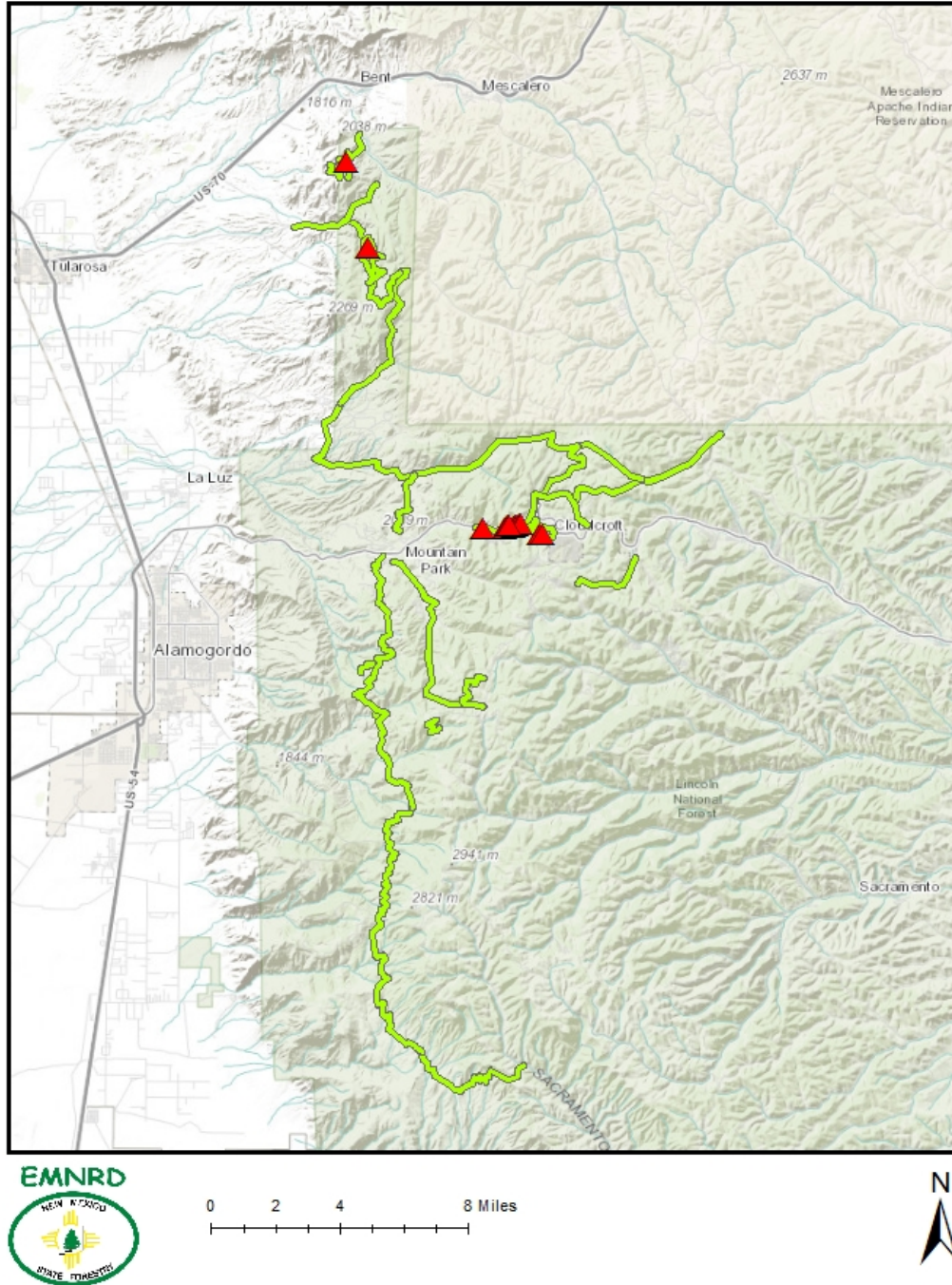


Figure 1. Survey routes and population sites for *Phacelia cloudcroftensis* in the Sacramento Mountains, Otero County, NM, in 2012.

RESULTS

The western slopes of the Sacramento Mountains were surveyed along roads and trails from the known site south of Bent to approximately 17 miles south of the type locality in Fresno Canyon (approximately 30 linear miles, Figure 1). Despite the extensive survey effort, only 3 new locations were found in 2012. A total of 293 plants were found in 4 locations (Table 1). All plants were bolting or flowering. One site included a number of dead plants, likely due to the lack of moisture (Trestle Trail population). McGrath reported seedlings at the type locality during the August 2011 survey for the Native Plant Society of New Mexico (McGrath 2011). The type locality was surveyed again in September 2012 to check for germination and establishment of seedlings in response to summer monsoon rains. None were found. No seedlings or rosettes were found at any of the population sites visited during this survey. Therefore it is assumed that plants germinate and establish primarily in the spring, in response to spring moisture.

Table 1. Population sites and total number of plants found in the Sacramento Mountains, Otero County, NM, in 2012.

Population Site	Number of Plants	New Population
Fresno Canyon	205	No
South of Bent	0	No
Ysletano Road	1	Yes
Old Cloudcroft HWY	12	Yes
Trestle Trail	75	Yes
Total Plants	293	

Known Sites

1. Fresno Canyon - Type Locality

In mid-July of 2012 a total of 204 individual plants were located at the type locality along HWY 82 in Fresno Canyon. All plants were located on the north side of the road, east and west of the pedestrian bridge, extending for approximately 0.5 miles from UTM 13 427728E 3647152N to 428587E 3647366N. Plants were growing in groupings of 5 to 75 individuals and were either bolting or flowering. No seedlings or rosettes were observed.

Extended surveys along the HWY, east and west of the type locality, resulted in only one additional plant, about 1 mile west of the known sites (UTM 13 426631E 3647150N +-15ft).

Habitat Characteristics

All plants were located along a rocky, steep, S-facing roadcut, in the immediate vicinity of the HWY (Figure 2). Soils are derived from limestone of the San Andres Formation at elevations ranging from 7,400 ft. to 7,770 ft. Plants were growing in full sun and partial shade. Associated species include *Pinus ponderosa*, *Pinus edulis*, *Cercocarpus montanus*, *Prunus virginiana*, *Gutierrezia sarothrae*, *Carduus nutans*, *Phacelia alba*, *Mentzelia rusbyi*, *Gaura mollis*, *Ulmus pumila*, *Verbascum thapsus*, *Cirsium vulgare*, *Elymus canadensis*, *Yucca baccata*, *Artemisia sp.*, *Penstemon sp.*, and *Philadelphus microphyllus var. argyocalyx*.

Threats

Threats to this populations include road maintenance and construction activities, including herbicide application, mowing, road improvement projects, and removal of debris. Observed invasive nonnative species include Siberian elm (*Ulmus pumila*), musk thistle (*Carduus nutans*) and bull thistle (*Cirsium vulgare*).

2. South of Bent

Access into the unnamed canyon south of Bent, the second known location of *Phacelia cloudcroftensis*, was gained through private property from Nogal Canyon. The entire canyon, including side drainages, was surveyed without success. Only 3 plants were found in 2009 during previous surveys by Bob Sivinski, on the dry gravel creek bed.

Habitat Characteristics

Grows in partial shade of *Pinus ponderosa*, *Pinus edulis*, and *Quercus undulata* on the canyon bottom on alluvial sand, gravel and cobble derived from the Yeso Formation, at 6,500 ft.

Threats

Seasonal flooding was listed as a potential threat in 2009. A large flood in July of 2012 may have destroyed any plants persisting on the canyon bottom. No plants were found. The landowners that granted access across their property reported that a flash flood had occurred in the canyon on July 10, 2012. They considered this event a 30-year flood, which had moved large amounts of rock and destroyed their fence. No invasive species or other threats were observed in the area in 2012.

New Population Sites - 2012

1. Ysletano Road

One plant was found along the Ysletano/Virden Road (NF Road 329b) at UTM 13 420918E 3661196N +/- 13ft (Figure 2). The plant was very robust and in full flower. I surveyed all along the road and in the dry gravel creek bed adjacent to the road, and a canyon leading up to North Tank and did not find any other plants, including seedling or rosettes.

Habitat Characteristics

A single plant was growing in the shade of ponderosa pine and Gambel oak in the immediate vicinity of the road, on a berm created by a road grader (Figure 2). It grew in limestone gravel derived from the Yeso Formation at 7,040 ft. Associated species included *Pinus ponderosa*, *Quercus gambelii*, *Pseudotsuga menziesii*, *Rhus aromatica*, *Oenothera sp.*, *Achillea millefolium*, and *Phacelia alba*.

Threats

Threats to this population include road maintenance and improvement activities, and herbicide application. No invasive species or other threats were observed in the area in 2012.

2. Old Cloudcroft HWY

Twelve plants were found along the Old Cloudcroft HWY Trail (FS # 5002), about 0.5 miles west of Cloudcroft (UTM 13 429523E 3646822N +/-11ft) (Figure 2). All plants were flowering. No seedlings or rosettes were observed in the vicinity.

Habitat Characteristics

Plants were found growing on and along the trails, in limestone gravels derived from the San Andres Formation, at 8,440 ft. elevation (Figure 2). Plants were growing in a flat area with southern exposure under partial shade in association with *Pinus ponderosa*, *Hedeoma drummondii*, *Cercarpus montanus*, *Prunus virginiana*, *Melilotus officinalis*, and *Fallugia paradoxa*.

Threats

Plants were growing on and right along the trail (Figure 2). This trail is open to OHV traffic, including motorcycles and ATVs, biking, hiking, and horses. Therefore plants are susceptible to being negatively impacted by any of these activities. Other threats include trail maintenance

and improvements activities, and invasive species. In 2012, yellow sweet clover (*Melilotus officinalis*) was the only documented invasive nonnative species observed.

3. Trestle Trail

Seventy-five plants were found along the Cloud Climbing Trestle Trail (FS # 5001), 50 were alive and flowering and about 25 dried up and dead. (UTM 13 429659E 3646798N +-11ft) (Figure 2). The dried up plants were small and located in areas with full exposure to the sun. They had bolted but likely did not receive enough water to make it to full maturity. No seedlings or rosettes were observed.

Habitat Characteristics

Plants were growing on steep gravelly limestone slopes derived from the San Andres Formation at 8,550 ft (Figure 2). Plants were found on exposed southern exposure slopes in full sun and partial shade. Associated species include *Pinus ponderosa*, *Cercocarpus montanus*, and *Quercus gambelii*.

Threats

Plants were found on steep slopes immediately next to the trail. Motorized traffic is not permitted along this trail. Due to the proximity of the trail and the annual nature of the plant, there is the potential that plants may be impacted by hiking activities, if they germinate and establish along or on the trail in the future (see other locations for this species). In 2012 no plants were observed on the trail. Other threats include trail maintenance and improvement activities. No invasive species were observed in the vicinity of this population in 2012.

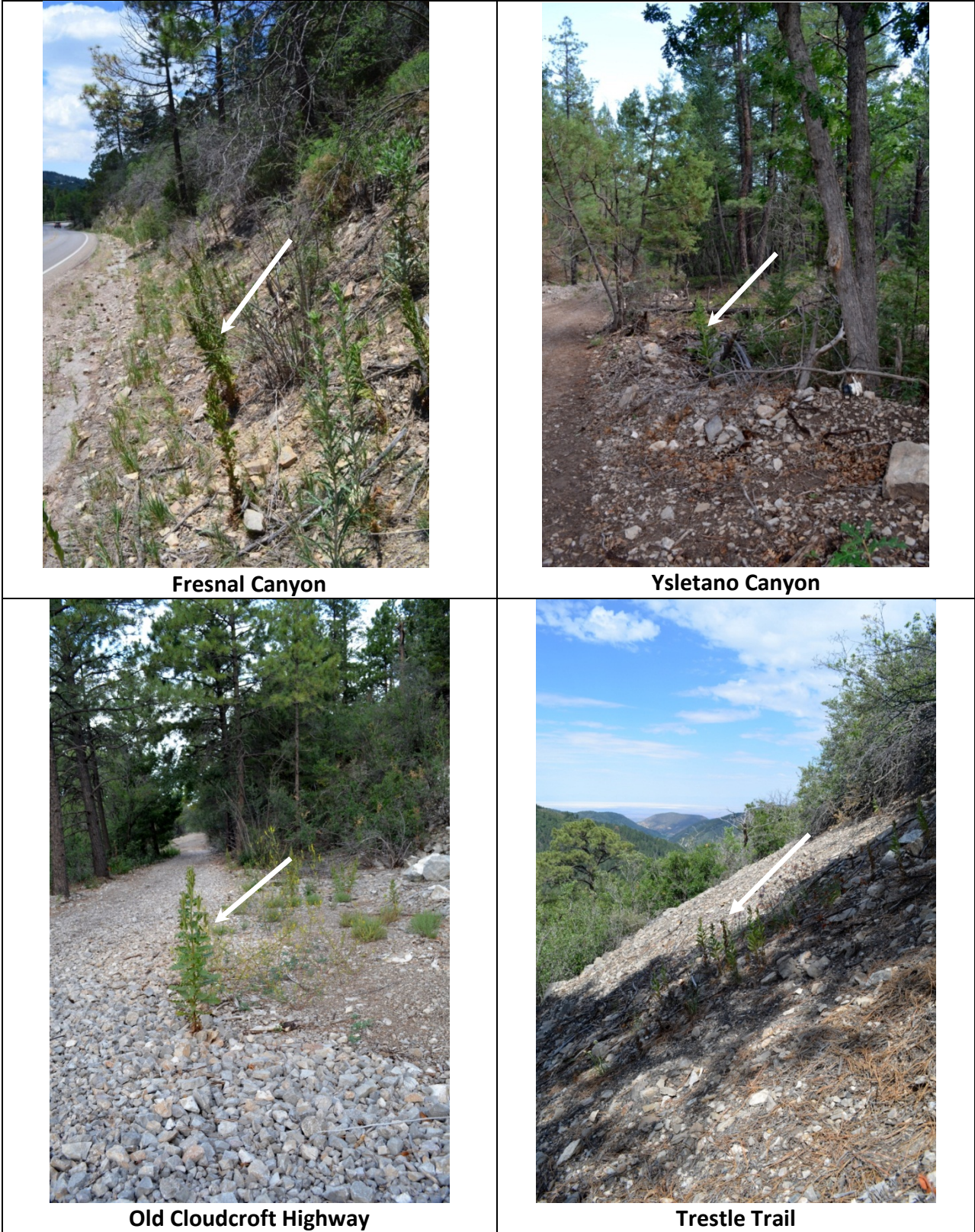


Figure 2. *Phacelia cloudcroftensis* occupied population sites and habitat, Sacramento Mountains, Otero County, NM, 2012.

CONCLUSIONS AND RECOMMENDATIONS

The 2012 survey effort shed some light into the rarity, distribution, habitat requirements, and threats of *Phacelia cloudcroftensis*. Despite extensive survey efforts, only 3 small new populations were located. One of the two previously known populations was not located in 2012 and was likely destroyed by a flood event. It is likely that a seedbank persists at the South of Bent population site and that plants will be found in the area in the future.

Phacelia cloudcroftensis appears to be adapted to grow in disturbed sites among limestone gravels derived from the Yeso or San Andres formations at an elevation range extending from 6,500 to 8,550 ft. It can grow in shady areas as well as in areas exposed to full sun, on all aspects and slopes. Given these habitat characteristics, which are common in the Sacramento Mountains, it is unclear why the distribution and abundance of this species appears so limited. *Phacelia cloudcroftensis* is an annual species, germinating primarily in the spring. Therefore spring moisture amounts are essential to the germination and establishment of this species. Unfortunately rainfall data has been incomplete in 2011 and 2012 and therefore no reliable information is available of rainfall amounts for these past 2 years within the range of the species (WRCC 2012). It is likely that more populations are present in the form of dormant seeds in the seedbank, but they did not receive enough rainfall in 2011 or 2012 to establish larger or additional populations. Given the annual nature of the species and its reliance on spring rainfall amounts, only multi-year survey efforts would give a good understanding of the species' abundance and distribution. Additional surveys should be conducted at a minimum during years with good spring precipitation.

All extant known populations are located in the immediate vicinity of roads or trails where they are highly susceptible to impacts associated with trail and road maintenance and improvement projects as well as impacts associated with regular trail and road use. Known populations should be avoided during regular maintenance and improvement activities along trails and roads to minimize impacts to these populations.

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