

Wright's Marsh Thistle

(Cirsium wrightii)

2017 – 2019 Monitoring Report

Blue Hole Cienega Nature Preserve

Santa Rosa, NM



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INTRODUCTION

Cirsium wrightii A. Gray (Wright's marsh thistle) is a wetland thistle that occurs in wet meadows associated with alkaline springs and seeps (ciénegas) primarily in New Mexico, and a few historic locations in Arizona and northern Mexico (Sivinski 2012). It is believed to be extirpated from all previously known locations in Arizona. Several historic locations in Mexico are also reported extirpated (Sanchez Escalante 2018a). *Cirsium wrightii* has recently been documented and verified from one location in Mexico and one location from Texas (Nesom 2018; Sivinski 2018; Sanchez Escalante 2018b).

Cirsium wrightii is state listed endangered in New Mexico (19 NMAC 21.2) and has been a Candidate for Federal Listing under the Endangered Species Act since 2010 (75 FR 67925 67944). NatureServe ranks *Cirsium wrightii* globally and state imperiled (G2/S2). The New Mexico Rare Plant Conservation Strategy gives the species an overall conservation rank of 'weakly conserved' due to moderate to high threat scores and a limited distribution (EMNRD – Forestry Division 2017). It is currently known from 8 locations within the State of New Mexico (Figure 1).

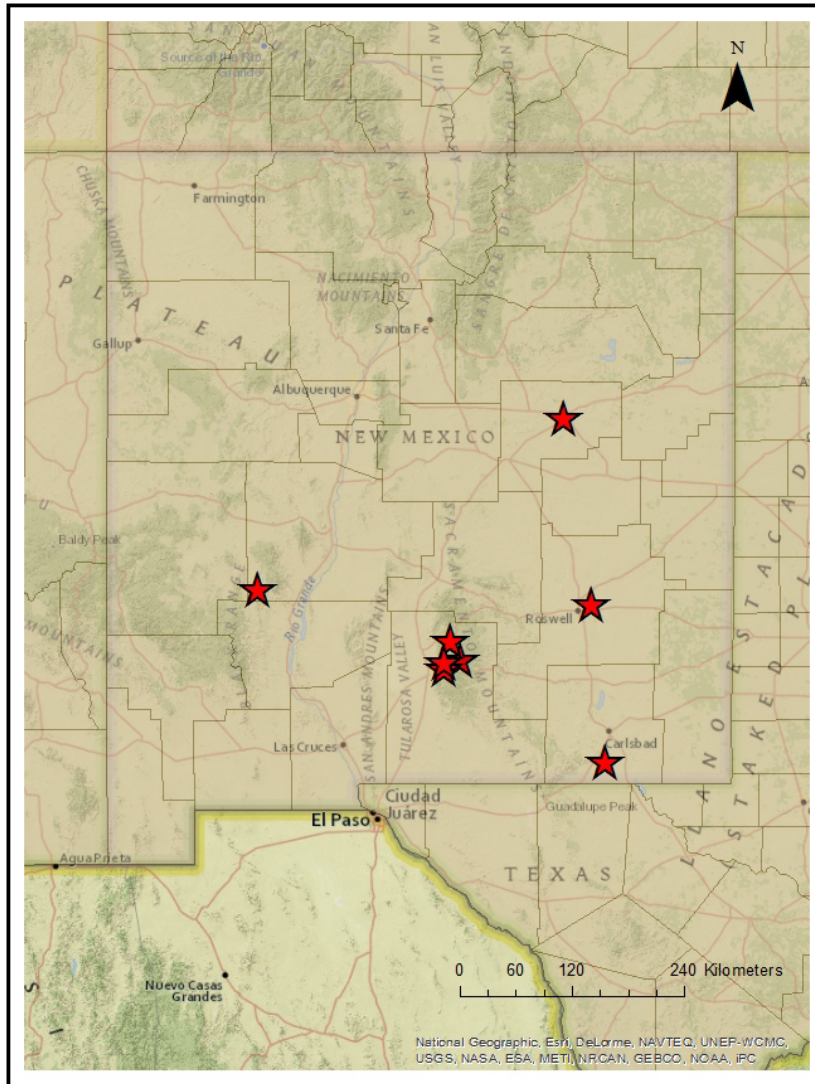


Figure 1. Extant distribution of *Cirsium wrightii* in New Mexico (Sivinski 2012).

DESCRIPTION



Cirsium wrightii is a robust biennial or monocarpic perennial herb up to 2.5 m tall (NMRPTC 1999). It has large, somewhat succulent nearly glabrous leaves, 30 cm or more long, sinuate or pinnatifid, weakly prickly with short black spines. The stem leaves are sessile, strongly decurrent, gradually reduced in size up the stem. Flower heads are hemispherical, 2-3 cm across; with small, somewhat glandular phyllaries with papillose projections on upper surface. Flowers are white or pink and terminate on thin branches in naked panicles. *Cirsium wrightii* flowers from August to October. Associated species include *Distichlis spicata* (saltgrass), *Sporobolus airoides* (alkali sacaton), *Phragmites australis* (common reed), *Sorghastrum nutans*

(Indiangrass), *Schoenoplectus americanus* (chairmaker's bullrush), *Juncus balticus* (Baltic rush), *Muhlenbergia asperifolia* (alkali muhly), *Apocynum cannabinum* (dogbane), *Baccharis salicina* (Great Plains seep-willow), *Limonium limbatum* (southwestern sea lavender), *Flaveria chlorifolia* (clasping yellowtops), and *Solidago canadensis* (goldenrod). Other associated rare and endangered plants include *Helianthus paradoxus* (Pecos sunflower) and *Spiranthes magnicamporum* (Great Plains lady's tresses).

HABITAT AND DISTRIBUTION

Cirsium wrightii is found in wet, alkaline springs, seeps, and marshy edges of streams and ponds between 3,450 and 8,500 ft (NMRPTC 1999). It is found in Eddy, Chavez, Guadalupe, Otero, Sierra, and Socorro countries in New Mexico. In the Santa Rosa wetland complex plants occur scattered within an assortment of marshes, spring seeps, streams, and along the margins of various sinkhole lakes (USFWS 2015; Figure 2).



Figure 2. Habitat of *Cirsium wrightii* at Blue Hole Ciénega in Santa Rosa, NM (*Helianthus paradoxus* in the background).

Blue Hole Ciénega Nature Preserve



The 116-acre Blue Hole Ciénega Nature Preserve in Santa Rosa was acquired by the New Mexico Forestry Division in 2005 with funds from a USFWS Recovery Land Acquisitions grant and a mitigation settlement from the NM Department of Transportation. It is managed by the Forestry Division for the sole purpose of protecting and enhancing the federally listed threatened *Helianthus paradoxus* (Pecos sunflower) population and other rare and endangered wetland plants, including the state listed endangered *Cirsium wrightii*. Management actions and associated research inform the types of management and land uses that are compatible with this species on Blue Hole Ciénega and elsewhere, including the removal of livestock, the ongoing management of invasive woody species (tamarisk, Siberian elm, Russian olive) through cut and herbicide treatments, and prescribed fires.

METHODS

To document the response of *Cirsium wrightii* to a prescribed fire in February of 2017 5 monitoring transects were established and distributed throughout the 116-acre Cienega, wherever plants occurred (Figure 3). Each transect measures 60 m x 4 m and is permanently marked by a metal t-post on either end. All permanent markers were mapped using a Garmin Monterra GPS. Annual monitoring occurs during the first 2 weeks of October, after the majority of plants are done flowering and plants are senescent. Within each transect the number of flowering plants is recorded. Annual observations may include the observance of predators (insects, deer) or diseases, and the general vigor of plants in the transect, measured by average height of the plants. Other monitoring activities on Blue Hole Ciénega include an annual census of *Helianthus paradoxus* along 11 monitoring transects (Roth 2019), rainfall (since July 2016), and groundwater fluctuations (LeJeune 2018). Regular monitoring results will inform our understanding of thistle population fluctuations in response to management activities, rainfall, and groundwater fluctuations. In addition to the removal of livestock following the purchase of Blue Hole Ciénega in 2005, initial vegetation treatment in 2007 included cut & herbicide, followed by a prescribed burn. Retreatments were conducted in between 2008 and 2011, using hand pulling and cut & herbicide treatments in 2008 and 2009. More recent management activities are listed here:

October 2013: Retreatment (cut & herbicide Russian olive, tamarisk, and Siberian elm)

October 2014: Retreatment (cut & herbicide of Russian olive, tamarisk, and Siberian elm)

February 2017: Prescribed burn

October / November 2017: Retreatment (cut & herbicide Russian olive, tamarisk, and Siberian elm)

October / November 2018: Retreatment (cut & herbicide Russian olive, tamarisk, and Siberian elm)

October / November 2019: Retreatment (cut & herbicide Russian olive, tamarisk, and Siberian elm)



Figure 3. Location of *Cirsium wrightii* monitoring transects on Blue Hole Ciénega in Santa Rosa, NM.

RESULTS

The number of flowering plants within the transects dropped from 576 plants documented pre-fire to 321 flowering plants in the fall of 2017, 8 months post-fire (Figure 4). One year later the population recovered to some degree; 501 flowering plants were documented in the monitoring transects in October 2018. However, the number of flowering plants fell in 2019, when only 235 plants were recorded in the 5 transects, only approximately half of the number recorded in

2018. The number of plants fell significantly in 3 out of 5 transects, all of which were located in the mid to northern sections of the Ciénega (Table 1).

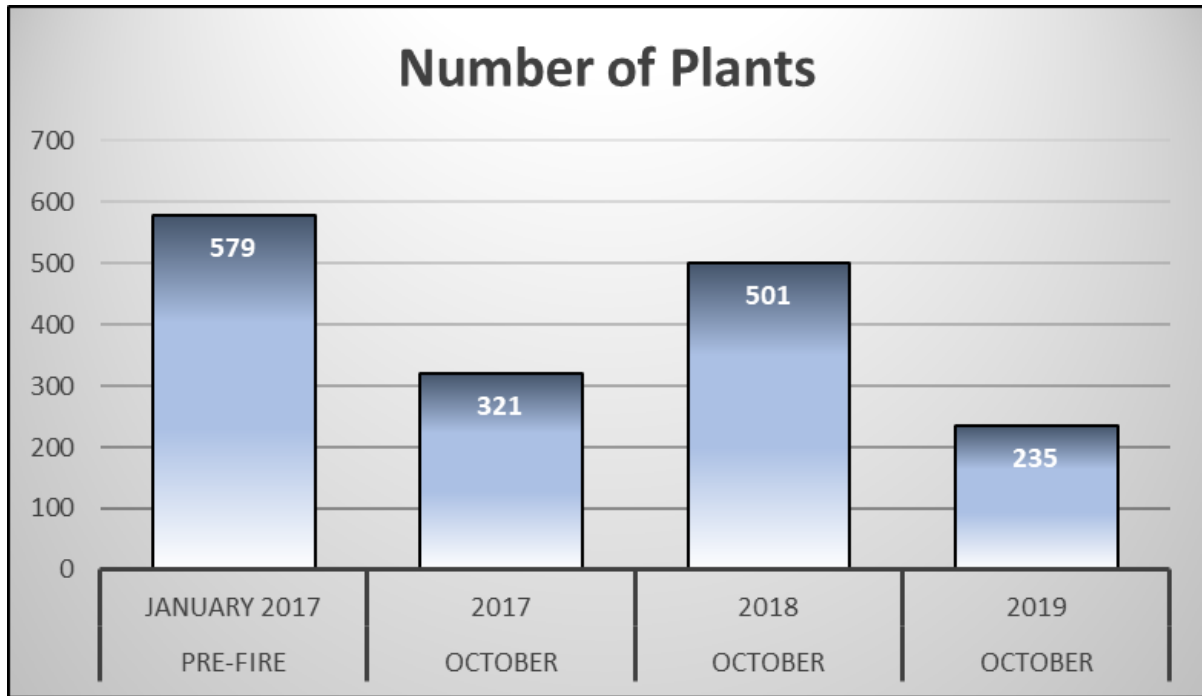


Figure 4. Number of flowering *Cirsium wrightii* plants in 5 monitoring transects pre- and post-fire at Blue Hole Ciénega, Santa Rosa, NM.

	Pre-fire	October	October	October
Transect No	January 2017	2017	2018	2019
1	124	42	36	58
2	70	20	17	1
3	130	118	94	37
4	218	99	279	60
5	37	42	75	79
	579	321	501	235

Table 1. The number of flowering *Cirsium wrightii* plants in 5 monitoring transects pre- and post-fire at Blue Hole Ciénega, Santa Rosa, NM.

DISCUSSION

Unlike the positive impacts documented on plant abundance in response to fire for *Helianthus paradoxus* (Roth 2017), *Cirsium wrightii* experienced a reduction in plant numbers following the fire. *Helianthus paradoxus* is an annual plant, overwintering in the seedbank in the form of seeds, hence it was dormant at the time of the fire in early February of 2017. The prescribed burn reduced the competition with perennial plant species, broke dormancy of sunflower seeds, and boosted available nitrogen in the soil, resulting in a significant increase of plants at Blue Hole Ciénega. *Cirsium wrightii* is biennial or monocarpic perennial plant (flowers once and dies). Plants survive as rosettes aboveground before flowering and are therefore more susceptible to fires. Whether rosettes would recover from fire damage was unknown. The reduced number of flowering plants documented post-fire in 2017 is likely the result of direct impacts of the fire on overwintering seedlings and rosettes. Although plants recovered largely within a year of the fire, fire does not appear to enhance population numbers for *Cirsium wrightii*. Lower numbers of plants documented in 2018 may be also be compounded by the extremely dry winter of 2017/2018 (0.39 inches between November 1, 2017 and April 30, 2018. 100-year average for Santa Rosa = 3.39 inches), possibly impacting the survival of seedlings and rosettes that may have germinated and established in response to the fire in 2017. Measurable impacts in response to fires are not expected to be documented beyond 2 years post-fire and it is unclear why the number of flowering plants within the transects was the lowest recorded in the 3 years of monitoring in 2019. Additional monitoring sites established on nearby Santa Rosa ciénegas in 2018 and burned in 2019 may provide further insights on the impacts of fires on *Cirsium wrightii*. Annual monitoring of the transects should continue to get a better understanding of population fluctuations and trends over time.

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