
Status of *Phlox oklahomensis* (Polemoniaceae) in Northwestern Oklahoma and Adjacent Kansas: Assessment 20 Years Later

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INTRODUCTION

In 1989, we published an article on the distribution, habitat, and reproductive biology of *Phlox oklahomensis* Wherry in these proceedings (Springer and Tyrl 1989). This article was based on the senior author's Master of Science thesis; work that began in 1979 and ended in 1983 (Springer 1983). At that time, the justification for studying *P. oklahomensis* was to gather information about a little known species that was being considered for designation as a threatened species by Ayensu and DeFilipps (1978) under the guidelines of the 1973 Threatened and Endangered Species Act. Whereas their listing of *P. oklahomensis* as threatened did not constitute an official or legal designation, it did indicate a need for additional research on the taxon. The U.S. Fish and Wildlife Service's designation (1980 FR 45:82557) for the species in 1980 was Category 3C, i.e., "Taxa that have proven to be more abundant or widespread than previously believed and/or those that are not subject to any identifiable threat." Our assessment in 1983 agreed with this designation.

Edgar T. Wherry described *P. oklahomensis* in 1944 from plants collected in Woodward County Oklahoma near Mooreland by H.C. Benke (collection #5017) on 22 April 1929. This perennial herb was later reported to occur in Woods County Oklahoma and also in Kansas (Horr and McGregor 1949, 1951). Reports of *P. oklahomensis* in northwestern Arkansas (Wherry, 1955) were later disproved by Marsh (1960) in a biosystematic study of the relationship of *P. oklahomensis* and *P. bifida* Beck. Reports that the taxon occurred in

Texas was based on one herbarium specimen (Shinners 1961) which was determined to be *P. bifida* var. *induta* Shinners, not *P. oklahomensis* (Springer 1983). Currently, *P. oklahomensis* is known to occur in Woods and Woodward Counties of Oklahoma and Butler, Chautauqua, Comanche, Cowley, and Elk Counties of Kansas (Springer and Tyrl 1989). Other information on the species distribution, habitat, morphology, and reproductive biology are found in Springer (1983) and Springer and Tyrl (1989).

Before 1979, our knowledge of the geographic range and of the abundance of *P. oklahomensis* in northwestern Oklahoma was based on a total of 20 herbarium specimens. At the end of our field work in 1982, the species was known to occur in 56 land survey sections in Woods County, 19 sections in Woodward County, and four sections in Comanche County, Kansas. Although land use (cattle grazing) in northwestern Oklahoma has not changed significantly since 1983, a major wild fire and severe drought have occurred. In February 1996, a fire burned 82 sections (21,247 ha) in Woods County (Miller 1996). The burned area included 32 of the 56 sections in Woods County and all four sections in Comanche County where *P. oklahomensis* was known to occur. From October 2001 through March 2002, precipitation totaled 78 mm, well below the average of 239 mm for the area. During the months of October, November, and December 2001 and January 2002 there was only 16 mm of precipitation (Oklahoma Climatological Survey 2002).

In 1989, we proposed that future monitoring of *P. oklahomensis* was appropriate (Springer and Tyrl 1989). Because 20 y have elapsed since the initial census and a major fire and drought have occurred in the area, we undertook another survey of the species. The objective of the work reported here was to compare the geographic range of *P. oklahomensis* in northwestern Oklahoma in 1983 to that of today and to assess the status of the species after a 20-y period.

METHODS

The initial study, conducted in 1980-1982 to determine the geographic range of *P. oklahomensis* in northwestern Oklahoma consisted of systematically surveying public land survey sections to determine whether populations of the species were present. The census criterion was the occurrence of a least one population per section. As might be expected, several populations were found in some sections. A distribution map and a list of sections where *P. oklahomensis* was found to occur in 1980-1982 was published previously (Springer 1983). In April of 2002 and 2003, we conducted a similar survey. Sections previously visited were again examined. The relative abundance of *Phlox* plants was noted, but not quantified.

RESULTS and DISCUSSION

Census of *Phlox oklahomensis* in 2002 and 2003

Phlox oklahomensis continues to flourish in northwestern Oklahoma and in adjacent Kansas. In 2002 and 2003 we found popu-

lations ranging in size from those of a few scattered individuals to those with hundreds of plants. As shown in Table 1, the number of sections containing populations has not changed substantially in 20 y. In only three sections in Woods County were plants encountered in the first survey but not in the second. In two of these, their disappearance was obviously due to construction of a pipeline and the concomitant clearing of the right-of-way. In the third section, prolonged, intensive grazing was possibly the cause. The discovery of additional sections containing populations is attributed to the abundant rainfall and minimal overgrazing in the fall and winter of 2002 and early spring of 2003.

The wild fire in February 1996 appeared to have little negative impact on *P. oklahomensis* and may have improved its habitat. We observed robust populations throughout the burned area. The fire eliminated many trees of *Juniperus virginiana* (eastern red cedar), which is a troublesome, invasive species in Oklahoma's rangelands.

Phlox oklahomensis was more abundant in 2003 compared to 2002 (Table 1). Populations of the species were difficult to locate in April 2002 because of drought stress and grazing pressure. Many, but not all, of the rangeland sites occupied by *P. oklahomensis* had been intensively grazed during the fall and winter seasons, thus reducing the previous year's standing crop canopy to approximately 7 cm or less. Plants usually were found where grazing was less intense, e.g., along canyon rim breaks or in sites inaccessible to cattle. In mid May 2002, the senior author examined two populations in

TABLE 1. Land survey sections containing one or more populations of *P. oklahomensis* in censuses conducted in 1980-1982 and 2002-2003. A list of specific sections is available from the senior author.

Survey Years	Number of Sections with Populations		
	Oklahoma		Kansas
	Woods Co.	Woodward Co.	Comanche Co.
1980-1982	56	19	4
2002	34	16	2
2003	68	39	7

Woods County, which had many vegetative plants but only a few individuals that had flowered, set fruit, and disseminated seed.

In contrast, *P. oklahomensis* was abundant in April 2003. This abundance is likely correlated with the above normal precipitation (355 mm) that occurred from October 2002 through April 2003 and to minimal livestock grazing.

Status of *Phlox oklahomensis* in 2003

Phlox oklahomensis was initially designated a Category 3C species by the U.S. Fish and Wildlife Service (1980 FR 45:82557). It is now ranked by the Oklahoma Natural Heritage Inventory (ONHI 2001, 2003) as a G2 species, i.e., it is "imperiled globally because of its rarity (6 to 20 occurrences or few remaining individuals or acres) or because of other factors demonstrably making it vulnerable to extinction throughout its range," and a S1S2 species, i.e., because it is "critically imperiled in Oklahoma because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because some factor of its biology making it especially vulnerable to extinction." The S2 rank is similar to the G2 rank, except that the S2 rank is at the state level.

As noted above, we found numerous populations of *P. oklahomensis* in April of 2002 and 2003 that ranged in size from those with scattered individuals to those with several hundred. Based on our comparative studies, these populations are stable and comprise both vegetative and reproductive plants. Plants were abundant where livestock grazing intensity was light to moderate, but absent where heavy grazing had occurred. Non-grazed habitats for *P. oklahomensis* are commonly encountered in areas where county roads deviate from their normal north-south or east-west orientation to bypass deep canyons or rugged outcrops of bedrock. The road right-of-ways and adjacent fences often create protected patches of prairie inaccessible to grazing cattle. When severe drought and grazing pressure increases, these areas may likely insure the survival of the species. In the absence of wild fires, prescribed burning

once or twice a decade will likely maintain suitable habitat for *P. oklahomensis*.

Based on our census of 2002-2003 and on the close observation of several populations, we suggest an ONHI listing of S2S3 rather than the current S1S2 ranking. The S3 ranking denotes that the species is "rare and local in Oklahoma (though it may be abundant at some of its locations); in the range of 21-100 occurrences." (ONHI 2001). We look forward to assessing the status of *P. oklahomensis* in 2023.

REFERENCES

- Ayensu ES, DeFilipps RH. 1978. Endangered and threatened plants of the United States. Washington, D.C., Smithsonian Institution and World Wildlife Fund, Inc. 403 p.
- Horr WH, McGregor RL. 1949. Kansas plants new to Kansas herbaria IV. Trans Kan Acad Sci 52: 346-349.
- Horr WH, McGregor RL. 1949. Kansas plants new to Kansas herbaria VI: Including a new form of *Liatris punctata*. Trans Kan Acad Sci 54: 212-217.
- Marsh DL. 1960. Relationship of *Phlox oklahomensis* to *Phlox bifida* complex: Including a new subspecies of *Phlox bifida*. Trans Kan Acad Sci 63:12-19.
- Miller Y. 1996. Firefighters baby-sit flare-ups at huge fire site—Workers deemed heroes. Alva Review-Courier 103(39):2.
- Oklahoma Climatological Survey. 2002. Mesonet summary data [online] Available from: <http://www.ocs.ou.edu/premium>. Accessed 2002 May 20.
- Oklahoma Natural Heritage Inventory. 2001. Guide to rare species status and rarity ranking codes. Norman: Oklahoma Natural Heritage Inventory, Oklahoma Biological Survey, [online] Available from: <http://www.biosurvey.ou.edu/heritage/publicat.html>. Accessed 2002 May 20. 4 p.
- Oklahoma Natural Heritage Inventory. 2003. Working list of rare Oklahoma plants. Norman: Oklahoma Natural Heritage Inventory, Oklahoma Biological Survey, [online] Available from:

<http://www.biosurvey.ou.edu/heritage/publicat.html>. Accessed 2003 May 5.

Shinners LH. 1961. *Phlox bifida* var. *induta* (Polemoniaceae) a new endemic in north central Texas. Southw Nat 6:50-51.

Springer TL. 1983. Distribution, habitat, and reproductive biology of *Phlox oklahomensis* (Polemoniaceae) [MS Thesis]. Stillwater: Oklahoma State University. 43 p.

Springer TL, Tyrl RJ. 1989. Distribution, habitat, and reproductive biology of *Phlox oklahomensis* (Polemoniaceae). Proc Okla Acad Sci 69:15-21.

U.S. Fish and Wildlife Service. 1980. Endangered and threatened wildlife and plants: review of plant taxa for listing as endangered or threatened species. FR 45:82557.

Wherry ET. 1955. The genus *Phlox*. Morris Arboretum Monograph, III, Philadelphia. 174 p.

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