

Species Status Assessment
for
Silvery Bladderpod
(*Physaria ludoviciana*)



Illinois Department of Natural Resources
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Section 1: Species Description

Taxonomy

Physaria ludoviciana (Nuttal) O’Kane & Al-Shehbaz (Family: Brassicaceae), whose common names include silvery bladderpod, silver bladderpod, foothill bladderpod, and Louisiana bladderpod (NatureServe Explorer, 2023) is sometimes still known as *Lesquerella ludoviciana* (Nuttal) S. Watson, although the genus *Lesquerella* was united with *Physaria* in 2002 after the morphologies between the two orders were shown to be nearly indistinguishable and genetic testing revealed that *Physaria* species had evolved from *Lesquerella* species more than once (Al-Shehbaz and O’Kane, 2002). Its Illinois population was first collected by Henry Allen Gleason in 1904, although its western populations have been observed since the 1800s (Payson, 1921).

The current classification for this species is (NatureServe Explorer, 2023):

Kingdom: Plantae

Phylum: Anthophyta

Class: Dicotyledoneae

Order: Capparales

Family: Brassicaceae

Its NatureServe Element Code is PDBRA1N110, and its symbol used for the USDA Plants Database is LELU (NatureServe Explorer, 2023; USDA, 2023).

Physical characteristics

P. ludoviciana is a stout, evergreen, perennial taproot plant covered in stellate, pubescent hairs that give the plant a silver-green color. Its radial leaves vary in shape from broadly linear to narrowly oblanceolate with entire or shallowly toothed edges with cauline leaves similar in form but smaller and more numerous. Its stems are described as erect or decumbent and usually unbranched. It has typical mustard yellow flowers, although they are narrow, with the blade and claw petals hardly distinguishable, and measuring about 8 mm. long. The fruiting inflorescence of the plant is elongated with recurved pedicels. The pods are usually pendent, sessile, or substipitate and have a globose or slightly elongated shape (Payson, 1921; Grant et al., 2012).

Habitat

The Illinois population of *P. ludoviciana* occurs in partially stabilized blow-out communities, which show significant community differences from dry prairies and from active blow-out communities (Paul Marcum, personal communication, Feb. 27, 2023). All populations of the plant thrive with full sun exposure on southwestern facing slopes and in areas of high disturbance where other plants would not typically grow, usually in sandy or rocky soils. It typically grows in exposed sand or rock, in areas either without competing vegetation or in

grasslands used as rangeland (Claerbout and Coons, n.d; Nathan Dahlberg, personal communication, July 25, 2022).

Life History and Reproduction

In Illinois, flowering occurs from April to May, with mature seeds to be shed in June (Grant et al., 2012). Claerbout et al. (2007) found that *P. ludoviciana* is self-incompatible and may need to reach a certain maturity before they are able to flower and could require a short photoperiod to trigger their flowering period. The plant's seeds do not appear to disperse farther than a meter or two from the mother plant and can germinate as early as the fall after they have fallen from the mother plant, although germination rates benefit from an after ripening period lasting 6-10 months before germination begins (Beach et al., n.d.; Grant et al., 2012). While the seeds seem to be prone to predation after they have fallen, it does not appear as if this is a limiting factor for population size, as it was observed that only 8% of fruit was found to indicate insect predation (Grant et al., 2012; Claerbout & Coons, n.d.). They do not appear to stay in the seed bank for more than a few months and require dormancy to germinate (although stratification and scarification is not required). The plant's seeds mature at different times, with seeds lower on the stalk developing before the seeds higher up. Mature seeds can survive in a controlled storage environment for up to 6.5 years (Grant et al., 2012).

Conservation Status

The global status of *P. ludoviciana* is listed as G5 - Secure by NatureServe Explorer (2023), although its status was last reviewed Dec. 18, 1986, and needs an updated review. It remains unranked in Nevada, Utah, Colorado, Oklahoma, Nebraska, North and South Dakota, and the Manitoba province of Canada. It is ranked as S4 - Apparently Secure in Wyoming and S2 - Imperiled in Arizona and Montana. In California, Kansas, Minnesota, Wisconsin, and **Illinois** the plant is ranked as **S1 - Critically Imperiled**, and it is ranked as SH - Possibly Extirpated in Iowa (NatureServe, 2023). It was listed as endangered in Illinois in 1980 due to its restricted habitat, low populations, and significant disjuncts from the rest of its species range (Mankowski, 2012). It is not listed federally (USFWS, 2023).

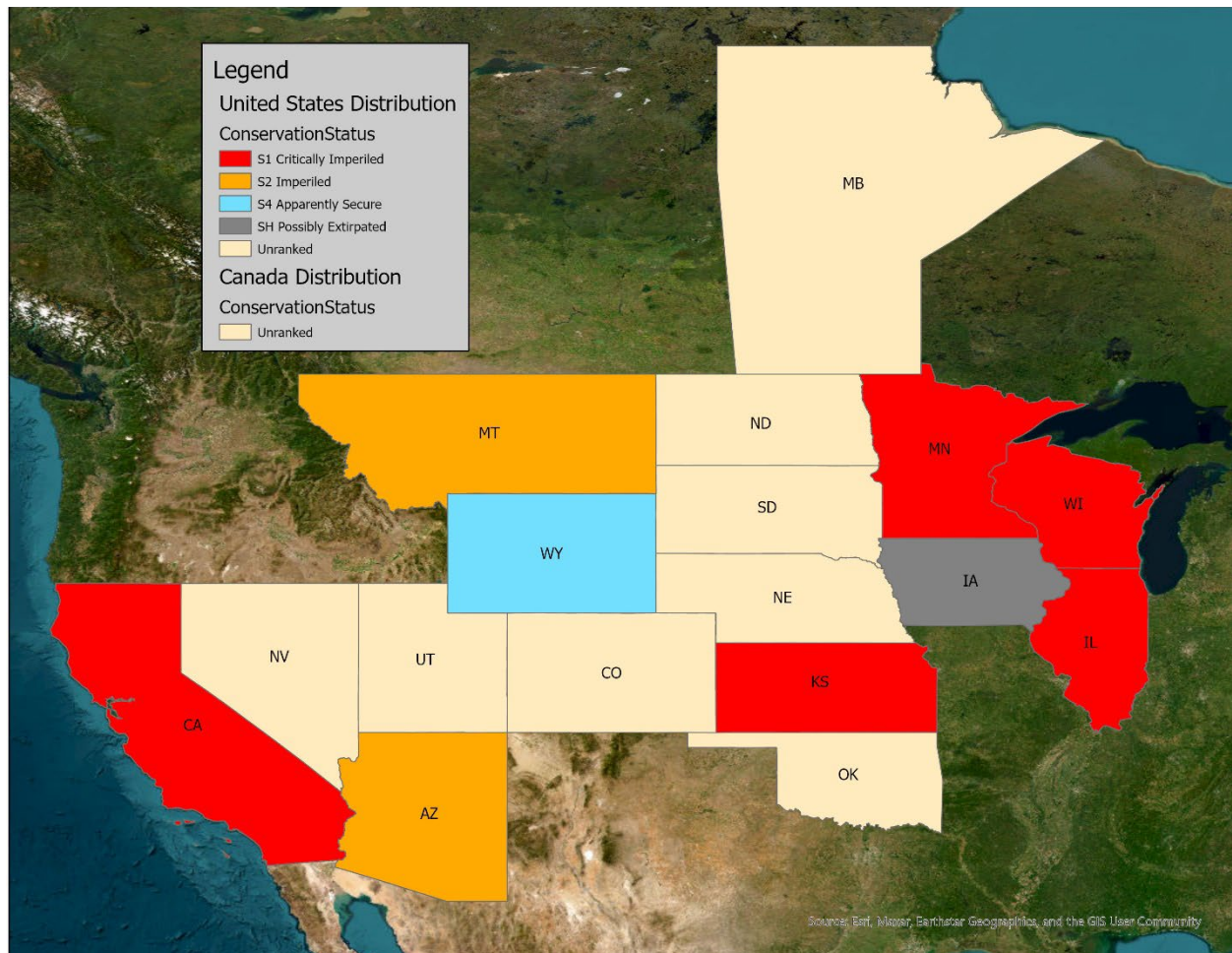


Figure 1: *Physaria ludoviciana* National Distribution and Conservation Status

Section 2: Range and Distribution

Range

P. ludoviciana has a wide range across the Midwest and into some of Western United States, stretching up into the Manitoba Province in Canada, although it appears to be most common in the western states (Figure 1) (NatureServe Explorer, 2023). Historic collections of this plant are found in Illinois, North and South Dakota, Nebraska, Kansas, Montana, Wyoming, Colorado, Utah, and Arizona (Payson, 1921).

Illinois Distribution

There is only one Element Occurrence Record of *P. ludoviciana* in the state of Illinois, located in Mason County where it was originally found by Henry Allan Gleason. According to notes in the Illinois Natural Heritage Database (2023), the population appears to be in decline, with one subpopulation at particular risk of disappearing. It has been recorded by Claerbout and Coons (n.d.) that there were three colonies at the site in 2000, although it is now more accurate to

state that only two colonies remain (see Figures 2a and 2b for historic and current population locations). This leads to some speculation as to whether the third colony has since disappeared or if it has been absorbed by one of the other colonies.

It is suspected that *P. ludoviciana* is limited in its distribution due to a lack of suitable habitat, appearing to require neutral, sandy soil with an abundance of minerals combined with a lack of moisture and a hotter soil temperature. It is possible there were historically more populations or subpopulations both in Illinois and across the Midwest, but that the acidic soil and a depletion of minerals caused by agricultural practices could have made the ground uninhabitable for *P. ludoviciana* (Coons et al., n.d)

Limitations of Surveys and/or Data Reporting

Most observations at the Illinois location for *P. ludoviciana* are not quantified and are typically a record of the species being observed at that site on a particular date, making it difficult to measure how quickly and by how much the species is in decline, or when this decline was most severe. Even with this obfuscation in the data records, the Illinois Element Occurrence of this species is likely the most studied of the nation (Claerbout and Coons, n.d). This implies there is little data or knowledge from other states or provinces about the health of their populations, which is supported by the lack of a ranking for *P. ludoviciana* in most states that it is present in. This leads to an overall gap in knowledge about the health of the species across North America.

Section 3: Abundance

There is only one Element Occurrence Record of *P. ludoviciana* in the state of Illinois, according to the Illinois Natural Heritage Database (2023), although the subpopulations within this EO vary in abundance. The northern subpopulation is relatively abundant, with a few hundred located within a little over 2 acres. The southern subpopulation, however, contains only a few individuals in around ¾ of an acre. There is a third subpopulation mentioned by Claerbout and Coons (n.d), although this subpopulation cannot be easily located, and it is unclear if this subpopulation has merged with the northern subpopulation or if it has disappeared entirely.

EO Number	Site Name	Last Observed Date	Plant Count at Last Observed Date	Acreage of EO
1	[REDACTED]	2021-09-24	~500 plants	21.9

Table 1: Abundance Measured by EO

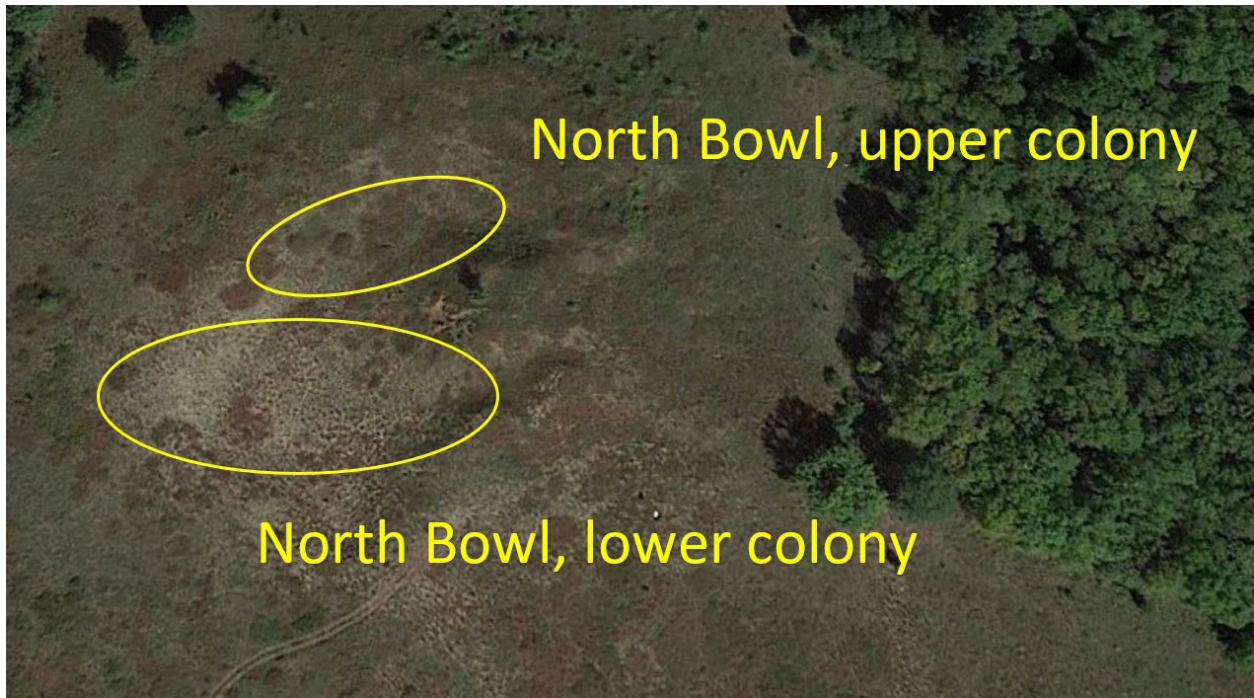


Figure 2a: Historic location of 2 of the 3 subpopulations, provided by Paul Marcum



Figure 2b: Current location of both existing subpopulations, provided by Eric Smith

Section 4: Population Identification and Viability

This assessment uses NatureServe’s EO Rank values to determine the viability of this *P. ludoviciana* population in Illinois. Guidance for determining these Element Occurrence Records is provided by NatureServe and used by the Illinois Natural Heritage Database, using the 1-kilometer default minimum separation distance between observations of *P. ludoviciana*. This means that any observation of *P. ludoviciana* in Illinois that was greater than 1 kilometer away from the current Element Occurrence would be recorded as a new Element Occurrence.

The Element Occurrence Record in the Illinois Natural Heritage Database (2023) of *P. ludoviciana* is ranked as C – Fair viability, as shown in Table 1 of the Appendix. This means that, given the current and non-optimal conditions, it is uncertain whether this plant will be able to persist into the foreseeable future, and records show a significant decline in the Illinois population. However, if the area is properly managed for *P. ludoviciana*, it is likely to make a comeback and the population may stabilize in the foreseeable future, although it is currently unclear what proper management will look like for this site. The population currently occurs on a state-owned site.

EO Number	Site Name	EO ID Number	Last Date Observed	EO Rank	Justification
1	[REDACTED]	2897	2021-09-24	C	Population in slow decline, but still viable

Table 2: *Physaria ludoviciana* EO Ranking

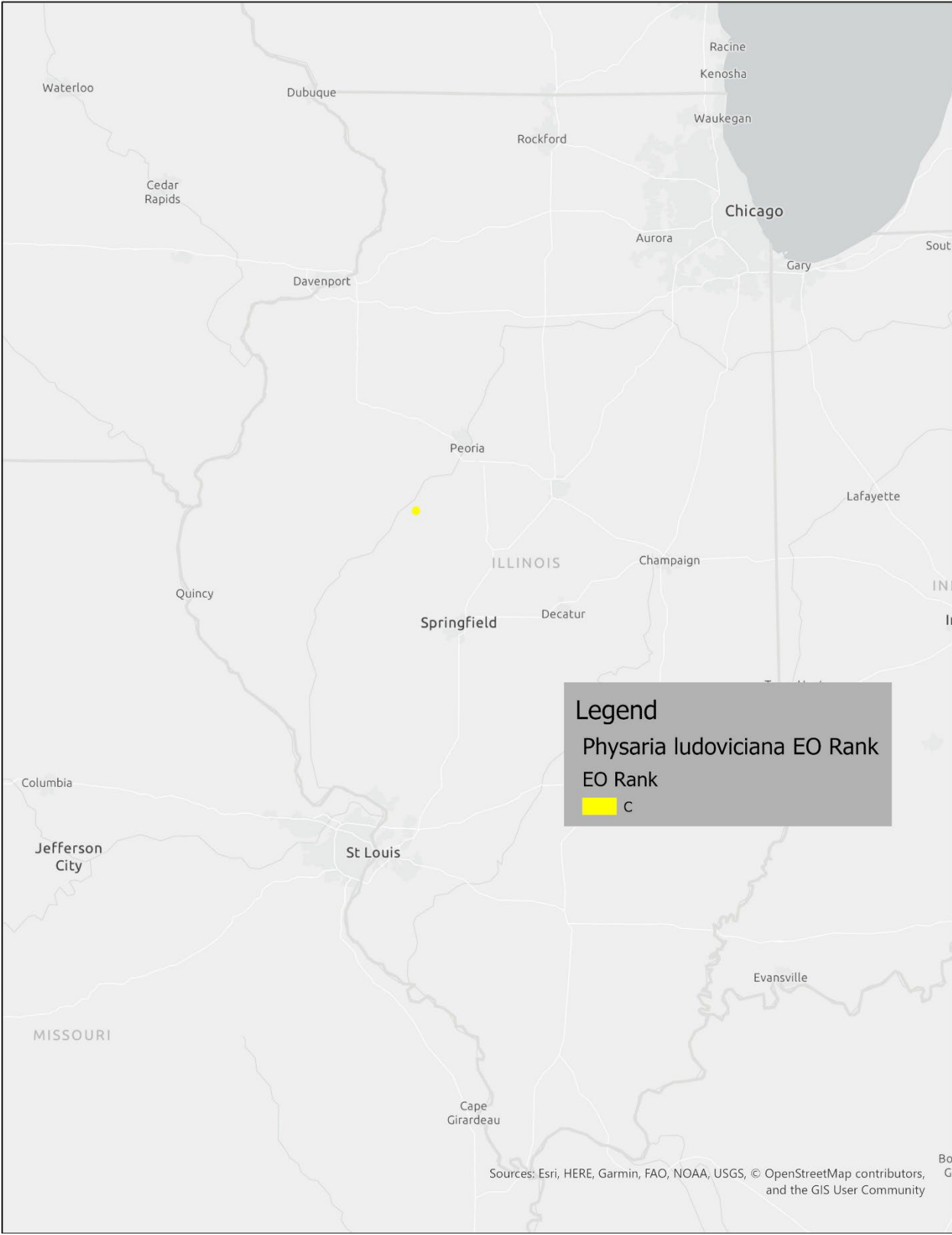


Figure 3: IL Distribution and EO Rank of *P. ludoviciana*

Section 7: References

- Al-Shehbaz, I. A. (2002). *Lesquerella* Is United with *Physaria* (Brassicaceae). *Missouri Botanical Garden Press*, 319-329.
- Beach, S., Coons, J., Owen, H., Todd, B., & Smith, M. (n.d.). *Seed Vigor and Population Size of Lesquerella ludoviciana as affected by Colony*.
- Claerbout, A. a. (n.d.). *Comparison of Populations of Lesquerella ludoviciana Throughout Its Range*.
- Claerbout, A. E. (2007). Floral Biology of *Physaria ludoviciana* (Brassicaceae), a Plant Rare to the Midwest. *Faculty Research and Creative Activity, The Keep*.
- Coons, J., Gutowski, V., Over, T., & and Owen, H. (n.d.). *Impact of Geological and Meteorological Factors on the Disjunct Distribution of Lesquerella ludoviciana in Illinois: Report for the Illinois Wildlife Preservation Fund--July 2003 to June 2004*.
- Grant, M. C. (2012). Seed biology of *Physaria ludoviciana* (silvery bladderpod; Brassicaceae), an endangered species in sand prairies of the Midwest. *Journal of the Torrey Botanical Society*, 63-75.
- Illinois Natural Heritage Database. (2023, 5 8). *Physaria ludoviciana*. Retrieved from Illinois Natural Heritage Database.
- Mankowski, A. (2012). *The Illinois Endangered Species Protection Act at Forty: A Review of the Act's Provisions and the Illinois List of Endangered and Threatened Species*. Springfield, IL: Illinois Endangered Species Protection Board.
- NatureServe. (2023, 1 6). *Lesquerella ludoviciana: Silver Bladderpod*. Retrieved from NatureServe Explorer: https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.130895/Lesquerella_ludoviciana
- Payson, E. B. (1921). A Monograph of the Genus *Lesquerella*. *Missouri Botanical Garden Press*, 103-236.
- USDA. (2023, 5 8). *Lesquerella ludoviciana* (Nutt.) S. Watson. Retrieved from USDA Plants Database: <https://plants.usda.gov/home/plantProfile?symbol=LELU>
- USFWS. (2023, June 6). *Listed Plants*. Retrieved from Environmental Conservation Online System: <https://ecos.fws.gov/ecp0/reports/ad-hoc-species-report?kingdom=P&status=E&status=T&status=EmE&status=EmT&status=EXPE&status=EXPN&status=SAE&status=SAT&mapstatus=3&fcritHab=on&fstatus=on&fspecrule=on&finvpop=on&fgroup=on&ffamily=on&header=Listed+Plants>