



Photograph by A. A. Reznicek, courtesy of Michigan Flora

Status: State Threatened

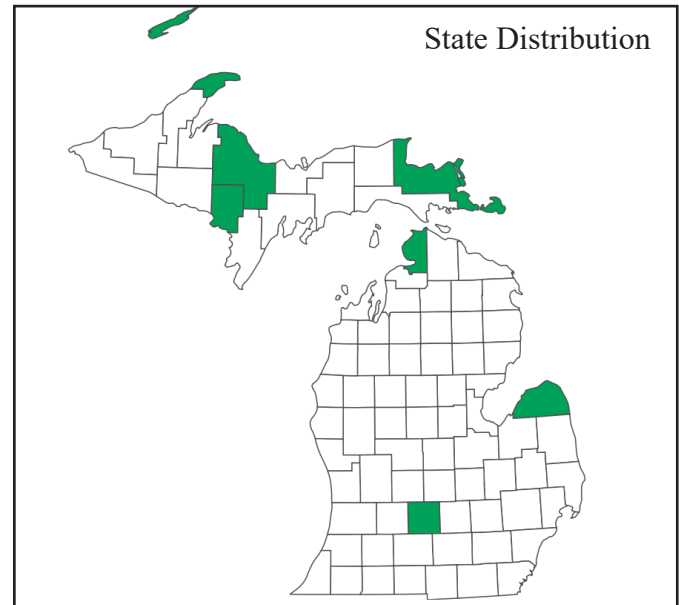
Global and state rank: G5 (Secure) / S1S2 (Critically imperiled to Imperiled)

Other common names: Bluntlobe cliff fern, bluntlobed cliff fern, common cliff fern

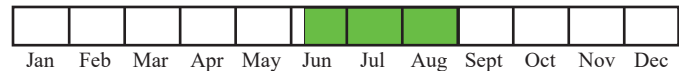
Synonyms: *Cystopteris obtusa* (Spreng.) C. Presl, *Physematium obtusum* (Spreng.) Hook., *Woodsiopsis obtusa* (Spreng.) Shmakox, *Aspidium obtusum* (Spreng.) Sw., *Aspidium pennsylvanicum* F. Dietr., *Polypodium obtusum* Spreng.

Family: Woodsiaceae – the cliff fern family

Taxonomy: The genus *Woodsia* is placed within the order Polypodiales, the suborder Aspleniineae and the family Woodsiaceae (Stevens 2026). Chromosomal/cytological studies have shown that blunt-lobed woodsia is $n=76$ (Brown 1964). Re-



Best Survey Period



cent phylogenetic research found equal support for either retaining *Woodsia* as a single genus or recognizing *Physematium* as a segregate (Lu et al. 2020). However, the Pteridophyte Phylogeny Group (2024) concluded that splitting off *Physematium* was unnecessary. Despite this, some taxonomic references, including Michigan Flora (Reznicek et al. 2026), continue to recognize *Physematium* as a separate genus for now.

Total range: Blunt-lobed woodsia is widespread across eastern North America, occurring from Quebec and Ontario south through Maine, extending west across the Midwest and Appalachian regions to Minnesota and Nebraska, and reaching as far south as Florida and Texas. Globally, the species is Vulnerable (G3) and is considered Imperiled (N2) in Canada and Secure (N5) in the United States. It is Critically Imperiled (S1) in Maine and Ontario, Imperiled to Critically Imperiled (S1S2) in Michigan, and Imperiled (S2) in Delaware. It is Vulnerable (S3) in Minnesota and Vermont, Apparently Secure (S4) in Iowa, and S4? (Inexact Numeric Rank) in Mississippi. It is Secure (S5) in Illinois, New York, North Carolina, Pennsylvania, and West Virginia, and is unranked (SNR) in Alabama,



Arkansas, Connecticut, the District of Columbia, Florida, Georgia, Indiana, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Missouri, Nebraska, New Hampshire, New Jersey, Ohio, Oklahoma, Rhode Island, South Carolina, Tennessee, Texas, Virginia, Wisconsin, and Quebec (NatureServe 2026).

State distribution: In Michigan, blunt-lobed woodsia is known from eight occurrences across seven counties with the majority of the records coming from the upper peninsula. In the upper peninsula, Dickinson County has two records and Keweenaw, Marquette and Chippewa Counties all have a single record each. The Keweenaw record reported by Farwell (1889) is disputed and likely incorrect, probably resulting from a labeling error; because of this mixup, the specimen's true collection location and date are unknown (Reznicek et al. 2026).

In the lower peninsula, Eaton, Emmet and Huron Counties all have a single record each. Out of the eight records, one is ranked C? (Possibly fair estimated viability), one is ranked E (Verified extant [Viability not assessed]), one is ranked U (Unrankable [Farwell 1889]) and five are ranked H (Historical) (MNFI 2026). These records are historical because they originate from older herbarium specimens—some dating back to the late 1800s—and provide only coarse spatial resolution.

Recognition: Blunt-lobed woodsia is a small to medium-sized perennial fern with stems that are compact to creeping and erect to horizontal, bearing few to many persistent petiole bases of unequal lengths. Scales are evenly brown to bicolored, having a dark central stripe and pale brown margins, and are narrowly lanceolate. **The rachis is light brown to straw-colored at maturity, occasionally darker at the base, not articulate above the base,** somewhat brittle, and easily shattered. The blade is lanceolate to ovate, 2-pinnate to 2-pinnate-pinnatifid proximally, moderately glandular, and rarely somewhat viscid (i.e., sticky). Many glandular hairs have thick stalks and distinctly bulbous tips.

The rachis bears glandular hairs and dispersed, often hairlike scales. Pinnae are ovate-deltoid to elliptic, longer than wide, abruptly tapered to a rounded or broadly acute apex, and occasionally attenuate. The largest pinnae have 5–14 pairs of pinnules. **Pinnules are dentate** and sometimes deeply lobed. **Both blade surfaces are glandular.** Margins are dull and thin with occasional glands and lack cilia or translucent projections. **Indusia consist of relatively broad, nonfilamentous segments** that are multiseriate throughout, composed of $\pm$ isodiametric cells, entire or glandular along the distal edge, and are concealed by or slightly surpass mature sporangia (FNA 1993+, Reznicek et al. 2026).

Blunt-lobed woodsia has **stipes that lack joints and break at uneven points, leaving clusters of stipe bases of irregular lengths** in contrast to the jointed, uniformly sized bases of northern woodsia (*W. alpina*) and rusty woodsia (*W. ilvensis*). Both leaf surfaces have **abundant glandular hairs**. **Mature stipe bases range from straw-colored to brown.** The **pinnule margins are toothed**, and the species commonly **bears twocolored scales** (Palmer 2018). Blunt-lobed woodsia can be distinguished from Oregon cliff fern (*W. oregana*) by its **indusia, which consist of relatively broad, ribbon-like segments** rather than the numerous thread-like segments of Oregon cliff fern; by its **sparse to absent glandular hairs** rather than the glandular surfaces of Oregon cliff fern and by its **light brown to straw-colored stipes** rather than the reddish-brown to dark purple stipes of Oregon cliff fern (Palmer 2018). Blunt-lobed woodsia resembles fragile fern (*Cystopteris fragilis*) but can be distinguished by its **starshaped indusia positioned beneath the sorus**, rather than the cupshaped indusia that partially cover the sorus in fragile fern, and by its **pinnae bearing glandular hairs**, which are absent in fragile fern. It is most easily found in late summer and fall, when *Cystopteris* species have withered (Palmer 2018).

Best survey time/phenology: The best time to survey for blunt-lobed woodsia is from the second



week of June to fourth week of August (MNFI 2026). It is most easily found in late summer after the small *Cystopteris* species that it superficially resembles go dormant (Reznicek et al. 2026).

Habitat: Blunt-lobed woodsia occurs on limestone cliffs and historically on sandstone cliffs along the Grand River in Eaton County. Specifically, it is found growing in shaded wet and dry cracks and crevices of rocks with little to no soil substrate and on the under sides of overhanging rock faces (MNFI 2026).

In Michigan, common woody associates include mountain maple (*Acer spicatum*), paper birch (*Betula papyrifera*), red pine (*Pinus resinosa*), white pine (*Pinus strobus*), red oak (*Quercus rubra*), and smooth sumac (*Rhus glabra*) (MNFI 2026).

Common herbaceous associates in Michigan include sedges (*Carex brevior* and *C. merritt-fernaldii*), prairie cinquefoil (*Drymocallis arguta*), prairie alum root (*Heuchera richardsonii*), and rusty woodsia (*Woodsia ilvensis*). Rare plants associated with blunt-lobed woodsia records include slender beard-tongue (*Penstemon gracilis*, State Endangered) (MNFI 2026).

Biology: Blunt-lobed woodsia is a perennial, homosporous (i.e., one type and size spore) fern. Members of the genus *Woodsia* exhibit the typical fern life cycle, which alternates between two independent generations: the sporophyte and the gametophyte. The cycle progresses from the sporophyte to sporangium, spore formation through meiosis, development of the gametophyte, production of egg and sperm, fertilization, and finally the growth of a new sporophyte (Peck 1980). This species does not reproduce asexually (vegetatively); however, as with most homosporous pteridophytes, bisexual gametophytes can self-fertilize, producing sporophytes that are completely homozygous (Peck 1980). Farrar and Gooch (1975) observed gametophyte populations of blunt-lobed woodsia establishing near fertile sporophytes in early fall and becoming fully mature by November when they observed



Figure 2. Habit on rock outcropping. Photograph by Steven Baskauf, <http://bioimages.vanderbilt.edu/>

production of the first leaf of the new sporophyte. By April the young sporophytes resumed growth.

Hybridization does occur within this genus; however, it often results in abortive, non-viable spores and sporangia that fail to produce fertile populations, such as the hybrid *Woodsia* × *kansana* described by Brooks (1982). Nonetheless, there are reports of hybrids with seemingly normal spores and sporangia (Brown 1964).

Spore production occurs annually in late summer to early fall, and the species is capable of producing large quantities of spores given the right environmental and ecological circumstances. Peck et al. (1990) estimated about 60 million per individual fertile frond. In greenhouse observations, *Woodsia* spores require 6 to 15 days to germinate in culture for all species studied, including blunt-lobed woodsia (Brown 1964). After cultures were flooded with water, it takes approximately three to five months to produce a new sporophyte (Brown 1964).

Conservation/management: Blunt-lobed woodsia grows on isolated patches of calcareous limestone formations where wind, thin soils and unstable substrates make the habitat vulnerable to anthropogenic uses like logging activities, development,





Photographs by Don Cameron Maine Natural Areas Program

Figure 3. Left: The rachis has glandular hairs and hairlike scales. Right: Indusium form relatively broad, ribbon-like segment some describe as star-shaped positioned beneath the sorus.

mining, trampling by hikers, ATV use and other forms of recreation. Due to slow soil development and plant reestablishment, the disturbance and removal of plants in this habitat are especially damaging, reducing further the amount of soil and substrate plants have access to for attachment. Maintaining mature and unfragmented forest buffers around these plants and their habitat are recommended in order to reduce ATV activity and other anthropogenic disturbances and slow the establishment of non-native invasive species that could pose a threat by reducing available habitat if established. Non-native plant species found growing with blunt-lobed woodsia include spotted knapweed (*Centaurea stoebe*) and Canada bluegrass (*Poa compressa*) (Cohen et al. 2020, MNFI 2026).

Wild and Gagnon (2005) demonstrated that the rarity of certain fern species, including blunt-lobed woodsia, cannot be attributed solely to a lack of suitable habitat, challenging a longstanding paradigm. Instead, factors such as limited dispersal ability, difficulties in establishing on harsh soil substrates, and unmet water requirements likely contribute to their restricted occurrence. Further research into these aspects of fern ecology and

reproduction is essential to fully understand their distribution dynamics and biogeography (Wild and Gagnon 2005).

Browsing by whitetailed deer (*Odocoileus virginianus*) may suppress or even eliminate bluntlobed woodsia populations, similar to the impacts seen on other delicate ferns like those in the genus *Asplenium*. This threat is especially worse for small limestonedwelling ferns that remain green into the fall, when more palatable species such as *Cystopteris* have already died back (Fawcett and Reznicek n.d.). More research is needed to understand how strongly deer browsing affects bluntlobed woodsia and to help guide effective conservation efforts for this species.

Three of the eight EOs are documented on a mix of public and private lands in the Upper Peninsula. These public lands include properties managed by the Michigan Nature Association, the Menominee River State Park and Recreation Area, and the Marquette County Road Commission. Only one of these three occurrences has been recently observed and was verified as extant in 2020; the other two records are from historical herbarium collections



with coarse spatial resolution. Despite occurring on public lands, existing threats persist, including browsing by whitetailed deer, trampling by hikers, ATV use, and other anthropogenic disturbances. One additional Upper Peninsula EO occurs exclusively on private land with last observation recorded in 1983 (MNFI 2026).

In the Lower Peninsula, all three known occurrences are historical records based on herbarium collections, with low location certainty and coarse spatial resolution due to limited information recorded in 1894, 1911 and 1923. If these populations still persist, they are most likely located on private lands based on current ownership patterns, though there remains some possibility of occurrences on nearby public lands such as Petoskey State Park or parcels managed by the Little Traverse Conservancy in Emmet County or Fitzgerald Park in Eaton County (MNFI 2026).

Status surveys are recommended to assess current population conditions and habitat viability at these locations. Additional surveys in surrounding areas with suitable habitat are also advised, as this species may be overlooked and undercollected where it occurs.

Comments: Blunt-lobed woodsia consists of two cytotypes often treated as subspecies due to subtle morphological and ecological differences and distinct distributions. Tetraploid populations (subsp. *obtusata*) are found throughout the eastern range, commonly on limestone, while the diploid populations (subsp. *occidentalis*) occur near the western edge of the range, and are typically found on sandstone or granitic substrates (Wild 2010). All Michigan plants are subsp. *obtusata*. Blunt-lobed woodsia has been known to hybridize with *Woodsia oregana* subsp. *cathcartiana* (B. L. Robinson) Windham, forming the sterile tetraploid hybrid *Woodsia* × *kansana* Brooks (Brooks 1982).

Research needs: Biological research on spore dispersal, water requirements for fertilization and establishment, and gametophyte development in

Woodsia and other fern genera is lacking. Such studies could help explain why some species remain rare despite the presence of seemingly suitable habitat (Wild and Gagnon 2005). The effects of white-tailed deer browse on blunt-lobed woodsia have not been fully documented and would provide valuable information that could direct conservation efforts for this species. Status surveys and monitoring of existing populations are high priority needs. Additional surveys for new populations in areas containing suitable habitat are needed to fully understand this species' distribution across the state.

Related abstracts: Limestone cliff, sandstone cliff.

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Abstract citation:

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