

**Conservation Assessment  
for  
Yellowish Gentian (*Gentiana alba*)**



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This Conservation Assessment was prepared to compile the published and unpublished information and serves as a Conservation Assessment for the Eastern Region of the Forest Service. It does not represent a management decision by the U.S. Forest Service. Though the best scientific information available was used and subject experts were consulted in preparation of this document, it is expected that new information will arise. In the spirit of continuous learning and adaptive management, if you have information that will assist in conserving the subject community, please contact the Eastern Region of the Forest Service - Threatened and Endangered Species Program at 310 Wisconsin Avenue, Suite 580 Milwaukee, Wisconsin 53203.

Table Of Contents

**EXECUTIVE**  
**SUMMARY**.....4  
**ACKNOWLEDGEMENTS**.....  
.....4  
**NOMENCLATURE AND**  
**TAXONOMY**.....5  
**DESCRIPTION OF**  
**SPECIES**.....5  
**HABITAT**.....  
.....6  
**LIFE**  
**HISTORY**.....  
.6  
**DISTRIBUTION AND**  
**ABUNDANCE**.....7  
**POTENTIAL**  
**THREATS**.....7  
**PROTECTION**  
**STATUS**.....8  
**REFERENCES**.....  
.....8

## **EXECUTIVE SUMMARY**

Barrens and glades occur at scattered sites on the Hoosier and Shawnee National Forests, and are found widely on the Mark Twain National Forest. Expressions of the barrens community on National Forest System lands are currently recognized on the Hoosier at a few sites within the Brown County Hills and the Crawford Escarpment, and at several sites in the Crawford Uplands. On the Shawnee, barrens are found as small remnants in the Cretaceous Hills, and the Greater Shawnee Hills, Lesser Shawnee Hills, and the Illinois Ozarks have more and somewhat larger communities. Barrens and glades are often large within most of the natural divisions found on the Mark Twain.

Barrens are characterized by species of canopy trees tolerant of xeric conditions having a stunted, open-grown appearance, the dominance of native warm-season grasses and prairie forbs, and, in glades, significant exposures of bedrock. The mix of plants and animals inhabiting these sites varies with the canopy openness, internal structure of the stands, slope, aspect, and other less tangible variables. The barrens is an ecosystem, not merely a hole in the forest filled with prairie plants.

The purpose of this assessment is to bring together the best available information about this community, provide a summary of the character and distribution of barrens across the three Forests, and provide similar information about six RFSS found in this habitat. An additional purpose is to provide the background information necessary to prepare a Conservation Strategy, including management actions to conserve species discussed in this assessment.

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## **NOMENCLATURE AND TAXONOMY**

### ***Gentiana alba* Muhl.**

There has been considerable debate over the correct scientific name of *Gentiana alba* (Porter 1889, Wilbur 1988, Pringle 1963, Pringle 1967). Gray originally named the white gentian *Gentiana flavida* (Fernald 1950) but later came to realize that this was the same species as *G. alba*. Although many botanists now use *G. alba*, some refer to the species as *Gentiana flavida* (Swink and Wilhelm 1994). The other synonyms listed are historic and have not been used for approximately 100 years.

*Gentiana flavida* Gray, Am. Jour. Sci. II. 1:80. 1846.

*Dasystephana flavida* (Gray) Britt. in Britton & Brown, Ill. Fl. ed. 2. 3:12. 1913.

*Gentiana ochroleuca* sensu auctt., non Froel. Gent. 35. 1796.

*Pneumonanthe flavida* (Gray) Greene, Leaflets Bot. Obs. & Crit. 1:71. 1904.

In addition to yellowish gentian, other common names for the species include pale gentian, white gentian (Pringle 1965, Mohlenbrock 1986, Wilbur 1988), and yellow gentian (Fernald 1950, Deam 1940, Pringle 1965, Cooperrider 1995, Wilbur 1988).

Gentians are rather showy flowers that often form a “conspicuous” although never dominant component of various plant communities (Wood and Weaver 1982). The family, Gentianaceae, is cosmopolitan but the majority of individuals are found in temperate and subtropical areas (Gleason and Cronquist 1991). Gentianaceae is a large (approximately 75 genera and 1000 species) and taxonomically difficult group (Gleason and Cronquist 1991, Wood and Weaver 1982). In addition, *Gentiana* is a large, polymorphic, and taxonomically difficult genus that occurs primarily in arctic and montane areas of the Northern Hemisphere (Wood and Weaver 1982).

## **DESCRIPTION OF SPECIES**

Pringle (1965) described *Gentiana alba* as “one of the coarsest and most robust of the gentians. Its stout, clustered stems are usually one to three feet [0.3 to 1m] in length, and often more or less decumbent. Its large, ovate leaves are distinctively yellowish-green and somewhat succulent. Its flowers are produced in large, dense clusters. The calyx lobes are ovate, with decurrent keels which cause them to spread horizontally.... The fresh corollas

are white, with a network of prominent green veins and faint traces of purple on the inner surface of the corolla tube and occasionally at the tips of the lobes... the tubular corolla of *G. alba* consists of five petals, which terminate in triangular lobes alternating with corolla appendages [plaits]. In *G. alba*, the summits of the appendages are low erose structures or small triangular projections between the corolla lobes and partly folded inside them. The corollas open at the summit, by only slightly” (Figure 50).

Pringle (1963) stated that the calyx lobes of *G. alba* are “distinctly unlike those of any other species of eastern North America in being somewhat folded, with bracket-like decurrent keels.” Other characteristics used to distinguish *G. alba* include the following: corolla color of yellowish-white or greenish-white (Small 1933, Pringle 1963, Smith 1994, McGregor and Barkley 1986); calyx lobes 2-5mm wide at the widest point, deltoid-ovate to ovate-lanceolate (Smith 1994, McGregor and Barkley 1986); corolla open, not spotted within; corolla lobes extending beyond the summit of plaits, lobes not fringed (Pringle 1963, Smith 1994, McGregor and Barkley 1986, Swink and Wilhelm 1994); flowers sessile or subsessile (Swink and Wilhelm 1994); and leaves yellowish-green, ovate, acuminate, margins smooth (Pringle 1963, Wood and Weaver 1982, Smith 1994). For a complete species description, see Appendix IV.

## **HABITAT**

Although *G. alba* is considered a prairie species (Pringle 1965, Wood and Weaver 1982), it also can be found in a variety of other open habitats including open woods and woodlands (Gleason 1963, McGregor and Barkley 1986, Gleason and Cronquist 1991, Yatskievych 2001), savannas (Pringle 1963), glades (Ladd 2000, Ketzner and Karnes 1998), and roadsides (Deam 1940). At times it also is found in more shaded environments such as rich wooded slopes (Mohlenbrock 1986) and mesic woods (Fernald 1950). Yatskievych (2001) indicated that *G. alba* is often found in a variety of forested habitats in Missouri, but he also noted that the Missouri forests are more open with discontinuous canopies than forests further east. Although the species has been found from xeric to mesic conditions and occasionally swampy areas (McGregor and Barkley 1986), it appears to be most abundant in drier conditions with abundant sunlight. Steyermark (1963) noted that in full sun the corollas were whiter when grown in cultivation. Pringle (1965) states that the species is an obligate calciphile; however, Small (1933) indicates the species can be found in meadows with acidic soils. The majority of extant populations in the study area are on limestone.

Associated species on the Michigan and northern Illinois sites include the following prairie plants: *Andropogon gerardii*, *Euphorbia corollata*, *Solidago rigida*, *Silphium terebinthinaceum*, *Aster laevis*, *Parthenium integrifolium*, *Psoralidium tenuifolium*, and *Veronicastrum virginicum* (Pringle 1965, Swink and Wilhelm 1994). On the Hoosier National Forest, associates include *Quercus marilandica*, *Cercis canadensis*, *Sorghastrum nutans*, *Schizachyrium scoparium*, *Kuhnia eupatorioides*, *Cunila organoides*, and *Ceanothus americana*.

## **LIFE HISTORY**

*Gentiana alba* is a perennial herb. Flowering begins in mid August and continues through September, and October southward. According to Baumgartner and Baumgartner (1987), in Oklahoma blooms have been observed as late as early December.

Several species of *Gentiana*, including *G. alba*, easily hybridize and may produce hybrid swarms where the hybrids ( $F_1$  generation) are fertile and can cross with another hybrid ( $F_1$  plant) or backcross to either parent species (Pringle 1963). These hybrids, especially the hybrid swarms, produce populations with a wide range of morphological characteristics, complicating proper identification (McGregor and Barkley 1986).

*Gentiana alba* frequently hybridizes with *G. puberula* and *G. andrewsii* in areas where these species overlap geographically (Pringle 1963, Pringle 1964, Pringle 1971, Mason and Iltis 1965). These hybrids have been named *Gentiana X curtsii* Pringle and *Gentiana X pallidocyanae* Pringle, respectively. Obviously, the hybrids may possess a variety of characteristics from both parents. One of the most confusing characteristics in terms proper identification of *G. alba* as opposed to one of the hybrids is corolla color. The corollas in both of hybrids may be pale yellow or yellowish-white but are often tinged with pale blue. Pringle (1964) developed the following list of hybrid characteristics that indicated one parent was *G. alba*: leaves yellowish-green, relatively large; calyx lobes keeled; corolla pale, whitish or yellowish; corolla appendages low, asymmetrical triangular; and anthers separate.

Although *G. puberula* and *G. andrewsii* have not been reported as associated species in the extant populations of *G. alba*, it is important to determine if these species are present. If hybridization is occurring it needs to be documented so that the hybrids and *G. alba* are properly identified.

## **DISTRIBUTION AND ABUNDANCE**

*Gentiana alba* is found throughout much of the central and midwestern U.S., from Manitoba to New Jersey and south to Oklahoma and North Carolina, becoming less common in eastern regions (Figure 51). In addition, there are isolated reports of its occurrence in Nevada (Gleason 1963) and Virginia (Deam 1940).

Pringle (1963) suggested that at one time *G. alba* had a center of populations west of the Mississippi River, perhaps in the Ozark Mountains, and that the species spread east with the expansion of prairie vegetation during the post-Wisconsin xerothermic period. He believes the eastern populations are relicts, as evidenced by the extensive primeval grasslands in some counties where extant populations of *G. alba* are found (Pringle 1963).

There are twelve extant populations of *G. alba* in Crawford, Franklin, Harrison, Perry and Ripley counties in Indiana and seven extirpated populations have been documented (Figure 52) (Indiana Department of Natural Resources 2002). Four extant populations occur on the Hoosier National Forest. In Illinois, *Gentiana alba* is scattered throughout the entire state with populations in approximately 40 counties (Ketzner and Karnes 1998) (Figure 53).

Populations of *Gentiana alba* occur in approximately half of the counties in Missouri (Figure 54); however, the populations are widely scattered and very sporadic within each county (Yatskievych 2002).

## **POTENTIAL THREATS**

Smith (2002) believes the biggest threat to *Gentiana alba* is the loss of native vegetation to exotic cool season grasses, such as *Festuca arundinacea*. Land covered with grasses makes the invasion of woody vegetation more difficult (Barnes 1948).

Although gentians in general are known to be beautiful and there has been some concern about over-collecting (Mason and Iltis 1965), there is no indication that the rarity of *G. alba* is due to over-collection.

## **PROTECTION STATUS**

*Gentiana alba* is ranked as G4, indicating that it is widespread, abundant and apparently secure (NatureServe 2002).

Ranking by individual states is: Arkansas (S?), Illinois (S?), Indiana (S2), Iowa (S3), Kansas (S1), Kentucky (S1S2), Maryland (SR), Michigan (S1), Minnesota (SR), Missouri (SR), Nebraska (S1), New Jersey (S?), North Carolina (SH), Ohio (S1), Oklahoma (S1), Pennsylvania (SH), West Virginia (SH), and Wisconsin (S2).

Although throughout much of its range *G. alba* is listed as vulnerable to extinction (NatureServe 2001), the species is not state listed in Missouri or Illinois (Illinois Endangered Species Protection Board 1999, Missouri Natural Heritage Program 2001). In Indiana, the species is listed as state imperiled (Indiana Department of Natural Resources 2002). Coefficients of conservatism of 8 and 9 have been applied the taxon in Missouri and Illinois, respectively (Swink and Wilhelm 1994, Ladd 2000).

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