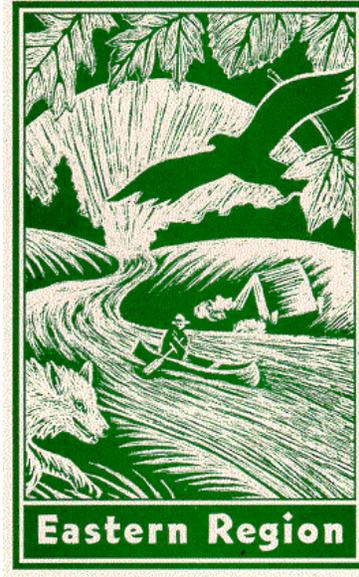


*Conservation Assessment  
for  
Illinois Wood-Sorrel (Oxalis illinoensis Schwegm.)*



*USDA Forest Service, Eastern Region*  
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*This document is undergoing peer review, comments welcome*

*This Conservation Assessment was prepared to compile the published and unpublished information on the subject taxon or community; or this document was prepared by another organization and provides information to serve as a Conservation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 taxon, please contact the Eastern Region of the Forest Service - Threatened and Endangered Species Program at 310 Wisconsin Avenue, Suite 580 Milwaukee, Wisconsin 53203.*

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## EXECUTIVE SUMMARY

*Oxalis illinoensis* is a recently described yellow wood-sorrel similar to *O. grandis* that is found in mesic and dry-mesic forests in Illinois, Indiana, Kentucky, and Tennessee. The species is ranked as G2G3Q, is state listed as endangered in Illinois and rare in Indiana, and is a Regional Forester Sensitive Species on both the Hoosier and Shawnee national forests in Indiana and Illinois. Populations range in size from less than 50 individuals to over 30,000 plants. There is little evidence of sexual reproduction but the species apparently reproduces asexually by tubers. Additional research is needed to accurately determine the status *O. illinoensis*, population trends, and threats to its survival.

The U. S. Forest Service identifies species that are sensitive within each region, i.e., Regional Forester Sensitive Species (RFSS). For each RFSS a conservation assessment is developed to help maintain viable populations of these species. The purpose of this assessment of *Oxalis illinoensis* is to document the current scientific knowledge of the species. Specific objectives include the following:

- 1) describe the plant and distinguish it from other similar species,
- 2) determine the status of the species including geographical distribution and population trends,
- 3) determine ecological requirements of the species and its reproductive biology, and
- 4) identify threats to the species.

## ACKNOWLEDGEMENTS

I sincerely thank Steve Olson for review of this conservation assessment. John Schwegman (retired from the Illinois Department of Conservation), Steven Hill (Illinois Natural History Survey), and Robert Gottfried (Illinois Natural History Survey) also provided valuable information on the species.

## NOMENCLATURE AND TAXONOMY

Scientific Name: *Oxalis illinoensis* Schwegm.

Common Names: Illinois Wood-Sorrel

Synonyms: *Oxalis grandis* Small *p.p.*

Class: Dicotyledoneae

Order: Geraniales

Family: Oxalidaceae

*Oxalis illinoensis* is a member of Oxalidaceae, a widespread family of approximately seven genera. The genus *Oxalis* contains approximately 800 species (110 in North America) and is most abundant in southern Africa and South America (Gleason 1963,

Gleason and Cronquist 1991). *Oxalis*, Greek for sorrel, is derived from “oxys” that refers to the sour water juice characteristic of the genus (Gleason 1963). The yellow-flowered species of *Oxalis*, including *O. illinoensis*, are a taxonomically difficult group that exhibit considerable variability (Gleason 1963).

*Oxalis illinoensis* was previously identified as *O. grandis* and in some areas, such as Tennessee, the species is not recognized as a separate species and is classified with *O. grandis* (NatureServe 2001). Also, Medley (1993) stated that these two taxa intergrade and suggested that *O. illinoensis* should probably be classified as a variety of *O. grandis*. At least one Indiana population is intermediate between typical *O. illinoensis* and *O. grandis*, but this site also has typical examples of both species (Olson 2003).

## DESCRIPTION OF SPECIES

Plant perennial herb, 0.3 – 1 m tall, erect, unbranched or sparingly branched.

Inflorescence cyme; flowers normally found among the leaves.

Petals 5, 12-18 mm long, yellow.

Leaflets margins green, shallowly lobed.

Seeds 1.8 – 2.2 mm long.

Flowering June in Indiana (Yatskievych 2000); June – September in Illinois (Mohlenbrock 1986, 2002).

(Mohlenbrock 1986, Yatskievych 2000, Mohlenbrock 2002).

### Distinguishing Characteristics

*Oxalis illinoensis* morphologically is similar to *O. grandis* but can be distinguished by the following characteristics (Schwegman 1982):

1. *O. illinoensis* has a single, terminal, fleshy, white fusiform tuber whereas *O. grandis* is strongly rhizomatous. Unfortunately, tubers and rhizomes often are absent on herbarium specimens, making this character of limited use in preserved specimens.
2. *O. illinoensis* lacks the brown or purple leaflet margins that characterize *O. grandis*.

Schwegman (1982) also identified several characteristics that often are useful in distinguishing the two species, but these characteristics do not always hold true.

1. *O. illinoensis* has large leaflets that are paler yellow-green in color and more rounded in shape.

2. Most *O. illinoensis* leaflets have convex margins above the base compared to the concave margins of *O. grandis*.
3. The terminal notches of leaflets in *O. illinoensis* are shallower and generally less acutely angled than *O. grandis*.
4. The peduncles in *O. grandis* tend to be longer and extend the flowers above the leaves whereas the flowers in *O. illinoensis* usually are among the leaves. This appears to be a good character in areas having mixed populations as in some locations in southern Indiana (Olson 2003).

## LIFE HISTORY

Schwegman (2003) speculated that the primary means of reproduction is asexual via stolons and that plants seldom reproduce by seeds. Although flowering is common, in most years only a few plants per clone flower but considerable flowering occasionally occurs (Schwegman 2003). The species is known to have explosive fruits, which aid in their dispersal (Ketzner and Karnes 1998).

Schwegman (1982) suggested that *O. illinoensis* probably evolved from *O. grandis* and the former may be genetically limited to calcareous environments. Another possible evolutionary route is that *O. illinoensis* and *O. grandis* both directly descended from *O. stricta* (Schwegman 1982).

## HABITAT

*Oxalis illinoensis* is found in mesic and dry-mesic forests of the western Highland Rim, Shawnee Hills, and on the Coastal Plain (Medley 1993) on limestone, shale, or calcareous loess substrates (Schwegman 1982). In Illinois, Schwegman (1982) found the species restricted to small, mesic, limestone forest habitats in a region of more acidic forests. Similarly, several populations in southern Indiana are on calcareous substrates within the predominately acidic landscape (Olson 2003). In contrast, *O. grandis* is more adapted to acidic soils in the Appalachian region (Schwegman 1982). In Kentucky, *O. illinoensis* occurs on the edge of the Mississippi Alluvial Plain (Schwegman 1982).

## DISTRIBUTION AND STATUS

*Oxalis illinoensis* has a limited geographic distribution in Illinois, Indiana, and Kentucky (NatureServe 2001) (Figure 1). Schwegman (1982) described the species as also occurring in central Tennessee, but it is not recognized as a distinct taxon there (NatureServe 2001). Schwegman (1982) indicated that the range of *O. illinoensis* does not overlap with the range for *O. grandis* although apparently suitable calcareous habitats occur within the *O. grandis* range. However, there are apparent mixed populations in Indiana (Olson 2003).

*Oxalis illinoensis* is ranked as G2G3Q (Illinois Endangered Species Protection Board, 1999, NatureServe 2001) indicating that it is vulnerable to extinction throughout its range, but its taxonomic status is questionable. The species is state listed as rare in Indiana (Indiana Department of Natural Resources 2003), endangered in Illinois (Illinois Endangered Species Protection Board 1999), and a Regional Forester Sensitive Species on the Shawnee and Hoosier national forests. State Heritage Status Rank is as follows:

Illinois	S1	critically imperiled
Indiana	S2	imperiled
Kentucky	S?	unranked

There are several species endemic to the Interior Low Plateaus province including *Oxalis priceae*, *Apios priceana*, and *Cimicifuga rubifolia* (Schwegman 1982), the latter of which often occurs with *Oxalis illinoensis* in southern Illinois and western Kentucky. In Kentucky, *O. illinoensis* occurs on the edge of the Mississippi Alluvial Plains (Schwegman 1982).

#### Illinois

Eight populations of *O. illinoensis* occur in mesic forests in Pope and Hardin counties (Illinois Department of Natural Resources 2003) in extreme southern Illinois (Figure 2), six of which are on the Shawnee National Forest (Dolan 2001). The populations range in size from less than 100 plants in one population in Pope County to approximately 500 plants in a Hardin County population. Three additional populations consist of several hundred plants. Associated species include *Stenophorum diphyllum*, *Asarum canadense*, and *Carex blanda* (Illinois Department of Natural Resources 2003).

Schwegman (2003) indicated that the Illinois populations have not undergone significant decline or expansion in the past two decades; however, Shimp (2002) indicated the populations on the Shawnee National Forest may be declining.

#### Indiana

Of the 26 populations of *O. illinoensis* in Indiana (Figure 3), 18 occur in the Hoosier National Forest, three occur in state forests, and one occurs in a state park. Populations range in size from a few with less than 50 plants, but most of the populations are large (hundreds to thousands of plants) with a few consisting of over 10,000 individuals. Most populations occupy slopes in mesic forests where they sometimes form the dominant ground cover, but populations also are found on floodplains and occasionally in dry mesic forests. Associated species include *Synandra hispidula*, *Verbesina alternifolia*, *Diarrhena americana*, *Agrimonia pubescens*, *Acer saccharum*, *Asimina triloba*, *Viola* sp., *Quercus muhlenbergii*, *Eupatorium rugosum*, *Panicum boscii*, *Fraxinus americana*, *Platanus occidentalis*, *Ulmus rubra*, *Prunus serotina*, *Quercus alba*, *Toxicodendron radicans*, *Smilax hispida*, *Polystichum acrostichoides*, *Polemonium reptans*, *Geum*

*canadense*, *Solidago flexicaulis*, *Asplenium platyneuron*, *Liriodendron tulipifera*, *Rosa multiflora*, *Galium triflorum*, *Adiantum pedatum*, *Impatiens* sp., *Athyrium thelpteroides*, *Athyrium pycnocarpon*, *Poa sylvestris*, *Valeriana pauciflora*, *Panax quinquefolium*, *Viola striata*, *Oxalis grandis*, *Tradescantia subaspera*, *Thalictrum dioicum*, *Zizia aurea*, *Rudbeckia laciniata*, *Sanicula gregaria*, *Dentaria diphylla*, *Pilea pumila*, *Symphoricarpos orbiculatus*, *Galium concinnum*, *Amphicarpa bracteata*, *Gallium circaezans*, *Brachyelytrum erectum*, *Fraxinus americana*, *Smilax collinsonia*, *Lindera benzoin*, *Sanicula canadensis*, *Asarum canadense*, *Juglans nigra*, and *Carya cordiformis*.

## Kentucky

One Kentucky population, although growing in a mesic upland forest on a north-facing slope, occurs in rather shallow soil (Hall 2002). Associated species here included *Hydrophyllum macrophyllum*, *Carex blanda*, *Viola pubescens*, and *Phlox divaricata* var. *laphamii* (Hall 2003).

## Tennessee

According to Schwegman (1982), *O. illinoensis* is found in Tennessee, but because others do not distinguish this taxon from *O. grandis*, it is not possible to determine the status of *O. illinoensis* in Tennessee.

## POTENTIAL THREATS

During the twenty years since discovery of *O. illinoensis*, there have been no reports of extirpated populations but Schwegman (2003) observed that horses had trampled and possibly killed plants at an Illinois site. One Illinois population on private property is threatened by dumping of trash (Illinois Department of Natural Resources 2003). As expected with a newly described taxon, the majority of information focuses on locating new populations and adding to the ecological and taxonomic understanding of the species. Potential threats to the species need to be identified.

## RESEARCH AND MONITORING

In addition to identifying new populations, it is important to monitor known populations of *O. illinoensis* so that population trends can be determined. Until specific threats to the species can be identified, it is imperative to protect the habitat and determine specific ecological and reproductive requirements. Schwegman (2003) indicated that little sexual reproduction is evident and suggested it should be determined if the species is self-compatible. Furthermore, to accurately assess the status of the species throughout its range, botanists and ecologists should be encouraged to reach consensus on the differences between *O. illinoensis* and *O. grandis*. Medley (1993) suggested reducing *O.*

*illinoensis* to a variety of *O. grandis*, and Tennessee does not recognize *O. illinoensis* as being distinct from *O. grandis*. According to Schwegman (1982), *O. illinoensis* does exist in Tennessee. A thorough study of *Oxalis* in Kentucky and Tennessee may help to alleviate this taxonomic confusion.

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Figure 1. Distribution of *Oxalis illinoensis* in the U.S. (NatureServe 2001).

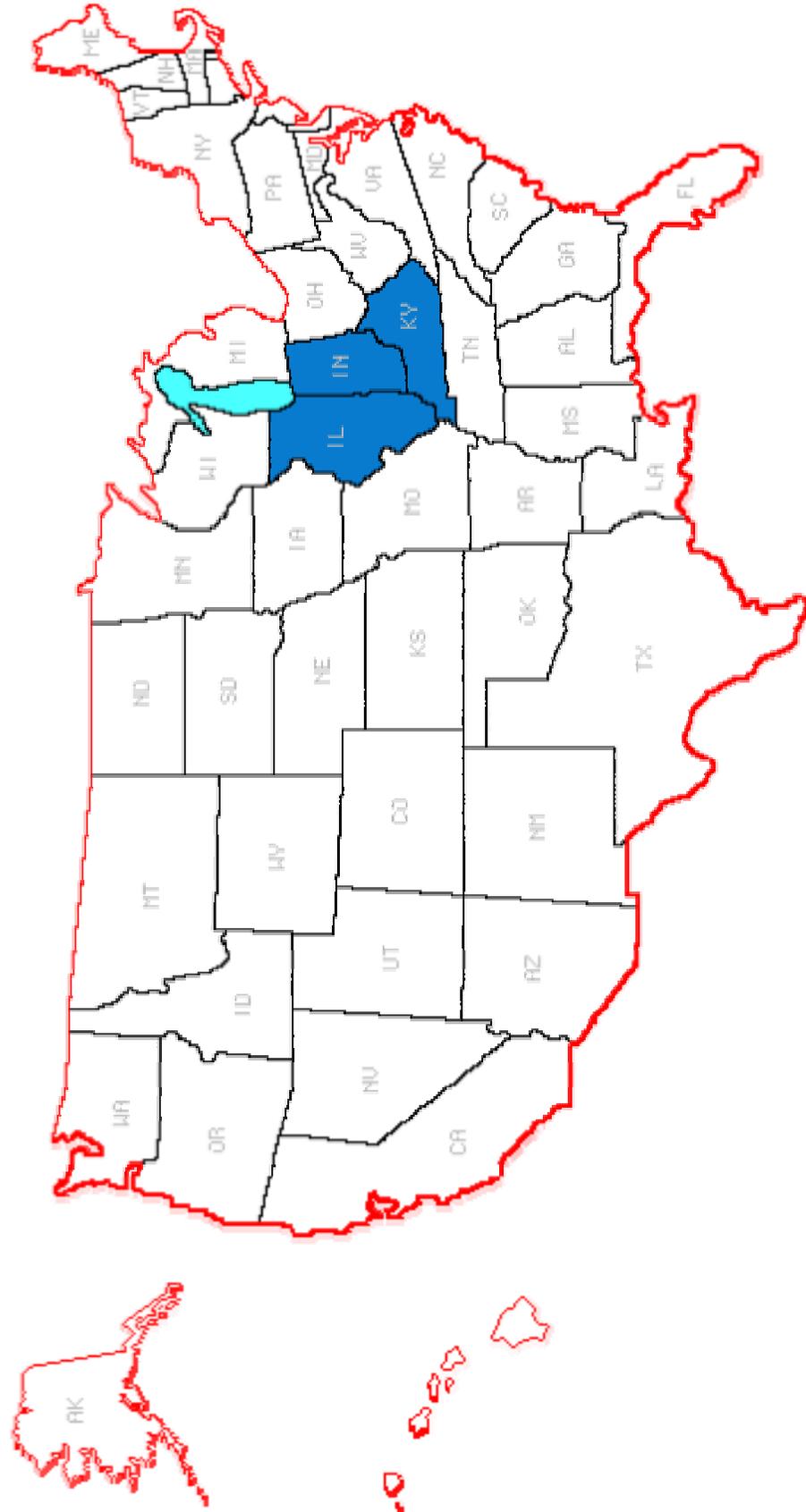


Figure 2. Distribution of *Oxalis illinoensis* in Illinois. Circles indicate counties with extant populations (Gottfried 2002).



Figure 3. Distribution of *Oxalis illinoensis* in Indiana. Circles indicate counties with extant populations (Indiana Department of Natural Resources 2003).

