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Conservation Assessment

for

Yellow Honeysuckle

(Lonicera flava Sims)

Steven R. Hill

Center for Biodiversity
Technical Report 2003 (13)

Illinois Natural History Survey
607 East Peabody Drive
Champaign, Illinois 61820

Prepared for:
U.S.D.A., Forest Service
Vienna Ranger District
Shawnee National Forest
P. O. Box 37
Vienna, IL 62995

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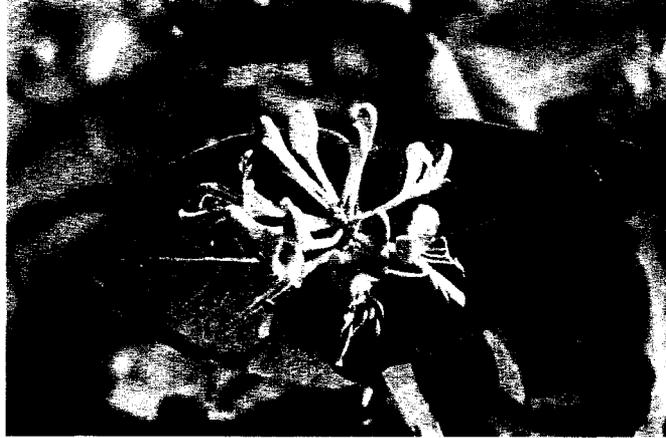


Photo:

Lonicera flava Sims, from the website of North Carolina State University, Department of Horticultural Science, Raleigh. Photograph probably taken at the J.C. Raulston Arboretum, NC State University, Raleigh, NC. Copyright: Erv Evans, NC State University. Used with permission.

http://www.ces.ncsu.edu/depts/hort/consumer/factsheets/vines/lonicera_flava.html

This Conservation Assessment was prepared to compile the published and unpublished information on the subject taxon or community; or this document was prepared by another organization and provides information to serve as a Conservation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

This Conservation Assessment is a review of the distribution, habitat, ecology, and population biology of the Yellow honeysuckle, *Lonicera flava* Sims, throughout the United States, and in the U.S.D.A. Forest Service lands, Eastern Region (Region 9), in particular. This document also serves to update knowledge about the status, potential threats, and conservation efforts regarding the Yellow honeysuckle to date. The Yellow honeysuckle is a perennial fibrous vine that has pale yellow, yellow-orange, to orange flowers, globose reddish-orange berries, and it has leaves that have a hairless upper surface and a glabrous to somewhat villous-pubescent undersurface; the hairs, if present, are normally restricted to the larger leaf veins. The undersurface of the leaves is slightly gray green or pale but not conspicuously whitened (glaucous) at maturity. The species is generally recognized as distinct by botanists, but there is some disagreement in the literature regarding varieties. In addition, the Yellow honeysuckle may be of hybrid origin or it may have hybridized extensively with other species in some portions of its range, including Illinois. The vine grows mainly in rocky open forests, bluff ledges and cliffs, and in rocky ground along streams. The species is found only in the central to southeastern United States (historically in 12 states) and nowhere else in the world. It propagates primarily by seeds, but its stems are capable of rooting and new plants are easily established. Globally, the species ranking is G5? (probably secure world-wide, but some additional information is needed). The Yellow honeysuckle is listed as Endangered in Illinois, of Special Concern in Tennessee, and Presumed Extirpated in Ohio. It is also considered to be critically imperiled in Kansas. The Yellow honeysuckle has been included on the Regional Forester Sensitive Species list (RFSS) for the Shawnee National Forest but not the Hoosier National Forest, where it has not been reported. In Illinois the species is critically imperiled and it is considered vulnerable because it has very few known occurrences. It faces extirpation in Illinois if it is not properly protected.

In addition to species listed as endangered or threatened under the Endangered Species Act (ESA), or species of Concern by U.S. Fish and Wildlife Service, the Forest Service lists species that are Sensitive within each region (RFSS). The National Forest Management Act and U.S. Forest Service policy require that National Forest System land be managed to maintain viable populations of all native plant and animal species. A viable population is one that has the estimated numbers and distribution of reproductive individuals to ensure the continued existence of the species throughout its range within a given planning area.

The objectives of this document are to:

- Provide an overview of the current scientific knowledge on the species.
- Provide a summary of the distribution and status on the species range-wide and within the Eastern Region of the Forest Service, in particular.
- Provide the available background information needed to prepare a subsequent Conservation Approach.

NOMENCLATURE AND TAXONOMY

Scientific Name: *Lonicera flava* Sims [Bot. Mag. 32: t. 1318. 1810]

Common Names: Yellow honeysuckle; Pale yellow honeysuckle

Synonymy: *Lonicera flavescens* Small [Fl. S. E. U.S. 1126, 1338. 1903], valid but illegitimate, not *Lonicera flavescens* Dippel [Ill. Handb. Laubholz. 1: 260. 1889], valid & legitimate. *Lonicera flavida* Cockerell ex Rehd. [Rhodora 12: 167. 1910], new name for *L. flavescens* Small (1903), non Dippel (1889). *Lonicera flava* Sims var. *flavescens* Gleason (Phytologia 4: 25. 1952), replaced synonym: *L. flavescens* Small (1903).

Class: Magnoliopsida (Flowering Plants - Dicotyledons)

Family: Caprifoliaceae (the Honeysuckle family)

Plants Code: LOFL [for the species] [LOFLF for var. *flavescens*] (USDA NRCS plant database, W-2) http://plants.usda.gov/cgi_bin/topics.cgi

The genus *Lonicera* includes 34 species that have been reported in North America (Kartesz and Meacham 1999). These 34 species include 18 native species and 16 exotic species, some of hybrid origin. The somewhat conservative treatment presented by Kartesz and Meacham listed nine additional varieties within the 18 native species resulting in a total of 27 taxa native in the United States. *Lonicera flava* Sims was treated in that work as a variable species with no accepted varieties.

The name *Lonicera flava* Sims was published in 1810. In 1903 Small described a new species that he decided was different from *Lonicera flava*, and he named it *Lonicera flavescens*, not realizing that this name had been published previously by Dippel as the name of a completely different plant. Small's name had to be dropped, and it was replaced by *Lonicera flavida* Cockerell by Rehder in 1910, using the same description and type specimen. Gleason decided that this plant was actually a variety of *Lonicera flava* and he named it *Lonicera flava* var. *flavescens* in 1952. The epithet was available at the variety level because the rule of priority only applies within ranks, not between ranks. Small could not be given credit as first author, however, because his name was illegitimate, but his type specimen became the type of this new variety (K.Gandhi, pers. comm.).

While the nomenclature has no additional problems, the taxonomy is still debated. One can recognize two entities in the species, or else two species. The available names, all correct, would be *Lonicera flava* Sims, *Lonicera flava* Sims var. *flava*, *Lonicera flava* Sims var. *flavescens* Gleason, and *Lonicera flavida* Cockerell ex Rehd. If var. *flavescens* is considered to be an insignificant variant of *Lonicera flava*, and if it is not accepted as taxonomically distinct from typical plants of the species, then all of these names would simply become synonyms of *Lonicera*

flava Sims, the earliest legitimate name at the rank of species. The decision concerning whether or not to accept the varieties is open to the judgement of individual botanists based upon available evidence, and, therefore, is not governed by current International Code of Botanical Nomenclature [ICBN] (Greuter *et al.*, 2000). This conservation assessment does not make this judgement, but it does attempt to present information available at both the variety and species ranks, leaving the final judgement to those who are in policy making positions regarding plant protection.

The common name for the taxon, Yellow honeysuckle, is nearly universal in the literature. The common name Pale yellow honeysuckle has been used for the var. *flavescens* by some. In this report, information in the literature that has been reported under a varietal name will be so specified.

Only a few current treatments recognize the variety as distinct, and it is possible that this variety will not be generally accepted in future treatments. However, it can be distinguished when in flower, and it may represent an important part of the understanding of the species. The var. *flavescens* has been suggested to be a hybrid. This suggestion was made by Rehder (1910) who stated: "*L. flavida* (*L. flavescens*) is closely related to *L. flava* Sims and intermediate between that species and *L. prolifera* (Kirchn.) Rehd.". Duncan (1967) stated that *L. flava* and *L. flavida* intergraded completely and could not be separated. He also remarked "*L. flava* and *L. dioica* intergrade in the Arkansas area". He felt that other transitional forms in Alabama and Arkansas also resembled *L. ciliosa* (Pursh) Poir. from the Pacific states. The Illinois specimens also strongly resemble this western species, but *L. ciliosa* has a much larger corolla than the local populations. A different treatment of this group was proposed by Smith (1978) in his listing and atlas of the plants of Arkansas, who has merged the Yellow honeysuckle within *Lonicera dioica*. A general consensus on the taxonomy of the group has not yet been reached and taxonomic judgements may differ in this case for some time to come.

To assist in understanding current assessments of the variety, the name in use in several commonly used floras and treatments has been included below in Table 1.

The name *Lonicera* was derived from the name of the German herbalist Adam Lonitzer (1527-1586) (see Giebelmann 2002). The honeysuckle is a well-known American, European and Asian genus with about 200 species total, and its common name was derived from its well-known heavy production of sweet nectar in the flowers. The epithet "flava" and its variants all refer to the yellow ('flavus') or yellowish ('flavescens') color of the flowers.

Table 1. The status of *Lonicera flava* in selected literature.

Accepted name	References	Additional notes
<i>Lonicera dioica</i> L.	Smith (1978)	Smith combined <i>L. flava</i> , <i>L. prolifera</i> , <i>L. flavida</i> , and <i>L. dioica</i> var. <i>glaucescens</i> all into <i>L. dioica</i> .
<i>Lonicera flava</i> Sims	Barkley <i>et al.</i> (1986); Chester <i>et al.</i> (1997); Mohlenbrock (1986, 2002); Radford <i>et al.</i> (1968); Kartesz and Meacham (1999); W-2; W-3	Barkley <i>et al.</i> mentioned no vars. (1986) and did not map it (1977); Chester <i>et al.</i> accepted no vars.; Mohlenbrock (1986) incl. no syns., but included <i>L. flavescens</i> Small as a syn. in the recent edition (2002); Radford <i>et al.</i> : included <i>L. flavida</i> as synonym, distinguished no vars.; Kartesz and Meacham accepted no vars. in <i>L. flava</i> ; NatureServe and USDA Plants sites follow Kartesz.
<i>Lonicera flava</i> Sims var. <i>flava</i> , and var. <i>flavescens</i> Gleason	Steyermark (1963); Gleason and Cronquist (1991)	Steyermark accepted both vars., with var. <i>flavescens</i> (Small) Gleason cited; Gleason and Cronquist tentatively accepted both vars.
<i>Lonicera flava</i> Sims, and <i>Lonicera flavida</i> Cockerell ex Rehd.	Fernald (1950)	Fernald accepted two distinct species with distinct ranges

DESCRIPTION OF SPECIES

Lonicera flava is a native perennial fibrous trailing or twining vine or woody climber that resembles *Lonicera dioica* and *L. prolifera* (*reticulata*) in general appearance, the stems are generally (1-) 1.5-2 (-3) m long, the leaves are opposite, simple, entire, (3-) 4-6 (-12) cm long, variable in shape (usually oblanceolate to broadly oval, obtuse to acute), and their lower surface is slightly gray-green or pale below but not conspicuously waxy-whitened (not glaucous) and it is glabrous to somewhat villous-pubescent; the hairs, if present, are normally restricted to the larger leaf veins; the upper surface of the leaf is hairless (glabrous). The uppermost leaf pair at the base of the terminal flower cluster (inflorescence) is joined (fused, connate) at its base into a rhombic (double ovate) to rounded disc through which the stem continues (perfoliate), the disc normally is narrowed at the point of fusion of the leaf pair, and the tip of each connate leaf is slightly narrowed to an obtuse tip; the upper and lower surfaces of this disc are dark green to grayish green and not glaucous (not whitened with a waxy covering) and the disc is typically somewhat longer than broad, oblong, elliptic, or diamond shaped (rhombic or doubly ovate); the flowers are arranged in 1-3 crowded whorls (in circles around the axis) that are usually not separated from one another; the corolla tube is slender and not enlarged on one side at the base (not gibbous), it is hairless on the outside and usually hairy inside but sometimes glabrous within, the color is

orange, orange-yellow, or pale yellow, the flower is often showy, 2.0-3 cm long, and the tube is normally as long as or longer than the lobes (lip) and is gradually expanded above the base. The style is glabrous. The fruits (rarely seen ?) are globose reddish-orange berries. The chromosome number is $2n = 18$ (adapted primarily from Steyermark 1963 and Gleason and Cronquist 1991).

This species is sometimes difficult to distinguish from several similar taxa. Much sterile material cannot be identified with certainty particularly after being heat-dried, because the waxy coatings important in distinguishing some related taxa can be destroyed by this process. Features of the connate inflorescence bracts (disc) are generally important in distinguishing the species, and these also are usually not present on sterile material. An identification key is provided below for this and similar taxa known in Illinois and neighboring states. This key has been expanded from those found in most current treatments because of the difficulties in identification in this group, and it includes both varieties within *Lonicera flava*. The additional detail may be helpful in distinguishing the taxa that are often not described in detail in local manuals; it was based primarily on keys in Fernald (1950), Steyermark (1963), and Gleason and Cronquist (1991).

Key to Illinois species of *Lonicera* that are: vines or viny shrubs, stems hairless, leaves never lobed, sometimes wider towards apex than base, uppermost leaf pair subtending inflorescence connate, flowers at branch tips in opposite 3-flowered cymules producing 6 flowered whorls.

1. Corolla not two-lipped, the 5 lobes nearly equal and much shorter than the tube, the base of the tube not swollen on one side, stamens and style barely protruding, corolla tube glabrous, narrow, showy, usually deep red (or yellow) outside, yellow inside, (2.5-) 3-5 cm long; flower whorls 1-4, separated from one another; bracts green above, glaucous beneath, rhombic-elliptic, relatively small (commonly 2 cm X 2 cm, emarginate); leaves glabrous and conspicuously glaucous beneath; often cultivated.....*Lonicera sempervirens* L. var. *sempervirens*

1. Corolla strongly two-lipped (bilabiate, bilateral), the 5 lobes not all equal in size or shape, shorter or almost equal in length to the tube, the base of the tube swollen on one side (gibbous) or not, stamens and style conspicuously protruding, corolla tube glabrous or pubescent, gradually or more abruptly expanded towards apex, showy or not, pale yellow-green, yellow, orange, rose, purplish, or reddish, 1.5-3 cm long; flower whorls 1-6, crowded or separated from one another; bracts green or conspicuously glaucous above, green or glaucous beneath; infrequently cultivated.....2

2. Upper and lower surfaces of connate bracts conspicuously glaucous (may not be visible in heated specimens), generally the disc length = width (circular) or wider than long; bract leaves rounded or emarginate (retuse) at the apex; leaves glaucous beneath, variably pubescent below, pubescent with short flat (or blister-like) white hairs on the surface with or without some spreading hairs on the midrib and main lateral nerves, less frequently essentially glabrous; flower whorls 2-6, normally separated from one another, rarely only 1; corolla tube glabrous on outside, gibbous at base, corolla pale yellow.....*Lonicera reticulata* Raf. (= *Lonicera prolifera* (Kirchn.) Rehd.)

2. Upper surface of connate bracts not glaucous, normally pale or dark green, lower surface glaucous or not, the disc length = width (circular) or, more commonly, longer than wide, sometimes diamond-shaped (rhombic); bract leaves rounded, emarginate, pointed, or mucronate at the apex; leaves glaucous or not

beneath, pubescent or glabrous, hairs if present not short and flat; flower whorls 1-3, congested; corolla tube glabrous, glandular, and/or pubescent on outside, gibbous or not at base, corolla orange, greenish-yellow, yellow, pale yellow, sometimes reddish or purple.....3

3. Corolla orange, orange-yellow, to pale (cream) yellow but lacking purple, rose, or brick color, 2-3 cm long; corolla tube not gibbous at base, glabrous, normally as long as or slightly longer than the petal lobes (lips); leaves and connate bracts not glaucous but can be pale or grey-green beneath; connate bracts usually rounded or blunt at apex; lower surface of leaves glabrous or with spreading hairs on the veins; southern 1/4 of Illinois.....*Lonicera flava* Sims (3a)

3a. Corolla orange or orange-yellow, usually 2.8-3 cm long, tube glabrous or slightly hairy within, longer than lobes, filaments shorter than corolla lobes, leaves tending to be acute and with a firm margin, often in more acidic substrates.....*Lonicera flava* var. *flava*

3a. Corolla pale yellow or cream-colored, usually 2-2.5 cm long, tube hairy within, shorter than lobes, filaments equalling corolla lobes, leaves tending to be obtuse (not acute) and with a papery margin, often in calcareous or pH neutral substrates.....*Lonicera flava*
var. *flavescens* Gleason (= *Lonicera flavescens* Small)

3. Corolla red, or yellow, pale yellow, to yellow-green tinged with purple, rose or brick-color (some reddish or purple color present in flowers), (0.6-)1.5-2.5 cm long; corolla tube gibbous at base, glabrous, glandular, and/or pubescent on outside, longer than petal lobes (lips); leaves and connate bracts conspicuously whitened-glaucous beneath; connate bracts usually narrowed to tip and pointed or mucronate, less frequently rounded; lower surface of leaves glabrous or uniformly villous-hairy beneath; northern 1/3 of Illinois, but rarely south.....*Lonicera dioica* L. (3b)

3b. Leaves glabrous beneath; corolla tube and style glabrous or sparsely hairy.....*Lonicera dioica*
var. *dioica*

3b. Leaves uniformly (sparsely or more densely) villous-hairy beneath; corolla tube normally glandular and villous, style hirsute.....*Lonicera dioica* var. *douglasii* (Lindl.) Farw.
[= var. *glaucescens* (Rydb.) Butters]

Additional notes on the varieties of *Lonicera dioica* may be found in Hill (2003c).

It may be important to note that most floras combine the variation seen within the varieties of *Lonicera flava*, as noted in the above key, into a single broader description of the species. An examination of herbarium specimens suggests that this concept may be too broad and may include plants of hybrid origin as well. Rehder (1910) retained the varieties as distinct species, and stated that *Lonicera flavida* was intermediate between *L. flava* and *L. prolifera* (= *L. reticulata*). Gleason and Cronquist (1991) stated concerning *Lonicera flava* var. *flavescens* "They may be hybrids with *L. prolifera*". However, this has not been confirmed through genetic means.

The morphology of examined herbarium specimens tends to support the idea that *L. flava* var. *flavescens* may be of hybrid origin between two species with the same chromosome number ($2n=18$). A loan of specimens for this study from Eastern Illinois University included a voucher from the Lusk Creek, Illinois, population complete with flowers. The flowers fit within the size range for var. *flavescens*, but they had an obviously gibbous corolla tube and very short corolla lobes, neither of which features fit *Lonicera flava* as described in the literature. The leaves have the reduced 'blister-like' hairs of *L. prolifera* as well as the more elongate villous hairs of *L. flava* on the leaf veins. The connate disc appeared to have a very small amount of wax near its center, but not overall, and it did not demonstrate the obvious constriction at the point of fusion that was more frequently seen in *L. flava*, but rarely if at all in *L. reticulata*. Because these observations have been limited to a very few specimens, a definite conclusion can not yet be drawn, but there is the suggestion that the Illinois specimens represent either *Lonicera flava* var. *flavescens* or a hybrid between *Lonicera flava* and *L. prolifera*, both of which occur in this part of the country.

The orange or red, fleshy berries of the Yellow honeysuckle are undoubtedly dispersed by birds, as in many other species of the genus. Their edibility to humans is unknown. Descriptions of the species in the literature rarely have any information on the fruits of this honeysuckle, and an examination of herbarium specimens suggests that it may rarely produce fruit.

No references were found for this particular species regarding the edibility or toxicity of its fruit. A perusal of the Internet and the literature can result in information that varies from advice on how to make Honeysuckle jam and jelly (W-4) to strong warnings of toxicity (W-5). It appears that there is either great variation in the fruits within the genus or a great deal of unsubstantiated information available. An inquiry was sent to the website that presented the recipe for jam and jelly (W-4) and a reply was received from Ernestina Parziale (earthnotes@attbi.com) as follows: "That recipe was given to me many years ago. I posted it for those who were interested, but have no further information on it. Four varieties are mentioned: *L. tatarica* which grows from Maine south to Kentucky, *L. canadensis* which grows from Canada through New England and west to Minnesota, *L. oblongifolia* which is found in New Brunswick south to Pennsylvania and west to Minnesota, and *L. caerulea* which is wide ranging enough to be found in Alaska."

HABITAT AND ECOLOGY

The preferred habitat of the Yellow honeysuckle appears to be in upland rocky forests or on rock bluffs, or in rocky ground along streams. The typical variety (var. *flava*) appears to occur in thin soils in the vicinity of sandstones and granitic rock that may tend to be somewhat acidic, and the var. *flavescens* appears to prefer thin soils associated with limestone (Fernald 1950; Steyermark 1963). Overall, reports of substrate (bedrock) upon which this honeysuckle grows include both limestone and sandstone, and some sources state that the majority of the plants are associated with limestone. In those treatments that do not separate the varieties, both substrates are generally indicated.

Among the characteristic habitats described on herbarium specimen labels are the summit of a limestone cliff near a river, the edge of a limestone cliff near a river, in rocky soil in a moist thicket, in rocky woods, on wooded hillsides in a canyon, on cherty slopes, at the margin of a hardwood forest over granite, on rocky bluffs (most common), on bare rocks at summits of mountains and ridges, on a west cliff, and in open woods. It appears to commonly be found trailing off of the margins of steep cliffs or ledges.

The site exposure is generally not on herbarium specimens, but on a few it was described as northern or western. Moisture conditions can vary from moist to dry depending on the season. The soil in which it grows is generally sandy or loam, or sandy with a periodically moist humus layer on its surface.

In Illinois, the Yellow honeysuckle tends to be restricted to the margins of rock outcrops in rocky woods, and particularly at the edges of sandstone bluffs (Herkert *et al.* 1991; Mohlenbrock 2002).

The tendency for this and other similar native honeysuckles to be restricted to areas near exposed rock outcrops may be the result of their dependence on birds as the primary means of flower pollination and seed dispersal. It is well known that the native honeysuckles are very dependent on hummingbirds for pollination (Pojar 1975), the species *Lonicera sempervirens* having an extreme example of a flower that can be pollinated by little else because of its long narrow red tube. Hummingbirds require open areas to fly and also to see brightly colored red, orange, or yellow flowers. The showy flowers of these honeysuckles would be less likely to be pollinated if hidden in shade. Furthermore, the brightly colored red or orange fruits of these vines are sought out by fruit-eating birds, and the fruits must be exposed to be easily found. The honeysuckles, generally preferring moist, well-oxygenated soils, must become established on a site that is exposed, oxygenated or well-drained, and, yet, has sufficient moisture. This type of site becomes scarce in warmer climates where wetlands tend to be poorly oxygenated and exposed sites tend to be very dry. Therefore, the southern habitats for plants such as the honeysuckle must possess some or all of the following characteristics - 1) the slopes must have mosses or soils (such as humus) that have water storage capabilities, 2) they must have dependable sources of water, such as rather frequent rainfall during the growing season, or crevices where persisting water can be sought out by the roots, 3) the slopes must have areas of shade available for vegetative parts of the plants to thrive and not desiccate from intense summer exposure, and 4) the slopes must also offer areas where flowers and fruits can be exposed for passing birds to find. Because honeysuckles are short vines that generally cannot grow high into the canopy of trees, suitable habitats are limited.

The plant communities and plant associations within which the Yellow honeysuckle grows have not always been very well documented. In Illinois, the plant community in which this vine grows has been described as a mesic upland forest at its margin or transition with the Sandstone Cliff Community (as defined by White and Madany 1978). Dominants in the community normally include *Quercus alba*, *Quercus rubra*, and *Quercus velutina* along with *Juniperus virginiana*.

Additional associated species may often include *Heuchera* sp., *Lonicera japonica*, *Hydrangea arborescens*, *Parthenocissus quinquefolia*, and *Dryopteris marginalis*.

One of the best-documented sites for the species in Illinois is at Bell Smith Springs in Pope County (Mohlenbrock 1968). Here the species (as *Lonicera flavescens*) was reported to be rare and to occur in 'lowland woods' that extended from the stream bank to the base of the sandstone cliffs or to the base of the wooded slopes, and that were characterized as having a dense canopy of mature trees and little or no understory with an exposed forest floor. In this very common southern Illinois mesic upland forest community, the dominant species were the trees *Fagus grandifolia*, *Acer saccharum*, *Quercus alba*, and several *Carya* spp.; the shrubs *Hydrangea arborescens* and *Cornus florida*, the vines *Parthenocissus quinquefolia*, *Smilax* sp., and *Toxicodendron radicans*, the herbs *Desmodium nudiflorum*, *Galium concinnum*, and *Viola sororia*, and the grass *Panicum microcarpon*. Botanists and ecologists have speculated on the original landscape in this part of Illinois based mostly upon land survey records and field observations (Eric Ulaszek, pers. comm.). Evidence suggests that the original pre-settlement landscape was a 'barrens', a savanna or prairie-like community with scattered oak trees and oak brush, that was periodically burned by Native Americans. The southern Illinois sites are within the Greater Shawnee Hills Section of the Shawnee Hills Natural Division as well as in the Ozark Natural Division of Illinois (Schwegman *et al.* 1973, Herkert *et al.* 1991).

Few herbarium specimen labels seen listed species associates. Because of the species' somewhat restricted range and relatively similar habitat, many or most of the species listed above would be expected in its vicinity. The availability of water may be more significant a factor than pH or community associates, as suggested previously.

According to George Yatskievych (pers. comm.) "The best population I have seen in Missouri was in Reynolds County at the site of a small sinkhole pond.... The company that owns the site had it clearcut and the *Lonicera* was going crazy in the regeneration area just below the pond.it isn't an easy place to find and the oaks will have grown up a lot by now". At least in Missouri, where the species is most common, it can act as an opportunistic plant, expanding into gaps in otherwise forested landscape and becoming locally common, only to be gradually crowded out as the open areas are filled with new growth.

DISTRIBUTION AND ABUNDANCE

Lonicera flava (the species) overall has been reported from twelve states in the midwestern and southeastern regions of the United States (W-3; Kartesz and Meacham 1999). These states are Alabama, Arkansas, Georgia, Illinois, Kansas, Kentucky, Missouri, North Carolina, Ohio, Oklahoma, South Carolina, and Tennessee. The Ohio records are considered historic and no extant populations are known in the state. The two varieties, if recognized, may not occur in each state. An ongoing investigation (Anita Cholewa, pers. comm.) has provided some early evidence that the Yellow honeysuckle may occur in Indiana, although Deam (1940) did not include it within the state, nor do present treatments (Homoya, pers. comm; K. Yatskievych, pers.

comm.). In Missouri, the Yellow honeysuckle is considered to be the most common wild honeysuckle (G. Yatskievych, pers. comm.).

In Arkansas, the Yellow honeysuckle has been merged within *Lonicera dioica* by Smith (1978) to form a very broad circumscription for that species. This, perhaps, is the most inclusive species concept found in any flora, and so the distribution map provided by Smith (1978) is of no use in distinguishing the narrower concept of the species in that state. A review of all Arkansas herbarium material would be needed to determine which taxa are there. Nevertheless, true *L. flava* is probably the most common member of the species complex in Arkansas based on available evidence.

The range of var. *flavescens* is not always easily distinguished from that of the typical variety because of the differences of opinion on its status as a variety and so some state maps are of limited use in this regard. The available information regarding the distribution of the two varieties suggests that they overlap in most, if not all of, the states where var. *flavescens* occurs. Fernald (1950) lists var. *flavescens* (as *L. flavida*) in western South Carolina, Kentucky, Tennessee, and Missouri. In the same treatment, *L. flava* was said to occur in North Carolina to Missouri, south to Georgia, Alabama, Arkansas, and Oklahoma. Steyermark (1963) stated that *L. flava* var. *flavescens* ranges “from South Carolina and Kentucky to Tennessee and Missouri” and that var. *flava* ranges “from Georgia, Alabama, Arkansas, and Oklahoma north to North Carolina, Kentucky, and Missouri”. Barkley *et al.* (1986) specifically included the species in southeastern Kansas, which is not included within the ranges indicated by the other two floras. The type specimen of *Lonicera flavescens* Small, which is the type of *L. flavida* and *L. flava* var. *flavescens* as well, was collected in the Cumberland Mountains of Cumberland County, Tennessee (specimen at the New York Botanical Garden).

The view that *L. flava* var. *flavescens* may be a hybrid between *L. flava* and *L. prolifera* (= *L. reticulata*) is supported by the fact that *L. prolifera*, a more northern species, reaches its southern range limits in Tennessee, Arkansas, and eastern Kansas and it can be shown to occur in nearly every state in which the var. *flavescens* and the other alleged parent, *L. flava*, grow together. The possible exception to this would be the states of South Carolina in the east and Kansas in the west, where at least one of the three taxa may be absent.

Based on the literature, it appears that *Lonicera flava* var. *flavescens* (= *L. flavida*) occurs primarily on the Cumberland Plateau, the Ozark highlands (including the Shawnee Hills), and has outliers on a few granitic domes (monadnocks) in the vicinity of the Blue Ridge in the western Carolinas. *Lonicera flava* var. *flava* would appear to be more widespread, and it has been recorded from eleven of the twelve states. The specimens would need re-examination to be certain of the distribution of the two taxa because of the differing opinions of the reporting botanists. Representative specimens of this vine have been listed in Appendix 1; the specimens have not been confirmed to variety. A summary of the known distribution by state has been presented in Appendix 2. Additional details on the distribution of the Yellow honeysuckle can be found in the references cited within Appendix 2.

Within the National Forest system, *Lonicera flava* has been reported in the Talladega National Forest in Alabama, the Ozark National Forest in Arkansas, the Shawnee National Forest in Illinois, the Daniel Boone National Forest in Kentucky, the Mark Twain National Forest in Missouri, and the Ouachita National Forest in Oklahoma. It is likely to occur in several others in addition to these.

In Illinois, the Yellow honeysuckle (as *L. flava*) has been reported at four sites within the Shawnee National Forest in southern Illinois in Jackson County at the Little Grand Canyon and at Fountain Bluff, in Pope County at Lusk Creek Canyon and Bell Smith Springs, according to the Illinois Department of Resources [IDNR] (2002), and there are additional unconfirmed reports at Reeds Creek Canyon and Bear Creek in Jackson County, and in Swayne Hollow in Randolph County. There may be problems regarding the identifications of the plants at several of the sites (see discussion in Hill 2003c). Moreover, an examination of a few specimens of the plants at these sites brought forward the possibility that they may be hybrids between 'true' *Lonicera flava* and a related species, such as *L. dioica* or *L. prolifera*, based on their intermediate morphological features. This intermediate form has been considered to be *Lonicera flava* var. *flavescens* (= *L. flavida*) by some, as discussed previously. *Lonicera dioica* 'var. *glaucescens*' was discovered at the Little Grand Canyon by John Schwegman (1970) in 1969, and Schwegman clearly described its distinguishing features that were unique to this variety. Mohlenbrock and Wilson (1985) later reported an additional site for 'var. *glaucescens*' from the top of sandstone bluffs at Fountain Bluff, Jackson County. I visited both sites with Mark Basinger and Ariane Hoard in July 2002 and collected vouchers of both plants, which were sterile. Only one individual appeared to be present at each site, but this is not certain (see Research and Monitoring, below). Both specimens appear to belong to the same taxon. What that taxon is, however, could not be readily determined from the sterile specimens. Neither specimen demonstrates the conspicuously glaucous leaf undersurface typical of *Lonicera dioica*, and the leaves are relatively large and obovate, more like leaves of *Lonicera flava* or *Lonicera reticulata* (= *prolifera*), as I understand them, than those of *L. dioica* 'var. *glaucescens*' from states north and west of Illinois. To further complicate this situation, *Lonicera flava* was reported from the same area "on top of a sandstone cliff" on Fountain Bluff by Don Kurz in May 1978, and it was also reported on the ledge of the chute going down into Little Grand Canyon by Keith Wilson in July 1973 (IDNR 2002). Until specimens can be re-evaluated or until the plants are again seen in flower, it is uncertain what species truly occurs at these two sites, although Schwegman's description is very convincing.

Botanists generally believe that most native plants have reached the limits to which they can travel under present conditions of climate (that is, temperature and rainfall), substrate, dispersal mechanism, and other pertinent factors. In other words, species are in balance with their environment as long as the environment is stable. In many biological simulations, however, ecological extremes are more important than the means in controlling plant distribution (Webb *et al.* 1975). An obvious example is that of frost tolerance (temperature extremes). A plant species completely intolerant of freezing can persist in a site indefinitely until the first time extreme

temperatures cause it to freeze. One such freeze in a century may be enough to eliminate a species entirely from a wide area of its range, and changes in climate historically have caused the greatest changes in plant distributions (see Hill 2003a).

In the case of *Lonicera flava*, the distribution does appear to be at least partly dependent on temperature, based on the fact that it has not been found in many, if any, glaciated northern landscapes. Its distribution suggests that it is neither adapted to extreme cold nor to extreme heat or drought. Its distribution also appears to be dependent on hydrology, substrate type, and the openness of the habitat rather than from temperature extremes alone. The limited distribution suggests that it may be unable to increase its range despite its effective avian dispersal. The possibility that it is a relatively young species of hybrid origin should also be considered, and the limited distribution could just as easily reflect this history.

PROTECTION STATUS

The Nature Conservancy currently lists the species overall as a G5? plant (W-3), indicating that it is probably secure world-wide, but that, in its opinion, some additional data is needed to finalize its overall protection status. In the United States the species is given the National Heritage rank of N? (for similar reasons). The varieties have not been accepted and /or evaluated and so their global and national rankings are the same as for the species overall when they are accepted as distinct. The taxonomic and nomenclatural status may require further review in states where they grow. Living plants and preserved herbarium specimens would require re-examination to determine which variety occurs in the state and to determine if the varieties should be recognized nationally or regionally.

The protection status of *Lonicera flava* has been evaluated at the level of species. No state has listed the plant for protection under the names *L. flavida* or *L. flava* var. *flavescens*. The Yellow honeysuckle is listed as Endangered in Illinois, of Special Concern in Tennessee, and as Presumed Extirpated in Ohio. It is also considered to be critically imperiled in Kansas. In Illinois the species is critically imperiled and it is considered vulnerable because it has very few known occurrences. It faces extirpation in the state if it is not properly protected.

The Yellow honeysuckle has been included on the Regional Forester Sensitive Species list (RFSS) for the Shawnee National Forest but not the Hoosier National Forest, where it has not been reported. Official protection for the species and varieties of *Lonicera flava* outside of Forest Service lands depends upon state and local laws because they are not listed as Federally threatened or endangered.

Table 2 lists the state rank assigned by each state's Natural Heritage program according to the Nature Conservancy at their Internet site (W-3). Appendix 3 explains the meanings of the acronyms used (W-6).

A summary of the current official protection status for the Yellow honeysuckle follows:

U.S. Fish and Wildlife Service: Not listed (None).

U.S. Forest Service: Region 9, Sensitive (Illinois only, Shawnee National Forest).

Global Heritage Status Rank: G5?

U.S. National Heritage Status Rank: N?

Table 2: S-ranks for *Lonicera flava* in the United States [Heritage identifier: PDCPR030A0].

STATE	HERITAGE S-RANK	STATE	HERITAGE S-RANK
Alabama	S3	Missouri	SR
Arkansas	SR	North Carolina	S2
Georgia	S3?	Ohio	SH
Illinois	S1	Oklahoma	SR
Kansas	S1	South Carolina	S2
Kentucky	S?	Tennessee	S1

LIFE HISTORY

As previously stated, the Yellow honeysuckle is a perennial fibrous vine with trailing or climbing stems, with often showy orange to pale yellow flowers and globose red to reddish-orange berries. Therefore, it does reproduce sexually. The stems of this and other species of viny honeysuckles also will readily root when in contact with moist organic soils, and so it may be difficult to determine how many individuals are present where it occurs. These roots appear to be rather weak or shallow, but they can occur wherever the sprawling stems contact moist soil. This species is not aggressive, stems are usually few, and each site may have only a single individual. The stems could break apart after rooting, so that several individuals may appear to be present. The plants are deciduous and dormant in the winter and the leaves normally emerge in late March or early April.

Honeysuckles primarily reproduce sexually by means of flowers and seeds. The flowering period is April-May, and perhaps sparingly into early June, depending upon location, often for only a brief period. In Illinois the flowers appear to be at their peak at about 15 May, on average. Based on herbarium specimen data, in Missouri the normal flowering period appears to be April 12- May 15. Specimens from South Carolina and Oklahoma appeared to be at peak flower between April 20-30. Pollinators probably include ruby-throated hummingbirds, and the

honeysuckle may have a mixed transitional pollination strategy, being pollinated also by insects such as bumblebees, as in similar species (Pojar 1975). The flowers of this and other honeysuckles often darken with age or after pollination, and may open first to a pale orange yellow, later changing to a dark orange to orange red. The fruits, fleshy to sticky inside, are globose reddish-orange to red berries, and they are produced in June-July (late July may be most typical) and they can persist longer. They normally do not fall, but are either picked off by birds or they dry on the plant. Illinois plants have rarely been seen in fruit, but those in Missouri appear to fruit well.

As discussed above, some of the Yellow honeysuckle plants may be hybrids with other native honeysuckle species. This, if proven, could help explain the difficulties in identifying and separating the taxa in southern Illinois, and may also explain the reduced reproductive success in the plants.

POPULATION BIOLOGY AND VIABILITY

Not a great deal is known of the Yellow honeysuckle's population biology beyond what was described in the previous section. The plant could be overlooked because it is only infrequently seen fertile and it may be dismissed as 'just another Japanese honeysuckle' by amateurs and professionals alike. In southern Illinois, the plants do not appear to produce very many fruits in a given year, and in dry years they may not produce fruits at all. None were seen on the plants visited in the summer of 2002, which was a drought year. It is also possible that the stems in some populations are all clones of a single individual. If this is true, this also could help explain the limited amount of fruit and seed production, because fertility is generally reduced in inbred populations through the process of autogamy (self fertilization). Autogamy is useful to the plant when there are small numbers of individuals per area, since the safeguarding of the success of propagation is more important than the production of new genotypes. In primary habitats (such as rock outcrops) that are generally poorly vegetated, initial success is very important. During subsequent periods of vegetation increase, pioneers are often substituted by other, more competitive species (W-7).

Maintaining the open habitat in which the Yellow honeysuckle grows is one of the most important means to insure the viability of this plant in southern Illinois and elsewhere where suitable habitat is so scarce.

In Illinois, the overall species viability for *Lonicera flava* has been considered to be poor. The very few known existing plants are spatially distant from one another and do not seem to be very reproductive. This fits the profile of relict species that are very vulnerable because they are very restricted to uncommon habitats, they are at the margin of their range, and there are very few individuals. There appears to have been little active management for the plant at the reported sites, but at least two of the better known sites are protected conservation areas within the Shawnee National Forest, and this provides some important basic protection. The species may also may have declined because of either too much shade or, just as likely, from excessive heat

and dessication, or because of some unknown factor. Part of the pessimism concerning its future survival arises because the Yellow honeysuckle habitat in southern Illinois has been observed to be steadily degrading (see Potential Threats below). It may or may not occur at other suitable sites in the southern portion of the state, but few searches have been made specifically for the Yellow honeysuckle in recent years here or even elsewhere farther north. Additional searches for this species are suggested in southern areas of the state to allow a better assessment of its frequency. If individuals are relocated in southern Illinois, or if new sites are found, they may persist with proper habitat management.

POTENTIAL THREATS

Globally, this species has been judged to be secure (with some hesitation) because of its relatively wide distribution and because it is somewhat common in a few areas. Herbarium records suggest that, in the United States, the species is especially common in southern Missouri and northwestern Arkansas, and probably northern Alabama. As one proceeds in all directions from Missouri the species becomes scarce quickly. The populations nearing the northern margins of its range are especially vulnerable.

In southern Illinois and elsewhere at the range margins, threats to the Yellow honeysuckle appear to fall into several categories, any of which could result in its extirpation in the state because of the extremely low numbers of individuals. All are serious, but none can be said to be the single most serious threat. A single chance natural disaster at either site where the plant is known could extirpate the variety from that site, and accidents at both sites could eliminate it from the state completely because of its low numbers.

The plants are located at the margins of precipitous sandstone ledges and cliffs. Normally, there is very little human traffic on these particular cliffs in Illinois; however, because cliff climbing is increasing in popularity, the plants could be extirpated by even a small amount of this type of recreational activity in their immediate vicinity. It would be tempting to grasp onto the plants for support, but they are very weakly rooted, so that they could be pulled out and destroyed very easily by careless climbers.

Herbicides pose an additional threat to the few plants remaining. The population at the Little Grand Canyon is located along a popular hiking trail, and there is Japanese honeysuckle also present along this trail. A careless application of herbicide to the plants could extirpate them. The Fountain Bluff population is on high bluffs adjoining and facing extensive agricultural fields. Herbicide drift could destroy these plants under certain circumstances. An additional potential threat to the Yellow honeysuckle in southern Illinois is the government's barberry eradication program which also involves herbicides. This program has been described briefly by Hill (2003b). The Yellow honeysuckle has been shown to grow in association with *Berberis canadensis* at one of its two known sites. Because the U.S.D.A.'s program uses herbicides to eliminate this rare native shrub, this barberry eradication effort should not be instituted in southern Illinois if these species are to survive.

At both extant sites, the surrounding vegetation has not been thinned or burned in the recent past. It is possible that the plants may be too shaded to successfully reproduce. While vegetative growth is continuing, this will not insure long term viability. However, it is not known how much thinning, if any, might be needed to allow these plants to successfully reproduce. Related to this, a very serious potential threat is from competition with the very invasive related exotic vine Japanese honeysuckle (*Lonicera japonica*) that increases with disturbance and which is also readily dispersed by birds throughout the landscape. This exotic vine grows at an extremely rapid rate compared to the generally slow growing Yellow honeysuckle in southern Illinois, and a colony of the exotic could easily overwhelm it and destroy it. Because herbicide control is out of the question, and because fire can actually benefit the Japanese honeysuckle, any individuals of this exotic and invasive species should be removed by hand on a regular basis, a very labor-intensive, but necessary, activity.

The loss or degradation of primary habitat may have played a role in the demise of this species as it has in the case of *Berberis canadensis* (W-3). The elimination of the natural fire regime throughout most of its historic range has resulted in the succession of savanna and open woodland habitats into closed-canopy woodlands. In the absence of fires, *Lonicera flava* in southern Illinois, like the American barberry, can persist today only at sites with extremely shallow soils at the margins of outcrops where there is an open exposure. Since settlement, much of the previously available habitat has been destroyed, converted to cultivated fields, or has succumbed to land development and urbanization (W-3). While it can not be demonstrated that the Yellow honeysuckle was any more common at the time of settlement than it is now, the amount of available fire-influenced habitat has certainly decreased in the past 150-200 years.

While mining, quarrying, and grazing would pose significant threats to this and many other cliff-face plants in southern Illinois, none of the extant populations appear to be affected by these activities currently. In addition, herbicide and sediment runoff and erosion from above do not appear to be threatening the plants at their two known sites. If the forest above the plants were to be cut or if land use changes, runoff and erosion could extirpate these plants.

It is generally believed among biologists that habitat fragmentation also can have profound effects on the success and persistence of local populations. Any activities that result in barriers to dispersal, such as developments, clearcuts, road/utility line corridors, and mined areas may limit the possibility of population expansion and genetic exchange in many species. Deleterious effects of fragmentation could possibly go unnoticed for a long period of time, making the short term effects on species viability less apparent, particularly in such a rarely-seen southern Illinois species as *Lonicera flava*. Over time, as populations become increasingly more isolated, the effects of fragmentation can potentially be observed at the molecular level by reduced genetic frequencies caused by random drift (Barrett and Kohn 1991). When one is considering populations that are already isolated, as in the case of the Illinois populations, random genetic drift may have already occurred and may have caused negative effects to the species.

At the current time, it appears that the populations of *Lonicera flava* in the Shawnee National Forest are very vulnerable to extirpation from a number of potential threats that could happen at any time. The extremely small number of known extant individuals suggests that a single event at either site could eliminate the variety from that site.

RESEARCH AND MONITORING

The primary problem to be solved at this time is to determine which taxa are actually present in southern Illinois. The Illinois Natural Heritage database and previous reports in the files of the IESPB have conflicting reports. According to these notes, plants identified as *Lonicera dioica* var. *glaucescens* were collected in Jackson County at Fountain Bluff by K. Wilson, and from an east facing ledge at the head of the trail down into the Little Grand Canyon natural area by J. Schwegman (specimens at SIU). *Lonicera flava* Sims has been reported in Pope County in the vicinity of Lusk Creek Canyon and Belle Smith Springs and in Randolph County in the vicinity of Swayne Hollow, where Red honeysuckle has not been found. However, it has also been reported in Jackson County from the same two sites at which the Red honeysuckle has been reported. So, both taxa have been reported at both sites, yet it is unlikely that both actually occur at both sites. For the purposes of this assessment, however, it has been assumed that all of these reports are correct. This problem remains unresolved until more field work and specimen examination can be conducted.

Based upon a survey of the literature, little research appears to have been conducted on this species. The taxonomy has not been settled, as has been discussed above. Additional basic research and monitoring is needed regarding *Lonicera flava* in areas other than taxonomy. The basic data on the location of extant populations is sparse, and the few known sites should be methodically re-surveyed. Similar suitable habitat should be explored for the plant. There is also a need to monitor and assess its optimal habitat needs and to determine what management techniques might be effective in insuring its survival.

As part of the basic research on current populations of the Yellow honeysuckle, data such as counts of numbers of individuals present, the determination of the amount of yearly fruit/seed production, and an assessment of recruitment rates are greatly needed in order to monitor population dynamics and to assess the viability of any populations found. Counts should be made not only of individual stems, but whether or not these stems are interconnected (to help determine the actual number of individuals) and an attempt should be made to find immature (seed grown) individuals at the same sites. It is recommended that surveys be conducted during the flowering and fruiting periods because it is very difficult to identify the plant without the flowers, and fruits must be counted to determine fertility. The populations of *Lonicera flava* in southern Illinois are only rarely monitored by botanists working on behalf of the state Natural Heritage programs and other organizations and few appear to have ever seen it there.

In addition to the basic effort of locating additional populations and conducting population counts, it would be useful to initiate a genetic investigation of the diversity within and between

the known populations using DNA methodology. It would be especially important to discover if colonies are clonal or contain related individuals, and if they can be proven to be of hybrid origin. This could be expanded to compare the local populations with the nearest populations in adjoining states to assess their origin or degree of genetic distance between them. A comparison of these results with similar studies of the possible parents would be a logical extension of the research. The techniques for several aspects of monitoring and studying rare plant species are presented in Collins *et al.* (2001), Philippi *et al.* (2001), and Imm *et al.* (2001). Individual wild plants should be monitored over time. Such basic facts as fungal associations (if any), longevity, yearly variations in population size, pollination and pollinators, flower behavior, and seed establishment are not precisely known. Perhaps the plants (flowers) are self-incompatible, but this is not known. One study on an Asiatic barberry demonstrated that fruit set and fruit weight can be improved by spraying with 200 ppm gibberellic acid (GA3) at full bloom and again 15 and 30 days later (Malasi *et al.* 1989). Perhaps this would also work on the honeysuckles.

No research programs directed at management needs for this plant are known at this time. It is known that *Lonicera flava* is a plant of open woodlands and bluffs in most of its range and that most of these habitats have grown closed with trees and shrubs since the elimination of a natural fire regime in midwestern areas of the United States. Some limited research on the effects of prescribed fire or selective thinning of the canopy could be conducted in order to determine the effects of increased light levels on the populations for the purpose of better management. Because there is a need to determine the optimal habitat for the species and how to best maintain it, long-term monitoring of known populations should be conducted every 1-2 years to track their status with respect to these current management activities.

Botanical surveys conducted by scientists from the Illinois Natural History Survey have shown repeatedly that with sufficient time and funding, and an experienced eye, many plants thought to be extirpated or else threatened or endangered can be found at additional locations (Hill 2002). These investigations have been important in that they have led not only to the de-listing of species once thought to be rare, but they have also resulted in the discovery of species previously unknown in the state. The U.S.D.A. Forest Service and other related agencies have done a fine job in the effort to preserve rare species with the resources that they have available. Much of the locating and monitoring of known populations of rare species in southern Illinois has been conducted by Forest Service biologists in cooperation with Illinois Department of Natural Resources personnel. However, a continuing problem is that there is neither sufficient funding nor are there enough botanists available to survey the immense area that needs to be covered in the monitoring of the large numbers of sensitive plants, including this one. It appears that a high priority should be given to the training and hiring of more qualified field botanists to achieve these goals.

RESTORATION

There are no known restoration efforts being conducted on *Lonicera flava* anywhere in its range. The difficulty in maintaining this species is that some active management appears to be

necessary, but the ideal means and combination of maintaining sufficient water availability along with an open exposure has not been fully determined. For this reason, great caution should be exercised in restoration and management programs at this time.

The generally recommended method to restore populations of this and other rare plants is to protect and manage their habitat. Protection of the hydrology and thin soil layer of the sites may be crucial, along with the maintenance of an open area. Girdling a few selected trees may be effective. Exotic and aggressive species must be completely eliminated from each site. This would entail physically pulling them out because it is very likely that herbicide application would eliminate this species at a site. The additional use of controlled burns, the thinning of the overstory, and the thinning of competing understory species may be beneficial to this plant but should be implemented with caution because of a lack of basic data concerning the specific effects of these management techniques on this plant.

Along with habitat management efforts, restorations of native plant species are recommended using only propagated material grown from native, local populations to avoid interbreeding with genotypes not adapted to the local conditions and to avoid compromising the local gene pool. If this rule is not followed, the result is generally the loss of plants because they are not competitive under local conditions. Another result could be the success of a plant or plants that can not be considered truly native (a reconstruction rather than a restoration). This is why local plants should be propagated for planting in such an effort, doing no damage to the source plants.

The species is occasionally available for sale in the nursery trade, and it appears to be increasing in popularity. The current catalog (2003) of Sunlight Gardens, Andersonville, TN, features a superb photograph of this vine on its cover. It is also available wholesale from Sunshine Farm & Gardens, Renick, West Virginia. Others sell this plant as well. Because it is considered to be rather common in Missouri, and because the Illinois plants do not appear to have flowers as showy as those found elsewhere, the species does not appear to be in particular danger from collectors in the state.

The secure establishment or effective augmentation of wild populations is dependant upon their sexual reproduction and subsequent seed germination, but the detailed conditions under which germination is triggered in this species are unknown. It is thought that a cold treatment and some scarification of the seed coat may be needed to encourage germination. This treatment is typical for northern latitude deciduous species that are dispersed after passing through the digestive system of birds. Propagation by seed is certainly the best means to insure genetic variability.

Honeysuckles, in general, are known to be readily propagated by means of stem cuttings. Several deciduous species are known to be best rooted when propagated from softwood cuttings collected in the summer (Dirr and Heuser 1987). The few extant wild plants in southern Illinois should be propagated in this manner under controlled nursery conditions. This is an important first step, because it is important to conserve the plant even if only in cultivation in case the wild plants are

lost. This may also enable the planting of the local genotype into other suitable habitats in the vicinity of the few remaining plants to help avoid their tragic chance destruction.

SUMMARY

The Yellow honeysuckle is a perennial fibrous vine that has pale yellow, yellow-orange, to orange flowers, globose reddish-orange berries, and it has leaves that have a hairless upper surface and a glabrous to somewhat villous-pubescent undersurface that is slightly gray green or pale but not conspicuously whitened (glaucous) at maturity. The species is generally recognized as distinct by botanists, but there is some disagreement in the literature regarding varieties. In addition, the Yellow honeysuckle may be of hybrid origin or it may have hybridized extensively with other species in some portions of its range, including Illinois. The vine grows mainly in rocky open forests, bluff ledges and cliffs, and in rocky ground along streams. The species is found only in the central to southeastern United States (historically in 12 states) and nowhere else in the world. It propagates primarily by seeds, but its stems are capable of rooting and new plants are easily established.

Globally, the species ranking is G5? (probably secure world-wide, but some additional information is needed). The Yellow honeysuckle is listed as Endangered in Illinois, of Special Concern in Tennessee, and Presumed Extirpated in Ohio. It is also considered to be critically imperiled in Kansas. The Yellow honeysuckle has been included on the Regional Forester Sensitive Species list (RFSS) for the Shawnee National Forest but not the Hoosier National Forest, where it has not been reported. In Illinois the species is critically imperiled and it is considered vulnerable because it has very few known occurrences. It faces extirpation in Illinois if it is not properly protected.

The highest priority regarding the species in Illinois is to determine if it has been identified correctly at each reported station in Illinois, and to determine, particularly, if the individuals are hybrids or if they are really this species. The identification process should include the monitoring of individual plants as well as studies of reproductive success. Secondly, it is recommended that existing individuals be propagated to ensure that the southern genotypes of this plant are not lost due to tragic natural disasters. Third, searches should be conducted for more plants in suitable habitat. Management through protection of its habitat should be done cautiously because of a lack of knowledge concerning management effects; the studies may include the controlled use of fire and the selective thinning of surrounding trees, but active management methods can not yet be recommended. It is recommended that rock climbing be banned where it grows, and that control of invasive Japanese honeysuckle in its vicinity be instituted by means of careful manual, not herbicidal, means.

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CONTACTS

Shawnee National Forest; 50 Highway 145 South, Harrisburg, IL 62946

Elizabeth L. Shimp (618) 253-7114; e-mail: eshimp@fs.fed.us
Stephen P. Widowski (618) 658-2111; e-mail: swidowski@fs.fed.us

Hoosier National Forest; 811 Constitution Avenue, Bedford, IN 47421 (812) 275-5987

Steven D. Olson (719) 553-1400; e-mail: solson01@fs.fed.us
currently: Pike-San Isabel National Forests,
Cimarron-Comanche National Grasslands,
Kachina Drive, Pueblo, CO 81008

Illinois Natural History Survey, 607 E. Peabody Drive, Champaign, IL 61820

Dr. Steven R. Hill (217) 244-8452; e-mail: srhill@mail.inhs.uiuc.edu
Dr. L. Richard Phillippe (217) 244-2181; e-mail: rickp@mail.inhs.uiuc.edu
Dr. John B. Taft (217) 244-5046; e-mail: taft@mail.inhs.uiuc.edu

Illinois Endangered Species Board

Dr. John E. Ebinger (217) 345-3815; e-mail: cfjee@eiu.edu

Indiana Department of Natural Resources, 402 W. Washington St., Indianapolis, IN 46204

Michael A. Homoya (317) 232-0208; e-mail: mhomoya@dnr.state.in.us

Biological Consultant

John E. Schwegman (618) 543-9429; e-mail: botany@midwest.net

Missouri Department of Conservation, 2901 W. Truman Blvd., Jefferson, MO 65109

Dr. George A. Yatskievych (314) 577-9522; e-mail: george.yatskievych@mobot.org

Biological and Physical Sciences, Barton College, Wilson, NC 27893

Mark Basinger (800) 345-4973 e-mail: mbasinger@barton.edu

APPENDIX 1.

Representative specimens of *Lonicera flava* examined or cited in the literature

Herbaria:

CINC = University of Cincinnati, Cincinnati, Ohio. EIU = Eastern Illinois University, Charleston. ILLS = Illinois Natural History Survey, Champaign. MIN = University of Minnesota, Saint Paul. MO = Missouri Botanical Garden, St. Louis. NY = The New York Botanical Garden, Bronx. SIU = Southern Illinois University, Carbondale. UMO = University of Missouri, Columbia. UNA = University of Alabama, Tuscaloosa. USF = University of South Florida, Tampa. WIS = University of Wisconsin, Madison.

UNITED STATES OF AMERICA

ALABAMA: CALHOUN CO., Choccolocco Mountain, mountain side, 1 Apr 1953, *Thorne s.n.* (UNA); Chimney Peak road, 0.5 mile east of Jacksonville, mountain side, 1 Apr 1953, *Diggs s.n.* (UNA); Chimney Peak road, two miles east of Jacksonville, hillside, shaded woods, 11 Apr 1954, *Sherman s.n.* (UNA); CLEBURNE CO., rocks, summit Chehawa Mts, 29 Jul 1896, *Mohr s.n.* (UNA); Bare rocks - summit, Chewahaw Mts. Signal Station, berries red just beginning to mature, 30 Jul 1896, *Mohr s.n.* (UNA); DE KALB CO., roadside, woody area, 6 May 1960, *Killinger s.n.* (UNA); Little River Canyon, wooded hillside, 6 May 1960, *Taunton s.n.* (UNA); JACKSON CO., Sand Mountain, May 1899, *Biltmore Herbarium s.n.* (UNA); ST. CLAIR CO., rocky area, partial sun, loam, 29 May 1962, *Deramus 187* (UNA); TALLADEGA CO., rocky summit of ridge in alpine mts near Renfroe, trailing over cliffs, s.d., *Mohr s.n.* (UNA)

ARKANSAS: CRAWFORD CO., south of Winslow, 29 Apr 1934, *Moore 340034* (WIS!); GARLAND CO., 24 Apr 1924, *Palmer 24518* (UMO); LOGAN CO., Magazine Mountain, 11 May 1924, *Buchholz 799* (WIS!); Ozark Nat. Forest, Magazine Mountain, rocky bluffs, elev. 2800 ft. 9 May 1942, *Demaree 22857* (MIN); WASHINGTON CO., summit of limestone cliff, West Fork, 22 Apr 1935, *Fassett 17523* (WIS!); edge of limestone cliff, Illinois River, Savoy, 23 Apr 1935, *Fassett 17524* (WIS!); YELL CO., Mt. Nebo State Park, Dardanelle, rocky bluffs, 1700 ft., 25 Apr 1942, *Demaree 22768* (MIN, UMO)

GEORGIA: DE KALB CO., Little Stone Mountain, elev. 1000-1100 ft., 19 Apr 1893, *Small 769* (MIN)

ILLINOIS: JACKSON CO., ledge of chute going into Little Grand Canyon, 22 Jul 1973, *Wilson 1450* (SIU); POPE CO., north-facing bluff, Lusk Creek Gorge, 21 May 1966, *Hopkins 125* (EIU, SIU); same location, 29 Jun 1967, *Hopkins 428* (EIU)

[identification tentative:] **INDIANA:** WELLS CO., east side of lakes in Jackson twp., in thicket, 27 May 1908, *Deam s.n.* (MIN); Pond, 1 mi N of Uniondale, *Deam s.n.* (MIN).

KANSAS: CHEROKEE CO., 4 miles E of Baxter Springs, alt. 825 ft, soil rocky, moist thicket, 12 Apr 1946, *Horr & McGregor E480* (WIS!)

MISSOURI: DALLAS CO., Lead Mine Conservation Area, ca. 7 mi E of Tunas on CO. Road E; chert-dolomite savanna/glade, liana to 3 m, flowers deep yellow, fruits red, leaves glaucous, 12 Apr 1995, *Dietrich 280* (MO); MCDONALD CO., ca. 6.0 mi W of Powell, T22N R31W S16 SW4, Big Sugar Creek State Park, limestone and shale ravine and cherty uplands; on cherty W-facing slope, corollas yellowish orange, 25 Apr 2000, *Smith et al. 3549* (MO); OREGON CO., limestone bluff on Frederick Creek, T22N R02W S16, 2.0 mi W of Calm, 1 May 1986, *Summers 1591B* (MO); PULASKI CO., Ft. Leonard Wood Army Base, on perimeter of Range 22 on gravel road, T34N R11W S22, parent rock chert and sandstone, topography moderately steep slope, vegetation recently disturbed area; associates *Quercus rubra*, *Vaccinium arboreum*, *Toxicodendron radicans*, 5 May 1989, *Ovrebo & Sladewski W0143* (MO); REYNOLDS CO., T33N R02W S24 SW4 of SE4, along logging road off W side of USFS road #2260, W-facing slope above Brown Branch, public lands, twining woody climber along clear cut margin, corolla tinged orange on inner surface of limb, 15 May 1996, *Brant 3570* (MO); OZARK CO., Mark Twain National Forest, Ava Ranger District, ca. 2.5 mi E of McClurg on Forest Service Road #145 at its junction with 145A; top of high ridge, oak-hickory woods, open cherty/dolomite soils; T24N R16W S05 SE4, 27 Apr 1996, *Summers 7712* (MO); STONE CO., Reed's Spring, rocky woods, 30 Apr 1936, *Bush 15358* (WIS!); TEXAS CO., Barn Hollow, rocky woods, 8 May 1973, *Christ s.n.* (MO); north-facing limestone bluffs along Big Piney River, NNW of Houston, 7 May 1957, *Steyermark 84182* (MO) [var. *flavescens*].

OHIO: CLERMONT CO., from gravel bluffs (calcareous) of the Little Miami River, Milford, 20 May 1911, *Braun s.n.* (CINC)

OKLAHOMA: CHEROKEE CO., cherty slopes 6 miles E of Tahlequah, 24 Apr 1941, *Shinners, Cottam, & Stephens 3608* (WIS!); LE FLORE CO., near Page, in open woods, 20 Apr 1915, *Blakley 3424* (MIN); 27 Apr 1933, *Palmer 20952* (UMO)

SOUTH CAROLINA: GREENVILLE CO., Paris Mountain, 20 Apr 1904, *Huger s.n.* (MIN); Little Texas Road, Burns farm, just north of Paris Mountain, margin of hardwood forest, 23 Apr 1968, *Mullens & Rodgers 68027* (MIN, WIS!);

TENNESSEE: FRANKLIN CO., Cumberland Mountains, 5 May 1898, *Eggert s.n.* (NY - holotype of *L. flavescens* Small); MARION CO., at Georgia state line, Lookout Mountain, west cliff, 6 May 1906, *Churchill s.n.* (MIN)

APPENDIX 2.

**The Distribution of *Lonicera flava* in the United States.
Information from herbarium specimens and the literature.
[Incomplete]**

STATE	COUNTIES	NOTES
Alabama	Calhoun, Cherokee, Clay, Cleburne, DeKalb, Jackson, Madison, Marshall, St. Clair, Talladega	Duncan (1967); Ginzburg (pers. comm.)
Arkansas	fourteen counties, NW half of state	Duncan (1967); Smith (1978) as <i>L. dioica</i>
Georgia	Dade, DeKalb, Forsyth, Harris, Rabun, Stephens, Walker, Whitfield	Duncan (1967); W-2
Illinois	Jackson, Pope, possibly Randolph	includes Shawnee N.F.; IL Dept. of Natural Resources (2002); Mohlenbrock (1986); Schwegman, pers. comm.
Indiana	? Wells	not in Deam (1940); tentative determination of two Deam specimens at MIN; to be investigated
Kansas	Cherokee	Steyermark (1963); Barkley <i>et al.</i> (1986); see Appendix 1.
Kentucky	?	see W-2; Steyermark (1963)
Missouri	35 counties, south half of state, excluding SE coastal plain area	see W-2; Steyermark (1963)
North Carolina	Henderson, Polk, Rutherford	see W-2, W-4; Radford <i>et al.</i> (1968); Duncan (1967)
Ohio	Clermont [historic]	Braun (1961), presumed extirpated
Oklahoma	18 counties, mostly east half of state	W-8
South Carolina	Cherokee, Greenville, Pickens, Spartanburg	Duncan (1967); Radford <i>et al.</i> (1968)
Tennessee	Franklin, Hamilton, Lewis, Marion	Chester <i>et al.</i> (1997); Duncan (1967)

APPENDIX 3.

Natural Diversity Database Element Ranking System

modified from: <http://www.cnpsci.org/html/PlantInfo/Definitions2.htm> [W-6]

Global Ranking (G)

G1

Critically imperiled world-wide. Less than 6 viable elements occurrences (populations for species) OR less than 1,000 individuals OR less than 809.4 hectares (ha) (2,000 acres [ac]) known on the planet.

G2

Imperiled world-wide. 6 to 20 element occurrences OR 809.4 to 4,047 ha (2,000 to 10,000 ac) known on the planet.

G3

Vulnerable world-wide. 21 to 100 element occurrences OR 3,000 to 10,000 individuals OR 4,047 to 20,235 ha (10,000 to 50,000 ac) known on the planet.

G4

Apparently secure world-wide. This rank is clearly more secure than G3 but factors exist to cause some concern (i.e. there is some threat, or somewhat narrow habitat).

G5

Secure globally. Numerous populations exist and there is no danger overall to the security of the element.

GH

All sites are historic. The element has not been seen for at least 20 years, but suitable habitat still exists.

GX

All sites are extirpated. This element is extinct in the wild.

GXC

Extinct in the wild. Exists only in cultivation.

G1Q

Classification uncertain. The element is very rare, but there is a taxonomic question associated with it.

National Heritage Ranking (N)

The rank of an element (species) can be assigned at the national level. The **N-rank** uses the same suffixes (clarifiers) as the global ranking system above.

Subspecies Level Ranking (T)

Subspecies receive a **T-rank** attached to the G-rank. With the subspecies, the G-rank reflects the condition of the entire species, whereas the T-rank reflects the global situation of just the subspecies or variety.

For example: *Chorizanthe robusta* var. *hartwegii*. This plant is ranked **G2T1**. The G-rank refers to the whole species range (*i.e.*, *Chorizanthe robusta*, whereas the T-rank refers only to the global condition of var. *hartwegii*. Otherwise, the variations in the clarifiers that can be used match those of the G-rank.

State Ranking (S)

S1

Critically imperiled. Less than 6 element occurrences OR less than 1,000 individuals OR less than 809.4 ha (2,000 ac). **S1.1** = very threatened; **S1.2** = threatened; **S1.3** = no current threats known.

S2

Imperiled. 6 to 20 element occurrences OR 3,000 individuals OR 809.4 to 4,047 ha (2,000 to 10,000 ac). **S2.1** = very threatened; **S2.2** = threatened; **S2.3** = no current threats known.

S3

Vulnerable. 21 to 100 element occurrences OR 3,000 to 10,000 individuals OR 4,047 to 20,235 ha (10,000 to 50,000 ac). **S3.1** = very threatened; **S3.2** = threatened; **S3.3** = no current threats known.

S4

Apparently Secure. This rank is clearly lower than S3 but factors exist to cause some concern (*i.e.*, there is some threat, or somewhat narrow habitat).

S5

Secure. Demonstrably secure to ineradicable in the state.

SH

All state sites are historic; the element has not been seen for at least 20 years, but suitable habitat still exists. Possibly extirpated.

SR

Reported to occur in the state. Otherwise not ranked.

SX

All state sites are extirpated; this element is extinct in the wild. Presumed extirpated.

Notes:

1. Other considerations used when ranking a species or natural community include the pattern of distribution of the element on the landscape, fragmentation of the population/stands, and historical extent as compared to its modern range. It is important to take a bird's eye or aerial view when ranking sensitive elements rather than simply counting element occurrences.
2. Uncertainty about the rank of an element is expressed in two major ways: by expressing the rank as a range of values (e.g., **S2S3** means the rank is somewhere between S2 and S3), and by adding a '?' to the rank (e.g. S2?). This represents more certainty than S2S3, but less than S2.