

*Conservation Assessment
for
Canada lily (Lilium canadense L.)*



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USDA Forest Service, Eastern Region
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This Conservation Assessment was prepared to compile the published and unpublished information on the subject taxon or community; or this document was prepared by another organization and provides information to serve as a Conservation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 626 East Wisconsin Avenue, Milwaukee, Wisconsin 53203.

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EXECUTIVE SUMMARY

Canada lily, *Lilium canadense*, is an herbaceous perennial that grows on moist or wet meadows and mesic slopes, but can also be found in drier sites like barrens. Canada lily is found in eastern United States and Canada. Two subspecies having generally overlapping distributions have been described, *L. canadense* subsp. *canadense* and *L. canadense* subsp. *editorum*, with *L. canadense* subsp. *canadense* having a few more western stations. The subspecies are distinguished based on tepal color and leaf size.

Canada lily has a Global Heritage Status Rank of G5. Its national rank is N? in both the United States and Canada, indicating inexact numeric rank. The plant is listed as a Regional Forester Sensitive Species on the Hoosier National Forest in Indiana. It is known from 25 states, is ranked S3 or above in 10, and is listed as threatened in Rhode Island and Tennessee and as rare in Indiana.

The plant is known from three localities on the Hoosier National Forest. One occurrence is historical. Plants were not seen at another during resurveys in 2002. A new site was discovered in 2001.

Based on Natural Heritage Database element occurrence records for the few states that track *Lilium canadense*, of 109 occurrences, 54% (59) are on protected land, 8% (9) are on private land, and 37% (40) are on land of unknown ownership.

Threats to Canada lily include woody encroachment into its meadow habitat and browsing by deer. The few Element Occurrence records that report population sizes usually report fewer than 10 plants. This small size makes populations at risk of extirpation through stochastic and genetic mechanisms.

ACKNOWLEDGEMENTS

I would like to thank Science Librarian Barb Howes at Butler University for tireless assistance with references, Marcia Moore, Herbarium Assistant for help in all things and Butler student Kathy Fidler for research and clerical assistance. I am grateful to Kirk Larson, Botanist on the Hoosier National Forest, and to all agency personnel who provided information.

NOMENCLATURE AND TAXONOMY

Lilium canadense L.

Published in: *Species Plantarum* 1:303. 1753

Common names: Canada lily, Wild yellow lily, Meadow lily

Synonyms:

Lilium canadense var. *coccineum* Pursh

Lilium canadense var. *editorum* Fernald

Lilium canadense var. *rubrum* hort. ex T. Moore

Some also treat *Lilium michigenense* as a synonym.

Subspecific designations:

L. canadense L. subsp. *editorum* (Fernald) Wherry

DESCRIPTION OF SPECIES

From Gleason and Cronquist (1991), Radford et al. (1968), Flora of North America (Flora of North America Committee 2002) and others:

Stem: slender, erect, to 2 m tall, smooth;

Leaves: mostly in 6-11 whorls of 4-12, the lowest regularly and a few of the uppermost occasionally alternate; leaf-blades lanceolate to linear-elliptic, widest at or below the middle, tapering to both ends, often speculate-scarbrous along the margins and veins beneath, the largest 8-15 cm x 8-20 mm, drooping at tips;

Inflorescence: racemose, 1-17 flowered;

Flowers: not fragrant, nodding from long pedicles; tepals narrowly oblanceolate, acuminate, only slightly or moderately recurved, 5-8 cm, yellow or orange-yellow, varying to sometimes nearly red, marked with purple spots within; filaments straight or nearly so, only the juxtaposed anthers evidently exerted; flower-bud subterete;

Fruit: a capsule erect, 3.5-5 cm. long.

The typical subspecies can be distinguished from *L. canadense editorum* based on the following traits (Woodcock and Stearn 1950):

subsp. *canadense*: Leaves 5 – 10 times as long as broad, the segments (tepals) gradually recurving and mostly yellow

subsp. *editorum*: Leaves 2-5 times as long as broad, the segments (tepals) more abruptly recurved and red.

The Flora of North America (Flora of North America Committee 2002) treatment does not recognize infraspecific taxa for *Lilium canadense*. It is noted that field observations do not support splitting. The distributions of the proposed varieties overlap and flower color and leaf size variation have proven not to be reliable distinguishing characters. “In short, the increasingly refined attempts to suitably characterize variation in this species suggest that it is quite difficult or impossible to do so.”

Canada lily can be distinguished from *L. superbum* and *L. michigenense* by the presence of styles and stamens that extend well beyond the tepals (Hedge et al. 2002) with the tips of Canada lily flowers being less recurved (Woodcock and Stearn 1950; Voss 1972).

LIFE HISTORY

Canada lily is an herbaceous perennial.

Reproduction

Lilium canadense reproduces sexually from seeds and asexually via short, creeping stolons (Woodcock and Stearns 1950). Canada lily blooms June-August and has a chromosome count of $2n=24$. Field accounts often mention the absence of flowers or capsules.

It seeds abundantly if cross-pollinated (Woodcock and Stearns 1950) and is easily raised from seed. Seeds exhibit morpho-physiological dormancy. Pretreatments needed for germination are warm and cold stratification and germinate at 20°C (W-14).

Ecology

Dispersal/Migration

No information found.

Obligate Associations

Lilium canadense is pollinated by butterflies, honeybees and leaf-cutting bees according to Henn (1998). Flora of North America (Flora of North America Committee 2002) states it is pollinated by ruby-throated hummingbirds.

HABITAT

Range-wide

Canada lily is a plant of moist or wet meadows (Gleason and Cronquist 1991) that can also be found on dry wooded slopes (Yatskievych 2000). It grows in wet

meadows, bogs and balds in the southeast (Radford et al. 1968). Flora of North America (Flora of North America Committee 2002) also mentions wet roadsides and railroads

The plants often cluster in large groups in moist areas in acid to neutral soils of moist meadows, swamps, and stream sides in Ohio (Henn 1998). The plant primarily grows on the Piedmont province in Delaware, where it is found in woodlands with rich, moist, loamy soils (William McAvoy, pers. com.). In northern locations, the plant is found in ditches, meadows, thickets and moist woods (Scoggan 1978). The plant primarily grows on the Piedmont province in Delaware, where it is found in woodlands with rich, moist, loamy soils (William McAvoy, pers. com.). In Alabama, the plant inhabits calcareous soils of bottomlands and mesic slopes (Al Schotz, pers. com.).

National Forests

On the Hoosier National Forest, Canada lily is reported as a plant of mesic forest habitat (Hedge et al. 2002). It co-occurs with *Quercus stellata*, *Q. muhlenbergia*, *Juniperus virginiana*, *Cercis canadensis*, *Rhus radicans*, *Melilotus alba*, *Verbesina helianthoides*, *Silene stellata*, and *Anemone virginiana* (Hedge et al. 2002).

Site Specific

On the Hoosier National Forest (based on Hedge et al. 2002, Indiana Natural Heritage Database records (2002) and Olson et al. 1990):

Tell City Ranger District--

Clover Lick Barrens: dry-mesic open woods, lime substrate, mid-slope with northeast aspect. Last observed in 2001.

Mogan Ridge site: last observed in 1912, not seen in 1980 or 1989.

Boone Creek Barrens: edge of road, lower slope, filtered and shaded light. Last seen in 1988, not seen in 2002.

Just off the Forest on private land (Roger Hedge, pers. com.):

Breeden Glade site: glade community. Last observed in 1981, not seen in 2002.

Additional sites are likely to exist in the Forest based on the presence of appropriate habitat (Hedge et al. 2002).

DISTRIBUTION AND ABUNDANCE

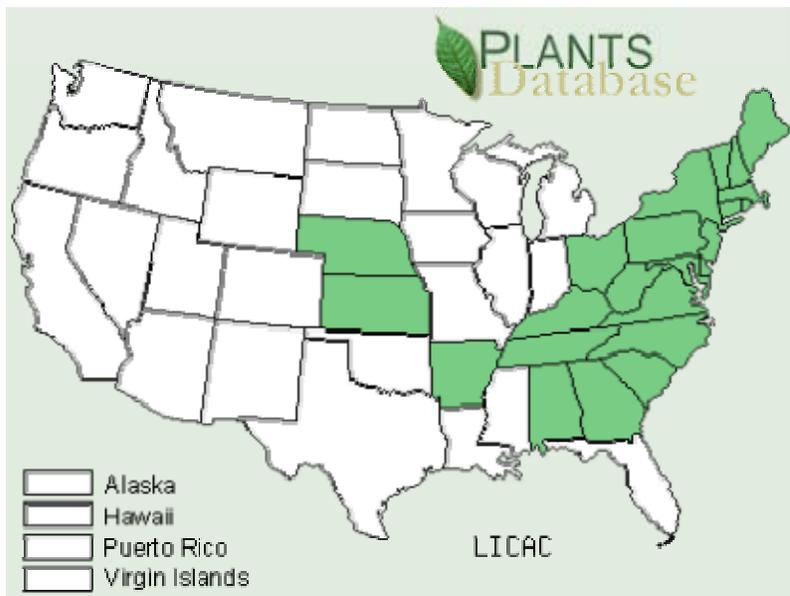
Range-wide Distribution

Canada lily is found in the eastern United States and Canada, west to Nebraska and Kansas (W-20). Gleason and Cronquist (1991) cite Quebec and Maine to Maryland and in the mountains to Virginia, west to Ohio, Kentucky, southern Indiana, and Alabama.

Woodcock and Stearn (1950) call Canada lily perhaps the most common and most widely distributed lily in eastern North America. Stone (1973) states it is frequent in swamps and meadows in northern counties in New Jersey. It is widespread and frequent/common in Pennsylvania (John Kunsman, pers. com.) However, the plant is considered to be rare in Delaware, where it is known from 4 occurrences on the Piedmont province and one on the Coastal Plain (William McAvoy, pers. com.) and it has never been common in Rhode Island (Rick Enser, pers. com.) No current sites in the later state have more than 1-2 plants, which tend to pop up and disappear sporadically (Rick Enser, pers. com.). It becomes less common in the southern and western parts of its range. It is infrequent in Kentucky (Wharton and Barbour 1971) and North Carolina (Justice and Bell 1968).

The two subspecies have generally overlapping distributions, with *L. canadense* subsp. *canadense* having a few more western stations. The following distribution maps for the United States are from W-20.

Lilium canadense subsp. *canadense*:



Lilium canadense subsp. *editorum*:



Flora of North America (W-24) does not recognize infraspecific taxa. It shows the distribution below for *Lilium canadense*. Reasons for the differences in distribution between the Plants website (W-20) and Flora of North America are not readily apparent. They do not appear to have to do with issues of synonymy. Flora of North America volumes have a tendency to under-represent Indiana localities (Kay Yatskievych, pers. com.).



State and National Forest Distribution

For the USDA Forest Service Region 9, *Lilium canadense* is known from the Hoosier National Forest and the Green Mountain National Forest. The Indiana Natural Heritage Database (2002) lists 3 localities on the Hoosier National Forest (Tell City Ranger District) out of a total of 10 for the state. Only two of these records have plant counts: one had one plant in flower (Boone Creek Barrens site), the other had 5 (Clover Lick Barrens), 3 of which were flowering (Indiana Natural Heritage Database 2002).

RANGE WIDE STATUS

Canada lily has a Global Heritage Status Rank of G5. This rank indicates the species is demonstrably widespread, abundant, and secure globally (W-9). Its national rank is N? in both the United States and Canada, indicating inexact numeric rank.

The plant is listed as a Regional Forester Sensitive Species on the Hoosier National Forest in Indiana.

Lilium canadense is ranked SR (reported from the state, but without persuasive documentation that would provide a basis for either accepting or rejecting the species) for 13 states and S? (not enough information available to assess at this time, more field studies and/or specimen identification is needed) for 3 (See Appendix for a detailed state listing). Subspecies are not indicated.

AL, KS, NC and RI rank the plant as S1, indicating it is extremely rare; typically 5 or fewer known occurrences in the state, or only a few remaining individuals may be especially vulnerable to extirpation. It is ranked S1? in SC, indicating some uncertainty.

It is ranked S2 (very rare; typically between 6 and 20 known occurrences; may be susceptible to becoming extirpated) in DE, IN, and TN. It is S2? in GA. NE ranks it as S3, indicating it is rare to uncommon; typically 21 to 50 known occurrences; S3 ranked species are not yet susceptible to becoming extirpated in the state but may be if additional populations are destroyed.

Lilium canadense is listed as threatened in TN, and RI and as rare in IN (11-20 occurrences). It is tracked in NC as SR-P, meaning it has 1-100 populations in the state and is substantially reduced in numbers by habitat destruction and that it is at the periphery of its range in NC.

Some populations alleged in the past to be *Lilium canadense* in Georgia have been re-identified as *L. michiganense* (Jim Allison, pers. com.). “Also, I find in our files transcriptions of label data from collections so identified and made elsewhere in the state; notes from the transcriber suggest these are suboptimal specimens with perhaps unreliable determinations. Both subsp. *canadense* and *editorum* are supposedly here, at least in Northwest Georgia” (Jim Allison, pers. com.).

In Kentucky, *Lilium canadense* is uncommon and may be considered for listing in the next 5 years. Habitat for all species that prefer open grassy habitats is declining (Deborah White, pers. com.)

Lilium canadense is considered to be rare in Delaware. It primarily occurs in the Piedmont province, where it is known from only 4 populations. It is found growing in

woodlands with rich, moist loamy soils. There is one population occurring on the Coastal Plain where it is found in a similar habitat as the Piedmont populations (William McAvoy, pers. com.).

Kansas had been tracking *Lilium michiganense* (which they equate to *L. canadense*), but recent fieldwork (including quite a bit in 2004) has revealed sufficient additional populations to drop the species to S3. The species occurs on mesic tallgrass prairie in the eastern 1/5 of the state, and populations are often found that are persisting in vegetative condition in woodlands that apparently have invaded into prairies) (Craig Freeman, pers. com.).

POPULATION BIOLOGY AND VIABILITY

No specific information on population biology or viability in *Lilium canadense* was located during the literature search for this project. However, the few Element Occurrence records that report population sizes usually report fewer than 10 plants. This small size makes populations at risk of extirpation through stochastic and genetic mechanisms.

POTENTIAL THREATS

Present or Threatened Risks to Habitat

Canada lily is very rare on the Hoosier National Forest in Indiana and may be susceptible to the effects of fire suppression, leading to woody encroachment into its open meadow habitat (Larson pers. com.). But dry sites (i.e., barrens) where it occurs may be slow to close in (Olson, pers. com.). Barrens sites on the Hoosier were probably open woodlands until relatively recently. Canada lily appears to be a plant of open areas and canopy gaps (Steve Olson, pers. com.).

Mesic forest habitat on the Hoosier National Forest is threatened by invasive exotic species (Hedge et al. 2002).

In Rhode Island, deer browsing is likely a potential threat, but there are not enough plants (populations) to evaluate the impact (Rick Enser, pers. com.).

In Georgia, habitat for lilies is at risk of shading out due to canopy closure in the absence of fire. Plants are also eaten by white-tail deer (Jim Allison, pers. com.). Although all 10 occurrences in Alabama have been recently documented to be extant and appear stable (Schotz, pers. com.), the greatest threat to Canada lily in the state is browsing by deer.

In Kansas, the primary threat to *Lilium* is from habitat destruction and fragmentation (Craig Freeman, pers. com.).

Over utilization

Canada lily is a showy species that may be susceptible to overcollection.

Disease or Predation

No information found.

Inadequacy of Existing Regulatory Mechanisms

No information found.

Other Natural or Human Factors

Canada lily is sold as an ornamental to attract hummingbirds (W-23). Native Americans collected the root and flower for food (Henn 1998).

SUMMARY OF LAND OWNERSHIP & EXISTING HABITAT PROTECTION

Based on Natural Heritage Database element occurrence records for the few states that track *Lilium canadense*, of 109 occurrences, 54% (59) are on protected land, 8% (9) are on private land, and 37% (40) are on land of unknown ownership.

AL: 10 occurrences

Protected: 4, on state or federal land

Private: 6 (but 5 landowners have agreed to protect the plants)

DE: 4 occurrences, all unknown ownership

IN: 10 occurrences

Protected: 4, 3 on the Hoosier National Forest, 1 on a State DNR property

Private: 4

Unknown: 2

NC: 13 occurrences

Lilium canadense subspecies *canadense* has three occurrences:

Protected: 1 on land owned by a land trust

Private: 1

Unknown: 1.

L. canadense subspecies *editorum* has 10 occurrences:

Protected: 2, 1 on the Blue Ridge National Park, 1 on land owned by the NC DOT

Private: 2

Unknown: 6

SC: Three occurrences:

Protected: 1, in Table Rock State Park.

Unknown: 2

TN: 69 total occurrences.

Protected: 47

5 – US Fish and Wildlife Refuges

21 - Oak Ridge National Laboratory

6 – Tennessee Valley Authority

10 – State of Tennessee

2 – National Park Service

1 – The Nature Conservancy

2 – Cherokee National Forest

Private: 3

Unknown: 19

SUMMARY OF EXISTING MANAGEMENT ACTIVITIES

None explicitly directed at Canada lily were found. However, prescribed burning that has been done on the Hoosier National Forest in the Boone Creek and Morgan Ridge areas will likely benefit plant populations there (Steve Olson, pers. com.).

PAST AND CURRENT CONSERVATION ACTIVITIES

None were found.

RESEARCH AND MONITORING

Existing Surveys, Monitoring, and Research

None were found.

Survey Protocol

N/A

Research Priorities

Several agency personnel reported deer browse as a major threat to Canada lily. Documentation of deer damage and the development of related management strategies are a priority.

Clarification of the taxonomic relationship of Canada lily and Michigan lily (*Lilium michigenense*), along with documentation of the exact number of occurrences of each subspecies of Canada lily in each state would help clarify the status of each taxon.

Documentation of threats, if any, due to canopy closure due to fire suppression, would be helpful for land managers.

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<http://www.natureserve.org/explorer>.
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<http://tenn.bio.utk.edu/vascular/database>.
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- W-20. USDA and NRCS PLANTS Database. <http://plants.usda.gov>
- W-21. Wildflowers of Western Kentucky. <http://knps.org/Wildflowers/canada.htm>.
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- W-23. Wilkes University, Rosenthal Herbarium: Kirby Key online plant identification guide. <http://wilkes1.wilkes.edu/~kirbypl/Liliumcanadense.html>.
- W-24. Flora of North America. <http://www.fna.org>.

APPENDIX

State Heritage Status ranks (from W-11).

Alabama	S1	New Hampshire	SR
Arkansas	SR	New Jersey	SR
Connecticut	SR	New York	SR
Delaware	S2	North Carolina	S1
District of Columbia	SR	Ohio	SR
Georgia	S2?	Pennsylvania	SR
Indiana	S2	Rhode Island	S1
Kansas	S1	South Carolina	S1?
Kentucky	S?	Tennessee	S2
Maine	SR	Vermont	SR
Maryland	SR	Virginia	SR
Massachusetts	SR	West Virginia	S?
Nebraska	S3		

New Brunswick	SR	Ontario	S1S3
Nova Scotia	S2S3	Quebec	SR

S1: Extremely rare; typically 5 or fewer known occurrences in the state, or only a few remaining individuals may be especially vulnerable to extirpation.

S2: Very rare; typically between 6 and 20 known occurrences; may be susceptible to becoming extirpated.

S3: Rare to uncommon; typically 21 to 50 known occurrences; S3 ranked species are not yet susceptible to becoming extirpated in the state but may be if additional populations are destroyed.

S4: Common; apparently secure under present conditions; typically 51 or more known occurrences, but may be fewer with many large populations; usually not susceptible to immediate threats.

S5: Very common; demonstrably secure under present conditions.

SX: Species has been determined or presumed to be extirpated. All historical occurrences have been searched, or all known sites have been destroyed and a thorough search of potential habitat has been completed.

SR: Reported from the state, but without persuasive documentation that would provide a basis for either accepting or rejecting the species.

S?: Not enough information available to assess at this time, more field studies and/or specimen identification is needed.

SH: Possibly extirpated (historical); occurred historically and there is some expectation that it may be rediscovered. Its presence may not have been verified in the past 20 years.

SU: Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

HYB: Unranked because it represents an interspecific hybrid, not a species.

LIST OF CONTACTS

Information Requests

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