R9 Species Conservation Assessment for

Usnea longissima Ach.

in

The Upper Great Lakes National Forests

Usnea longissima

Prepared by
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DISCLAIMER

This Conservation Assessment was prepared to compile the published and unpublished information on the subject species or community. 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, Milwaukee, Wisconsin 53203.

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EXECUTIVE SUMMARY

Usnea longissima Ach. is designated as a candidate Regional Forester Sensitive Species on the Superior and Ottawa National Forests in the Eastern Region of the Forest Service. The species occurs on the Ottawa and Superior National Forests. The purpose of this document is to provide the background information necessary to prepare Conservation Approaches and a Conservation Strategy that will include management actions to conserve the species.

This conservation assessment provides available information on *Usnea longissima* Ach. and its distribution, habitat, range, status, life history, and ecology. *Usnea longissima* has a circumboreal distribution and grows on trees in very moist forests and bogs. In North America it occurs in the northeastern and northwestern parts of the continent. This species is listed as Vulnerable or Endangered in many parts of northern Europe and Extinct in part of southern Europe. In the Great Lakes area common habitat for this species is in *Thuja* bogs that are near water. Threats to *Usnea longissima* are logging of old-growth forests, especially near rivers or streams. It is also very sensitive to air pollution.

ACKNOWLEDGEMENTS

Appreciation is extended to the curators of the herbaria for help in obtaining label data for collections of rare lichens and to Dr. James Bennett for assistance. Regional USFS personnel also provided maps and assistance in obtaining data for their forests and are thanked for their help.

INTRODUCTION

For this document a search was made of the printed literature, Internet (W-1), and other literature thought to have pertinent information. Distribution and ecological information was gathered along with range-wide status and threats. All collections of the species found in the University of Michigan Herbarium (MICH), University of Minnesota Herbarium (MIN), Michigan State University Herbarium (MSC), and University of Wisconsin Herbarium (WIS) were located and the labels copied and entered into species databases. From these records ecological information, land ownership, and distribution maps were prepared for the area covered in this report. The draft reports were then sent to reviewers for comments and additions.

Most lichens do not have common names that are widely known, although some attempts have been made to create them (Brodo et al. 2001). For most species there is little known about the detailed ecology and the historical distributions of these lichens but some data could be derived from the herbarium collections.

NOMENCLATURE AND TAXONOMY

Family: Parmeliaceae
Scientific name: *Usnea longissima* Ach.
Common name: none
USDA plant code: USLO50
Synonyms: none

DESCRIPTION OF SPECIES

"Thallus pale greenish yellow, pendulous, 15-30 cm long; main branches rugose, the cortex disappearing with age, the secondary branches with sparse soralia; apothecia rare" (Hale 1979).

The most characteristic feature of the species is the long main axis of the thallus with fairly equal short side branches that protrude straight out from the central axis. Under a hand lens the cortex of the main axis can be seen to erode on older parts. The central cord is present, as in all *Usnea* species. See color photo # 889 in Brodo et al. (2001) and McCune & Geiser (1997) p. 307.

LIFE HISTORY

Reproduction : This lichen rarely has apothecia (Keon 2002) and reproduces mainly asexually by thallus fragments, but in some areas of its distribution soredia may occasionally be produced.

Ecology : This lichen grows on trees in humid old-growth habitats. It is very sensitive to air pollution (McCune & Geiser 1997). It also seems to require more light than some of the other species of humid habitats. The largest colonies are usually found in the tops of trees.

Dispersal : Dispersal of this lichen is mainly by thallus fragments and occasionally by soredia. It seems to be dispersal-limited (Keon & Muir 2002) because

the thallus fragments cannot blow very far in the wind. Many times pieces of thallus are found only within 100-200 feet of the parent colony.

Obligate Associations : NA

HABITAT

Range-wide : In central Europe this species occurs on old trees in montane habitats in undisturbed areas with spruce-fir and spruce-beech forests that have high precipitation and humidity. It shows strong oceanic preferences such as cold, foggy areas protected from strong sunlight (Wirth 1995). In Norway it is found on old trees in fairly open old-growth forests dominated by *Picea abies* as well as old spruce forests on north-facing hillsides and in forested canyons (Tønsberg et al. 1996). In Italy it occurs in very humid, semi-natural, montane forests (Nimis 1993). In North America is found on trees in open or somewhat shaded, humid forests often near lakes or streams (Brodo et al. 2001). In our Pacific Northwest it is usually found on riparian trees, both conifers and hardwoods (McCune & Geiser 1997). Keon & Muir (2002) summarize that this species requires undisturbed sites on north to northeast facing slopes in older stands with high humidity or annual rainfall in the Pacific Northwest. Other authors indicate similar habitats in other parts of the world (Esseen et al. 1981; Halonen 1997; Rolstad & Rolstad 1999; Tønsberg et al. 1996).

National Forests : The habitats in our region are similar to those in other parts of its range. These are usually near streams, lakes, or in bogs. The forests are balsam fir, black spruce, or white cedar over 100 years old that may be open or quite shady (Wetmore 2001). High humidity and habitat continuity is important for growth, but this species grows better on the upper branches of trees where there is more light. Sometimes *Usnea longissima* may colonize younger trees near a parent colony on an old tree.

Site Specific : The recent localities in Superior National Forest are undisturbed balsam fir or white cedar stands near water. In one locality (Mark Creek) it apparently began growth in a mature balsam fir forest that has since been killed by insects but the thallus persisted on a dead balsam fir. Thallus fragments were found up to 200 feet from the main thallus (Wetmore 2001).

DISTRIBUTION AND ABUNDANCE

Range-wide Distribution : This species has a circumpolar boreal coniferous distribution and is rare throughout most of Europe (Tønsberg et al. 1996). It is known from scattered localities in Europe, where it is disappearing (Poelt 1969), in Asia south to Tibet (Wei 1991), and in eastern and western North America (Brodo et al. 2001). The only part of its North American range where it is still abundant is in the Pacific Northwest (Keon 2002).

Region-wide Distribution : In this region this species is known from Michigan, Wisconsin, and Minnesota (see Appendix 1). Harris (1978) and Fryday et al. (2001) reported it from Isle Royale and the western Upper Peninsula of Michigan. In this region before 1970 it was known from 24 localities, and after 1970 it has been collected at 29 additional localities.

Population Trends : Range-wide this species is now considered rare, especially in Europe; however, in our Pacific Northwest it is abundant at some localities (McCune & Geiser 1997, Brodo et al. 2001). In this region the populations have decreased in the last 100 years, probably due to logging of the old-growth forests. The species is considered very sensitive to air pollution, but that is probably

not the cause of its decrease in the Upper Great Lakes area because air quality monitoring in the BWCA over the past 15 years show no significant air quality problems (Wetmore & Bennett 1998.

RANGEWIDE STATUS

This species is listed as Vulnerable in Norway, Endangered in Sweden (Thor 1999), Extinct in Finland (Kuusinen et al. 1995), Slovakia, and Poland, and Extinct or Endangered in the rest of Europe. This species requires very humid old-growth forests to survive and is very sensitive to air pollution. For definitions of ranks see Appendix 4.

U. S. Fish and Wildlife Rank: Not ranked
Global Heritage Status Rank : G3
U. S. National Heritage Rank : N2
U. S. Forest Service, R9 Sensitive Species: Sensitive on Superior National Forest . See Appendix 2.
Michigan Rank : Not ranked
Minnesota Rank : Not ranked
Wisconsin Rank : Not ranked
Ontario, Canada Rank : Not ranked

The decrease of this species in Europe is due to forestry practices and air pollution. In our region the main cause of decline has been due to logging of old-growth forests over large areas.

POPULATION BIOLOGY AND VIABILITY

This lichen reproduces mainly asexually by thallus fragments (Esseen 1985, Renhorn, K-E. & P-A Esseen 1995), but in some areas it also occasionally produces soredia (Halonen et al. 1998). Usually only small fragments a few inches long are found near the ground but the main colony is in the top of a nearby tree. The most frequent thallus fragments were 2-12 cm long (Esseen 1985). In good localities the thallus can grow to four to six feet long. This species grows best in areas of high humidity and rainfall on branches with moderate sun (Gauslaa et al. 1998).

Transplant studies were used to prove that the distribution of thallus fragments is probably the limiting factor in the distribution of this species (Keon & Muir 2002). They used 15 cm strands of thallus attached to PVC rods and measured 5-23% increase in biomass and 3.5-9.1% increase in length in one year. They reported the best growth in more open but humid sites. Other transplant studies with *U. longissima* showed an annual biomass increase of 20-30% (McCune et al. 1996) or 9.2% (Renhorn & Esseen 1995).

Usnea longissima is very sensitive to air pollution. Most of the European populations may not be viable except in Norway. In North America the main area of secure populations is in the Pacific Northwest. In our region the species is marginally viable in Minnesota but probably secure on Isle Royale.

POTENTIAL THREATS

This species has undergone a drastic reduction throughout many parts of its range. In most parts of Europe it is extinct or very rare. In our Pacific Northwest it still is abundant in some localities. At the southern edge of its range in our region is only

abundant on the shoreline of Lake Superior on Isle Royale. In northern Minnesota the species was historically uncommon and many of these localities have been lost. This species requires suitable potential habitats in close proximity because the thallus fragments cannot disperse very far. The extensive logging in the past have eliminated many potential habitats. The species is marginally viable at present in parts of our region.

Present or Threatened Risks to Habitat : This species requires extensive and continuous tracts of suitable habitat because it disperses mainly by thallus fragments. Logging of the old-growth humid forests over large areas would limit its ability to disperse. It often grows in the tops of dead trees so it must disperse to survive in an area. It is very sensitive to air pollution and other human disturbance.

Overutilization : NA

Disease or Predation : NA

Inadequacy of Existing Regulatory Mechanisms : Michigan and Wisconsin do not have official lists of protected lichens and are not monitoring them.

Other Natural or Human Factors : Major fires, blowdowns, and climatic warming could reduce forest continuity and create widely separated patches of suitable habitat to the point where this lichen could not disperse.

SUMMARY OF LAND OWNERSHIP AND EXISTING HABITAT PROTECTION

Of the 53 known localities of this species, 40 are in areas under state or federal ownership but these may not be protected. See data base table for known localities in Appendix 3.

RESEARCH AND MONITORING

Existing Surveys, Monitoring, and Research : A survey was made in Superior National Forest in 1999 to look for localities with rare lichens (Wetmore 2000) . This species was found at four new localities during this survey.

Another survey was made in 2000 to characterize the habitats of three of the rare species in Superior National Forest (Wetmore 2001). This species was one of those included. In addition two pre-timber sales surveys have been made to look for rare species but this species was not found.

Survey Protocol : In the 1999 survey likely sites were chosen using USFS vegetation maps followed by low-level aerial flights to look for likely habitats. Ground checking was then done and collections of all species were made at interesting localities.

In the 2000 survey as many of the known localities as possible were revisited with a forest ecologist to describe the vegetation of the sites. Five sites where this lichen occurs were studied.

For the pre-timber sales surveys a lichenologist walked through parts of the sales area looking for rare lichens.

Research Priorities : This species might still be present in northern Wisconsin and Michigan in old-growth forests and suitable habitats should be sought. Historical localities should be checked for the persistence of this species. Transplant trials should be begun to establish new populations in suitable habitats using methods similar to those of Keon & Muir (2002).

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INTERNET SOURCES

W-1 Recent Literature on Lichens: http://www.toyen.uio.no/botanisk/bot-mus/lav/sok_rll.htm
W-2 Plant name database: http://plants.usda.gov/cgi_bin/topics.cgi

LIST OF CONTACTS

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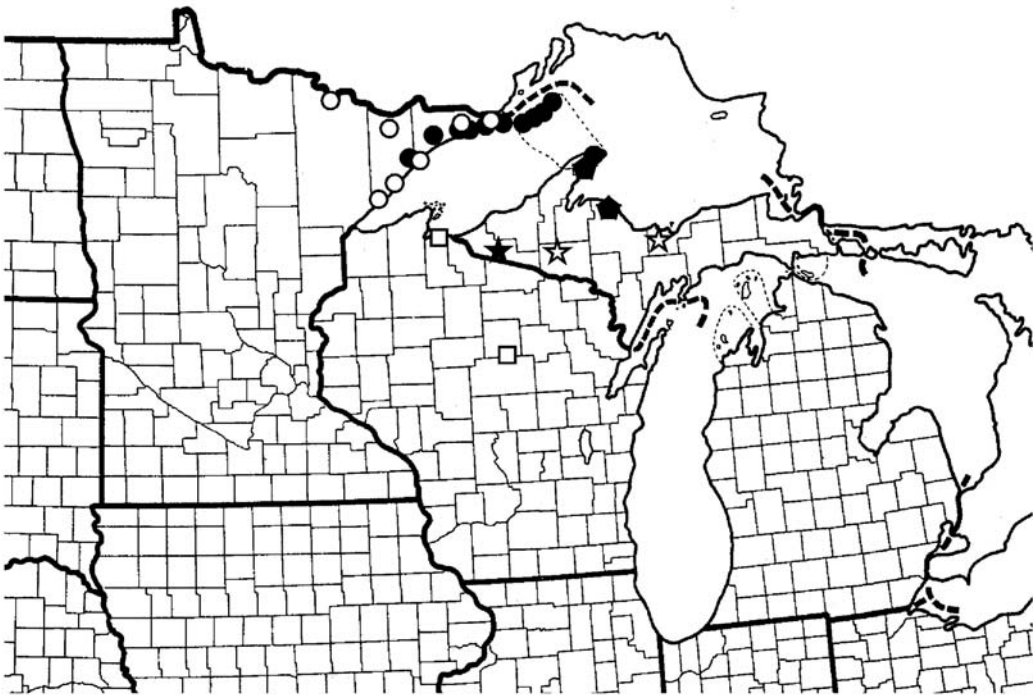
APPENDIX 1 Distribution of *Usnea longissima.*

APPENDIX 2 Lichens of conservation concern on the Lakes States National Forests.

APPENDIX 3 Locality data of *Usnea longissima.*

APPENDIX 4 Definitions of Ranks

APPENDIX 1 Distribution of *Usnea longissima*



Usnea longissima

☆ = MICH herbarium specimens before 1970
★ = MICH herbarium specimens after 1970
○ = MIN herbarium specimens before 1970
● = MIN herbarium specimens after 1970
⛤ = MSC herbarium specimens before 1970
⬟ = MSC herbarium specimens after 1970
□ = WIS herbarium specimens before 1970
■ = WIS herbarium specimens after 1970

APPENDIX 2 Lichens of conservation concern on the Lakes States National Forests

Scientific Name	**CN**	**CP**	**HI**	**HM**	**OT**	**SU**
Arctoparmelia centrifuga						(X)
Caloplaca parvula						X
Cetraria aurescens			(X)	(X)	(X)	X
Cetraria oakesiana			(X)	(X)	(X)	X
Cladonia wainioi						X
Lobaria quercizans	(X)		(X)	(X)	(X)	X
Peltigera venosa						X
Pseudocyphellaria crocata						X
Ramalina thrausta						(X)
Sticta fuliginosa						X
Usnea longissima					**(X)**	**X**

X = present in the forest and listed as sensitive
(X)= present in the forest but not listed as sensitive

National Forest Codes
CN Chequamegon/Nicolet
CP Chippewa
HI Hiawatha
HM Huron/Manistee
OT Ottawa
SU Superior

APPENDIX 3 Locality data of *Usnea longissima*

Area	*State*	*County*	*Locality*	*Year*
	WI	Lincoln	Merrill, Wisconsin River	1893
	MN	Cook	Grand Portage	1902
	MN	Cook	Pigeon Point Peninsula	1977
	MN	Lake	Two Harbors	1897
	MN	Cook	Grand Portage Isl.	1897
	MN	Lake	Beaver Bay	1897
	MI	Keweenaw	Lac La Belle	1976
	MI	Alger	Catham	1900
	MI			1868
	MN	Cook	Grand Marais	1902
	MI	Keweenaw	S of Copper Harbor	1976
	MI	Keweenaw	11 km NW of South Point	1976
	MI	Marquette	entrance, Salmon Trout River, Huron	1976
Grand Potage NM	MN	Cook	Fort Carlotte on Pigeon R.	1991
Indian reservation	WI	Ashland	3 mi W of Montreal River	1896
Isle Royale NP	MI	Keweenaw	Grace Creek Bog, SE of	1984
Isle Royale NP	MI	Keweenaw	Raspberry Isl.	1958
Isle Royale NP	MI	Keweenaw	Spruce Point	1983
Isle Royale NP	MI	Keweenaw	Tobin Harbor, Hidden Lake	1983
Isle Royale NP	MI	Keweenaw	Outer Hill Isl.	1980
Isle Royale NP	MI	Keweenaw	Checker Point	1983
Isle Royale NP	MI	Keweenaw	Windigo Mine	1965
Isle Royale NP	MI	Keweenaw	Lookout Louise	1983
Isle Royale NP	MI	Keweenaw	Beaver Isl., SW of	1984
Isle Royale NP	MI	Keweenaw	Chippewa Harbor, W end	1983
Isle Royale NP	MI	Keweenaw	Locke Point, outside of	1983
Isle Royale NP	MI	Keweenaw	Siskiwit Lake outlet	1930
Isle Royale NP	MI	Keweenaw	Rainbow Cove, E of	1984
Isle Royale NP	MI	Keweenaw	Huginnin Cove	1984
Isle Royale NP	MI	Keweenaw	Chippewa Harbor	1977
Isle Royale NP	MI	Keweenaw	Mott Isl.	1941
Isle Royale NP	MI	Keweenaw	Siskiwit Swamp	1959
Isle Royale NP	MI	Keweenaw	Smithwick Isl.	1958
Isle Royale NP	MI	Keweenaw	Windigo	1958
Isle Royale NP	MI	Keweenaw	Johns Isl.	1958
Isle Royale NP	MI	Keweenaw	Passage Isl.	1959
Isle Royale NP	MI	Keweenaw	Grace Creek Trail	1958
Isle Royale NP	MI	Keweenaw	Feldtman Ridge	1959
Isle Royale NP	MI	Keweenaw	Duncan Bay	1977
Isle Royale NP	MI	Keweenaw	Malone Bay	1977
Isle Royale NP	MI	Keweenaw	Huginnin Cove, 1 mi S	1984
Ottawa NF	MI	Gogebic	Bobcat Lake CG 2 mi SE of Marenisco	1975
Ottawa NF	MI	Iron	Teepee Lake S of Kenton	1964
Superior NF	MN	Cook	Misquah Hills	1897
Superior NF	MN	Lake	Trail to T Lake	2001
Superior NF	MN	Lake	Wanless Creek	1999
Superior NF	MN	Cook	Mark Creek NE of Pike Lake	1999
Superior NF	MN	Cook	S of Ball Club Lake	1999
Superior NF	MN	Cook	S of Kimball Lake on USFS 304	1999
Superior NF	MN	Lake	Snowbank Lake area	1897
Susie Isl.	MN	Cook	Susie Isl., SW point	1980

Area	*State*	*County*	*Locality*	*Year*
Susie Isl.	MN	Cook	Lucille Isl., NE end	1980
Voyageurs NP	MN	St. Louis	Kettle Falls	1901

Count = : 53

APPENDIX 4 Definitions of Ranks

Definitions of Global Heritage Ranks

G3: Vulnerable—Vulnerable globally either because very rare and local throughout its range, found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extinction or elimination. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.

G4: Apparently Secure—Uncommon but not rare (although it may be rare in parts of its range, particularly on the periphery), and usually widespread. Apparently not vulnerable in most of its range, but possibly cause for long-term concern. Typically more than 100 occurrences and more than 10,000 individuals.

G5: Secure—Common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Not vulnerable in most of its range. Typically with considerably more than 100 occurrences and more than 10,000 individuals.

Definitions of National and Subnational Heritage Ranks

N2 , S2: Imperiled—Imperiled in the nation or subnation because of rarity or because of some factor(s) making it very vulnerable to extirpation from the nation or subnation. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000).

N3, S3: Vulnerable—Vulnerable in the nation or subnation either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.

N4, S4: Apparently Secure—Uncommon but not rare, and usually widespread in the nation or subnation. Possible cause of long-term concern. Usually more than 100 occurrences and more than 10,000 individuals.

N5, S5: Secure—Common, widespread, and abundant in the nation or subnation. Essentially ineradicable under present conditions. Typically with considerably more than 100 occurrences and more than 10,000 individuals.

N?, S?: Unranked—Nation or subnation rank not yet assessed.

Minnesota Ranks

Endangered: A species is considered endangered if the species is threatened with extinction throughout all or a significant portion of its range within Minnesota.

Threatened: A species is considered threatened if the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range within Minnesota.

Special Concern: A species is considered a species of special concern if, although the species is not endangered or threatened, it is extremely uncommon in Minnesota, or has unique or highly specific habitat requirements and deserves careful monitoring of its status. Species on the periphery of their range that are not listed as threatened may be included in this category along with those species that were once threatened or endangered but now have increasing or protected, stable populations.

Regional USDA Forest Service Ranks (USDA Forest Service. 1995. Forest Service Manual 2670.5. Washington, D.C.)

Sensitive Species: Those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by:

a. Significant current or predicted downward trends in population numbers or density.

b. Significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.