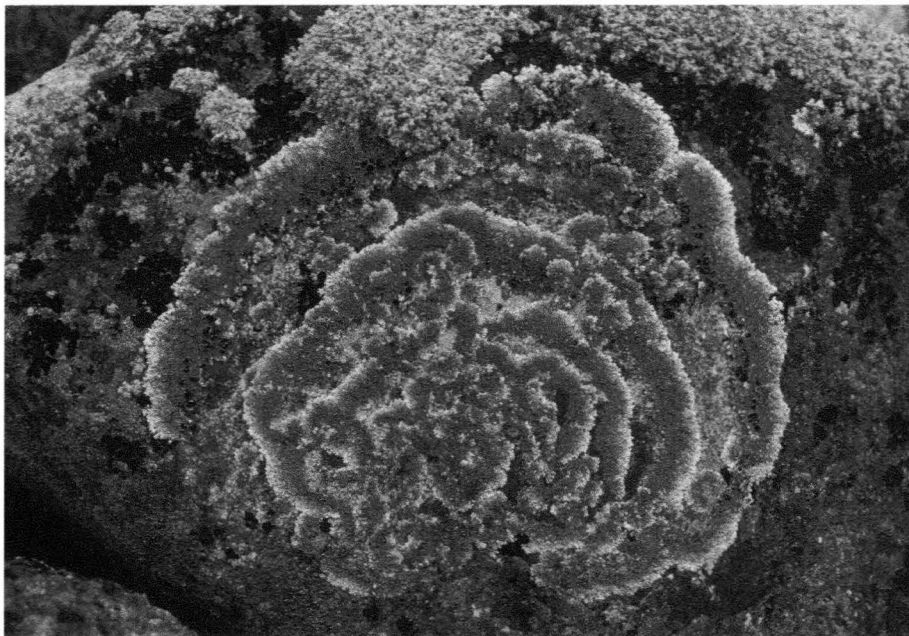


R9 Species Conservation Assessment
for
Arctoparmelia centrifuga (L.) Hale
in
The Upper Great Lakes National Forests



Arctoparmelia centrifuga

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This Conservation Assessment was prepared to compile the published and unpublished information on the subject species or community.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

Arctoparmelia centrifuga (L.) Hale is a candidate Regional Forester Sensitive Species on the Superior National Forest in the Eastern Region of the Forest Service. The species occurs on the Superior National Forest. 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 *Arctoparmelia centrifuga* (L.) Hale and its distribution, habitat, range, status, life history, and ecology. *Arctoparmelia centrifuga* grows on sunny bare rock outcrops and has an arctic-alpine distribution throughout the boreal region of the world. In North America it barely enters the Great Lakes area but occurs further south in the Appalachians. It is not listed on any red lists for any of Europe. In the Great Lakes area common habitats for this species are talus slopes and bare rocky ridges. It is a candidate R9 Sensitive Species on Superior National Forest in Minnesota. Threats to *Arctoparmelia centrifuga* are road and building construction on the rocky ridges, rock climbing, and foot traffic from trails on the ridges.

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: *Arctoparmelia centrifuga* (L.) Hale

Common name: none

USDA plant code: ARCE60

Synonyms: *Arctoparmelia aleuritica* (Nyl.) Hale

Parmelia aleuritica Nyl.

Parmelia centrifuga (L.) Ach.

Xanthoparmelia centrifuga (L.) Hale

DESCRIPTION OF SPECIES

“Thallus pale greenish yellow, closely adnate, often forming concentric bands, 3-10 cm broad; lower surface sparsely rhizinate; apothecia rare. Medulla K-, KC+ red, P- (alectoronic acid)” (Hale 1979).

Some key identification characteristics are the narrow, dull yellow green lobes frequently forming a donut shaped ring. The lower surface is pale to white and under UV light the thallus fluoresces white. This species is more closely attached to the rock and has narrower lobes than most *Xanthoparmelia* species. *Xanthoparmelia* also has shiny lobes. *Arctoparmelia subcentrifuga* is very similar to *A. centrifuga* but has soredia. See color photo # 112 in Brodo et. al. (2001).

LIFE HISTORY

Reproduction: Since apothecia are rare and this lichen has no soredia (asexual) the main means of reproduction probably is by thallus fragments that can be blown to new rock areas.

Hakulinen (1966) reported on the growth rate of individual lobes of *Arctoparmelia centrifuga* (as *Parmelia centrifuga*) over a three year period. He reported average lobe growth of 1.5 to 2.5 mm per year. Growth rate in the Great Lakes area may be less. This points out the slow growth rate of the species and

therefore the need for long periods without local disturbance in order for it to survive and propagate.

Ecology: This lichen grows on unshaded rocks, often on large rock outcrops and talus slopes. Along the Canadian shore of Lake Superior it is found on the north sides of shoreline rocks. It probably needs high humidity because it grows near water and on north-facing slopes.

Dispersal: Reproduction by thallus fragments means that this lichen probably cannot disperse far or rapidly but depends on nearby suitable rocks for colonization.

Obligate Associations: NA

HABITAT

Range-wide: This species always occurs on sunny bare rocks throughout its range. Usually the rocks are acidic (Thomson 1984). These habitats are not likely to be subject to disturbance unless large-scale construction is done adjacent to the rocks or buildings placed on the rock ridges. Trail or road construction along the ridgetops would also damage the lichen. These bare rock outcrops have decreased since glacial times due to forest succession. Large-scale major fires can expose more of these rock outcrops and allow colonization by the species if sufficient time (100+ years?) elapses between disturbance.

National Forests : Same

Site Specific : Talus slopes and rock ledges and ridges seem to be good habitats. One such site near South Fowl Lake in Superior National Forest has an extensive talus slope with numerous thalli of this species.

DISTRIBUTION AND ABUNDANCE

Range-wide Distribution : This species has a circumpolar, arctic-alpine distribution extending south in central and eastern North America to the upper Great Lakes (Brodo et al. 2001, Thomson 1984). In Europe it extends south to northern Germany (Poelt 1969) and in Asia south to northern China (Wei 1991).

Region-wide Distribution This lichen is at the southern end of its distribution in the upper Great Lakes area where it is rare (see Appendix 1). Harris (1978) says this is rare in Marquette County, Michigan. Fryday et. al. (2001) list it only from Isle Royale in Michigan. It was rare in Minnesota at the time Fink (1910) published on the lichens of the state. In this region before 1970 it was known from two localities and after 1970 it has been collected at four additional localities.

Population Trends: Range-wide and regionally there does not seem to be a significant change in the distribution or abundance of this species. This is probably because the habitat where it grows is not subject to human disturbance. However, there may be unknown localities where buildings have been constructed on rock ridgetops that might have destroyed a population at that locality.

RANGEWIDE STATUS

This species is not listed outside of North America. For definitions of ranks see Appendix 4.

U. S. Fish and Wildlife Rank: Not ranked

Global Heritage Status Rank : G3G5

U. S. National Heritage Rank : Not ranked

U. S. Forest Service, R9 Sensitive Species: See Appendix 2.

Michigan Rank : Not ranked
Minnesota Rank : Not ranked
Wisconsin Rank : Not ranked
Ontario, Canada Rank : S?

Houses built on the bare rock ridges may have eliminated some habitats. Forest succession has also reduced the number of suitable sites.

POPULATION BIOLOGY AND VIABILITY

Clayden (1992) reports chemical differences between North American and European populations of this species. Some individuals lack usnic acid and are not yellow and these individuals occur sporadically in both North America and in Europe. However, the fatty acid contents also vary and have different geographical distributions. These all appear to be genetic mutations and highlight the importance of protecting outlier populations of this species, such as those in the Upper Great Lakes area.

Because this species grows slowly and reproduces mainly by thallus fragments and apothecia are rare, the ability to disperse is limited. Sometimes the thallus may be damaged by animals or natural actions (rock falls) to produce breaks in the thallus and form small thallus fragments.

With few populations in our region at the southern edge of its range the prospects for colonization of new habitats is very limited. If these four known populations are lost it is not likely that this species can persist in the region. The one historical locality has not been revisited since the original collection in 1897 but that locality is now within the BWCA and the lichen may still exist there. The recent populations all seem to be old with large thalli so the species does not seem to be expanding rapidly. An effort should be made to locate additional populations within this area.

POTENTIAL THREATS

There is no evidence that this species is declining either rangewide or locally. In the northern parts of its range in North America it is more abundant and not in danger of loss. At the edge of its range in this region the loss of a single population may lead to a reduction in its world-wide range. In Superior National Forest the single recent locality is isolated and protected unless further housing development takes place around the cabins below the talus slopes.

Present or Threatened Risks to Habitat : The habitat and this lichen could be destroyed by construction of buildings or roads on the large rock outcrops. To a lesser extent major trail construction could destroy some rock habitat but would also lead to more visitation and foot traffic that could destroy the lichen. In some areas where rock climbing might occur this species could be damaged by the activity.

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 : Because this species is at the southern end of its distribution in our area climate warming could reduce populations or prevent colonization of new habitats.

SUMMARY OF LAND OWNERSHIP AND EXISTING HABITAT PROTECTION

Four of the six known localities of this species are in areas under state or federal ownership but they may not be protected. In Canada on the north shore of Lake Superior this species can be found frequently on shore rocks. 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 one new locality during this survey.

Survey Protocol : 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 total collections were made at interesting localities. In addition two pre-timber sales surveys have been made to look for rare species but this species was not found.

Research Priorities : A search for additional habitats of this species in the northern parts of the region should be made. Likely habitats could be spotted from the air in low-level flights. Ground checking of these potential sites should be done to check for this species. Sites where this species has been previously reported should be relocated, if possible, to determine whether the populations are maintaining themselves.

REFERENCES

- Brodo, I., S. Sharnoff, & S. Sharnoff, 2001. Lichens of North America. Yale Univ. Press.
- Claydon, S. 1992. Chemical divergence of Eastern North American and European populations of *Arctoparmelia centrifuga* and their sympatric usnic acid-deficient chemotypes. *Bryologist* 95: 1-4.
- Fryday, A., J. Fair, M. Googe, A. Johnson, E. Bunting, and A. Prather. 2001. Checklist of lichens and allied fungi of Michigan. *Contrib. Univ. Michigan Herbarium* 23: 145-223.
- Hakulinen, H. 1966. Über die Wachstumsgeschwindigkeit einiger Laubflechten. *Ann. Bot. Fenn.* 3: 167-179.
- Hale, M. E. 1979. *How to Know the Lichens*. 2. ed. Dubuque.
- Harris, R. 1978. *Lichens of the Straits Counties, Michigan*. Publ. by the author.
- Poelt, J. 1969. *Bestimmungsschüssel Europäischer Flechten*. J. Cramer, Lehre. Thomson, J. 1984. *American Arctic Lichens*. 1. The Macrolichens. Columbia University Press.
- Wei, J.-C. 1991. *An Enumeration of Lichens in China*. International Academic Publishers, Beijing.
- Wetmore, C. 2000. *Rare Lichen Survey of Superior National Forest*. Report submitted to USDA Forest Service.

INTERNET SOURCES

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

LIST OF CONTACTS

Information Requests:

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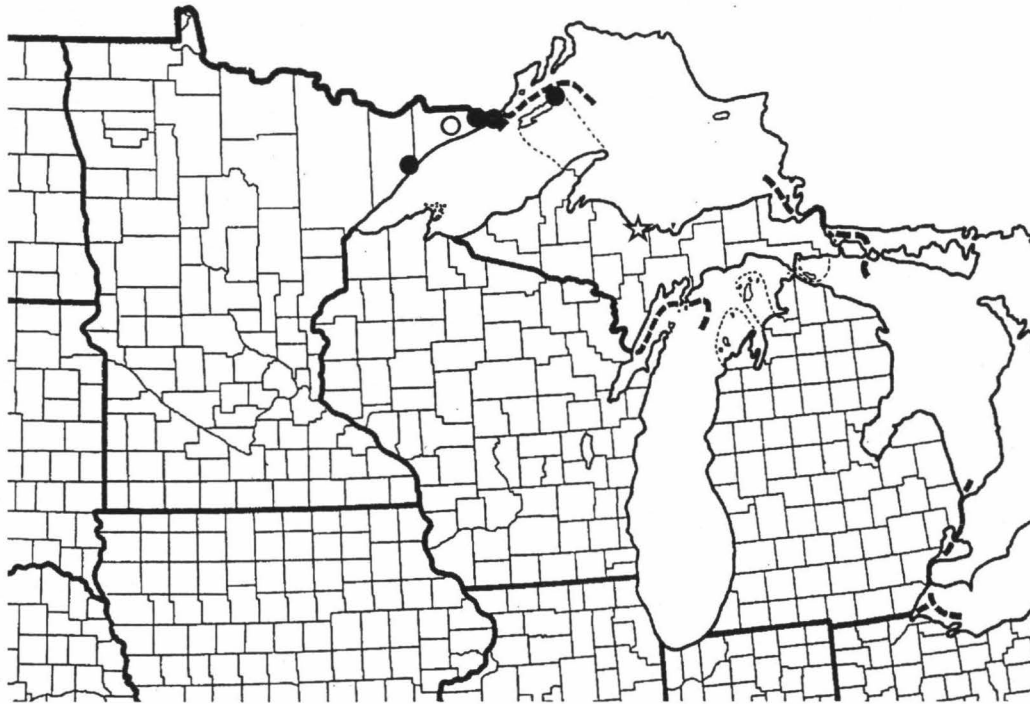
APPENDIX 1 Distribution of *Arctoparmelia centrifuga*.

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

APPENDIX 3 Locality data of *Arctoparmelia centrifuga*.

APPENDIX 4 Definitions of Ranks

APPENDIX 1 Distribution of *Arctoparmelia centrifuga*



Arctoparmelia centrifuga

- ☆ = 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
<i>Arctoparmelia centrifuga</i>						(X)
<i>Caloplaca parvula</i>						X
<i>Cetraria aurescens</i>			(X)	(X)	(X)	X
<i>Cetraria oakesiana</i>			(X)	(X)	(X)	X
<i>Cladonia wainioi</i>						X
<i>Lobaria quercizans</i>	(X)		(X)	(X)	(X)	X
<i>Peltigera venosa</i>						X
<i>Pseudocyphellaria crocata</i>						X
<i>Ramalina thrausta</i>						(X)
<i>Sticta fuliginosa</i>						X
<i>Usnea longissima</i>					(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 *Arctoparmelia centrifuga*

<i>Area</i>	<i>State</i>	<i>County</i>	<i>Locality</i>	<i>Year</i>
	MI	Marquette	Sugarloaf Mt, Marquette	1933
	MN	Lake	5 mi N of Little Marais	1980
Isle Royale NP	MI	Keweenaw	outside of Locke Point	1983
Superior NF	MN	Cook	SW corner of South Fowl Lake	1999
Superior NF	MN	Cook	Misquah Hills	1897
Susie Isl.	MN	Cook	Susie Isl., SW point	1980
Count = :				6

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.