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Sulcaria spiralifera, Dune Hair Lichen

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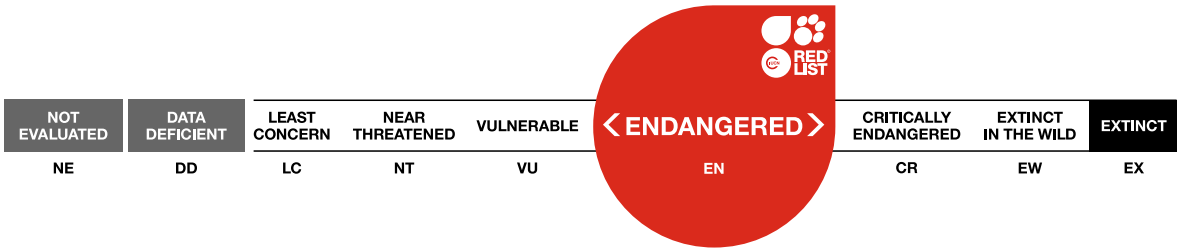

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Taxonomy

Kingdom	Phylum	Class	Order	Family
Fungi	Ascomycota	Lecanoromycetes	Lecanorales	Parmeliaceae

Scientific Name: *Sulcaria spiralifera* (Brodo & D.Hawksw.) Myllys, Velmala & Goward

Synonym(s):

- *Bryoria pseudocapillaris* Brodo & D. Hawksw.
- *Bryoria spiralifera* Brodo & D. Hawksw.

Common Name(s):

- English: Dune Hair Lichen

Assessment Information

Red List Category & Criteria: Endangered B2ab(i,ii,iii,iv,v); C2a(i) ver 3.1

Year Published: 2021

Date Assessed: August 18, 2020

Justification:

Sulcaria spiralifera is a fruticose arboreal lichen that is endemic to coastal dune forests in western North America. It occurs at scattered localities from central California to Washington. It is rare throughout its range, except on the Samoa Peninsula in California's Humboldt County and on the Oregon Dunes in Coos County where it is locally abundant (Glavich 2003, 2008). This species, and its rare and sensitive ecosystem, are threatened by coastal development, climate change, and air pollution. This species is severely fragmented with an area of occupancy of only 104 km^2, and is therefore Endangered under criterion B2. Its small and fragmented population containing fewer than 2,500 mature individuals also qualifies it as Endangered under criterion C2a(i)

Geographic Range

Range Description:

Sulcaria spiralifera occurs at scattered and isolated localities from central California to Washington, but it is locally common only on the Samoa Peninsula in California's Humboldt County and on the Oregon Dunes in Coos County. It is known from ca. 15 localities (Glavich 2003, 2008).

Country Occurrence:

Native, Extant (resident): United States (California, Oregon, Washington)

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Distribution Map

Legend

EXTANT (RESIDENT)

Compiled by:

IUCN 2020

The boundaries and names shown and the designations used on this map do not imply any official endorsement, acceptance or opinion by IUCN.

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Population

Sulcaria spiralifera was first described as two species, *Bryoria spiralifera* and *B. pseudocapillaris* (Brodo and Hawksworth 1977), which have been reclassified as one species with two chemotypes (Myllys *et al.* 2014). The norstictic acid chemotype (*B. spiralifera*) is less frequent, it is not known from Washington and it is only known from ca. 5 locations, the largest of which is the type locality on the Samoa Peninsula in California (Brodo and Hawksworth 1977, Glavich 2008). The barbatolic acid chemotype (*B. pseudocapillaris*) is known from the same locations as the norstictic acid chemotype in northern California and Oregon, but it occurs at an additional ca. 10 locations including some in Washington. The norstictic acid chemotype occurs further south in California than the barbatic acid chemotype. Most locations have been discovered since 2003 and the original locality discovered in the 1970's was confirmed as extant by R.T. McMullin in 2009 (Brodo and Hawksworth 1977, Glavich 2003, 2008, Glavich *et al.* 2005, McMullin 2015). All known localities are presumed to be extant and it is suspected that less than 2,500 mature individuals exist in the population, though further research is necessary to confirm this.

Current Population Trend: Decreasing

Habitat and Ecology **(see Appendix for additional information)**

This species is restricted to hyper-maritime dune forests. It is usually on the branches of conifer trees, predominantly on *Picea stichensis* and *Pinus contorta* var. *contorta* and less frequently on *Abies grandis, Pseudotsuga menziesii,* and *Tsuga heterophylla* (Brodo and Hawksworth 1977, Glavich 2003, 2005). The barbatolic acid chemotype rarely occurs on rock as well (Brodo and Hawksworth 1977).

Systems: Terrestrial

Threats **(see Appendix for additional information)**

Coastline development, climate change, and air pollution are the primary threats to *Sulcaria spiralifera.* This species appears to have a narrow tolerance for specific climatic conditions and its range is predicted to become warmer, increasing by as much as 1.5° C by 2050 (Mote *et al.* 2003). On-going coastal development and the resulting air pollution are also threats causing a decline in suitable habitat.

Conservation Actions **(see Appendix for additional information)**

Several sites in California and Oregon are protected by state or federal land parcels, including Lake Earl State Park, US Fish & Wildlife Lanphere Dunes, and Samoa Dune (Bureau of Land Management, Geiser *et al.* 2004, Glavich *et al*. 2005). The barbatolic acid chemotype is ranked as S1 in Washington and G3 globally by the Washington Natural Heritage Program. The norstictic acid chemotype has a proposed rank of S1 in California and G1 globally (Glavich 2008). Regulations should be imposed to limit the development of urban and industrial areas in mature coastal dune forests in the Pacific Northwest. The impacts of climate change on the rare and sensitive habitat that *Sulcaria spiralifera* requires should be modelled to assist with sound conservation planning. Education and local stewardship are also needed to raise awareness and promote the conservation of this rare habitat, as are further research and conservation planning for this species. This species should be listed as a species at risk and protected by federal and state laws.

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Credits

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External Resources

For Supplementary Material, and for Images and External Links to Additional Information, please see the Red List website.

Appendix

Habitats

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Habitat	Season	Suitability	Major Importance?
1. Forest -> 1.4. Forest - Temperate	Resident	Suitable	Yes

Plant Growth Forms

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Plant Growth Form
E. Epiphyte
LC. Lichen

Threats

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Threat	Timing	Scope	Severity	Impact Score
1. Residential & commercial development -> 1.1. Housing & urban areas	Ongoing	Unknown	Rapid declines	Unknown
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
1. Residential & commercial development -> 1.3. Tourism & recreation areas	Ongoing	Unknown	Rapid declines	Unknown
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
6. Human intrusions & disturbance -> 6.1. Recreational activities	Ongoing	Unknown	Slow, significant declines	Unknown
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation		
9. Pollution -> 9.5. Air-borne pollutants -> 9.5.2. Smog	Ongoing	Unknown	Slow, significant declines	Unknown
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
11. Climate change & severe weather -> 11.1. Habitat shifting & alteration	Future	Unknown	Slow, significant declines	Unknown
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 1. Ecosystem stresses -> 1.3. Indirect ecosystem effects		
11. Climate change & severe weather -> 11.2. Droughts	Future	Unknown	Slow, significant declines	Unknown
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 1. Ecosystem stresses -> 1.3. Indirect ecosystem effects		

11. Climate change & severe weather -> 11.3. Temperature extremes	Future	Unknown	Slow, significant declines	Unknown
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 1. Ecosystem stresses -> 1.3. Indirect ecosystem effects		

Conservation Actions in Place

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Conservation Action in Place
In-place land/water protection
Conservation sites identified: No
Occurs in at least one protected area: Yes

Conservation Actions Needed

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Conservation Action Needed
1. Land/water protection -> 1.1. Site/area protection
1. Land/water protection -> 1.2. Resource & habitat protection
2. Land/water management -> 2.1. Site/area management
3. Species management -> 3.2. Species recovery
5. Law & policy -> 5.1. Legislation -> 5.1.2. National level
5. Law & policy -> 5.2. Policies and regulations
5. Law & policy -> 5.4. Compliance and enforcement -> 5.4.3. Sub-national level

Research Needed

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Research Needed
1. Research -> 1.2. Population size, distribution & trends
1. Research -> 1.5. Threats
2. Conservation Planning -> 2.2. Area-based Management Plan
3. Monitoring -> 3.4. Habitat trends

Additional Data Fields

Distribution
Estimated area of occupancy (AOO) (km²): 104
Continuing decline in area of occupancy (AOO): Yes
Extreme fluctuations in area of occupancy (AOO): No
Estimated extent of occurrence (EOO) (km²): 148577
Continuing decline in extent of occurrence (EOO): Yes
Extreme fluctuations in extent of occurrence (EOO): No
Number of Locations: 15
Continuing decline in number of locations: Unknown
Extreme fluctuations in the number of locations: No
Population
Number of mature individuals: 1,000-2,499
Continuing decline of mature individuals: Yes
Extreme fluctuations: No
Population severely fragmented: Yes
Continuing decline in subpopulations: Yes
Extreme fluctuations in subpopulations: No
All individuals in one subpopulation: No
No. of individuals in largest subpopulation: 51-250
Habitats and Ecology
Continuing decline in area, extent and/or quality of habitat: Yes

The IUCN Red List Partnership

The IUCN Red List of Threatened Species™ is produced and managed by the IUCN Global Species Programme, the IUCN Species Survival Commission (SSC) and The IUCN Red List Partnership.

The IUCN Red List Partners are: Arizona State University; BirdLife International; Botanic Gardens Conservation International; Conservation International; NatureServe; Royal Botanic Gardens, Kew; Sapienza University of Rome; Texas A&M University; and Zoological Society of London.