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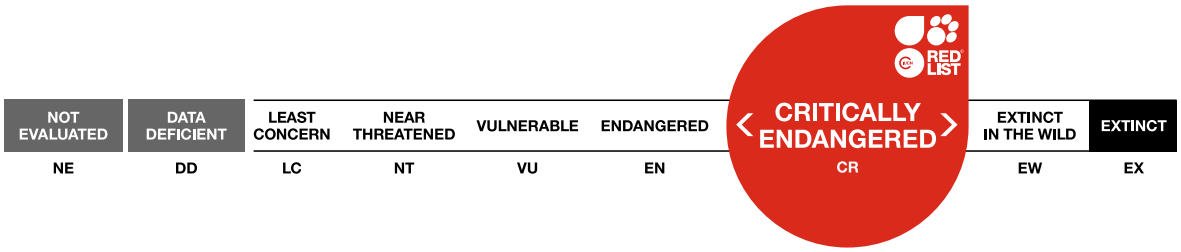
Scope(s): Global
Language: English

Sticta deyana, Dey's Moon Lichen

Assessment by: Lendemer, J.



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Taxonomy

Kingdom	Phylum	Class	Order	Family
Fungi	Ascomycota	Lecanoromycetes	Peltigerales	Lobariaceae

Scientific Name: *Sticta deyana* Lendemer & Goffinet

Common Name(s):

- English: Dey's Moon Lichen

Assessment Information

Red List Category & Criteria: Critically Endangered A3ce ver 3.1

Year Published: 2020

Date Assessed: July 22, 2020

Justification:

Sticta deyana is a rare macrolichen endemic to south-eastern North America with a suspected future population reduction that will occur in the future as the entire North Carolina subpopulation, containing >80% of the individuals, is projected to be inundated by sea-level rise by 2100 which is less than three generations (based on a 30 year generation time), while invasive species also provide a threat. Therefore, it is listed as Critically Endangered under criterion A3ce.

Geographic Range

Range Description:

Sticta deyana is endemic to south-eastern North America where it is restricted to two extant subpopulations that are both highly limited in spatial extent. One is located in the Dare Regional Biodiversity Hotspot of eastern North Carolina (Lendemer *et al.* 2016) and the other is located in a small area of the Southern Appalachian Biodiversity Hotspot in northern Alabama (Tripp *et al.* 2019). An historical occurrence (1965) was reported by McDonald *et al.* (2003) from central Florida as *S. fragilinata*. Despite extensive study of *S. deyana* in the south-eastern United States, and field surveys in much of this region, no additional occurrences of the species have been found.

Country Occurrence:

Native, Extant (resident): United States (Alabama, North Carolina)

Native, Extinct: United States (Florida)

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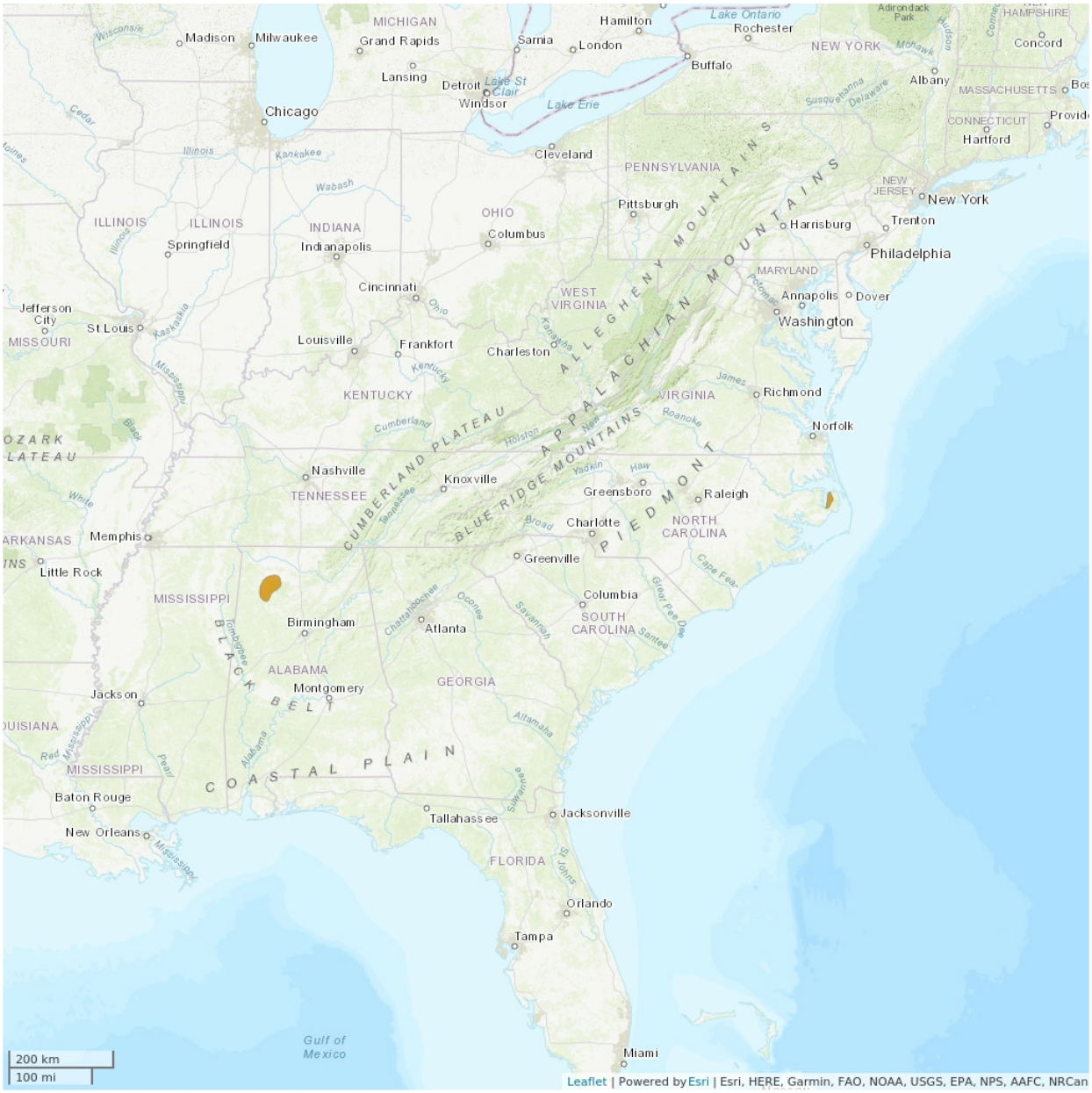
Distribution Map



Legend

EXTANT (RESIDENT)

Compiled by:

IUCN (International Union for Conservation of Nature) 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

The species is known from three subpopulations total, two extant and on presumed extirpated, all separated by substantial geographic distances. The subpopulation in Florida, represented by one site, is suspected to have been extirpated as it was known from a single record made in 1965 and has not been relocated there since despite extensive lichen study in the area subsequently. The subpopulation in North Carolina is restricted to five sites on a single peninsula, all projected to be inundated by sea-level rise by 2100. The subpopulation in Alabama is restricted to three sites in highly restricted slot canyons. At all extant sites the species occurs as small numbers of individuals that are spatially restricted. The population is estimated to comprise 95 functional individuals (15 Alabama; 80 North Carolina) based on visual assessment of in the field.

Current Population Trend: Decreasing

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

Sticta deyana is restricted to mature forests in high humidity habitats, where it occurs on the bark of mature trees (North Carolina) and large shaded rock outcrops (Alabama). In North Carolina, it is associated with mature swamp forests while in Alabama it is associated with remnant old-growth in slot canyons associated with streams and rivers.

Systems: Terrestrial

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

There are numerous threats to this species. The largest extant subpopulation is projected to be entirely inundated by sea-level rise by 2100 (Lendemer and Allen 2014, Allen and Lendemer 2016) and is restricted to the largest remaining unfragmented swamp forests in the Mid-Atlantic Coast and these are already being impacted by salt-water intrusion and erosion (see Lendemer *et al.* 2016 for detailed discussion and citation of literature). Several sites of the North Carolina subpopulations are also within a short distance of major proposed road construction projects. The smaller subpopulation in Alabama is restricted to remnant mature forest stands that will likely undergo major shifts in climate and humidity regimes as the keystone forest species (American Hemlock; *Tsuga canadensis*) is lost at these sites due to an invasive species (Ellison *et al.* 2018).

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

The majority of areas where the species is known are within existing public lands, however locations outside of federally designated wilderness could be subjected to resource extraction, habitat alteration or further fragmentation in the future. As such, additional protection of sites on both public and private lands is needed. Invasive species management is also needed to prevent the spread of the Hemlock Adelgid to disjunct inland sites where the species occurs, and to prevent the loss of that tree species if the adelgid does spread there. The species is not presently listed as threatened or endangered in any formal conservation framework, hence inclusion in existing policy and management frameworks is needed at both the national and regional levels. Also, increased education about the species and its threatened status is needed, as well as research and conservation planning.

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
1. Forest -> 1.8. Forest - Subtropical/Tropical Swamp	Resident	Suitable	Yes
5. Wetlands (inland) -> 5.4. Wetlands (inland) - Bogs, Marshes, Swamps, Fens, Peatlands	Resident	Suitable	Yes

Plant Growth Forms

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

Plant Growth Form
M. Fungus
LC. Lichen

Threats

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

Threat	Timing	Scope	Severity	Impact Score
4. Transportation & service corridors -> 4.1. Roads & railroads	Future	Majority (50-90%)	Slow, significant declines	Low impact: 4
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
8. Invasive and other problematic species, genes & diseases -> 8.1. Invasive non-native/alien species/diseases -> 8.1.2. Named species (Adelges tsugae)	Ongoing	Minority (50%)	Slow, significant declines	Low impact: 5
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.1. Species mortality		
11. Climate change & severe weather -> 11.1. Habitat shifting & alteration	Ongoing	Whole (>90%)	Slow, significant declines	Medium impact: 7
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
11. Climate change & severe weather -> 11.4. Storms & flooding	Ongoing	Majority (50-90%)	Rapid declines	Medium impact: 7
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.1. Species mortality		

Conservation Actions in Place

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

Conservation Action in Place
In-place research and monitoring
Action Recovery Plan: No
Systematic monitoring scheme: No
In-place land/water protection
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 -> 2.2. Invasive/problematic species control
4. Education & awareness -> 4.1. Formal education
4. Education & awareness -> 4.2. Training
4. Education & awareness -> 4.3. Awareness & communications
5. Law & policy -> 5.1. Legislation -> 5.1.2. National level
5. Law & policy -> 5.1. Legislation -> 5.1.3. Sub-national level
5. Law & policy -> 5.2. Policies and regulations

Research Needed

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

Research Needed
1. Research -> 1.2. Population size, distribution & trends
1. Research -> 1.3. Life history & ecology
2. Conservation Planning -> 2.1. Species Action/Recovery Plan
2. Conservation Planning -> 2.2. Area-based Management Plan
3. Monitoring -> 3.1. Population trends
3. Monitoring -> 3.4. Habitat trends

Additional Data Fields

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Distribution
Estimated area of occupancy (AOO) (km²): 28
Continuing decline in area of occupancy (AOO): Yes
Extreme fluctuations in area of occupancy (AOO): Unknown
Estimated extent of occurrence (EOO) (km²): 25033
Continuing decline in extent of occurrence (EOO): Yes
Extreme fluctuations in extent of occurrence (EOO): Unknown
Number of Locations: 2
Continuing decline in number of locations: Yes
Extreme fluctuations in the number of locations: No
Population
Number of mature individuals: 95
Continuing decline of mature individuals: Yes
No. of subpopulations: 2
No. of individuals in largest subpopulation: 80
Habitats and Ecology
Continuing decline in area, extent and/or quality of habitat: Yes
Generation Length (years): 30

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The IUCN Red List Partnership

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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.