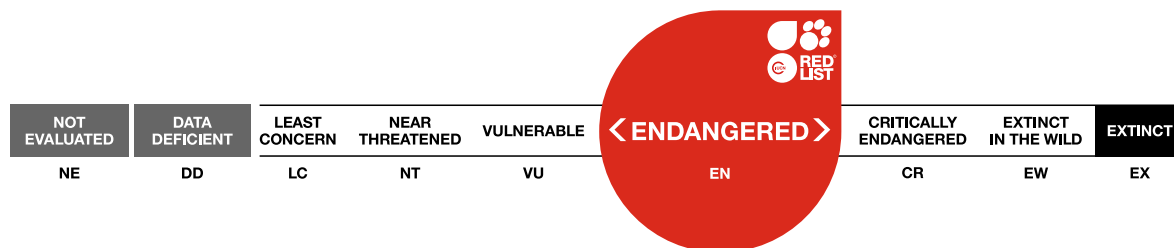


## *Calicium sequoiae*, Redwood Stubble

Assessment by: Reese Næsborg, R.



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## Taxonomy

Kingdom	Phylum	Class	Order	Family
Fungi	Ascomycota	Lecanoromycetes	Caliciales	Caliciaceae

**Scientific Name:** *Calicium sequoiae* C.B. Williams & Tibell

**Common Name(s):**

- English: Redwood Stubble

**Taxonomic Source(s):**

Index Fungorum Partnership. 2020. Index Fungorum. Available at: <http://www.indexfungorum.org>.

**Taxonomic Notes:**

The species was described by Williams and Tibell (2008) and the type specimen was collected in Prairie Creek Redwoods State Park, Humboldt County, CA.

## Assessment Information

**Red List Category & Criteria:** Endangered B2ab(i,ii,iii,v) [ver 3.1](#)

**Year Published:** 2021

**Date Assessed:** May 5, 2021

**Justification:**

*Calicium sequoiae* is narrowly endemic to old-growth Coast Redwood forests in California where it grows on the bark of redwood trees. Its extent of occurrence is 5,083 km<sup>2</sup> and its area of occupancy is 32 km<sup>2</sup>. There are estimated, ongoing declines in the extent and quality of habitat and inferred ongoing declines in the extent of occurrence, area of occupancy, and number of mature individuals due to logging, climate change, and large, high-intensity wildfires. Its subpopulations have been severely fragmented by large-scale timber harvesting that has resulted in only ca. 5% of old-growth coast redwood forests remaining intact today. Therefore, it is assessed as Endangered: B2ab(i,ii,iii,v).

## Geographic Range

**Range Description:**

*Calicium sequoiae* is endemic to old-growth Coast Redwood forest in Northern California. The species has been found in Jedediah Smith Redwoods State Park, Six Rivers National Forest, Prairie Creek Redwoods State Park, Redwood National Park, Humboldt Redwoods State Park, and Armstrong Redwoods State National Reserve. It could be present in the few other old-growth parks between Humboldt Redwoods SP and Armstrong SNR, but this has not been verified.

**Country Occurrence:**

**Native, Extant (resident):** United States (California)

## Population

*Calicium sequoiae* has so far only been found on old-growth Coast Redwood (*Sequoia sempervirens*) trees, which were historically impacted by widespread logging, leaving only about 5% of the original forests intact. The remaining old-growth redwood forests are severely fragmented. Because *Calicium sequoiae* only lives on old-growth Coast Redwoods, impacts to the tree likely caused equivalent impacts to the population of the lichen species. Climate change impacts, including drought, and large-scale wildfires that occur as a result of fire suppression are projected to further reduce the population size of this species. Indeed, one of the few remaining occurrences of *Calicium sequoiae*, at Armstrong Redwoods State Natural Preserve experienced a low intensity fire in 2020. If the occurrence at Armstrong was extirpated by the fire it would result in a 92% reduction of EOO and a 12.5% reduction in AOO. The impacts of the fire remain to be confirmed.

**Current Population Trend:** Decreasing

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

This species appears to be restricted to thick, fibrous bark between 20 and 80 m above ground level on trunks of large coast redwood (*Sequoia sempervirens*) trees in low elevation, old-growth redwood forests.

**Systems:** Terrestrial

## Use and Trade

This species could be impacted by collecting of specimens, but this is almost certainly not a major threat to this species because it lives high up in the trees and people are not allowed to climb them.

## Threats (see Appendix for additional information)

Historically, logging was the greatest threat to *Calicium sequoiae*. Only c.5% of old-growth Coast Redwood forest is left after decades of timber harvesting, so the lichen populations are likely severely fragmented. However, most old Coast Redwood trees are currently protected in State and National Parks. Wildfires, which are projected to increase in frequency and severity, are probably the most imminent threat. The southernmost location, Armstrong Redwoods State Natural Preserve experienced a low intensity fire in 2020, but as conditions get warmer and drier, even parks in the north may experience hot, devastating fires in the future.

## Conservation Actions (see Appendix for additional information)

*Calicium sequoiae* occurs in multiple protected areas, including State and National Parks. It is not currently protected at the state or federal level in California or the United States.

This species is difficult to gather accurate knowledge about since it requires climbing of the trees to access where it grows. The species is too tiny to see from the ground and anatomical and chemical tests need to be performed to confidently identify it. Climbing without a research permit is strictly prohibited in all State and National Parks. In addition to Coast Redwoods, other possible hosts could be other members of Cupressaceae that share similar bark textural characteristics to Coast Redwood, and these should be explored. Actions to stop climate change from getting worse are needed for the protection of this species.

## Credits

**Assessor(s):** Reese Næsborg, R.

**Reviewer(s):** Allen, J.

**Facilitator(s) and  
Compiler(s):** Lymbery, C. & Allen, J.

## Bibliography

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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
LC. Lichen

## Use and Trade

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

End Use	Local	National	International
Sport hunting/specimen collecting	No	Yes	No

## Threats

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

Threat	Timing	Scope	Severity	Impact Score
5. Biological resource use -> 5.3. Logging & wood harvesting -> 5.3.4. Unintentional effects: (large scale) [harvest]	Past, unlikely to return	Majority (50-90%)	Unknown	Past impact
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 1. Ecosystem stresses -> 1.3. Indirect ecosystem effects		
7. Natural system modifications -> 7.1. Fire & fire suppression -> 7.1.1. Increase in fire frequency/intensity	Ongoing	Whole (>90%)	Unknown	Unknown
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
11. Climate change & severe weather -> 11.1. Habitat shifting & alteration	Ongoing	Whole (>90%)	Unknown	Unknown
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.1. Species mortality		
11. Climate change & severe weather -> 11.2. Droughts	Ongoing	Whole (>90%)	Unknown	Unknown
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		

## Conservation Actions in Place

(<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
Conservation sites identified: Yes, over entire range
Percentage of population protected by PAs: 81-90
Area based regional management plan: No
Occurs in at least one protected area: Yes

## Conservation Actions Needed

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

Conservation Action Needed
5. Law & policy -> 5.1. Legislation -> 5.1.1. International level

## 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

## Additional Data Fields

Distribution
Estimated area of occupancy (AOO) (km <sup>2</sup> ): 32
Continuing decline in area of occupancy (AOO): Yes
Estimated extent of occurrence (EOO) (km <sup>2</sup> ): 5083
Continuing decline in extent of occurrence (EOO): Yes
Number of Locations: 6

<b>Distribution</b>
Continuing decline in number of locations: Unknown
<b>Population</b>
Continuing decline of mature individuals: Yes
Population severely fragmented: Yes
<b>Habitats and Ecology</b>
Continuing decline in area, extent and/or quality of habitat: Yes



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