

# **Management Recommendations for**

## ***Pseudocyphellaria* sp. #1**

[erroneously called *Pseudocyphellaria mougeotiana* (Delise) Vainio]

version 2.0

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version 2.0  
**SUMMARY**

**Species:** *Pseudocyphellaria* sp. #1 (erroneously called *Pseudocyphellaria mougeotiana* (Delise) Vainio in the Record of Decision (USDA and USDI 1994c).

**Taxonomic Group:** Lichens (Rare Oceanic Influenced)

**ROD Components:** 1,3

**Other Management Status:** Considered for inclusion on rare lichen working list by the Oregon Natural Heritage Program (1995), but rejected because of taxonomic uncertainty.

**Range:** *Pseudocyphellaria* sp. #1 is known from only three sites in the Pacific Northwest, all on the Oregon Coast: Gwynn Creek Trail in Gwynn Creek Special Interest Area (Siuslaw National Forest), and near Clear Lake and Rock Creek, both north of Florence.

**Specific Habitat:** *Pseudocyphellaria* sp. #1 was found in conifer litter in a riparian old-growth Sitka spruce, Douglas-fir, and western hemlock forest on the immediate coast, and on shaded branches of bristly manzanita in an unspecified shrub community on stabilized sand dune.

**Threats:** The major threat to *Pseudocyphellaria* sp. #1 is loss of local populations resulting from activities that adversely affect the habitat or local populations, including removing colonized substrate, altering the microclimate, and collecting voucher specimens. Because *P.* sp. #1 is known from only three sites, impact to these sites or habitat areas could result in extirpation of the taxon. Altering potentially suitable habitat could also threaten the taxon by rendering nearby habitat unsuitable to colonization. *Pseudocyphellaria* sp. #1 could also be threatened by air pollution and air quality degradation.

**Management Recommendations:**

- Maintain known sites of *P.* sp. #1 by allowing existing habitat conditions to persist and evolve naturally.
- Restrict collecting of voucher specimens to litterfall only, and deposit in accredited herbarium.
- Minimize air pollution impacts to the site.

**Information Needs:**

- Determine the taxonomic status of *P.* sp. #1 and its relation to Pacific Northwest, Hawaiian, and New Zealand *P. crocata*, or a similar Asian species.
- Verify the current status of the three local populations of *P.* sp. #1.
- Survey potentially suitable habitat at Sutton Creek and Eel Creek Recreation Areas, and Sand Lake, Siuslaw National Forest; BLM Heceta Beach ACEC; BLM parcels adjacent to Cape Lookout, and other coastal BLM parcels.

# Management Recommendations for *Pseudocyphellaria* sp. #1

[erroneously called *Pseudocyphellaria mougeotiana*]

## I. NATURAL HISTORY

### A. Taxonomy and Nomenclature

In the Pacific Northwest, the names *Pseudocyphellaria aurata*, *P. crocata*, and *P. mougeotiana* have all been applied to large foliose lichens with yellowish soredia. *Pseudocyphellaria mougeotiana* is a synonym for *P. crocata* (Esslinger and Egan 1995), a lichen that is frequently found in the area. The material in question, however, is morphologically distinct from *P. crocata* in North America (McCune *et al.* 1997), as are some Japanese, Hawaiian and New Zealand collections. Pacific Northwest material appears to have more narrow habitat restrictions as well (McCune *et al.* 1997). These morphological and ecological differences need to be evaluated to determine its taxonomic status. More study is needed to determine the fidelity of these characteristics in places where individuals of both species grow side by side (McCune *et al.* 1997), and Japanese, Hawaiian, and New Zealand material needs to be compared as well. This material may also represent a disjunct Asian species not known from North America, and should be compared with morphologically similar Asian material. Until these taxonomic uncertainties are resolved, the material erroneously referred to as *P. mougeotiana* (USDA and USDI 1994a, 1994b, 1994c) will be referred to as *Pseudocyphellaria* sp. #1.

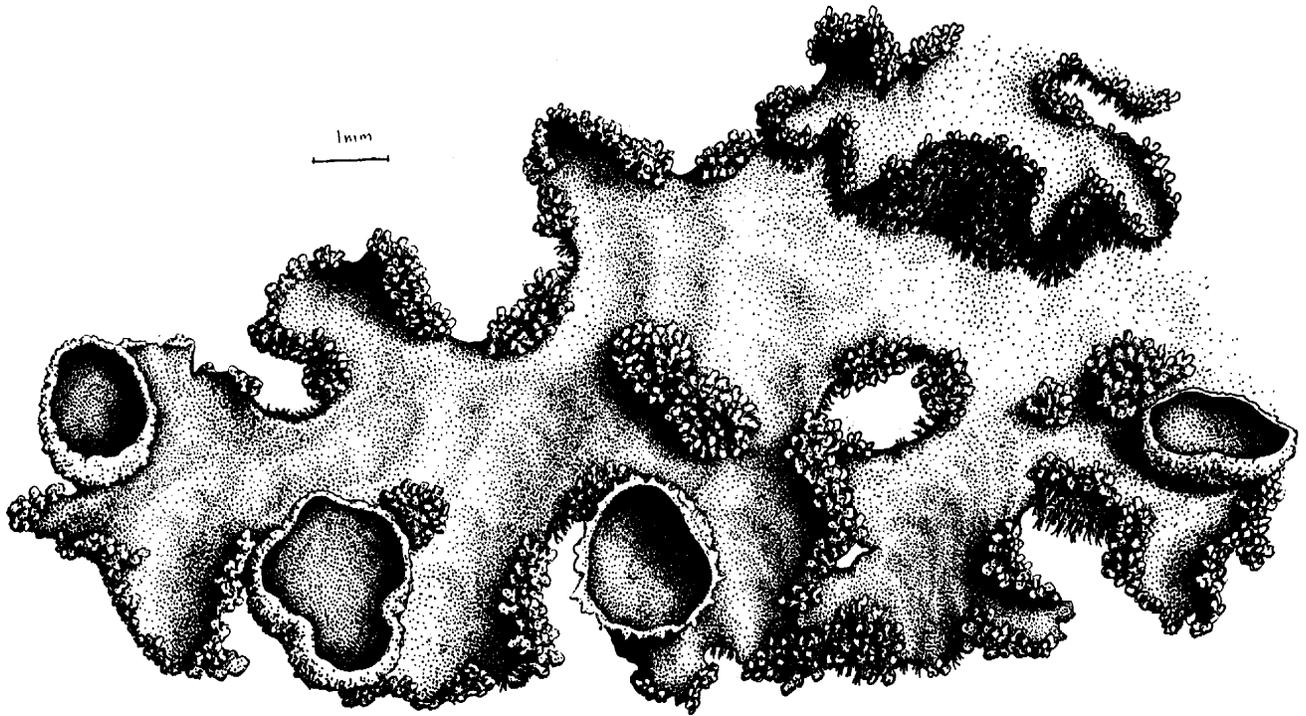
### B. Species Description

#### 1. Morphology

The material in question, which has variously been called *Pseudocyphellaria mougeotiana*, *P. aurata* or *P. crocata* in the past, is morphologically distinct from all three of those species. *Pseudocyphellaria* sp. #1 has narrow, linear lobes, almost exclusively marginal soralia, a yellow medulla, a pale lower surface and a blue-green photobiont (Figure 1) (McCune *et al.* 1997). *Pseudocyphellaria aurata* has a green primary photobiont, where *P. sp. #1*'s is blue-green. Based on recent monographic work, *P. mougeotiana* is now a synonym for *P. crocata* (McCune and Geiser 1997). *Pseudocyphellaria* sp. #1, however, differs both morphologically and ecologically from *P. crocata*. Galloway (1985) notes morphological variation in lobe length in New Zealand *P. crocata*, and that this variety is often called *P. mougeotiana*. A photograph of *P. crocata* included by Yoshimura (1974) appears to be morphologically similar to *P. sp. #1* (St. Clair, pers. comm.).

#### 2. Reproductive Biology

*Pseudocyphellaria* sp. #1 reproduces asexually by soredia.



**Figure 1.** Line drawing of *Pseudocyphellaria* sp. #1 by Alexander Mikulin.

### 3. Ecological Roles

*Pseudocyphellaria* sp. #1 is a nitrogen-fixing cyanolichen and it contributes usable nitrogen to nutrient cycles in ecosystems where it occurs. Like other cyanolichens, it is probably sensitive to air pollution.

#### C. Range and Known Sites

*Pseudocyphellaria* sp. #1 is known globally from only three sites, all on the Oregon Coast. These are Gwynn Creek Special Interest Area (Siuslaw National Forest), near Clear Lake about 23 km (14 mi) north of Florence, and Rock Creek, about 6.4 km (4 mi) north of Florence (Lane County). Two Hawaiian collections, in the Brigham Young University Herbarium, however, appear to be morphologically similar to *P.* sp. #1 (St. Clair, pers. comm.). Elongate-lobed material similar to *P.* sp. #1 is also present in New Zealand (Galloway 1985).

#### D. Habitat Characteristics and Species Abundance

*Pseudocyphellaria* sp. #1 is known from an old Sitka spruce (*Picea sitchensis*) forest on the immediate Oregon Coast at Gwynn Creek near Cape Perpetua, where it was found in conifer litter. The habitat was reported as a riparian old-growth Sitka spruce/Douglas-fir (*Pseudotsuga menziesii*)/western hemlock (*Tsuga heterophylla*) forest; the single specimen was found on litter under conifers. This taxon is very rare, currently known globally from only three locations.

## II. CURRENT SPECIES SITUATION

### A. Why Species Is Listed Under Survey and Manage Standard and Guidelines

*Pseudocyphellaria* sp. #1 was considered at risk under the Northwest Forest Plan because of its rarity and limited distribution in the range of the northern spotted owl. At the time of the FEMAT viability analysis, this taxon was known from only one site (USDA and USDI 1994a and 1994b).

### B. Major Habitat and Viability Considerations

The major viability considerations for *P.* sp. #1 are loss of sites resulting from management activities that adversely affect the habitat area. Collecting voucher specimens may detrimentally affect this taxon which appears to be rare and of limited abundance.

### C. Threats to the Species

Threats to *P.* sp. #1 are those actions that disrupt stand conditions necessary for its survival, including treatments that may impact sites, such as removing colonized or potentially suitable substrate, stand treatments that change microclimatic conditions, or from recreational activity

and development, or possibly degrading air quality. Because the taxon is currently known only from three sites in a habitat that is limited in extent due to past logging activities, fire history and land development, alteration of this area may result in extirpation of the taxon. Collecting specimens may also have an adverse effect on the local population.

#### **D. Distribution Relative to Land Allocations**

One population of *P. sp. #1* is in the Gwynn Creek Special Interest Area, and is in the proposed Cummins/Gwynn Research Natural Area (Plumley, pers. comm.). Land ownership and allocations for Clear Lake and Rock Creek sites are unknown at this time.

### **III. MANAGEMENT GOALS AND OBJECTIVES**

#### **A. Management Goals for the Taxon**

The goal for managing *P. sp. #1* is to assist in maintaining species viability.

#### **B. Objectives**

Manage all known sites on federal land by maintaining habitat, forest structure, occupied and potentially suitable substrate, and microclimatic conditions associated with *P. sp. #1*.

### **IV. HABITAT MANAGEMENT**

#### **A. Lessons From History**

The taxonomic entity referred to as *P. sp. #1* is currently thought to be a rare Pacific Northwest endemic whose taxonomy is poorly understood. Until the issues of taxonomic uncertainty are resolved, its history cannot be evaluated.

*Pseudocyphellaria sp. #1* is a nitrogen-fixing taxon. For more than a century, lichen sensitivity to air pollution has been known, and many nitrogen-fixing species are especially sensitive to air pollution, particularly sulfur dioxide (Wetmore 1983). In the Pacific Northwest, lichens are currently being used as indicators of air quality on public lands (Geiser *et al.* 1994, Rhoades 1988, Ryan and Rhoades 1992, Stolte *et al.* 1993). In some parts of the Pacific Northwest, some nitrogen-fixing lichen species are beginning to decline and change morphologically from air quality degradation (Denison and Carpenter 1973, Geiser, pers. comm.).

#### **B. Identifying Habitat Areas for Management**

Known sites of *P. sp. #1* on federal land administered by the Forest Service and BLM in the range of the Northwest Forest Plan are identified as areas where these management recommendations should be implemented. A habitat area for management is defined as suitable habitat occupied by or adjacent to a known population.

### **C. Managing in Habitat Areas**

- Manage known sites to maintain suitable habitat for *P. sp. #1* by allowing existing habitat conditions to persist and evolve naturally.
- Maintain existing habitat conditions until the taxonomic issues and rarity of the taxon are resolved.
- Collecting specimens of *P. sp. #1* should be restricted to litterfall only; no material attached to its substrate should be collected.
- Specimens should be properly curated and deposited in an accredited herbarium.
- Activities such as prescribed burns and building new roads should be mitigated to minimize air pollution effects to the site.

### **D. Other Management Issues and Considerations**

- The taxonomic uncertainty of this lichen is problematic. When the taxonomy is resolved, these management recommendations should be re-evaluated and updated to reflect appropriate action given the taxonomic status and relative rarity of this lichen.
- If sites are discovered on state lands, work with appropriate state officials to exchange information and expertise, if requested.

## **V. RESEARCH, INVENTORY AND MONITORING NEEDS**

The objective of this section is to identify opportunities to acquire additional information which could contribute to more effective species management. The content of this section has not been prioritized or reviewed as to how important the particular items are for species management. The inventory, research, and monitoring identified below are not required. These recommendations should be addressed by a regional coordinating body.

### **A. Data Gaps and Information Needs**

- Revisit known sites to verify the status of the local populations, determine the extent and abundance of the population, and characterize ecological conditions.
- Evaluate distribution of populations, taxon abundance, and ecological requirements of *P. sp. #1*, after taxonomic issues are resolved, to determine if this is still a taxon of concern.
- Determine if *P. sp. #1* occurs in areas identified as potentially suitable habitat. Potential suitable habitat is identified as foggy coastal headlands with old-growth Sitka spruce, Douglas-fir, and western hemlock stands. Areas with potentially suitable habitat include Sutton Creek Recreation Area, Eel Creek Recreation Area and Sand Lake, Siuslaw National Forest; BLM Heceta Beach ACEC; BLM parcel adjacent to Cape Lookout, and other coastal BLM parcels.

## **B. Research Questions**

- What is the taxonomic status of *P. sp. #1*, and what is its relation to *P. crocata*?
- Does Hawaiian, Japanese and New Zealand material belong to the *P. sp. #1* morphological group?
- Which habitat characteristics and ecological conditions are necessary for establishment of *P. sp. #1* propagules and survival of established thalli?
- What are the rates of reproduction, dispersal and growth?
- What are the dispersal mechanisms and dispersal distances of *P. sp. #1*?
- Is *P. sp. #1* sensitive to air pollution?
- What is the genetic diversity within local populations and across the region?

## **C. Monitoring Needs and Recommendations**

Monitor the known site at Gwynn Creek to document population trends and changes in habitat conditions.

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