Management Recommendations for

Erioderma sorediatum D.J. Galloway & P.M. Jørg.

version 2.0

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SUMMARY

Species: *Erioderma sorediatum* D.J. Galloway & P.M. Jørg.
Taxonomic Group: Lichens (Rare Oceanic Influenced)
ROD Components: 1,3

Other Management Status: The Nature Conservancy Oregon State Rank S1 (critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation, typically with 5 or fewer occurrences); Oregon Natural Heritage Program List 2 (imperiled because of rarity or because other factors demonstrably makes it very vulnerable to extinction (extirpation), typically with 6-20 occurrences); The Nature Conservancy Global Rank 3 (rare, uncommon, or threatened, but not immediately imperiled, typically with 21-100 occurrences) (Oregon Natural Heritage Program 1998); and BLM Assessment Status (USDI Bureau of Land Management 1998).

Range: *Erioderma sorediatum* is rare in the range of the northern spotted owl, known from one site in Washington and eight in Oregon. *Erioderma sorediatum* is paleotropical, known from New Zealand and North America, where it is rare from southeast Alaska through British Columbia, Washington, and Oregon.

Specific Habitat: *Erioderma sorediatum* occurs in the coastal fog zone, and one site in a young, riparian red alder stand about ten miles from the coast. In Oregon, it is found in coastal stabilized dune forests of Sitka spruce and shore pine and interspersed willow/wax myrtle or ericaceous shrub thickets. It is epiphytic on huckleberry, rhododendron, *Arctostaphylos*, and western hemlock. In Washington, it was growing on bark of young red alder.

Threats: The major threat to *E. sorediatum* is loss of local populations resulting from activities that harm the population or impact the habitat, including altering the microclimate and removing colonized substrate. These activities would most likely be related to recreation, such as building trails and shelters, collecting firewood, and off-trail bicycle, off-road vehicle, and foot traffic. As a cyanolichen, it is probably sensitive to air pollution from vehicle exhaust and fire. It is vulnerable to loss of habitat from development along the coast.

Management Recommendations:

- Manage populations at known sites by maintaining ecological conditions associated with *E. sorediatum*, including stand structure, substrate and microclimatic conditions.
- Restrict building, burning, collecting specimens, collecting firewood, operating off-road vehicles and bicycles, and other recreational activities or development that affect colonized substrate and harm known populations.

Information Needs:

- Verify the status of known populations and characterize their ecological conditions.
- Determine if this species meets the criteria for association with late-successional/old-growth forests.

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Management Recommendations for *Erioderma sorediatum*

I. NATURAL HISTORY

A. Taxonomy and Nomenclature

Erioderma sorediatum D.J. Galloway & P.M. Jørg. was described from New Zealand in 1975 (Galloway and Jørgensen 1975).

B. Species Description

1. Morphology

This foliose lichen looks like brownish-gray paint that has dried on the lid of a paint can. The margins of this paint pancake curl up, its lower surface is white, and the upper surface is covered with fine, cottony hairs (Figure 1). This species can be confused with *Leioderma sorediatum*, another rare oceanic Survey and Manage lichen, but *E. sorediatum* can be distinguished by the erect tomentum on its upper surface and its PD+ orange reaction (eriodermin) (Tønsberg 1997). It can also be superficially confused with diminutive *Peltigera collina*, but *E. sorediatum* lacks veins below (McCune and Geiser 1997).

Technical description: Thallus foliose, lobate (to 40 mm broad), corticolous. Lobes broad, to 5 mm wide, short, margins ascending, sometimes strongly involute and crenate, developing prominent, bluish, limbiform soralia on the edges of the upturned lower surface of the lobes; soredia coarse, granular, grayish-blue, about 0.1 mm in diameter, often trapped on tomentum of the upper surface and thus becoming spread superficially over the lobes. Upper surface grayish-brown, finely tomentose. Tomentum rather variable in appearance and texture, from a uniform, thin, whitish bloom to a long (to 2 mm) buff or yellowish, tangled or loosely woven mat. Apothecia and pycnidia are not observed. Photobiont is a cyanobacterium. Lower surface white or pale cream, not distinctly yellow. Lower cortex and veins absent; rhizines blue-black, simple to squarrosely branched (to 3 mm long), restricted to margins where they form small dense tufts (Galloway and Jørgensen 1975).

2. Reproductive Biology

Erioderma sorediatum reproduces asexually by producing soredia, which are probably distributed by wind, gravity, animals, or birds (McCune *et al.* 1997). No sexually reproductive structures are known for this species.

3. Ecological Roles

Little is known about the ecological roles of *E. sorediatum*. *Erioderma sorediatum* is a nitrogen-fixing species, providing a small amount of usable nitrogen to the ecosystems it inhabits. Like

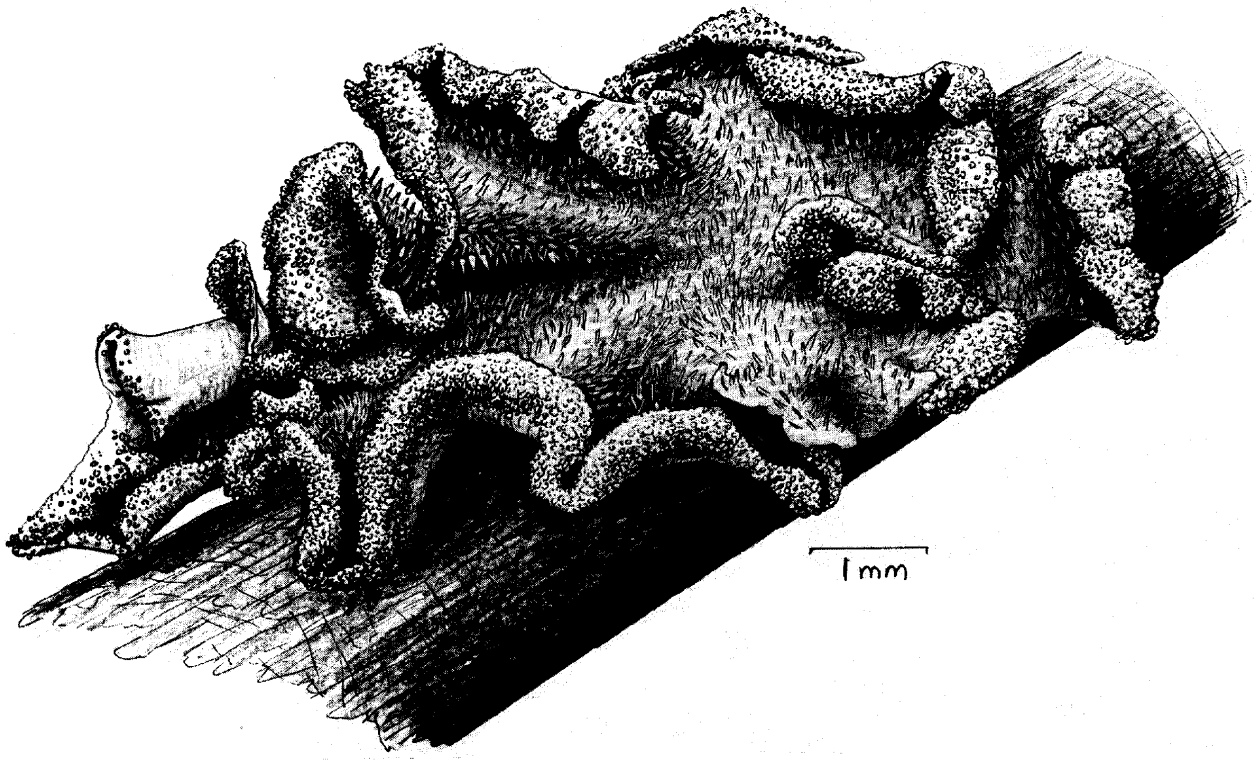

Figure 1. Line drawing of *Erioderma sorediatum* by Alexander Mikulin.

other nitrogen-fixing species it is likely to be sensitive to air quality, though its specific sensitivity is unknown.

C. Range and Known Sites

Erioderma sorediatum is rare in the range of the northern spotted owl, known from one site in Washington and eight in Oregon. On the Olympic Peninsula in Jefferson County, Washington, it is found on private land off the Hoh River Road. In Oregon, it is apparently restricted to the extensive dune sheets between Heceta Head and Cape Arago. Oregon sites include Sutton Creek Recreation Area, Siuslaw National Forest; Clear Lake (McCune *et al.* 1997); BLM Heceta Dunes Area of Critical Environmental Concern; and T18 R12 Section 35 on land of unknown ownership (Lane County); Lower Canal Creek, Siuslaw National Forest; T13S R11E Section 2, Siuslaw National Forest, (Lincoln County); Coos Bay north of North Bend, Siuslaw National Forest, (Coos County); and Eel Creek Recreation Area, Siuslaw National Forest (Douglas County) (McCune *et al.* 1997). *Erioderma sorediatum* has a paleotropical distribution, known from New Zealand and North America, where it is rare from southeast Alaska (Geiser *et al.* 1998) through British Columbia, Washington, and Oregon.

D. Habitat Characteristics and Species Abundance

In Oregon, *E. sorediatum* is found in the coastal fog zone, in broken shore pine (*Pinus contorta*) and Sitka spruce (*Picea sitchensis*) forests interspersed with willow/wax myrtle (*Salix/Myrica*) or ericaceous shrub thickets covering an old system of dune ridges and swales (McCune *et al.* 1997). It is epiphytic on huckleberry (*Vaccinium*), rhododendron (*Rhododendron macrophyllum*), *Arctostaphylos*, and western hemlock (*Tsuga heterophylla*). In Washington, it grows on the bark of young red alder (*Alnus rubra*) in a riparian area, about 16 km (10 mi) from the coast. This site had an abundance of the cyanolichen *Lobaria oregana*, which is uncommon in young alder stands. The alder stand was next to a large clear-cut, a bridge and a road, and was probably disturbed during road and bridge building (Tønsberg, pers. comm.).

II. Current Species Situation

A. Why Species Is Listed Under Survey and Manage Standard and Guideline

Erioderma sorediatum 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 species was known from only three sites within the range of the northern spotted owl (USDA and USDI 1994a and 1994b).

B. Major Habitat and Viability Considerations

The major viability consideration for *E. sorediatum* is loss of sites resulting from management activities that damage the populations or their habitat.

C. Threats to the Species

Threats to *E. sorediatum* are those actions that affect its habitat area, including altering the microclimate and removing colonized substrate, which could result in the loss of individuals and populations. These activities would most likely be related to recreation, such as building trails and shelters, collecting firewood, and off-trail bicycle, off-road vehicle, and foot traffic. It is probably sensitive to air pollution from vehicle exhaust and burning. Collecting specimens may be a threat in populations with low numbers of individuals. It is vulnerable to loss of habitat from construction or clearing along the coast.

D. Distribution Relative to Land Allocations

Several sites of *E. sorediatum* are on BLM land near Heceta Beach, one of which is an Area of Critical Environmental Concern. The species also occurs at two coastal recreation areas on the Siuslaw National Forest. The Olympic Peninsula site is privately owned.

III. MANAGEMENT GOAL AND OBJECTIVES

A. Management Goal for the Species

The goal for managing *E. sorediatum* is to assist in maintaining species viability.

B. Objectives

Manage known sites on federal lands by maintaining habitat, forest stand structure, occupied and potentially suitable substrate, and microclimatic conditions associated with *E. sorediatum*, and by allowing existing habitat conditions to persist and evolve naturally.

IV. HABITAT MANAGEMENT

A. Lessons From History

No specific historical lessons are known for *E. sorediatum*, but as a nitrogen-fixing lichen it is probably sensitive to air pollution, and in many industrialized parts of the world, nitrogen-fixing lichens have disappeared because of air quality degradation (Rhoades 1988; Ryan and Rhoades 1992; Geiser *et al.* 1994).

In many parts of the industrialized world, lichens are declining because of habitat alteration (Seaward 1977). *Erioderma sorediatum* habitat is at risk because of development of coastal properties along the Oregon dunes.

B. Identifying Habitat Areas for Management

All known sites of *E. sorediatum* on federal lands within the range of the northern spotted owl are identified as habitat 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 on federal land by allowing existing habitat conditions to persist and evolve naturally.
- Firewood collecting should be restricted.
- Collecting voucher specimens should be restricted unless the specimen is found in litterfall.
- Restrict off-trail use of vehicles and bicycles in coastal ericaceous shrub habitats.
- Minimize the extent of shrub and tree clearing along trails during maintenance activities.
- Develop practices to route human use away from the populations (such as, diverting trails and roads). The trampling of shrubs, removing trees or branches, introducing non-native species by seed dispersal or planting, compacting of tree or shrub roots which support the species are examples of potential recreational impacts.

D. Other Management Issues and Considerations

Information from reported sites suggests that *E. sorediatum* may not be a species closely associated with late-successional and old-growth forests. For a species to be appropriately listed as a Survey and Manage species, it must first meet the criteria established for designating a species closely associated with late-successional and old-growth forests (USDA and USDI 1994a [Table IV-6] and 1994b). This issue should be addressed by a regional coordinating body.

In addition to Sutton Creek and Eel Creek, several other federally owned parcels of coastal fog zone habitat with populations of other rare oceanic lichens have similar habitat requirements. These sites are identified as potentially suitable *E. sorediatum* habitat, and should be evaluated for the presence for this species. They are Gwynn Creek and Sand Lake (Siuslaw National Forest), BLM Heceta Dunes ACEC; a small BLM parcel near Cape Lookout State Park; and a small BLM parcel near Cape Arago and Cape Blanco State Parks.

- Share information with state and private sectors to further activities directed at conservation of *E. sorediatum*.
- Consider opportunities for managing known sites, such as Botanical Special Interest Areas, Areas of Critical Environmental Concern, or other administratively withdrawn designation, or prescribing special standards and guidelines during Forest Plan and Resource Management Plan revisions.
- Request the Oregon and Washington State Natural Heritage Programs track and store information for *E. sorediatum* across all land ownerships.

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

- Determine if *E. sorediatum* meets the criteria for being closely associated with late-successional and old-growth forests.
- Revisit known sites to verify the status of known sites, determine the extent of the populations and abundance, and better characterize ecological conditions.
- Determine if *E. sorediatum* occurs in areas identified as potentially suitable habitat. Potentially suitable habitat is identified as foggy coastal deflation dune systems with scattered old Sitka spruce and lodgepole pine forests and ericaceous shrub thickets. Areas with potential suitable habitat include Gwynn Creek Recreation Area and Sand Lake, Siuslaw National Forest; and BLM parcels adjacent to Cape Lookout, and other coastal BLM parcels. Coastally influenced riparian alder stands could also be potentially suitable habitat.
- Share information with other land management agencies regarding potential suitable habitat in areas such as Cape Lookout, Cape Arago, and Cape Blanco State Parks.

B. Research Questions

- What are the dispersal rates and mechanisms of *E. sorediatum*?
- Which habitat characteristics and ecological conditions are necessary for survival of *E. sorediatum* propagules?
- What limits dispersal and establishment of propagules and colonizing of suitable *E. sorediatum* habitat?
- Is *E. sorediatum* sensitive to air pollution?
- Which other rare lichens occur with *E. sorediatum*?
- How do populations of *E. sorediatum* respond to successional changes and associated changes in microclimate?

C. Monitoring Needs and Recommendations

Monitor the effects of recreational activities on populations of *E. sorediatum* in habitat areas.

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