

## Rare Lichen Habitats and Rare Lichen Species of Ventura County, California

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ABSTRACT. – Four sensitive lichen habitats - Maritime, Thin-Soil, Relative High-Humidity, Old-Growth Chaparral - of Ventura County, California and their associated rare species are discussed.

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The lichen flora of the Santa Monica Mountains is especially important because it was extensively collected by Dr. Herman Hasse from 1890 to 1915. His pioneer work supplies important baseline data. A modern revision needs to clarify the data, especially in light of the advances in lichen taxonomy. Kerry Knudsen is working on a lichen flora of the Santa Monica Mountains funded by the National Park Service (Knudsen 2005, Knudsen *in prep*) and has been collecting extensively in Ventura County. David Magney has been working with the Ventura County Planning Division to identify rare species and habitats within Ventura County as part of implementing General Plan policies and goals for conserving the biological resources of the county.

Several lichen species occurring in the Santa Monica Mountains in Ventura County are currently considered rare based on herbarium records and field observations. These include *Aspicilia glaucopsina* (Nyl. ex Hasse) Hue, *Cyphelium brunneum* W.A. Weber, *Placynthiella knudsenii* Lendemer, *Punctelia punctilla* (Hale) Krog, and *Texosporium sancti-jacobi* (Tuck.) Nád. ex Tibell & Hofsten. Other rare species from the Santa Monica Mountains are expected in Ventura County such as *Endocarpon pseudosubnitescens* Breuss. It is also hoped that a number of lichen species collected in the Santa Monica Mountains by Herman Hasse, who died in 1915, may be rediscovered in Ventura County, including *Gylalideopsis athalloides* (Nyl.) Vezda, *Placopyrenium heppioides* (Zahlbr.) Breuss, and *Ramonia ablephora* (Nyl. ex Hasse) R.C. Harris (Knudsen *in prep*).

A more extensive study of the lichen flora of Ventura County is needed beyond the Santa Monica Mountains. Nonetheless, the study of the Santa Monica Mountains already has begun the process of authenticating a list of rare lichens for Ventura County as well as for the Santa Monica Mountains National Recreation Area.

In Part Two of Kerry Knudsen's study of the Santa Monica Mountains he makes a preliminary classification of four lichen habitats that support high diversity and rare species (Knudsen *in prep*). These are Maritime Habitat, Thin-Soil Habitat, Relative High Humidity Habitat, and Old-Growth Chaparral Habitat. All of these habitats occur in Ventura County.

Because of the slow growth and the environmental sensitivity of most lichen species, a habitat approach to their conservation would likely be the most effective approach to use. This approach allows for the development of data sets on rare species without revisions causing confusion or mismanagement. It also conserves the biodiversity of the flora, which is often ignored by the rare species only approach. While a habitat approach is not used in current federal and California Endangered Species Acts, it can easily be implemented on the local level through planning and regulation of open space and biological resource overlay zones.

Each of the four lichen-rich habitats is described below.

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## MARITIME HABITAT

Maritime habitat exists above tide level along the coast of California and on the Channel Islands. High lichen diversity characterizes this community. It has suffered major degradation and fragmentation through coastal development. It contains the remaining California populations of many lichens such as *Niebla ceruchoides* (Bowler & Marsh 2005) as well as rare species like the endemic *Cyphelium brunneum*, with only two known reports from southern California (Tibell & Ryan 2005) until a site was discovered recently in Ventura County (Knudsen *in prep*).

The maritime habitat is relatively rare in mainland Ventura County because the coastal side of the Santa Monica Mountains and the rest of the county have a generally southern exposure. Despite the strong influence of fog, the arid aspect of the coastline combined with the Mediterranean climate and regular strong winds off the Pacific Ocean limits the diversity of lichens.

But relics of the habitat are found in Ventura County as far inland as Conejo Mountain on north slopes along the edge of the Oxnard Plain. These local sites harbor high lichen diversity and species richness, and contain both rare lichen species such as *Cyphelium brunneum* as well as abundant *Niebla* populations. These sites are also rich in vascular plants with large populations of *Coreopsis gigantea*, as well as two rare endemics, Conejo Buckwheat (*Eriogonium crocatum*) and *Dudleya verityi*, among others.

This habitat should be protected from further disturbance to protect this biological resource and the remaining habitat, especially on the north slope of Conejo Mountain, should be placed in an ecological reserve.

## THIN-SOIL HABITAT

Thin-soil habitat occurs throughout southern California in opening of the chaparral and coastal sage scrub and on slopes and sandstone outcrops, especially in terraces formed by Bigelow Spike-moss (*Selaginella bigelovii* Underwood). The soil is usually thin over bedrock and often clay sediment, poor in nutrients and organic debris. This habitat supports native annuals and perennial bulbs, and the main host plant for the rare and endangered Quino Checkerspot Butterfly, *Plantago erecta* E. Morris. In this habitat, lichens grow on soil in biological crusts with bryophytes. In Ventura County this habitat supports *Texosporium sancti-jacobi*, a rare lichen that is on the California Department of Fish and Game's Special Plants, Bryophytes and Lichens List (Riefner & Rosentreter 2004). *Aspicilia glaucopsina* is known from approximately seven sites at this time, including one thin-soiled habitat on Sandstone Peak (Knudsen 2005) and is expected on other Ventura County sites. *Placynthiella knudsenii* is known from only six sites worldwide at this time including the Sandstone Peak area and is expected on other similar sites in Ventura County (Lendemer 2004, Ryan *et al.* 2005, Knudsen 2005). Several very rare lichens occur in thin-soil habitat such as the *Gylalideopsis athalloides* and *Ramonia ablephora*. Neither has been collected in southern California since the turn of the 20<sup>th</sup> century and they might potentially be rediscovered in Ventura County.

Thin-soiled habitat was probably common in southern California before ranching and then urban and suburban development transformed the southern California landscape. Invasive non-native annual plants, probably favored through dry nitrate deposition from agricultural fertilizers and air pollution, have indirectly degraded this habitat in many areas including Sandstone Peak. Nonetheless, thin-soil habitat persists on ridges and arid inland locations. Damage to this habitat should be mitigated when it contains a rich lichen flora, or any rare lichen species.

## RELATIVE HIGH-HUMIDITY HABITAT

Relative high-humidity habitat occurs in a patchwork throughout southern California and is rich in lichen biodiversity. It occurs usually on north-facing or partially shaded areas where storm drainage or a nearby creek or pond supplies seasonal or constant higher humidity than normally occurs in similar sites with less shelter or water input. Relative high-humidity habitat differs from maritime habitat because, while it can be favored by fog from dense marine layers, it generally occurs in arid, more inland locations. The majority of lichens that occur in this habitat, although often colorful, are usually common. This habitat probably acts as spore and propagule bank that replenishes the general diversity of lichens across the landscape. In Ventura County, this habitat supports one of only two Californian populations of the rare tropical macrolichen *Punctelia punctilla* (Egan & Aptroot 2005, Knudsen *in prep*). Relative high-humidity habitat may also support in Ventura County *Endocarpon pseudosubnitescens* Breuss, currently known from

only three locations worldwide, two in Baja (Breuss, 2002) and one in Los Angeles County in the Santa Monica Mountains where it occurs with *Punctelia punctilla* (Knudsen 2005, Knudsen *in prep*).

Further degradation of this habitat should be considered a significant impact and mitigated, and areas especially rich in this habitat and containing either of the above rare species should be preserved.

### OLD GROWTH CHAPARRAL HABITAT

This habitat occurs across southern California in a patchwork pattern. In the Santa Monica Mountains and coastal Ventura County lightning does not generally ignite the chaparral. The fire regime of this area before the 20<sup>th</sup> century had a relatively low fire frequency. Under those conditions the chaparral goes through a self-renewing cycle of growth and senescence (Halsey 2005). Old-growth chaparral supports epiphytic lichens in rich concentrations (Knudsen *in prep*). Old-growth chaparral supports many corticolous (bark-dwelling) lichen crusts including some endemic species that were once common in the Santa Monica Mountains in Los Angeles and Ventura Counties (Hasse 1913) but are now rare and possibly extirpated (Knudsen *in prep*). The probable cause of this rarity is the anthropogenic increase in fire frequency has reduced intervals between fires to 10 to 20-years in some areas. The increased fire frequency has definitely caused a decrease in the lichen diversity in the chaparral and whole areas may support little or no lichens where the frequent occurrence of fires does not support the renewal and slow growth of lichen communities on bark and have depleted their spore and propagule banks.

Though the air quality is relatively good in Ventura County, air pollution decreases lichen diversity in chaparral, eliminating pollution-sensitive species. Air pollution can acidify bark pH, which probably limits the growth of algal species necessary for lichenization as well as eliminates acid-sensitive lichens from the local flora.

The conservation of this habitat is problematic in a landscape where the fire regime has changed. However, areas of old-growth chaparral should be identified and given priority as open space in Ventura County planning.

### CONCLUSION

The conservation of lichen habitats preserves the biodiversity of lichens in southern California and supports the rare lichen species enumerated as well as numerous species that could become rare in the future without far-sighted conservation planning at the local level. The recognition of lichen habitats as a valuable component of Ventura County biological resources enriches the natural beauty of existing open space with a colorful dimension often noticed, but whose aesthetic value has been neglected in the past.

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