



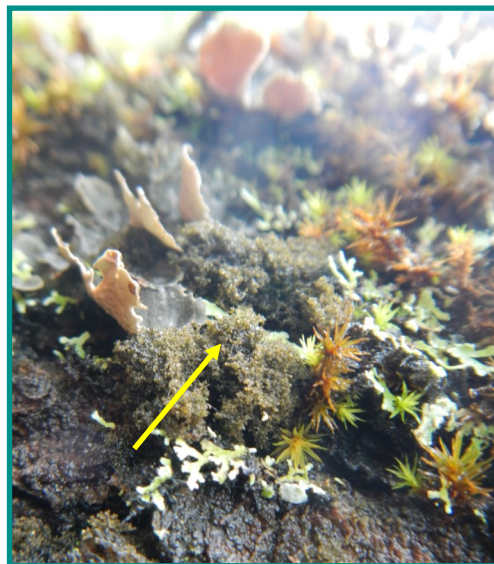
**What We've Learned:**

*Most olive-thorn lichen patches were associated with 7"-9.5" diameter black oak trees, overtopped by conifers, and in stands with few oak seedlings or saplings.*

## Assessing black oak habitat characteristics for rare olive-thorn lichen

Olive-thorn lichen (*Dendrocoaulon intricatum*) is a rare species that grows on a variety of host trees in across its range, and occurs on black oak trees within mixed conifer-oak stands on the Lassen NF.

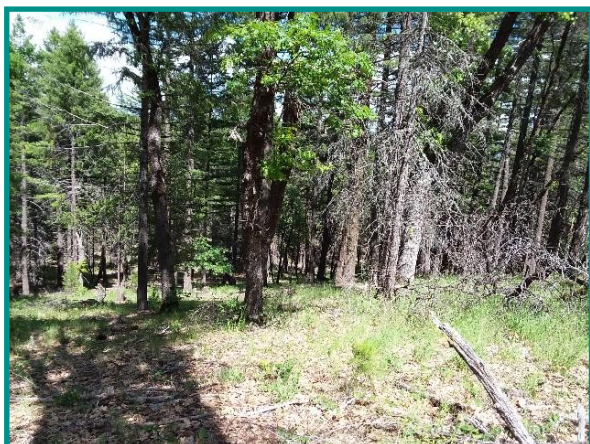
Previous management on the Lassen NF has focused on maintaining existing conditions around olive-thorn lichen. The association with shade-intolerant black oak, however, required a better understanding of current habitat characteristics within the Crossroads Project to help design treatments that will successfully promote oak persistence and regeneration while maintaining a moist microclimate for the lichen.



*Olive-thorn lichen (indicated with yellow arrow) growing among other lichen on the bark of a black oak tree..*

### Key Questions

- Is olive-thorn lichen associated with small diameter oak as it is in Southern Oregon?
- What is current conifer canopy cover, host tree height, and average conifer canopy height where olive-thorn lichen occurs?
- What is current oak recruitment within the vicinity of olive-thorn lichen occurrences?



*Olive-thorn lichen habitat in the Crossroads Project with approximately 25% conifer canopy cover (left), and with approximately 65% conifer canopy cover (right).*



## Monitoring Overview

The objective of monitoring is to 1) assess current habitat conditions in known occurrences of DEIN12 within the Crossroads Project area, 2) use this data to inform prescriptions within occupied mixed conifer-black oak stands, 3) quantify pre-treatment solar exposure, basal area, and conifer shading, and 4) resample post-treatment to assess whether treatments create conditions that promote oak regeneration while maintaining a moist microclimate for DEIN12. Treatment success would be determined by assessing whether reduction in overtopping conifers occurred without large changes in solar exposure for lichen patches.

We assessed habitat characteristics across 105 acres where DEIN12 occupies scattered black oak trees. We measured the dbh and height of 27 host trees, the average height of adjacent conifers, and the number of oak seedlings, sprouts, saplings and trees within 50 ft. of the host tree. Nearly half of plots were estimated at 60% - 70% canopy cover, while the remainder ranged from 10% - 60% canopy cover.

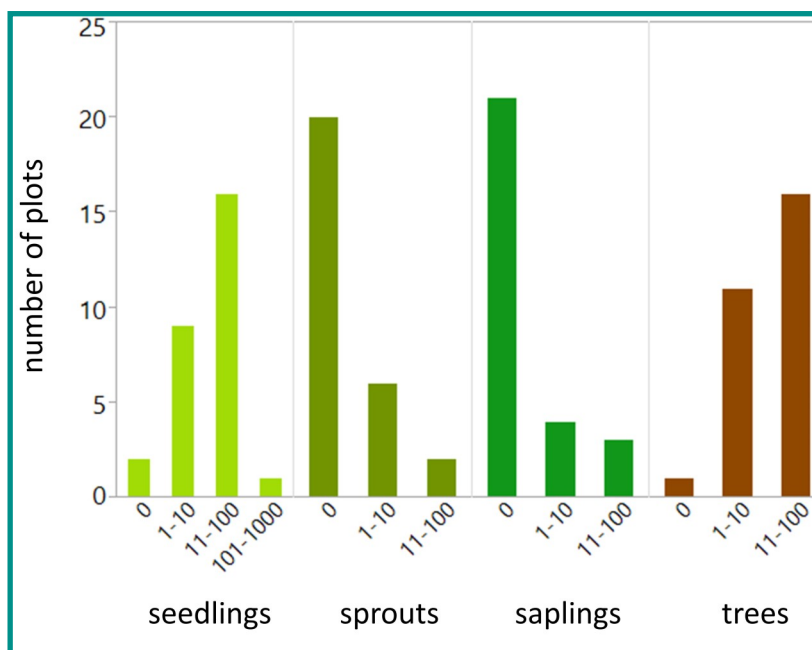
This information helped us to see that DEIN12 occupies larger trees than observed in southern Oregon populations, and that oak trees are overtopped by neighboring conifers, with many oak seedlings but very few sprouts or saplings that would provide future substrates for recruitment. In plots with high oak recruitment, conifers were on average 20 ft. higher than the host tree. In plots with low oak recruitment, by contrast, conifers were on average 50 ft. taller than the host tree.

	mean	95% confidence interval
Average dbh of host tree	<b>8.4 inches</b>	<b>7.2 inches - 9.6 inches</b>
Average height of host tree	<b>39.5 feet</b>	<b>34.1 feet - 44.9 feet</b>
Average height of adjacent conifers	<b>70.7 feet</b>	<b>62.4 feet - 79.0 feet</b>

*Characteristics of host trees and adjacent conifers, N= 27 (left).*

## Management Recommendations

The Crossroads Project proposed to thin conifers to a basal area of 75 ft<sup>2</sup>/ acre in stands containing DEIN12, leaving all oaks, all trees 30" dbh or greater, and favoring the retention of pine and cedar. Future monitoring will determine whether the retention of large trees retain the moist microclimate for DEIN12, while also opening up canopy gaps to promote oak recruitment.



*Most plots were characterized by no oak saplings or stump sprouts within*