

## Identifying Distinctive Understory Species of Old-Growth Forests in Mendocino County Using Indicator Species Analysis

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High variation between old-growth coast redwood (*Sequoia sempervirens*) forests exists, particularly within sub-canopy and understory communities. Yet, distinctive associates of individual old-growth redwood stands have yet to be identified. We collected ground-layer species-level data on 20-meter diameter circular plots in three old-growth stands in Mendocino County, California: Montgomery Woods State Natural Reserve, Hendy Woods State Park, and the Russell Unit of Mendocino Headlands State Park. We randomized 20 plot locations in each site for a total of 60 sample plots. We utilized a multivariate statistical technique, Indicator Species Analysis (ISA), to establish which rare species, if any, could be identified as distinctive associates of each of the three old-growth coast redwood stands. ISA excludes common species present within all sites (e.g., *Oxalis oregana*), using relative abundance and relative constancy, to select rare species indicative of each study site.

We found eleven understory, herbaceous (non-Pterophyte) species common to all sampled sites and thus excluded these species from the ISA. Of the remaining understory species, ISA selected six associated species for Montgomery Woods, four associated species for Hendy Woods, and four associated species for the Russell Unit. Among these, trail plant (*Adenocaulon bicolor*) had the highest ISA value for Montgomery Woods, hedgenettle (*Stachys mexicana*) had the highest ISA value in Hendy Woods, and clintonia (*Clintonia andrewsiana*) had the highest ISA value for the Russell Unit.

The diverse species assemblages identified by the presence of these associate species suggest unique understory species dynamics in individual old-growth coast redwood forests. Using a suite of identified rare species, the ground-layer plant community could potentially provide a mechanism to identify formerly unknown old-growth forest associations. These notable understory characteristics could also offer insight for restoration practitioners aiming to preserve the overall diversity of remnant old-growth coast redwood stands.