



Vital Sign Update: 2025 Results for Vegetation Community Monitoring at Lassen Volcanic National Park

Importance

From highly diverse riparian areas to homogenous fir forests, distinct plant communities grow at Lassen. Each responds uniquely to a particular set of climate, soil, and disturbance conditions, and each is vital to the park's health, providing food and shelter to animals, and cycling water, carbon and other nutrients through the soil for continual reuse. Riparian areas, though a small percentage of the park, contribute a high percentage of its plant species, many of which only grow in wet stream-side areas. But natural and human-caused changes, like fire, climate, local land-use, and invasive species can profoundly affect plant communities. To detect concerning changes that park managers need to know about, we've been monitoring land plants (terrestrial vegetation) at Lassen since 2012. We measure composition (variety and abundance of species), structure (tree size, height, and density; shrub height) and function (tree death and regeneration) as vital signs of ecological health. This brief describes how we measure one of these elements—*species composition*—at Lassen and reports the average conditions we observed during our most recent sampling event in 2025.

Measuring Vegetation Composition

Changes in vegetation are not always unhealthy. To understand which changes are concerning, we examine our species data in different ways. Taken as a whole, these different measures provide the context park managers need to identify negative trends and make decisions.



NPS / Hannah Wirth

Within a 20 x 50 m plot (0.1 ha), botanists at Lassen identify plants to track changes in species composition. In smaller nested plots, we also measure the total cover of each species to calculate diversity at different scales within the park.

Species Richness

Richness is a straight count of the number of vascular plant species (not mosses or fungi) detected in our plots. In general, the wider variety of species we find, the more biodiverse and resilient the ecosystem is. Related to species richness, we also examine several measures of diversity—each one provides slightly different information about the balance of species relative to each other.

Nonnative Species

Because nonnative species can cause serious ecological problems, we report how many nonnative species we detect, how much area they cover, and the ratio of native to nonnative species. This ratio is a useful measurement to track over time and to compare with more disturbed areas inside and outside the park.

Results and Ongoing Monitoring

Every 3 years, between July and September, we monitor terrestrial vegetation at 52 sites from 3 types of habitat at Lassen, barring unforeseen complications. In 2025, we sampled all 52 sites.

At Lassen, riparian sites on average had approximately 3 times higher species richness than upland sites and 5 times higher species richness than high-elevation sites. This highlights the value of park riparian areas in conserving biodiversity. Nonnative species were absent from the high elevation sites, but low in both abundance and richness in lower elevation sites. View the map on the back for detailed results. We'll sample park vegetation again in 2028.

More Information

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Project overview, reports, and protocol:
<https://www.nps.gov/im/klmn/vegetation.htm>

Datasets and all related publications:
<https://irma.nps.gov/Datastore/Reference/Profile/2171794>

