2021 CALIFORNIA *PHYTOPHTHORA RAMORUM* IN WILDLANDS SUMMARY

In 2021, the incidence of new *Phytophthora ramorum* infections statewide on California bay laurel and tanoak leaves was at a historic low in California based on the 2021 SOD Blitz, with an estimated general infection rate of 3.3% compared to 7.4% in 2020. Aerial surveys also found less tree mortality with approximately 20,000 acres of tanoak mortality attributed to *P. ramorum* recorded by the US Forest Service (USFS), Forest Health Protection flights. Localized pockets of sudden oak death expansion were observed, but overall, significantly fewer dead trees were recorded than in the previous two years, because the wave of mortality sparked by the very wet 2016-2017 winter has subsided and has been followed by several years of drought.

In Del Norte Co., the EU1 strain was again detected on tanoaks along State Route 197: two PCR detections were identified based on nuclear ITS and mitochondrial Cox I DNA. The EU1 lineage, considered more aggressive on conifers than the NA1 strain, was officially first confirmed at this location in 2020. In late 2020, to eradicate or slow the EU1 infestation, host trees were removed, and herbicide applied to remaining tanoak root systems to prevent resprouting. Tanoaks in the surrounding area were treated with herbicide, then removed after treatment along State Route 197 because the snags were deemed a future hazard. The detected strain is genetically consistent with EU1 isolates from Oregon forests, the only U.S. state in which it was previously found in wildlands. The NA1 strain was not detected this year in Del Norte Co. The first *P. ramorum* detection in Del Norte Co. was an NA1 strain isolate in 2019, collected in Jedediah Smith State Park. The area was resampled, but the pathogen was not detected in 2021.

California stream monitoring results also indicate reduced *P. ramorum* spread into new areas in 2021. Four positive streams were detected out of the 58 sampled in north and central coastal California. This cooperative program coordinated by the Rizzo Lab, UC Davis, selects stream monitoring locations to maximize detection of *P. ramorum* spread into high-risk and high-value forests, particularly at the boundaries of the pathogen's known range in Humboldt and Del Norte Cos., and in the south, in San Luis Obispo Co.; most known infested areas are not sampled. Notable positives included Mill Creek and Widow White Creek in McKinleyville (Humboldt Co.), sites that have been sporadically positive over the years despite the virtual absence of tanoak or California bay laurel in their respective watersheds (the streams are dominated by urbanized, coastal coniferous forest dominated by Sitka spruce, riparian hardwoods, and ornamental plants). The pathogen was not detected from any streams north or east of Redwood National Park. In central and southern Humboldt Co., positive samples were retrieved from Yager Creek and Stanley Creek, both of which have been previously positive. At the southern edge of California's *P. ramorum* infestation, monitoring focused on streams around the Monterey/San Luis Obispo Co. border, with two streams (Santa Rita and San Simeon Creeks in San Luis Obispo Co.) intensively surveyed along the lengths of their channels because they had been previously positive. However, no positives were detected from the streams, or 200 ground-based samples collected.

Results from the citizen science SOD Blitz surveys, held under the direction of Matteo Garbelotto, are available from the UC Berkeley, Forest Pathology and Mycology Lab; the 2021 Forest Service, California aerial survey results are available from the USFS Pacific Southwest

Region. More details of *P. ramorum* status in California in 2021 are pending publication in the annual California Forest Pest Conditions report.