

California Forest Pest Conditions



2021



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2021 California Forest Pest Conditions Report

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Aerial Detection Survey

Aerial surveys happened in 2021

38 million acres were surveyed

Estimated 9.5 million dead trees (not including those killed by wildfires)

173 million dead trees since the beginning of the drought and bark beetle epidemic

Recorded 6.1 million dead fir trees over 1.9 million acres

380,000 pines killed by mountain pine beetle

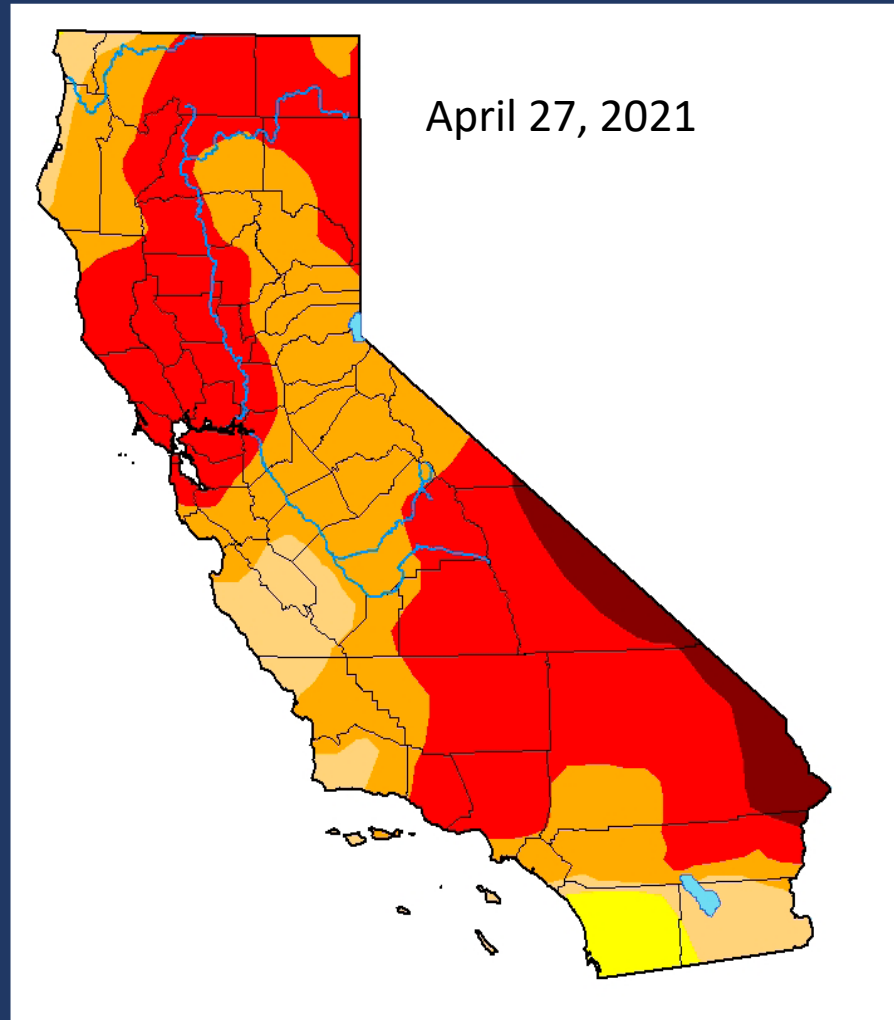
2.1 million dead pines over 300,000 acres (western pine beetle)

19,000 oaks killed by gold spotted oak borer

97,000 oaks killed by sudden oak death



Drought and Weather



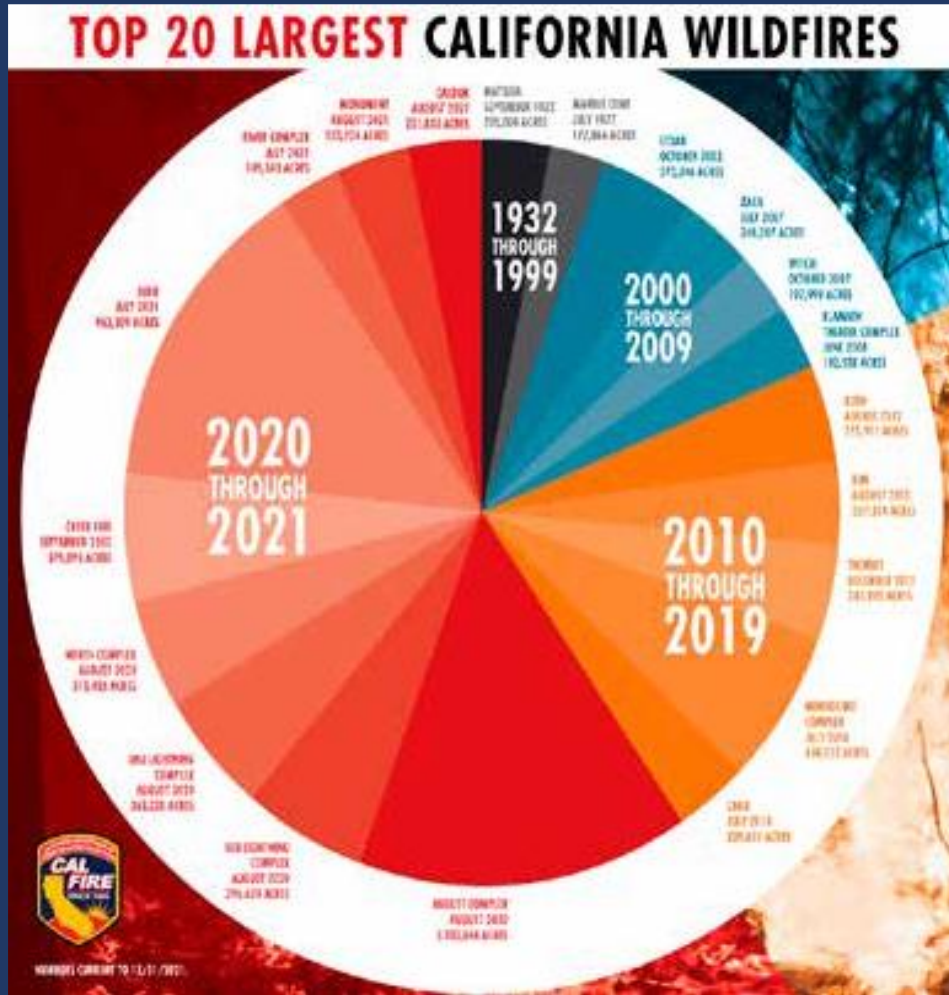
The 2020/2021 water year was at only 50% of average (October and May were the 2nd driest every recorded)

October, June and July were the warmest on record while April, August and September were also abnormally warm

The 2021 water year was the 2nd warmest on record with temperatures around 3.4 degrees above the historic average.



Wildfire Damage



Wildfire Damage

Over 2.5 million acres
burned

6 fires over 100,000 acres
in size

The Dixie Fire 963,309
acres

Fire resulted in direct
mortality and increased the
likelihood of bark beetle
attacks and other pests



Western Pine Bark Beetle – *Dendroctonus brevicomis*



Activity was mostly in the central and northern Sierra Nevada, along with some in the Cascades and northern Coast Ranges

An estimated 2.1 million ponderosa pines died over 300,000 acres in California (a suspected increase over the past two years)

Fir Engraver Beetle – *Scolytus ventralis*

An estimated 6.1 million dead firs
over about 780,000 acres

An increase from 2019 (and
probably 2020)

Fir mortality increases typically
follows pine mortality but are
delayed by a year or two



Lodgepole Needleminer – *Coleotechnites milleri*



2021 was the first year since the early 1990's that lodgepole needleminer damage was considered severe

Damage remained in the typical areas of the state in the greater Yosemite area

Goldspotted Oak Borer – *Agrilus auroguttatus*

No new counties became infested

Infestations spread in the known areas and new infestations were found in previously infested counties

Chemical treatments and tree removals were ongoing

Research into firewood heat treatments happened



Invasive Shot Hole Borers – *Euwallacea* spp.



- The pest complex continued to spread in the seven impacted counties of southern California on multiple host species (no infested trees were found in San Luis Obispo County)
- Populations appeared to be expanding eastward
- All the counties are working to remove amplifier and hazard trees, trap and monitor for the insects using Cal Fire Grant funds

Mediterranean Oak Borer – *Xyleborus monographus*

- The first infested tree was found west of Highway 101 in Sonoma County (previously all infested trees were to the east of 101)
- Research on using the chemical Verbenone for control had mixed results
- Insect flights were found to be high in the trees (most trees appear to be attacked on the top-most branched first)



Sudden Oak Death – *Phytophthora ramorum*



Del N



- SOD was found in Del Norte County for the first time
- The EU1 lineage of the pathogen was found for the first time in a wildland situation
- Tree mortality remained low likely due to continuing drought conditions in the State
- The search continued for a vegetation source for SOD in San Luis Obispo County

Black Stain Root Disease – *Leptographium wageneri*

- Research was conducted around the state on the different strains of the black stain root disease fungus
- Black stain root disease was isolated from the roots of bristlecone pines in the Methuselah Grove and pinyon pines further down in elevation in the White Mountains



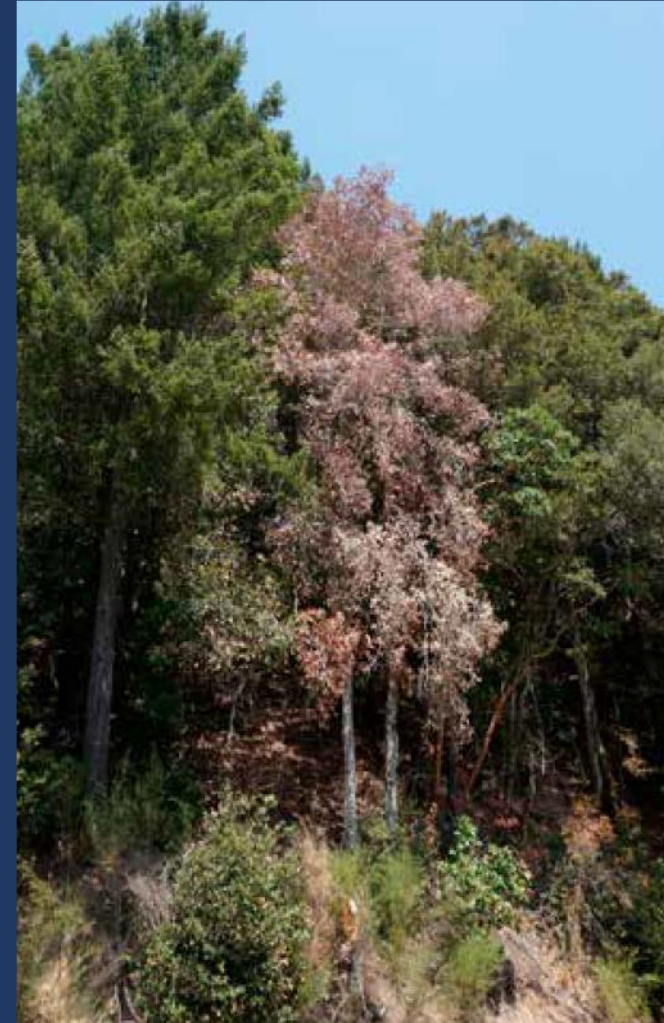
Maple Leaf Scorch – cause uncertain



- MLS remained a problem throughout northern California
- The cause of the conditions remains unknown, but it is suspected to be the result of insect feeding introducing the xylem limited bacterium *Xylella fastidiosa*

Tubakia and *Diplodia* of Oaks and Tanoaks

- Numerous calls about potential sudden oak death disease turned out to be caused by other pathogens (*Tubakia californica* and *Diplodia* spp.)
- Trees were often stressed due to drought and/or heat conditions
- Affected trees included both true oaks and tanoaks
- The trees had symptoms on leaves and branch cankers



Heat and Drought



Extreme heat and continuing drought resulted in several mortality and dieback issues throughout the State

Affected plants included manzanita, eucalyptus, oaks, California bay laurel and many others

Some fungi appeared to be endophytes that went pathogenic in stressed conditions

Some diseases hadn't been seen in over 60 years

Blackwood Acacia Dieback

- Massive dieback of acacia through the Bay Area
- Trees had a number of both native and exotic pathogens
- Heat appeared to be the main cause
- The trees are now recovering



Biocontrol of Invasive Plants



- Biocontrol efforts against invasive plants moved forward
- Release of the rosette weevil for yellow starthistle
- Release of the Arundo wasp for giant reed
- Release of the cape-ivy gall-fly for cape ivy
- All are showing some success

Questions?