



AERIAL DETECTION SURVEY 2019 SUMMARY REPORT

Information below is based on data recorded and shared by the USDA Forest Service, R5 State & Private Forestry, Aerial Detection Survey program.

Surveys are conducted to provide annual estimates of tree mortality and damage and depict broad mortality trends. The majority of forested areas in California were surveyed in 2019. Estimated acreages affected and numbers of dead trees are rounded as appropriate.

Highlights from this year's survey

- Total tree mortality decreased from an estimated 18.6 million trees killed across 2 million acres in 2018 to approximately 15.1 million trees across 2.2 million acres in 2019. This is the third year statewide mortality has decreased since 2016.
- Over 82% of the tree mortality recorded in 2019 was in California red fir and white fir. Approximately 12.4 million dead firs were recorded across 1.9 million acres in 2019, compared to 14 million dead firs across 1.4 million acres in 2018.
- Pine mortality attributed to western pine beetle (*Dendroctonus brevicomis*) decreased from 950,000 dead trees across 166,000 acres in 2018 to an estimated 793,000 dead trees across 124,000 acres in 2019.
- Mortality attributed to mountain pine beetle (*Dendroctonus ponderosae*) increased to an estimated 552,000 dead trees across 57,000 acres in 2019 from approximately 500,000 dead trees across 50,000 acres in 2018.
- Jeffrey pine mortality attributed to Jeffrey pine beetle (*Dendroctonus jeffreyi*) (or to *Ips* spp. around the Mt. Pinos Ranger District of the Los Padres National Forest) decreased to an estimated 190,000 dead trees across 70,000 acres in 2019, from 753,000 dead trees across 99,000 acres in 2018.
- Douglas-fir mortality (not attributed to damage by bears) remained elevated in 2019 with an estimated 127,000 dead trees across 27,000 acres, compared to 107,000 dead trees across 32,000 acres in 2018.
- Tanoak mortality attributed to sudden oak death (*Phytophthora ramorum*) remained elevated with an estimated 885,000 dead trees across 92,000 acres in 2019, compared to 1.6 million dead trees across 106,000 acres in 2018.
- Oak mortality attributed to goldspotted oak borer (*Agilus auroguttatus*) was detected across 11,000 acres with 17,000 dead trees in 2019, compared to 3,700 acres and 11,000 dead trees in 2018. Mortality was concentrated primarily in and around the Palomar Ranger District, Cleveland National Forest, in San Diego County; some mortality was also detected in Riverside and Orange Counties.
- Defoliation of quaking aspen, primarily attributed to Marssonina leaf blight, was observed across 4,200 acres in the eastern Sierra Nevada range.
- Multiple agents were involved in defoliation of pinyon pine that was observed on approximately 37,000 acres in and around the Inyo National Forest. Approximately 9,000 of those acres were attributed to pinyon needle scale (*Matsucoccus acalyptus*) by ground survey.

Summary for 2019 Season Aerial Detection Survey

Report Date	February 3rd, 2020
Flight Dates	6/24/2019 - 8/23/2019
Area Flown	California, state-wide
Acres Surveyed	41 million
Acres with Mortality	2.2 million
Acres with tree damage other than mortality	53,000
Primary agents of non-mortality tree damage (does not include bears, fire, herbicide damage)	needleminers, pinyon needle scale
Estimated number of dead trees (2019 only)	15.1 million

Online resources:

Pacific Southwest Aerial Detection Program

https://www.fs.usda.gov/detail/r5/forest-grasslandhealth/?cid=fsbdev3_046696

USFS California Tree Mortality <https://www.fs.usda.gov/CATreeMortality>

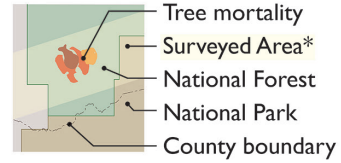
Scan QR code to visit the program web page for reports, maps, and more information about the Aerial Survey program.



Questions regarding this report should be directed to Kayanna Warren at kayanna.warren@usda.gov or 707.562.8691

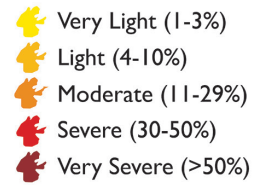
FOREST HEALTH PROTECTION AERIAL DETECTION MONITORING

2019 SURVEY

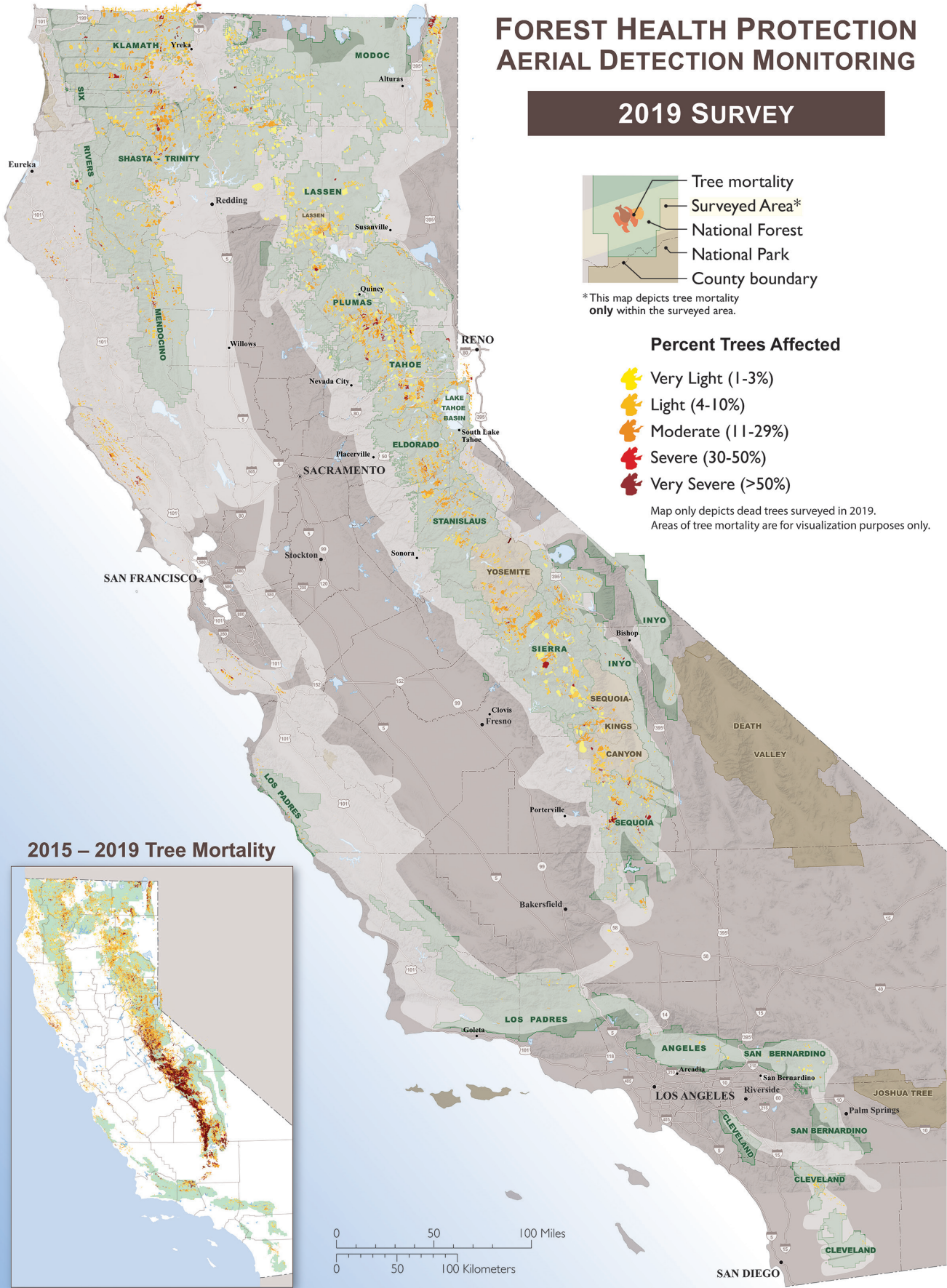


*This map depicts tree mortality only within the surveyed area.

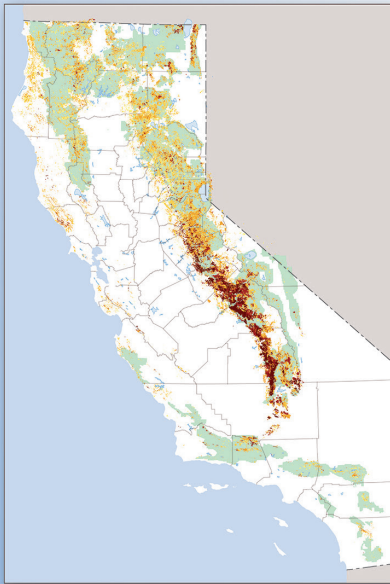
Percent Trees Affected



Map only depicts dead trees surveyed in 2019. Areas of tree mortality are for visualization purposes only.



2015 – 2019 Tree Mortality





RESULTS BY COUNTY – 2019

County	Estimated Number of Acres with Mortality	Estimated Number of Dead Trees
Alameda	1	37
Alpine	25,000	132,000
Amador	14,000	137,000
Butte	12,000	59,000
Calaveras	22,000	141,000
Colusa	0	0
Contra Costa	129	1,000
Del Norte	21,000	150,000
El Dorado	76,000	534,000
Fresno	153,000	805,000
Glenn	15,000	138,000
Humboldt	35,000	321,000
Inyo	7,000	60,000
Kern	17,000	89,000
Lake	1,000	3,000
Lassen	54,000	163,000
Los Angeles	3,000	22,000
Madera	70,000	540,000
Marin	2,000	21,000
Mariposa	38,000	262,000
Mendocino	42,000	297,000
Merced	1	3
Modoc	84,000	894,000
Mono	40,000	234,000
Monterey	5,000	41,000
Napa	39	400
Nevada	39,000	174,000
Orange	39	400
Placer	90,000	712,000
Plumas	187,000	1,110,000
Riverside	1,000	6,000
San Benito	1	14
San Bernardino	12,000	29,000
San Diego	12,000	19,000
San Luis Obispo	134	2,000
San Mateo	2,000	13,000
Santa Barbara	1,000	5,000
Santa Clara	5,000	56,000
Santa Cruz	10,000	89,000

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RESULTS BY COUNTY – 2019

County	Estimated Number of Acres with Mortality	Estimated Number of Dead Trees
Shasta	115,000	305,000
Sierra	112,000	955,000
Siskiyou	406,000	2,823,000
Solano	0	0
Sonoma	39,000	424,000
Stanislaus	0	0
Tehama	67,000	318,000
Trinity	150,000	1,069,000
Tulare	167,000	1,409,000
Tuolumne	72,000	517,000
Ventura	3,000	10,000
Yolo	1	1
Yuba	2,000	5,000
Total	2,228,000 acres	15,094,000 dead trees

RESULTS BY NATIONAL FOREST – 2019

Forest	Estimated Number of Acres with Mortality	Estimated Number of Dead Trees
Angeles National Forest	3,000	14,000
Cleveland National Forest	7,000	14,000
Eldorado National Forest	91,000	668,000
Humboldt-Toiyabe National Forest	28,000	233,000
Inyo National Forest	66,000	409,000
Klamath National Forest	253,000	1,860,000
Lake Tahoe Basin Management Unit	25,000	194,000
Lassen National Forest	160,000	553,000
Los Padres National Forest	8,000	45,000
Mendocino National Forest	61,000	510,000
Modoc National Forest	93,000	865,000
Plumas National Forest	149,000	995,000
San Bernardino National Forest	13,000	34,000
Sequoia National Forest	88,000	1,014,000
Shasta-Trinity National Forest	214,000	1,348,000
Sierra National Forest	185,000	1,131,000
Six Rivers National Forest	53,000	474,000
Stanislaus National Forest	81,000	499,000
Tahoe National Forest	196,000	1,458,000
Total	1,774,400 acres	12,318,000 dead trees

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