

Forest tree mortality

Tree deaths increased dramatically in California during the 2012 – 2016 drought. Higher temperatures and decreased water availability have made trees more vulnerable to insect and pathogen attacks.



Large numbers of trees have died in California since 2012, at the beginning of the most severe drought ever recorded. Approximately 129 million trees died between 2012 and 2017. Most of these trees were stressed from higher temperatures and a shortage of water, making them more vulnerable to insects and diseases. Tree mortality is a complex process that often involves a chain of events and a wide range of factors. California’s pattern of tree mortality corresponds with global trends over the past two decades that are linked to increasingly dry and hot climatic conditions.



Tree mortality in the Sierra National Forest

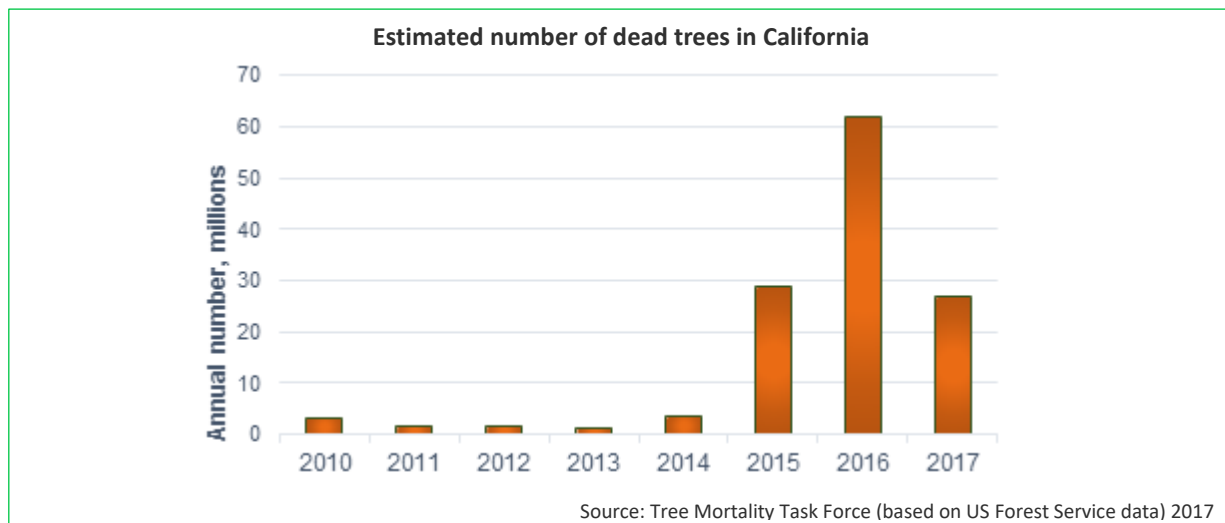
Photo: Steve Dunsky, US Forest Service

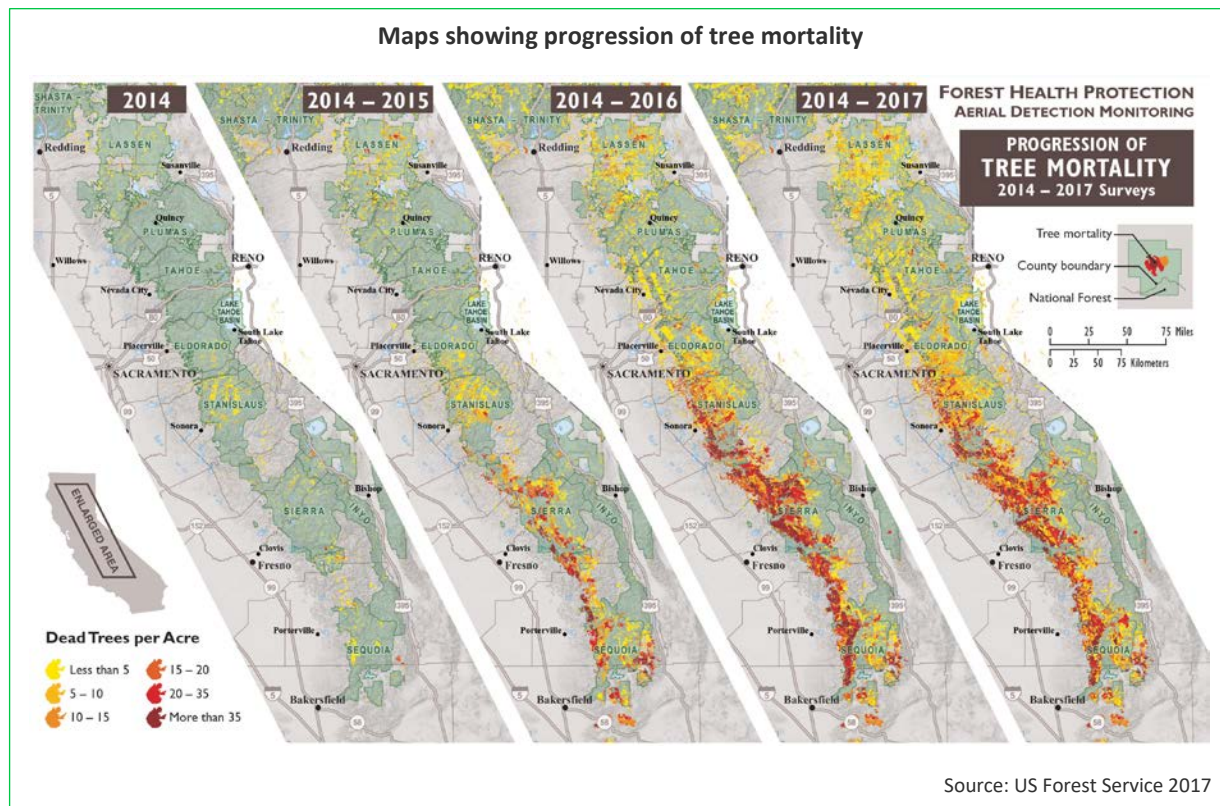
Forests occupy almost one-third of California. They are a vital resource for the state, providing ecological, economic and aesthetic benefits. With increased warming, large-scale tree mortality is expected, leading to profound effects on the state, including increasing the risk of wildfires.

What does the indicator show?

Annual tree mortality in California forests increased in 2014, two years into the unprecedented 2012 - 2016 drought. Steep increases in mortality followed in subsequent years; the highest number, 62 million tree deaths, was recorded in 2016.

The recent drought may foreshadow an increasingly common condition known as a “hotter drought,” where warm temperatures coincide with periodic dry years. The record warmth — 2014 and 2015 are the warmest years on record — was accompanied by record low snowpack. When temperatures are high, plant water demand increases while soil moisture decreases, creating a stress on trees. This stress in combination with bark beetle infestation led to the dramatic number of tree deaths in the state.





Why is this indicator important?

Forests produce wood and fiber, provide food and habitat for wildlife, store carbon, offer recreational benefits, and play many other important roles. Accelerating tree mortality could significantly impact these roles.

Increased tree mortality could also amplify other climate change-related phenomena. For instance, dead trees provide fuel for wildfires, which are expected to become more frequent and extreme in response to climate change. Elevated rates of tree mortality could cause changes in the types of vegetation, the structure and other characteristics of the state's forests, or even the outright loss of forests.

For more information about this and other climate change indicators, visit:

<https://oehha.ca.gov/climate-change/report/2018-report-indicators-climate-change-california>

