



# Why is my Tree Dying?

## Western redcedar (*Thuja plicata*)

March 2024

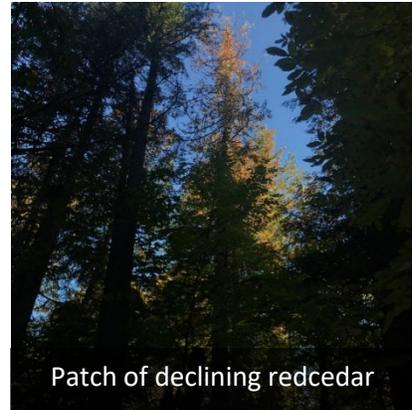


**Common cause(s):** not determined, but evidence suggests a combination of factors including primarily climate change

**Symptoms:** top dieback, flagging, crown thinning, yellowing, whole-tree mortality

### Summary

Top-dieback, branch mortality, crown thinning and whole-tree mortality in all ages of western redcedar has been observed recently at lower elevations in the Willamette Valley and beyond. Although it is common to see 'spiked' or dead tops in older western redcedar, usually there are living lateral branches and a functional crown. No single factor has been identified in these more recent die offs, but a combination of poor or unsustainable growing conditions may be to blame. Redcedar may simply be growing in areas or within microclimates outside of their preferred range or areas that are no longer sustainable for long-term growth under current climate conditions.



Patch of declining redcedar

Climate change and drought events increase the intensity and duration of high temperatures as well as the amount, frequency and/or consistency of precipitation. Trees have adjustable pores (stomata) in their leaves, which open for gas exchange during photosynthesis. Opening these pores causes water vapor loss. The rate of loss depends on vapor pressure deficit which is the difference between moisture levels in the air currently and when the air is saturated. When it's hot and dry this deficit increases and causes tension in the water columns, in vascular tissues, that extend from the leaves to the roots (like the tension you get from sucking on a straw). Low moisture availability further increases this tension. The water columns may eventually break (air gets introduced into the straws) after repeated or severe droughts and this reduces the ability for a tree to transport water to its leaves. More information on drought here: <https://www.oregon.gov/odf/Documents/forestbenefits/Drought.pdf>

### Common pests

Several secondary insects and diseases are known to infest dead or dying western redcedar, although none are typically implicated as primary causes of tree mortality. These common secondary insects include cedar bark beetles (*Phloeosinus* spp.), western cedar borers (*Trachykele blondeli*), Amethyst cedar borers (*Semanotus amethystinus*), as well as flathead cedar borers (*Chrysobothris nixa*) which are more often pests of ornamental arborvitae. Rarely do these insect infestations result in tree mortality. Diseases of redcedar are often opportunistic root and butt rot pathogens that degrade wood once the tree has died. Common diseases include pencil rot (*Postia sericeomollis*), red ring rot (*Phellinus pini*), yellow ring rot (*Coniferporia weirii*), armillaria root disease (*Armillaria* spp.) and cedar leaf blight



Woodborer gallery



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(*Dryomascella thujina*). Note, damage from squirrels, porcupines and bears can also cause flagging and topkill due to bark stripping activity.

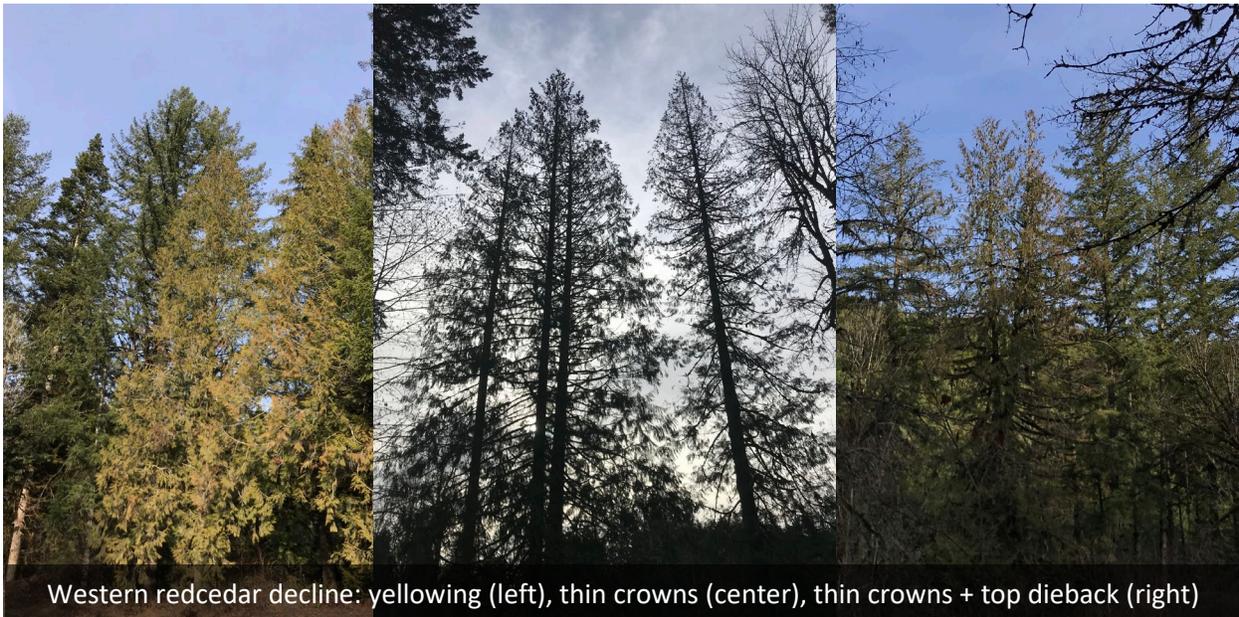
### Why am I seeing this now?

Changing climate may be repeatedly stressing trees and/or altering the suitability of some habitats to support western redcedar. Most of Oregon has been in a drought since 2012, and climate predications indicate a continuation in trends toward higher temperatures and inconsistent precipitation.

Recent research identified areas of western redcedar dieback in Oregon and Washington, and found evidence that climate change factors, specifically increasing temperatures and drought, are correlated with dieback of this species. More information here: <https://tinyurl.com/WRCStorymap>

### Where should I grow western redcedar?

Western redcedar is very shade tolerant. Trees can thrive in sunny locations with sufficient moisture, but they are more at risk during hotter droughts. This species requires moist conditions and thrives in coastal fog belts and moist inland areas up to about 4000 feet elevation. It tolerates most types of soils and outcompetes many other species in wet soils. Western redcedar is shallow rooted and may not do well in soil crowded by roots of other plants (including trees) that are competing for water. Alternate species for redcedar include incense cedar, Oregon white oak, sequoia, bigleaf maple in generally dry sites and western white pine, maple, alder, ash or cottonwood at wetter sites that do not dry out in the summer.



Western redcedar decline: yellowing (left), thin crowns (center), thin crowns + top dieback (right)