

Pacific Northwest Post-Fire Tree Assessment Marking Guide

This field guide provides a simplified post-fire rubric to evaluate trees after fire for injuries and estimate whether it is likely to die within 3 years. For details, see Hood, S., I. Ragenovich, and B. Schaupp. 2021. Post-fire Assessment of Tree Status and Marking Guidelines for Conifers in Oregon and Washington. USDA Forest Service, Pacific Northwest Region. Report Number R6-FHP-RO-2020-02 (Revised June 2021).

Usage Notes:

Do not use this guide for identifying hazard trees.

Evaluate trees before the beginning of the second post-fire winter.

Use the rubric to meet post-fire management objectives by deciding how many of the criteria are used in the marking decision.

- *For a less conservative mark, where more trees will be marked, if **any** one criterion is met, the tree is predicted to die within 3 years post-fire.*
- *For a more conservative mark, where fewer trees will be marked, if **both crown scorch and bark char** criteria are met, the tree is predicted to die within 3 years post-fire.*

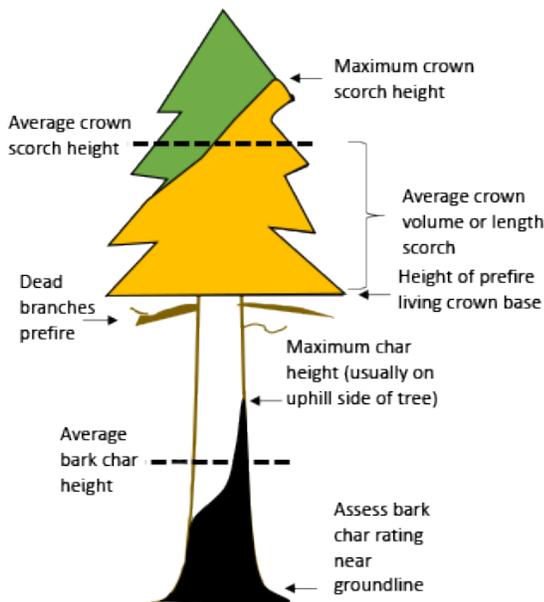


Figure 1—Example of how to assess fire-caused injuries.

The likelihood of a tree dying depends on three factors – crown scorch, bark char and beetle activity.

Crown Scorch is an estimate of how much of the pre-fire living crown was killed by fire, including scorched and consumed needles. It is either a percent of the pre-fire crown volume or crown length impacted by fire; crown volume and length estimates are not interchangeable. Visually reconstruct pre-fire living crown based on fine branch structure and use that to estimate the scorch amount. Ponderosa pine and western larch may have crown portions with scorched needles but buds and branches that survived.



Figure 2—Scorched needles on ponderosa pine with surviving buds.

Bark char indicates the level of injury to the cambium. Estimate bark char severity using the percent of the tree stem circumference near the root collar that is charred, not the overall char height. *Unburned* = no char; *Light* = bark characteristics discernable, bark plate edges burned; *Moderate* = bark uniformly black but characteristics discernable; *Heavy* = burned into bark, smooth, no discernable characteristics.

Beetle Activity is characterized by boring dust, or pitch tubes (only in pines and spruce). If attack is on >50% of the bole or root collar circumference, it will die regardless of fire injury. Attacks from red turpentine beetles (RTB) in pine do not usually kill trees and should not be included when assessing beetle activity. RTB pitch tubes are typically larger than a quarter, are deep-red, and found in the lower 3-feet of a tree's bole.



Figure 3—Signs of insect attack indicating of tree mortality.

Post-fire Tree Mortality Assessment Rubric

Species	Criteria	Diameter Class		
		5 – 11.9”	12 – 20.9”	21”+
ABAM: Pacific silver fir	Crown scorch	> 30% volume		> 40% volume
	Bark char	≥ 50% any char		
ABCO: white fir or hybrids	Crown scorch	≥ 70% volume		
	Bark char	≥ 75% deep char		
ABGR: grand fir	Crown scorch	≥ 60% volume		
	Bark char	≥ 50% any char	≥ 75% moderate or deep char	
ABLA: subalpine fir	Crown scorch	> 30% volume		> 40% volume
	Bark char	> 50% any char		
ABMA: Shasta red fir	Crown scorch	≥ 70% volume		
	Bark char	> 75% deep char		
CADE: Incense cedar	Crown scorch	≥ 85% volume		
	Bark char	> 75% deep char		
LAOC: Western larch	Crown scorch	If needles on: ≥ 80% crown length If needles off: average char height over entire tree length > 70%		
	Bark char	> 75% deep char	Bark char not a predictive injury indicator	
PIEN: Engelmann spruce	Crown scorch	≥ 75% volume		
	Bark char	> 75% any char		
PISI: Sitka spruce	Crown scorch	≥ 75% volume		
	Bark char	> 75% any char		
PICO: Lodgepole pine	Crown scorch	≥ 40% volume		
	Bark char	≥ 75% any char		
PIAL: Whitebark pine	Crown scorch	≥ 40% volume		
	Bark char	≥ 75% any char		
PILA: Sugar pine	Crown scorch	≥ 70% volume		
	Bark char	> 90% moderate or deep char		
PIMO: Western white pine	Crown scorch	> 30% volume		
	Bark char	≥ 90% any char		
PIPO/PIJE: Ponderosa and Jeffrey pine	Crown scorch	Pre-bud break (volume): <ul style="list-style-type: none"> • ≥ 85% needles scorched OR • ≥ 40% needles consumed/blackened OR • ≥ 5% and ≤ 40% needles consumed/blackened combined with >50% needles scorched Post-bud break (volume): > 70% crown volume killed (no new growth)		
	Bark char	> 90% deep char		
PSME: Douglas-fir	Crown scorch	> 65% crown volume		
	Bark char	> 50% deep char	> 75% deep char	
THPL: Western red cedar	Crown scorch	> 20% crown volume	> 40% crown volume	> 60% crown volume
	Bark char	> 50% any char		> 75% any char
TSHE: Western hemlock	Crown scorch	≥ 20% crown volume		
	Bark char	≥ 90% any char		
TSME: Mountain hemlock	Crown scorch	≥ 20% crown volume		
	Bark char	≥ 90% any char		

Crown scorch = % length or volume scorched

Bark char = % circumference of bole near groundline

Beetle/wood borer activity = % circumference of bole with signs of attack