Tree Survival After a Fire

The level of scorch determines whether a tree will survive a fire. Ponderosa pine and Douglas-fir are adapted to fire, but this resistance increases with age. Generally, younger trees are more susceptible to damage.
Some mechanisms of fire resistance are:
• **Thick bark** Western larch, Douglas-fir and ponderosa pine develop thick bark at the base which will tolerate some scorch. This thick bark is not present in young trees.

• **Protected buds** Ponderosa pine buds are protected from heat by long needles.

• **Self pruning branches** Shade intolerant species (pines and larch) that are grown in denser stands usually have fewer green branches close to the ground. When grown in the open, pines and larch may have green lower branches that are easily damaged by fire.

Crown , Bark, and Root Scorch

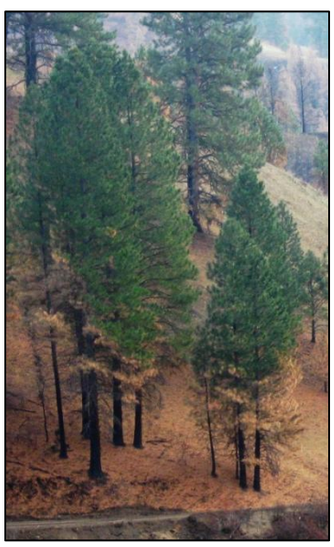
See US Forest Service pamphlets on Douglas-fir and ponderosa pine survivability after a fire.

• **Crown scorch** If the dormant buds have developed for the next season, trees are more likely to survive crown scorch. Early season fires, before buds have hardened off, are more damaging. Look for green buds and shoots, even if the foliage is scorched. Ponderosa pine can survive up to 75% crown scorch, Douglas-fir can tolerate up to 50% scorch.

•**Bark scorch** The inner bark (phloem) is the sugar conducting tissue in trees, and is vulnerable to excessive heat. If the fire was fast moving or was a light ground fire, the bark may provide enough protection for the phloem. Look for moist, green or cream colored inner bark. If the inner bark is dried and brown, it has been killed by heat. Trees of any species are not likely to survive if more than 50% of the circumference is damaged.

•**Root damage** If trees have a thick duff layer around the base, they are vulnerable to root damage, even if the fire did not burn particularly hot. Check the condition of the bark on major structural roots and the root collar area. If 3 or more of the samples show brown phloem, the tree will probably not survive.

Trees likely to survive



Trees likely to die

Trees that survive the fire may still be attacked by bark beetles or borers later

Tree Survival After Fire

Crown Scorch

Firs

Firs with <50% crown scorch should survive fire

25-30% Scorch

Pines

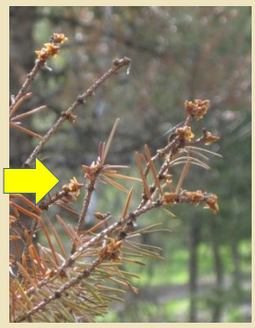
Pines with <75% crown scorch should survive fire

See below, condition of inner bark also determines survivability

Bud Condition

Firs

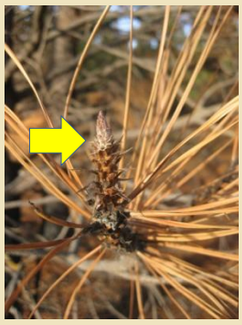
Moist, green buds are still alive



Douglas-fir buds killed by heat

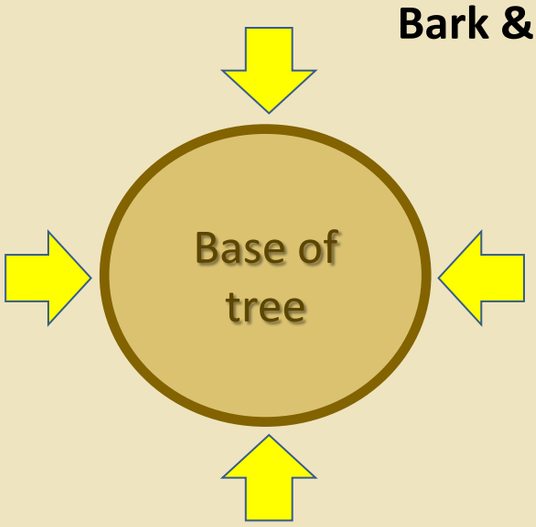
Pines

Pine buds are often protected by foliage



Ponderosa pine bud killed by heat

Bark & Root Condition



Check condition of inner bark and/or main roots at 4 locations around tree

If inner bark is brown and dead at 2 of 4 locations, the tree will probably die from effects of fire

Live Bark

Phloem (inner bark) is still moist and cream colored

Dead Bark

Phloem (inner bark) and adjacent sapwood is dry and brown

Trees that survive the fire may still be attacked by bark beetles or borers later