



Tree Health and Safety Following the 1/9/18 Debris Flow Event

The catastrophic mud and debris flow event on the South Coast has left a layer of mud from several inches to several feet deep in many locations in the greater Montecito area. Beyond the obvious physical damage caused by the storm to the native oaks, sycamores and ornamentals that compose our urban forest, a much more insidious type of damage is quietly occurring: trees are suffocating.

Trees “breathe” through their root systems. When mud, soil or sediment is deposited over the existing root system of a tree, it causes a reduction in the oxygen supply to the tree roots and slows down the rate of gas exchange between the roots and the air in the soil pore space. Lack of oxygen in the soil may result in accumulation of noxious gases and chemicals detrimental to tree growth and survival. When this occurs, the feeder roots fail to develop, and the root system and the above-ground portion of the tree begins to decline. Roots may die back as a result of the suffocation, causing stress to the tree above. Pests and diseases that prey on stressed plants infiltrate the tree causing further injury.

Contributing Factors

Many factors have a determining influence upon the time it takes for the above-ground symptoms to appear (loss of foliage, die back):

- Tree species
- Depth
- Type of fill
- Drainage
- Soil structure below the fill and the general vigor of the existing tree

Timeframe

It might take anywhere from several weeks to as long as 3 to 5 years before tree death would occur. Many of the live oaks (Coast Live Oak, Interior Live Oak, and Canyon Live Oak) in the greater Montecito urban forest are already stressed, vulnerable, and in decline after several years of drought. These trees are particularly susceptible to the negative effect of a layer of mud on top of their previous soil level. They do not tolerate it well. 6 or more inches of mud on top of the previous soil level will typically bring more serious consequences- tree death. In many areas the mud layer has already dried out and has formed a hard impervious “pan” or layer. The clock is ticking for intolerant trees like the live oaks. Tree species like sycamore

and willows can tolerate sediment and soil level fluctuations and are a little more resilient in this regard.

What to Do to Help

1. Remove deposited mud/soil/sediment/debris away from the base of the tree. \

Take it back down to the original soil level. This is typically where the trunk or stem of the tree flares outward as it approaches the root system. This is known as the root collar. It is recommended that the soil be removed horizontally at least 3 times the diameter of the tree in all directions at a minimum. For example, if the tree is one foot in diameter, the mud should be removed outward from the base of the tree at least 3 feet in all directions. Ideally the mud should be removed horizontally out a distance which corresponds to the tree's "drip line", which is the area on the ground covered by the tree's crown. A tree's root system diameter often reflects or mirrors the diameter of the tree's crown. This would be the outer limit of the mud removal. See the accompanying diagram for details.

2. Aerate the soil. Soil compaction also adversely effects tree health and survival. Be careful not to damage the roots when you aerate. Avoid the use of heavy equipment or vehicles around and underneath trees.

3. Consult with a licensed or certified Arborist, Forester, or tree care professional.

They can provide specific direction regarding mud damage to particular trees, deep watering, use of fertilizers, invasive pests and diseases, as well as other types of damage and safety hazards (e.g. hanging or broken limbs and branches aka "widow makers", unstable/leaning trees, undermined root systems).

The Urban Forest

The urban forest provides many environmental and esthetic benefits to the residents and visitors to the South Coast. It is a vital part of our connection to the natural world and landscape, and worth the efforts to save it. Beyond the many non-monetary benefits trees provide, research by the Arbor Day Foundation revealed "a mature tree can often have an appraised value of between \$1,000 and \$10,000". Mature healthy trees can increase property value between 7-19% according to a national real estate organization, and on average add 10% percent to a property's value according to the USDA Forest Service.

A dead or dying urban forest will increase the risk of catastrophic wildfire spread across the South Coast. Please do your part as a resident or property owner to help save our urban forest.

Author: Jeff Gater, Emergency Manager, Santa Barbara County Office of Emergency Management