



2020 CZU Lightning Complex Fire Post-Fire Watershed Recovery Guide

**Learn how to stay safe, protect your property,
and preserve our natural resources.**

The CZU Lightning Complex Fire burned 86,509 acres in Santa Cruz and San Mateo counties and destroyed more than 900 homes. As our community rebuilds, it's important to know that the risk of erosion, debris flows, and flooding are highest over the next few years.

This guide includes the basics about post-fire property assessments, where to find more information, and when to rely on nature's own power of recovery.

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Fires create immediate risk in the landscape including:

Increased runoff. Fire-impacted landscapes absorb less rainfall due to the loss of vegetation and changes to the soil. During storms, runoff could double, increasing the amount of water on property, driveways, roads, and in waterways. The CZU Lightning Fire burned areas that receive the highest rainfall totals in Santa Cruz County, creating a serious concern.

Increased erosion – Bare soils, loss of vegetation, and increased runoff will result in more soil movement, especially on moderate and steep slopes. For the next few years, debris flows and landslides are more likely to occur and create a hazard for lives and property.

Increased sediment – Increased erosion will result in more sediments flowing downslope and into waterways, streams, and rivers. Slope failures, landslides, and debris flows could deposit sediments including cobbles and boulders onto roads, properties, and in waterways.

Increased tree fall - More trees will fall into drainage courses and creeks. Fallen trees could block road culverts, divert water, and cause bank erosion. However, fallen trees and other wood also help to stabilize channels and create stream habitat complexity that benefits endangered coho salmon, threatened steelhead, and other fish and wildlife.



After the Lockheed Fire 2009

The plant communities of the Santa Cruz Mountains are adapted to periodic fire and many plants will reseed, resprout, or recover from the fire over time. Fire liberates nutrients, clears excessive fuel loads, and rejuvenates fire dependent plant communities such as chaparral and sandhills. Allow areas to recover naturally unless action is needed to control erosion.

Post-Fire Property Assessment

Hazardous Materials, Ash and Structure Debris Removal

- ◆ For detailed information, visit santacruzcounty.us/firerecovery
- ◆ The County's Environmental Health Division is coordinating the safe removal of household hazardous materials (Phase 1), and then ash and structure debris (Phase 2) from your property.
- ◆ The removal of hazardous materials, ash and structure debris will help protect our community drinking water supplies, fish, and wildlife.
- ◆ After Phase 1 and before Phase 2, install protective measures downslope of the structure to limit toxic runoff into waterways. See the website for information about installing weed-free mulch, wood chips, or other measures.
- ◆ After hazardous materials, ash and structure debris are removed, assess your homesite for erosion potential and take appropriate actions.

Hazardous Trees

- ◆ Work with a Registered Professional Forester or arborist to evaluate trees.
- ◆ For personal safety, any burned tree within falling distance to the homesite should be evaluated for removal. Trees farther from the home should be assessed for fire damage and left to regenerate whenever possible. Even when burned, tree roots provide slope stability.
- ◆ Whenever possible, leave dead trees for wildlife habitat.



Left: Potentially hazardous material from a home lost in the fire.
Right: Acorn woodpecker using dead tree to store acorns (Mike's Birds)

Post-Fire Property Assessment

Home Drainage

- ◆ Learn about home drainage at www.rcdsantacruz.org/publications.
- ◆ Look carefully to see if any underground drainage pipes were burned or damaged.
- ◆ Think about where existing drainage patterns may cause problems with increased runoff. Solutions could be as simple as providing an outlet energy dissipation structure such as boulders or a gabion basket, or upsizing a ditch or berm.
- ◆ Plastic sheeting is usually the wrong approach to erosion control. The plastic holds soil moisture, kills vegetation and increases runoff.

Driveways and Private Roads

- ◆ Inspect your driveways and private roads for fire damage, which can include burned culverts or debris-filled ditches. Do maintenance and make repairs prior to the rainy season. Clear ditches and culvert inlets before, during and after storms.
- ◆ Expect higher runoff this winter! Driveways and private roads will need more frequent inspections and maintenance for the next few years. Address problems as soon as possible to avoid more expensive repairs.
- ◆ Contact the Resource Conservation District (RCD) of Santa Cruz County for technical assistance. Some funding is available for private roads within the San Lorenzo Watershed.



Left: Poles protect a culvert inlet from branches and sediment; Right: Culvert with rocks at outlet for energy dissipation

Post-Fire Property Assessment

Native Plant Communities

- ♦ The fire impacted a broad range of native plant communities, including redwood forests, mixed conifer forests, oak woodlands, chaparral, riparian and Sandhills.
- ♦ The Santa Cruz Sandhills are a unique community of plants and animals found only on outcrops of Zayante sands. Native Sandhills plants are adapted to recurring fire and many will regenerate from seed or resprout. Native Sandhills animals rely on native plants for food and habitat. Limit all mulching and do not use wood chips in Sandhills habitat.
- ♦ **For all habitats, especially Sandhills, all replanting should consist of local, native plants.** Nurseries and native plant sources are listed on both the County and RCD websites.
- ♦ If necessary, use sterile erosion control seed (e.g. sterile barley) and weed free mulch (e.g. rice straw). Where possible, remove non-native plants that invade fire-impacted areas.



Left: Sandhills; Right: Variable Checkerspot on Santa Cruz wallflower; Sandhills restoration with native plants (Photo: Jodi McGraw)

Post-Fire Property Assessment

Hillslopes and Erosion Control

- ♦ **Consider NATURE as the first and best post-fire restoration practice.** Our native plants are fire adapted and many of them will reseed, resprout, or regenerate over the next year.
- ♦ Allow forest litter and burned plants to remain to reduce the erosive nature of raindrops. Even fire damaged shrubs and trees will have viable root systems and many will resprout in the coming months. When possible, stay off fire impacted areas to reduce damage to delicate soils and roots.
- ♦ Improperly installed erosion control measures can cause expensive damage! If you are concerned about erosion, get assistance from the Resource Conservation District (RCD) or an erosion control professional. More information is on County and RCD websites.
- ♦ In areas with little or no vegetation, mulching with weed-free straw or chipped wood are simple options for post-fire erosion control. Spread mulch lightly, 2-3" in depth, to allow for native regeneration. Due to the fire risk, mulch should not be placed within 10' of the house or on areas where fire may be smoldering underground.
- ♦ If you need to remove hazardous trees, get branches chipped and use the wood chips in bare areas. Do not share chipped wood beyond your immediate neighborhood to prevent spreading Sudden Oak Death fungus or other pathogens.



Left: Regeneration from 2009 Lockheed Fire; Right; post-fire conifer seedlings, fallen leaves left on the ground for erosion control

Post-Fire Property Assessment

Waterways and Riparian Corridors

- ♦ Fire damaged trees are an important source of instream wood and should be allowed to fall into the stream or river. Leave standing riparian trees to regenerate or to serve as wildlife habitat.
- ♦ The County of Santa Cruz protects the stream channel and the adjacent riparian corridor as a sensitive habitat. For perennial streams, the protected riparian corridor includes the channel and 50' on either side of the mean rainy season flowline. Within this protected area, the accumulation of stream wood and sediment will be allowed as long as it is not damaging property or roads.
- ♦ While excess fine sediments can be detrimental to water supplies and aquatic habitat, gravel and cobble sediments build up the streambed which supports bank stability and helps create spawning habitat for steelhead and coho salmon.
- ♦ If you are concerned about wood in a stream, contact County of Santa Cruz, Public Works Drainage (831) 477-3999 for an evaluation and technical assistance.



Stream wood in Scott Creek provides habitat complexity for coho salmon and steelhead

Post-Fire Threats to Life and Property

In some areas, there are serious threats to life and property, including debris flows, landslides and flooding. These threats are most serious in the first 2 years after the fire.

Identify if your property is within one of these threatened areas - which includes areas outside the fire zone - become informed and be prepared this winter with evacuation plans.

Flood Risk

- ◆ Due to high runoff, flows will increase more rapidly and flooding is more likely in the rainy season immediately following a fire
- ◆ Localized flooding can result when large deposits of wood and sediment block the channel
- ◆ Flooding can affect areas downstream of the fire area
- ◆ Be prepared and be ready to evacuate when needed

Landslides

- ◆ Landslide risk is higher following a fire due to increased runoff and loss of vegetation
- ◆ The geology of the hillside determines the risk of landslides
- ◆ Landslides are a result of slippage of one layer of material over another with saturated conditions; Landslides can be deep or shallow and can occur quickly or slowly
- ◆ Concentrated runoff can start a landslide; work with neighbors to safely direct runoff
- ◆ Consult with a geologist if you are concerned about landslide risk



Left: Flooding on the San Lorenzo River in 2017 (Shmuel Thaler, Santa Cruz Sentinel); Right : Santa Cruz landslide (County staff)

Debris Flows

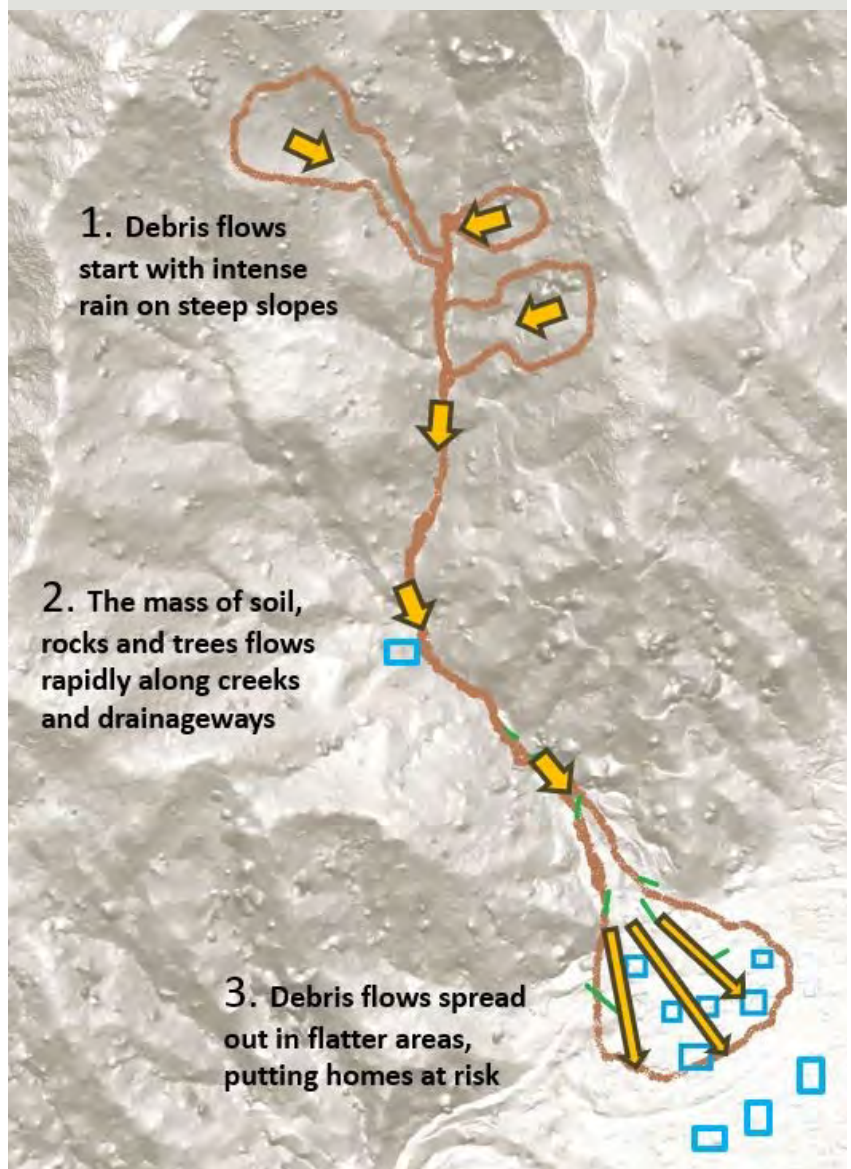
A debris flow is a fast-moving mass of material—a slurry of water, rock, soil, vegetation - even boulders and trees—that moves downhill by sliding, flowing or falling. They can damage property and endanger lives as they rush down steep slopes, along drainage courses and onto flatter areas.

Learn if you are at risk from debris flows and be prepared to leave your home during predicted intense rain events. Stay Safe, Evacuate.

- ♦ **Debris flows occur in minutes! Due to their speed, you need to evacuate prior to the storm event to stay safe.** Even if your property did not burn, there can be a risk from upslope areas. The County will continue to study the potential debris flow hazard and provide information to those at risk.
- ♦ Debris flows are triggered by intense rainfall on fire-impacted steep slopes, such as 1/4" of rain in 15 minutes. Storms with predicted high intensity rainfall create a debris flow hazard.



Debris Flows in the Santa Cruz Mountains



Evaluate Your Erosion Risk

As part of a post-fire property assessment, evaluate the erosion risk for areas beyond the homesite. For **Low** and **Moderate** Erosion Risk, natural areas are expected to recover on their own. For **High** and **Very High** Erosion Risk, it's recommended that you get technical assistance to reduce the risk to your property and safety. Remember to work with your neighbors since runoff and erosion can cross property boundaries.

Low Erosion Risk

- ♦ Relatively flat property without adjacent steep slopes
- ♦ Property accessed by public road or short private road
- ♦ Well-drained soils
- ♦ Low or moderate fire burn intensity



Relatively flat property = Low Erosion Risk

Moderate Erosion Risk

- ♦ Low or moderate fire burn intensity
- ♦ Moderately sloped property or well-vegetated and short steep slopes
- ♦ Property accessed by medium length driveway or road system



Moderate slopes + low burn intensity = Moderate Erosion Risk. Leave downed trees and shrubs for erosion control.

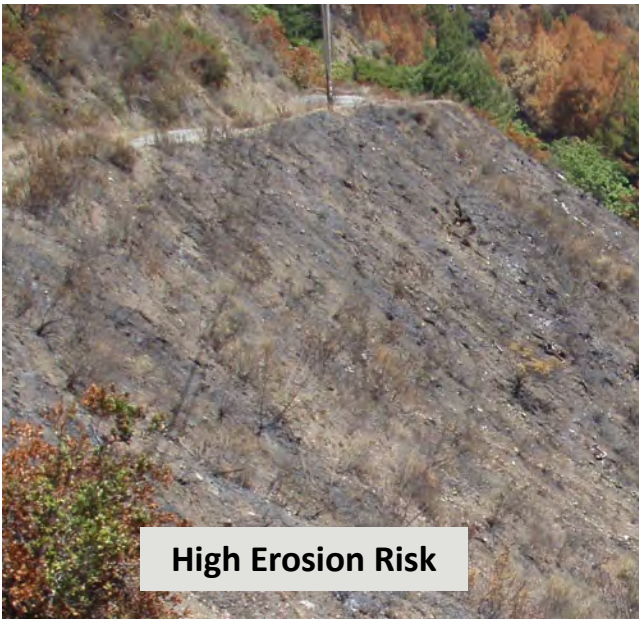
Evaluate Your Erosion Risk

High Erosion Risk

- ♦ Moderately or steeply sloped property, especially with long slopes
- ♦ Moderate to high fire burn intensity
- ♦ Property that is adjacent to steep slopes
- ♦ Property accessed by long driveways or extensive private road system

Very High Erosion Risk

- ♦ Property that is steeply sloped, adjacent to steep slopes or downstream of steep slopes
- ♦ High fire burn intensity
- ♦ Property accessed by long driveways or extensive private road system on steep slopes
- ♦ In an area identified as having a debris flow or landslide risk
- ♦ If you think you may be at risk for landslides, contact a geologist for an evaluation.
- ♦ If you think you may be at risk for debris flows, learn more about your risk and follow County efforts to identify threatened properties.
- ♦ During the rainy season, be aware of weather forecasts
- ♦ **Always leave your property if you feel unsafe!**

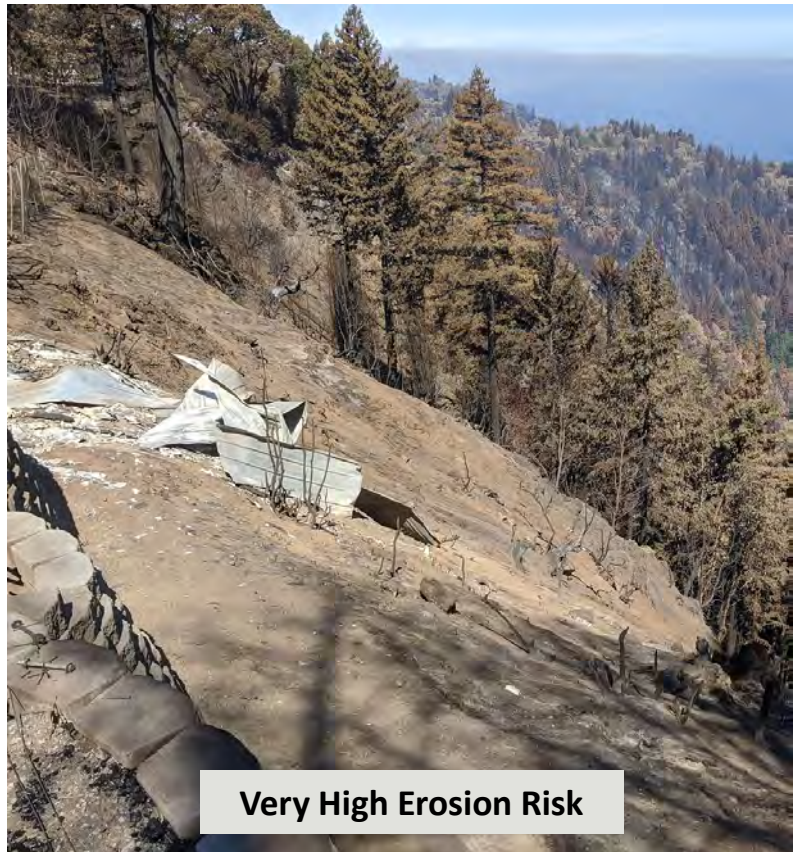


High Erosion Risk

Above: Steep slope + high burn intensity = High Erosion Risk;

Right: Long, steep slope + high burn intensity + identified debris flow risk = Very High Erosion Risk

Right photo: Jessica deGrassi



Very High Erosion Risk

Resources

County of Santa Cruz

701 Ocean Street
Santa Cruz, CA 95060

Fire Recovery website: www.santacruzcounty.us/FireRecovery.aspx

County Public Roads and Stream Wood

To report a problem with a public road or to request a stream wood evaluation,
contact DPW Drainage at (831) 477- 3999

Track Rainfall and Flood Warnings

<https://santacruz.onerain.com/>

Resource Conservation District (RCD) of Santa Cruz County

Post-fire information and to request site visits for technical assistance
www.rcdsantacruz.org
(831) 464-2950



Slope in Scott Creek Watershed, 1 year after the 2009 Lockheed Fire.

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