

Erosion Potential After A Wildfire

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Assessing the erosion potential after a wildfire is an important step of post-fire management. Erosion is a natural process occurring on landscapes at different rates and scales, depending on geology, topography, vegetation, climate and weather, and is defined as the movement of individual soil particles by wind or water. Erosion is a function of the forces available, the amount of protection to the soil surface, the type of the soil and soil stabilizing components such as roots. It is usually described by three components: detachment, transport, and deposition.



- Detachment is influenced by the ease with which individual soil particles are detached (soil erodibility), slope gradient and slope length.
- Transport of detached soil particles from one place to another occurs via overland flow of water, gravity, wind and animal activity.
- Deposition is where the particles settle, such as at the bottom of slopes, in areas of vegetation and surface litter, behind rocks or in streams or rivers.

The amount of erosion after a burn will be dependent on the magnitude and timing of each storm event, the severity of the burn, the slope, soil type and condition of the watershed before the burn. Erosion may be fast or may continue to occur over several years after a burn as the root systems of burnt vegetation decay, further decreasing soil stability. Types of erosion include:

- Surface erosion - the movement of individual soil particles, usually by water flowing over exposed soil surfaces, that occurs when precipitation exceeds soil infiltration rates.
- Debris avalanches - rapid, shallow soil mass movements from steep slope areas.
- Debris flows – rapid down slope mass movements of a slurry of soil, rocks and organic debris directly to stream channels.
- Debris torrents - debris avalanches/flows that reach steep stream channels and become a mass movement of large volumes of water mixed with soil, rock and organic material.
- Slumps and earth flows - slow mass movements that usually occur in areas with deep, fine-textured soils, moving only inches per year.
- Dry ravel - best described as dry grain flowing downhill. Occurring in semiarid ecosystems, gravity moves soil grains, aggregates and rock material down-slope, often in huge quantities.

A common initial concern after a wildfire is erosion and flooding. Some soils are more erodible than others. Post fire erosion rates will be dependent on a number of factors, some measurable (percent slope) or known (soil type), some that can be estimated (burn severity), some that we have control over (vegetative cover) and others we do not have control over (post fire weather patterns).

In general, erosion hazard will increase as slope increases and vegetative cover decreases. To be safe, assume that all drainages in steep, hilly areas are capable of carrying debris flows and are especially vulnerable after a wildfire. Areas burned at moderate to high severity are of greatest concern due to lack of cover and the development of water repellent layers. Note unique unit features such as draws and rocky outcrops. Even areas with low erosion hazard ratings can experience rill and gully erosion if denuded of vegetation and challenged with a short duration, high intensity storm event.

For more information on assessing your erosion potential after a wildfire, go to [After the Burn: Assessing and](#)

[Managing Your Forestland after a Wildfire](#) (pgs.24-25).

For recommendations on erosion control, go to [After the Burn: Assessing and Managing Your Forestland after a Wildfire](#) (Appendix II – Erosion Control pgs.62-74).

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