

# WHY WILDFIRE INCREASES LANDSLIDE AND DEBRIS-FLOW RISK

Burned slopes can shed water and sediment rapidly because vegetation is removed, roots are weakened, and soil behavior is altered after wildfire.



VEGETATION PROTECTS SOIL



ROOTS HOLD SOIL TOGETHER



RAIN TRIGGERS RUNOFF



SEDIMENT FLOWS THREATEN DOWNSTREAM AREAS

## UNBURNED SLOPE

- VEGETATION COVER**  
Intercepts rain and protects soil
- LIVING ROOTS**  
Hold soil together and increase stability
- MORE INFILTRATION**  
Rain soaks in, recharges soil and streams
- SLOWER RUNOFF**  
Less water flows over the surface
- LOWER EROSION**  
Less soil and sediment move downslope

**RUNOFF SLOWS DOWN**

**LOWER RISK TO DOWNSTREAM AREAS**

## BURNED SLOPE (AFTER WILDFIRE)

- WILDFIRE REMOVES VEGETATION**  
No canopy to intercept rain
- ROOTS WEAKENED OR BURNED**  
Roots may no longer help hold soil
- ASH & EXPOSED SOIL**  
Soil structure altered; less able to absorb water
- RAIN RUNS OFF FASTER**  
More water moves over the surface
- MORE EROSION**  
Soil, ash, rocks, and debris are mobilized
- CHANNELS CONCENTRATE RUNOFF**  
Water and sediment focus in drainages

**RUNOFF SPEEDS UP**

**DEBRIS-FLOW PATH**

**HIGHER RISK TO DOWNSTREAM AREAS**

## FROM FIRE TO FLOOD: POST-FIRE HAZARD SEQUENCE

- 1 WILDFIRE REMOVES VEGETATION**
- 2 EXPOSED SLOPE AND WEAKENED ROOTS**
- 3 INTENSE RAIN ARRIVES**
- 4 RAPID RUNOFF AND EROSION**
- 5 DEBRIS FLOW OR SLOPE FAILURE THREATENS DOWNSTREAM AREAS**

### ROOTS BEFORE AND AFTER FIRE

**BEFORE FIRE**  
Living roots help hold soil together

**AFTER FIRE**  
Roots are weakened or burned, providing less reinforcement

### POST-FIRE SURFACE BEHAVIOR

Ash and exposed soil

Water-repellent (hydrophobic) soil

Less infiltration, more surface runoff

- Rainfall runs off faster
- More erosion and sediment mobilization
- Sediment and debris move downslope

### DOWNSLOPE EXPOSURES

**ROADS & BRIDGES**   **CULVERTS & DRAINAGES**   **HOMES & COMMUNITIES**   **INFRASTRUCTURE & UTILITIES**

Roads, homes, and infrastructure downslope may be exposed



**POLICY TAKEAWAY:** After wildfire, slopes can shed water and sediment quickly during storms. Post-fire planning, emergency alerts, road closures, watershed recovery, and infrastructure protection should begin **before heavy rain arrives.**

