Pacific Fire Exchange

After-Fire Action Series
Resource 1

August 2023

JOINT FIRE SCIENCE PROGRAM

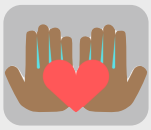
As wildfires burn with greater frequency and intensity across Hawai'i and the Western Pacific, many natural resource management partners have been working together to learn about, better prepare for, and address post-fire impacts on communities and natural resources. The Pacific Fire Exchange Program's After-Fire Action Series is designed share the results of this ongoing learning.

After fire, first things first.

Stabilize health, safety, property, infrastructure, and soil.

As natural resource managers, we are trained to think about the impacts fire can have on ecosystems and landscape health. Before we can start replanting or otherwise working to restore a burned area, there are immediate matters that must be considered and addressed.

Health



- **Physical injuries and breathing impacts.** It is common for people to sustain physical injuries during evacuation, as well as breathing impacts from fire-caused smoke and dust. Preparation for severe smoke conditions includes having N95 or respirator masks on hand or available for distribution. Medical treatment resources and locations should be made known to all land management personnel.

Safety & Security

- **Damages to personal, community, agricultural, and municipal property and infrastructure.** Effected residents need support to rebuild as quickly as possible. Evacuated animals may need alternative boarding while fences are repaired and feed restored. Water, power, and utilities infrastructure may need repair. Culverts and drainages may need to be cleared. Trees and power lines/poles may become unstable and fall, requiring immediate action and ongoing caution.

Soil & Land Stabilization

- **Burned soil and loss of plants that hold the soil cause erosion, landslides, flooding, and pollution of nearshore coastal waters.** Safe roads, stable homes, water quality, stream channels, fisheries, coral reefs, and recreation are negatively affected. The primary and immediate focus of post-fire action on the landscape is slope and soil stabilization, regardless of desired future land use or rehabilitation/restoration goals. This ensures both public safety from flooding and landslides, and soil integrity for longer-term land management activities, such as restoration, rehabilitation, and reactivation of agriculture.

Pacific Islands have a unique urgency to stabilize soil right away.

The lifting and suspension of dust, ash, and burned particles due to wind not only move soil around, but cause impacts to human health because of loss of air quality. Burned, hydrophobic soils inhibit water absorption into the land and instead slide off into nearshore streams, waterways, and coastal environments, eventually polluting and wreaking havoc on ocean water quality and marine resources.

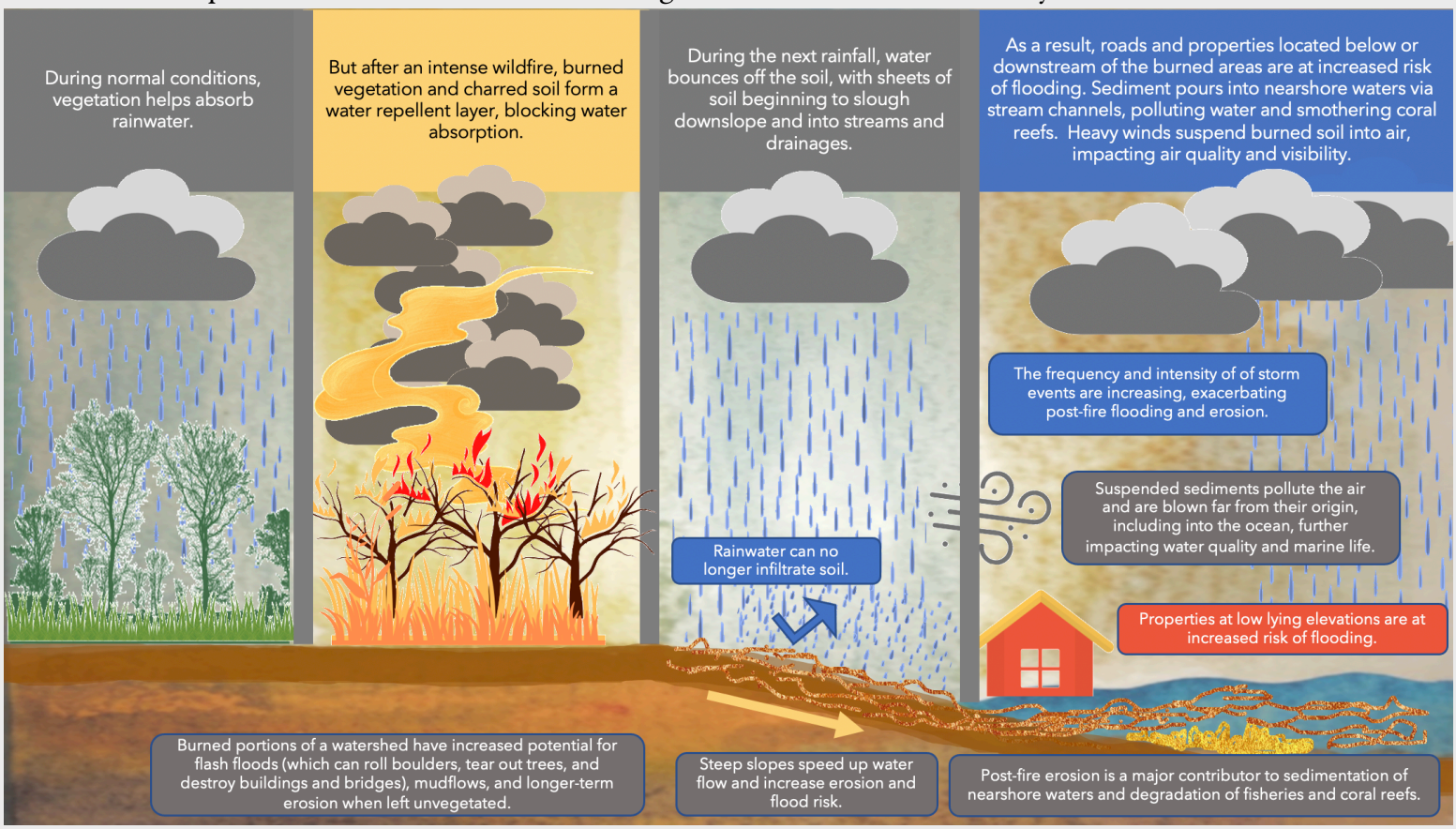
Photo 1. High winds suspended post-fire sediment across much of South Kohala, Hawaii Island in the days after a large wildfire in 2021 .

Photo 2. Burned soil quickly filled nearshore waters in Kawaihae following an intense storm that occurred days after a nearby fire in 2017.

Photo 3. An underwater view, showing corals smothered by post-fire runoff after the combined fire-then-flood event in 2017.

What leads to soil loss after a wildfire?

The following graphic was adapted from FEMA Flood After Fire Toolkit and Oregon Post-Fire Flood Playbook to reflect the after-fire soil loss process in the Hawaii/Pacific Island Region. Note that soil loss occurs by wind and water.



Preventing soil loss is key to long-term recovery after fire.

Wildfires in Hawaii and across the Western Pacific dramatically change the landscape and ground conditions. When a wildfire burns a portion of a Pacific Island watershed, the resulting burn scar increases the potential for flooding, erosion, pollution of nearshore waters and reef systems, and even poor air quality from suspended dust, dirt, and ash. Unburned vegetation protects soils from wind and rain, while unburned soils act as a sponge during rainfall events. However, fires eliminate plant cover, thereby increasing soil loss to wind and rain erosion. High intensity fires can also effectively bake the ground and create a surface that increases the speed with which water, sediment, and debris flow off of the slope. These impacts have dire consequences for human health, land and marine ecosystem health, road and community safety, and can hamper future efforts to restore agriculture and vegetation. For these reasons, emergency stabilization of slopes and soils must be the first priority before other longer-term land management goals.

A decade of collaborative learning among fire and land managers in Hawai‘i and across the Pacific Islands Region have clarified some initial actions that can address post-fire impacts on burned landscapes through emergency stabilization. These actions can be informed by local knowledge of valued resources, soils, vegetation, and topography as well as specific knowledge of fire impacts. Existing needs include identifying and building capacity for post-fire assessment teams and site- or regionally-specific strategies and availability of materials for actions like re-seeding, mulching, and other erosion control measures.

1) Assess the severity of fire impacts and landscape condition (eg. slope, proximity to assets) to prioritize type and location of actions;
2) Reduce soil disturbance through mulching, re-seeding, installing erosion and run-off control structures, and repairing roads and protective fences; and
3) Initiate planning for long-term re-vegetation and recovery.

This fact sheet was co-produced by Hawaii Wildfire Management Organization and University of Hawaii Cooperative Extension Wildland Fire Program, on behalf of the Pacific Fire Exchange project.

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