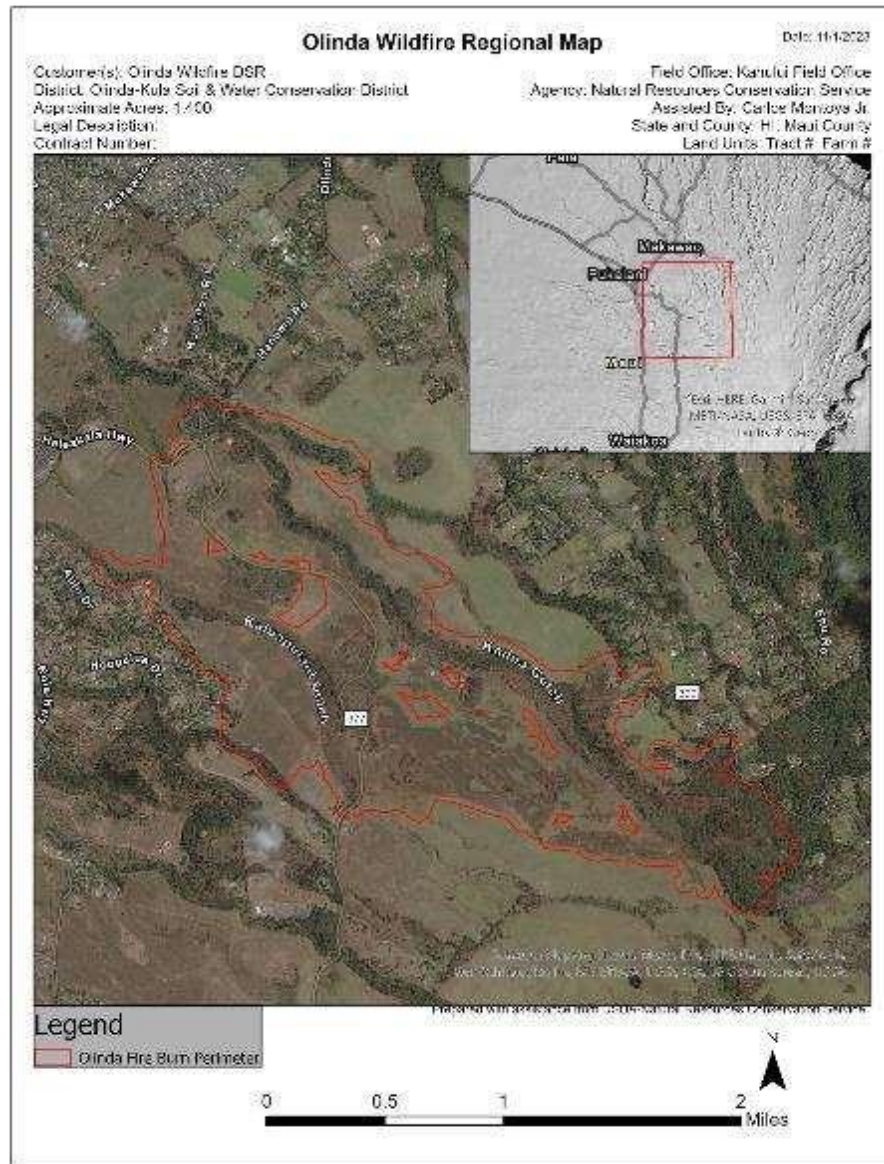


Emergency Watershed Protection Program (EWPP) Maui, Hawaii – Olinda Fire:

Due to the liability concerns associated with the work for this project, we are consulting with other federal agencies at this time. How much of the work will be undertaken by SWCD is still under question at this time.

Overview

In August 2023, the Olinda Fire burned approximately 1400 acres of Maui up-country southeast of Pukalani on Haleakala Volcano. The burn extended through rangeland, heavily wooded gulches, and a few isolated residences from above the Haleakala Highway (Route 377) to midway between Kula Highway (Route 37) and the Haleakala Highway. The fire was primarily fueled by trees on the banks of the gulches, which are ephemeral streams, and was carried to the NW by strong winds potentially stemming from the passage of Hurricane Dora south of Hawaii. Two houses burned in this fire.



The Olinda Fire burn area is located on Kailua Gulch, on Kaluapulani Gulch, and on managed rangeland. The rangeland is accessible by truck and has average slopes of 15%. Access to the gulches is limited by dense tree cover, slopes greater than 100%, rock outcroppings, and waterfall features. The average annual rainfall in the area is approximately 23 inches and the primary vegetation consists of non-native species of Eucalyptus trees (*Eucalyptus* spp.), black wattle trees (*Acacia mearnsii*), and Kikuyu grass (*Cenchrus clandestinus*). This wind-driven fire had short residence time and the intensity was highest along the outer banks of the gulches where fuel loads were high, wind was unobstructed, and moisture content was low. Trees at the bottom of the gulches were rooted in moist soil and had a high survival rate. The grasslands surrounding the gulches had been grazed and generally did not burn with enough intensity to destroy the roots or seed bank.



Bare soil between rangeland and Kailua Gulch (proposed mulch area)

Slopes along the gulch are comprised of altered basalt rock and highly erosive mineral soils. The predominant soil type in the area is Pane Silt Loam.

Resource Concerns

Water-induced erosion is a primary resource concern resulting from the Olinda Fire. If left unaddressed, erosion is expected to cause human health and safety concerns downslope due to sediment laden storm runoff, damage sensitive aquatic ecosystems, degrade public use areas, undermine private roads, and impede traffic.



Low-flow crossing at Kealaloa Avenue (Debris basin proposed at this location.)



Kealaloa Avenue low flow-crossing (looking upstream toward the crossing)



Outlet of the Kaluapulani Gulch Watershed into Kanaha Beach Park, Kahalui Bay

Without intervention, woody debris is expected to obstruct culverts and roadways needed for transportation, including emergency services. Such obstructions have the potential to cause flooding of adjacent lands and communities.



Woody debris in Kaluapulani Gulch (recommend clearing and debris removal)



Kula Highway double 10' culvert below Kaluapulani Gulch burn area (recommended upstream clearing and debris removal)



Hazard trees along Haleakala Highway and debris recently removed from highway

Recommended Alternatives

NRCS recommends the application of wood chip mulch (3" thickness) along the outer gulch banks in areas where the soil is bare and sloping into the gulch. Wood chips are locally available from non-native tree species. In the specific case of organic mulches, use of NRCS EWPP funding is only permissible for purchase, production or spreading of organic mulches sourced from the island of Maui.

NRCS recommends the clearing and removal of debris from the streambed within the Kaluapulani Gulch burn area. Woody debris, including dead and dying trees, should be removed from the bed of the stream to prevent mobilization and subsequent plugging of the culvert under Kula Highway. Ideally, the removed material will be chipped and spread along the top of the gulch banks where the burn intensity was high and little organic material remains. Unexposed roots and rooted herbaceous material should be left in tact to help stabilize the soil. Clearing and removal work typically commences from the top of the watershed and advances toward the bottom.

NRCS recommends the installation of a debris basin located upstream of the Kealaloa Avenue low-flow crossing easement. This basin will allow debris and sediment to settle out before becoming a road hazard and will provide additional warning for drivers and maintenance crews. The proposed basin is approximately 0.5 acres in area and 3 feet deep with 33% slopes around the perimeter. This work includes removing existing vegetation, removing soil, and seeding with grasses of common groundcover species, with proven short-term restoration values that are not weed risks such as annual rye grass (*Lolium multiflorum*) or perennial rye grass (*Lolium perenne*). Other perennial groundcover species that are already naturalized in this landscape could be included in such mixes, however NRCS must approve all species and seeding rates prior to application for EWPP-funded work.

Maintenance of the basin will be optional as it is expected to simply aggrade back to its original elevation. The proposed basin is not expected to alter upstream flow or cause head-cutting due to the steep slope (supercritical flow) and competent rock bed located immediately upstream. Note that this work is expected to require stream channel alteration permitting.

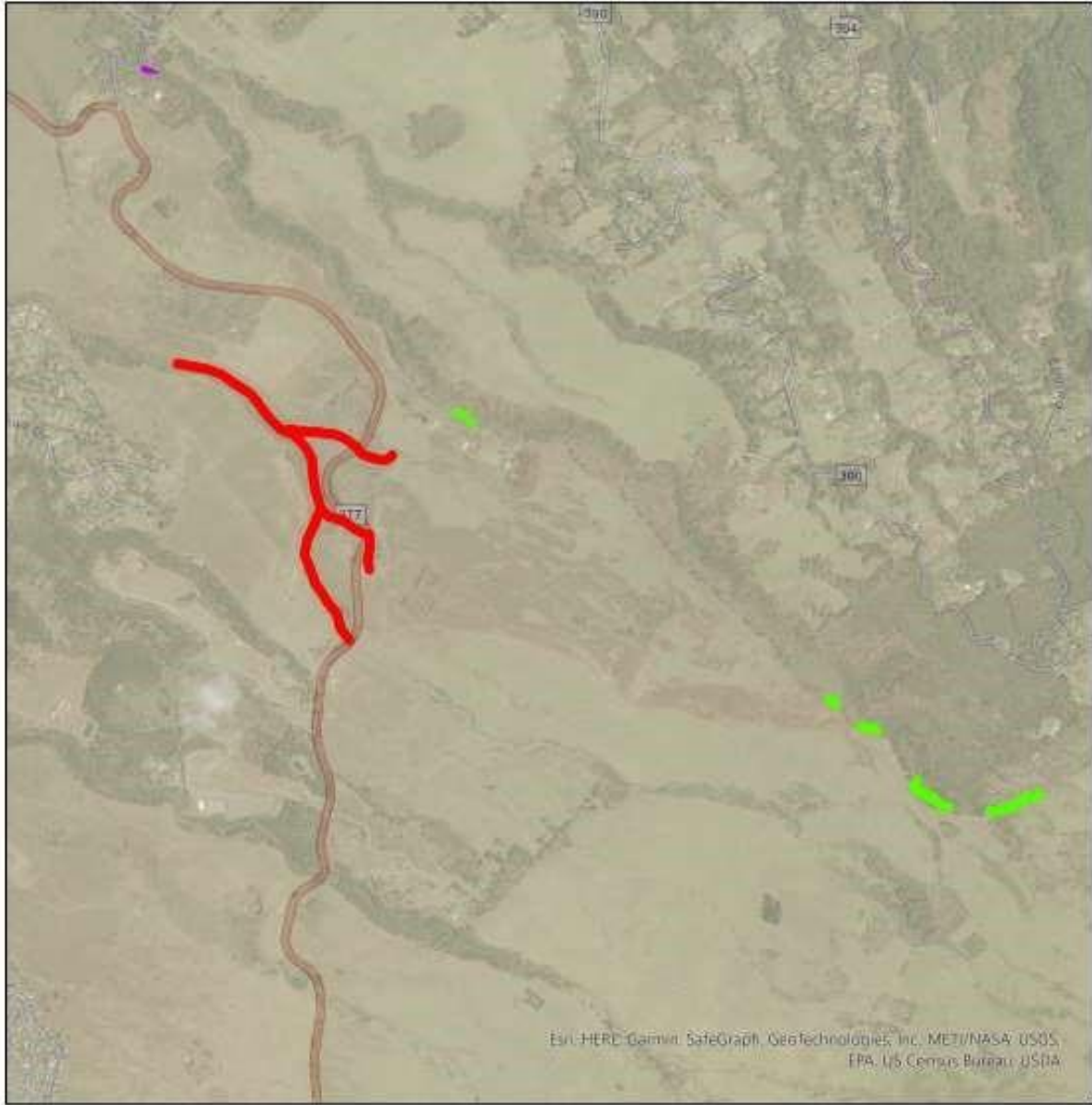
NRCS recommends the installation of Road May Flood warning signs along both approaches to the Kealaloa Ave low-flow crossing and proposed debris basin. This crossing is expected to receive an increase in sediment, woody debris, and water flow as a result of the burn scar.

Olinda Fire DSR Map

Date: 10/18/2023

Customer(s): Haleakala Ranch, Anne Carter
District: Olinda-Kula Soil & Water Conservation District
Approximate Acres: 13 (Treated)
Legal Description: TMK 23006001
Damage Survey Report Number #

Field Office: Kahului Field Office
Agency: Natural Resources Conservation Service
Assisted By: NRCS Olinda Fire DSR Team
State and County: HI, Maui County

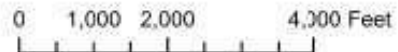


Esri, HERE, Garmin, SafeGraph, Geotechnologies, Inc., METI/NASA, USGS, EPA, U.S. Census Bureau, USDA

Prepared with assistance from USDA-Natural Resources Conservation Service

Legend

- Proposed 3 Inch Wood Mulch (3 Acres, Practice Code 484)
- Proposed Clearing and Snagging (8,150 Feet, Practice Code 326)
- Proposed Sediment Basin (1.5 Acres Foot, Practice Code 350)



Considered Alternatives (Not recommended)

NRCS recognizes the need for removal of hazard trees within striking distance of the roadways and powerlines within the Olinda burn unit. However, EWPP funds are intended to address impairments to the watershed. For this reason, the removal of hazard trees is not proposed in this report nor indicated on the attached Olinda Fire DSR Map. NRCS is working with other partners to seek support for this need.

NRCS considered the option of seeding the Olinda Fire burn area. This option was not recommended because the grassland burn intensity was low and regrowth is already underway. The heavily wooded areas were predominantly composed of Eucalyptus and Black Wattle Trees. These trees compete for soil moisture and cast enough shade to impede the growth of grass below the tree canopy.

NRCS considered clearing and debris removal from Kailua Gulch. This gulch is longer and wider than the Kaluapulani Gulch and the removal of woody debris is expected to be relatively more difficult due to access issues. Additionally, this gulch has a low flow crossing immediately downstream of the burn area and sediment in the roadway is as much a concern for safety as the woody debris. NRCS determined that the debris and sediment basin with road signs as proposed in the report above would be the more cost-effective approach.

NRCS considered using hydromulch or similar mulch treatments to protect the lower bank slopes from erosion. The NRCS field team did not feel that hydromulch, straw, or wood chip mulch would remain onsite where the slopes exceed 100%. Additionally, the gulches are heavily wooded and access is limited. Sections of the banks are already covered with duff and/or tree canopy and it would not be cost-effective to treat the lower portions of the banks with additional mulch.

NRCS considered mulching the wooded uplands within the burn area. This generally would not be cost-effective, unless done as a byproduct of hazard tree removal, since the trees are still casting leaves and the localized sheet and rill erosion is somewhat confined by the non-burn areas.

NRCS considered applying mulch and seed to the firebreaks. This did not appear to be necessary for the Olinda burn area because the firebreaks are primarily located in unburned and low burn intensity (rangeland) areas and are already surrounded by regrowth. Firebreak soils are somewhat confined by the vegetation surrounding them and are already showing vegetation regrowth.

NRCS considered applications of irrigation water to accelerate regrowth in the burn scar. Although NRCS encourages irrigation of erosive soils to promote seed germination and regrowth, the field team had concerns about including this in this EWPP proposal contract due to water availability issues and site access limitations. The application of irrigation water at an appropriate time, amount, and application rate deserves additional consideration.