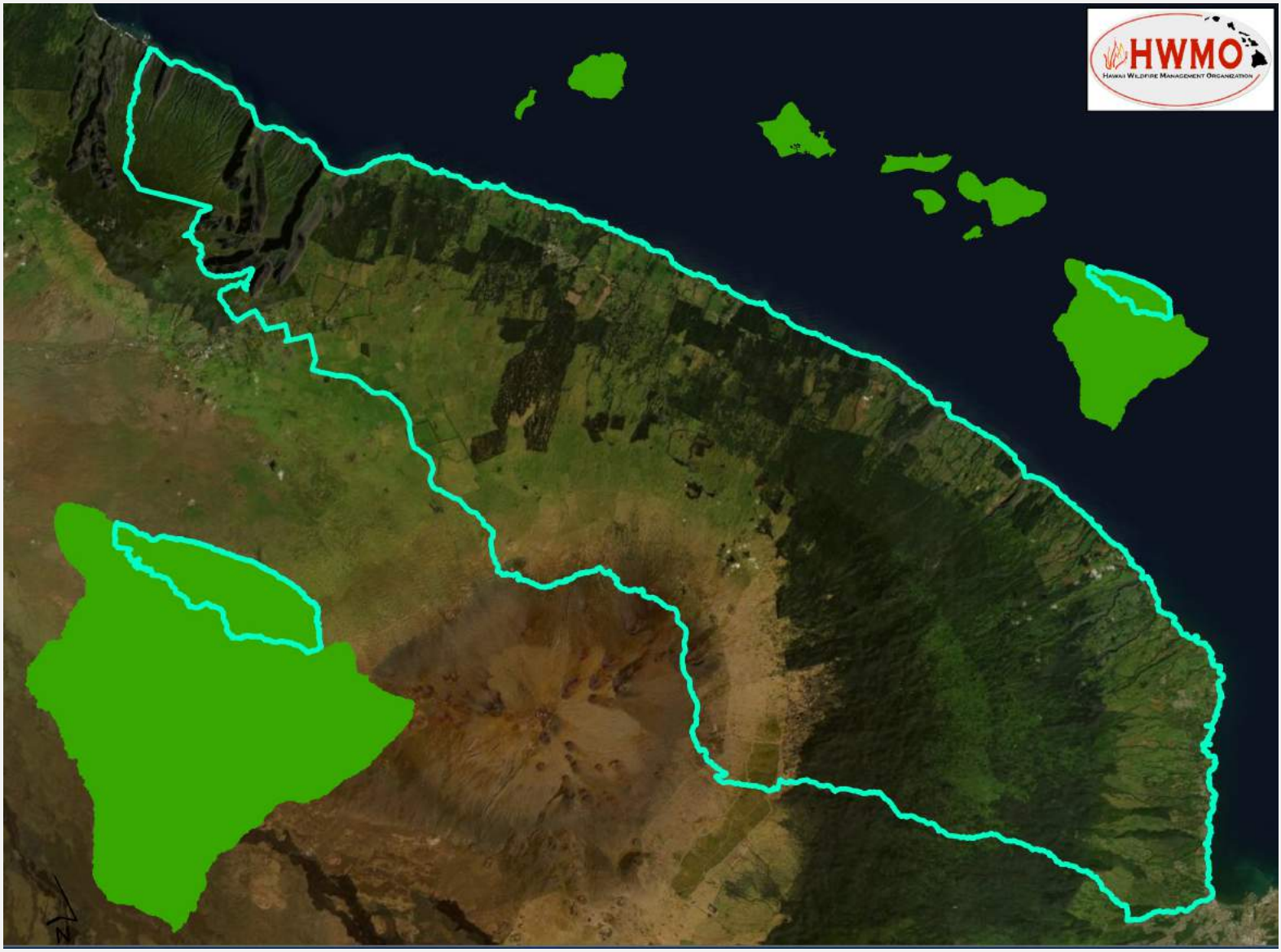
# COMMUNITY WILDFIRE PROTECTION PLAN



## HĀMĀKUA

## HAWAIʻI ISLAND, 2024

Coordinated and developed by Hawai'i Wildfire Management Organization, in partnership with Hawai'i Department of Land and Natural Resources, Division of Forestry and Wildlife. Funded by the USDA Forest Service Landscape Scale Restoration Program

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# MUTUAL AGREEMENT SIGNATURE PAGE

The following three entities mutually agree to the final contents of this Hāmākua Community Wildfire Protection Plan: State of Hawai'i Department of Land and Natural Resources, Division of Forestry and Wildlife; Hawai'i Fire Department; and Hawaii County Civil Defense Agency.

This plan:

- Was collaboratively developed by agencies, entities, community members, and individuals with interest or jurisdiction in Hāmākua, Hawai'i Island.
- Describes wildfire hazards in the natural and built environment.
- Provides the concerns, recommended actions, and priorities of those who live and work in the area to better reduce wildfire threats, mitigate hazards, improve public safety, and protect natural resources from the impacts of wildfire.
- Is written to appropriately begin and inform wildfire mitigation action planning at the local level, and is not regulatory or binding.

Pursuant to the 2003 Healthy Forest Restoration Act (HFRA), the following signatures represent mutual agreement of the contents of this CWPP.

Michael Walker

_____

**Michael J. Walker, State Fire Protection Forester**
**Department of Land and Natural Resources**
**Division of Forestry and Wildlife**

_____

**Kazuo Todd, Fire Chief**
**County of Hawai'i**
**Hawai'i Fire Department**

Talmadge Magno
Talmadge Magno (Jul 11, 2024 08:31 HST)

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**Talmadge Magno, Administrator**
**Hawai'i County Civil Defense Agency**

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# HĀMĀKUA

## COMMUNITY WILDFIRE PROTECTION PLAN

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*ACRONYMS*

**DLNR-DOFAW:** Department of Land and Natural Resources, Division of Forestry and Wildlife;
**HFD:** County of Hawai'i Fire Department; **HWMO:** Hawai'i Wildfire Management Organization
**USAG-FES-PTA:** US Army Garrison Fire & Emergency Services Pohakuloa Training Area.

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# EXECUTIVE SUMMARY

This Community Wildfire Protection Plan (CWPP) was developed by the Hawai'i Wildfire Management Organization (HWMO) with guidance and support from government agencies and representatives, private resource management entities, community members, and decision makers concerned about wildfire issues in Hāmākua, Hawai'i Island, Hawai'i. State of Hawai'i Department of Land and Natural Resources- Division of Forestry and Wildlife (DLNR-DOFAW) was the primary partner in carrying out this CWPP process.

The Hāmākua CWPP focuses on wildfire preparedness and readiness, hazard assessment and reduction, and the wildfire mitigation priorities of those who live and work in the area. The process used to develop this plan engaged a diversity of agencies and individuals concerned with the at-risk area, following the guidelines and requirements of several relevant federal programs and grant opportunities.

Stakeholder participants in the development of this plan agree that wildfire threats are imminent and can have widespread damage to Hāmākua watersheds, natural resources, and human communities. The danger of fire is related to high numbers of human-caused fires, dry conditions, steep slopes, high fire potential of vegetation, and challenging firefighting conditions. In the last decade, numerous areas of Hāmākua have burned. While CWPPs serve mainly as a mechanism for assessing, communicating, and preparing for wildfire collaboratively, they are not enforceable or funded. The action plans are voluntary and rely on all parties understanding they play a role in wildfire safety and protection and taking appropriate actions toward risk reduction. A CWPP is a first step toward increased public-private collaboration toward these goals.

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# PART I
# OVERVIEW

# INTRODUCTION

*The communities, lands, and waters of Hāmākua, Hawai'i Island, Hawai'i, have been classified as "at high risk" of wildfire occurrence and impacts. The safety of residents, and the protection of private property, community infrastructure, and natural and cultural resources, is a shared responsibility between residents and communities; owners, developers, and associations; private businesses and municipal service operators; and county, state, and federal governments. The aim of this Community Wildfire Protection Plan (CWPP) is to carry out wildfire protection planning and subsequent actions for Hāmākua.*

## THE PURPOSE OF WILDFIRE PROTECTION PLANNING IS TO...

- Motivate and empower local government, communities, and property owners to organize, plan, and take action on issues impacting the safety and resilience of values at risk.
- Enhance levels of fire resilience and protection to the communities and infrastructure.
- Identify the threat of wildland fires in the area.
- Identify strategies to reduce the risks to structures, infrastructure, and commerce in the community during a wildfire.
- Identify wildfire hazards, education, and mitigation actions needed to reduce risk.
- Transfer practical knowledge through collaboration between stakeholders toward common goals and objectives.

## OUTCOMES OF WILDFIRE PROTECTION PLANNING...

***1. Improve community safety through:***

- Coordination and collaboration
- Public awareness and education
- Increased wildfire prevention and preparedness
- Widespread hazard reduction efforts
- Improved wildfire response capacity
- Development of long term strategies

***2. Catalyze efforts to guide planning and sustained implementation of actions toward***:

**FIRE ADAPTED COMMUNITIES**

**RESILIENT LANDSCAPES**

**SAFE & EFFECTIVE WILDFIRE RESPONSE**

## PROCESS- HOW A CWPP IS DEVELOPED

1. The project is launched, partnerships are established, administrative and funding processes are completed.
2. The community risk assessment is reviewed, updated, or performed as necessary.
3. Opportunities are coordinated and offered for interested parties (community members, government agencies, other relevant/concerned individuals and entities) to review wildfire information, discuss concerns, identify strategies, and prioritize recommended actions.
4. Wildfire information and community input results are used to develop the CWPP document.
5. The CWPP is finalized via review and signatures of Fire, Forestry, and Civil Defense/ Emergency Management departments to meet federal compliance requisites.

## TIMELINE- THE DEVELOPMENT OF THE HĀMĀKUA CWPP

2020 DLNR-DOFAW worked with HWMO to propose the project and to coordinate and complete all contract and administrative components.

2021 An introductory meeting was held with the DOFAW and HWMO, to lay the groundwork for a collaborative all-partner effort, agree on the process and timeline, and establish exact planning area boundaries.

HWMO developed fire weather and other maps for the planning document

Planning discussions were held with Big Island Wildfire Coordinating Group and other relevant parties to:

Reviewed the purpose, intent, and next steps for the CWPP.

Planned a collaborative workshop with relevant agencies, organizations, and community members for discussion of wildfire concerns. Selected dates and times.

Discussed and determined strategies for adapting the process to COVID-19 social distancing and travel restrictions.

Held 2 community workshops to discuss the purpose of the CWPP, to review fire history maps and hazard assessment results, and to collect community input on concerns and priorities, with the intent of developing relationships and catalyzing collective learning and action.

2021-2 Community CWPP input survey was launched and circulated via email.

2022 HWMO completed all background information, research, mapping, and processed workshop input and community survey results.

2023 Release to partners for review and signature was delayed by urgent and necessary shift to tasks related to catastrophic fires.

2024 Updated project list was completed. Full document provided to agencies for review and signature.

## PARTNERSHIPS AND COLLABORATIONS

This CWPP was developed in close collaboration with several stakeholders:
Primary collaborators were:

- County of Hawai'i Hawai'i Fire Department
- County of Hawai'i Civil Defense Agency
- Department of Land and Natural Resources- Division of Forestry and Wildlife
- County Councilperson Heather Kimball
- Hawai'i Wildfire Management Organization
- Big Island Wildfire Coordinating Group

## STATEMENT OF LIABILITY

A CWPP helps communities clarify and refine priorities for the protection of life, property, and critical infrastructure. It is intended to create a foundation of collaboration and communication among diverse parties toward achieving wildfire risk reduction goals.

A CWPP is not a binding, regulatory document. The action plans are voluntary. The process and the associated document are mechanisms for assessing risk, discussing, learning, and planning collaboratively across sectors and neighboring communities. This is not a pre-determined, top-down, outside-expert or single-agency-driven determination of future activities, but rather a compilation of information and priorities to inspire, inform, and guide wildfire preparedness activities. This is in line with the improved understanding across the country that everyone who lives and works in fire-prone areas has a role to play when it comes to preventing ignitions, reducing hazards, and ensuring a wildfire-informed, wildfire-ready, and wildfire-resilient community. A CWPP does not provide or guarantee funding but does qualify entities in the area to apply for certain wildfire mitigation funding opportunities.

The activities suggested by this document, the assessments and recommendations of fire experts and officials, and the plans and projects outlined by the community, are made in good faith according to information available at this time. HWMO and DLNR-DOFAW assume no liability and make no guarantees regarding the level of success users of this plan will experience. Despite efforts to prevent or contain wildfires, fires still occur. The intention of all decisions and actions made under this plan is to reduce the potential for, and the consequences of, wildfire.

## COVID-19 STATEMENT

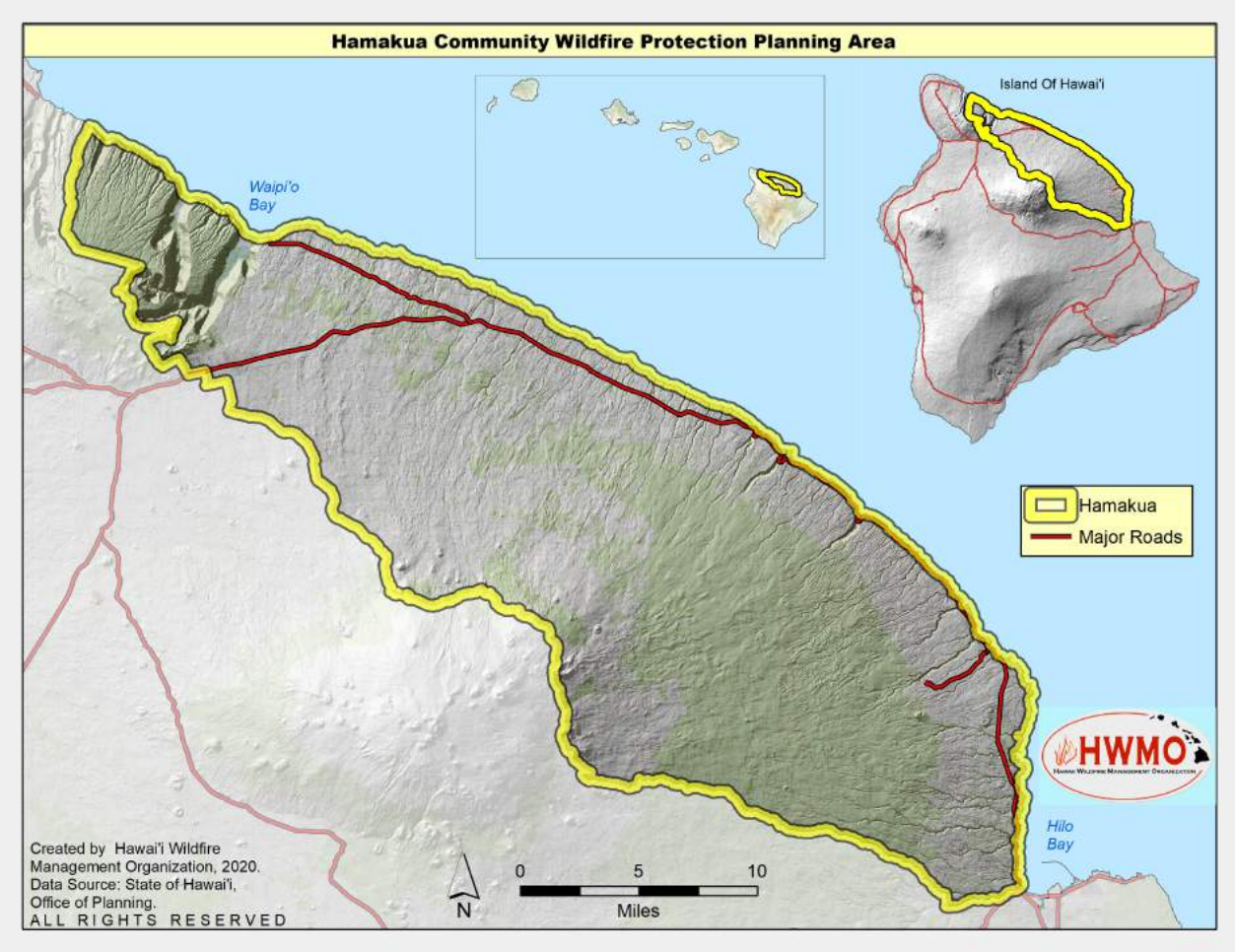
In an effort to maintain a highly collaborative, effective, and safe CWPP process during several variations of social and travel restrictions across the county and state, the majority of this CWPP was using virtual alternatives to in-person activities. To adapt to COVID-19, several virtual workshops were held with agency and community representatives, and a web-based survey went out to those who

lived and worked in Hāmākua for 30 days. Any additional information, community input, and/or action plans generated will be added to this document as updates. The collaborators involved in the development of this CWPP are committed to a long-term process of community engagement and partnership.

# PLANNING AREA

## CWPP BOUNDARIES

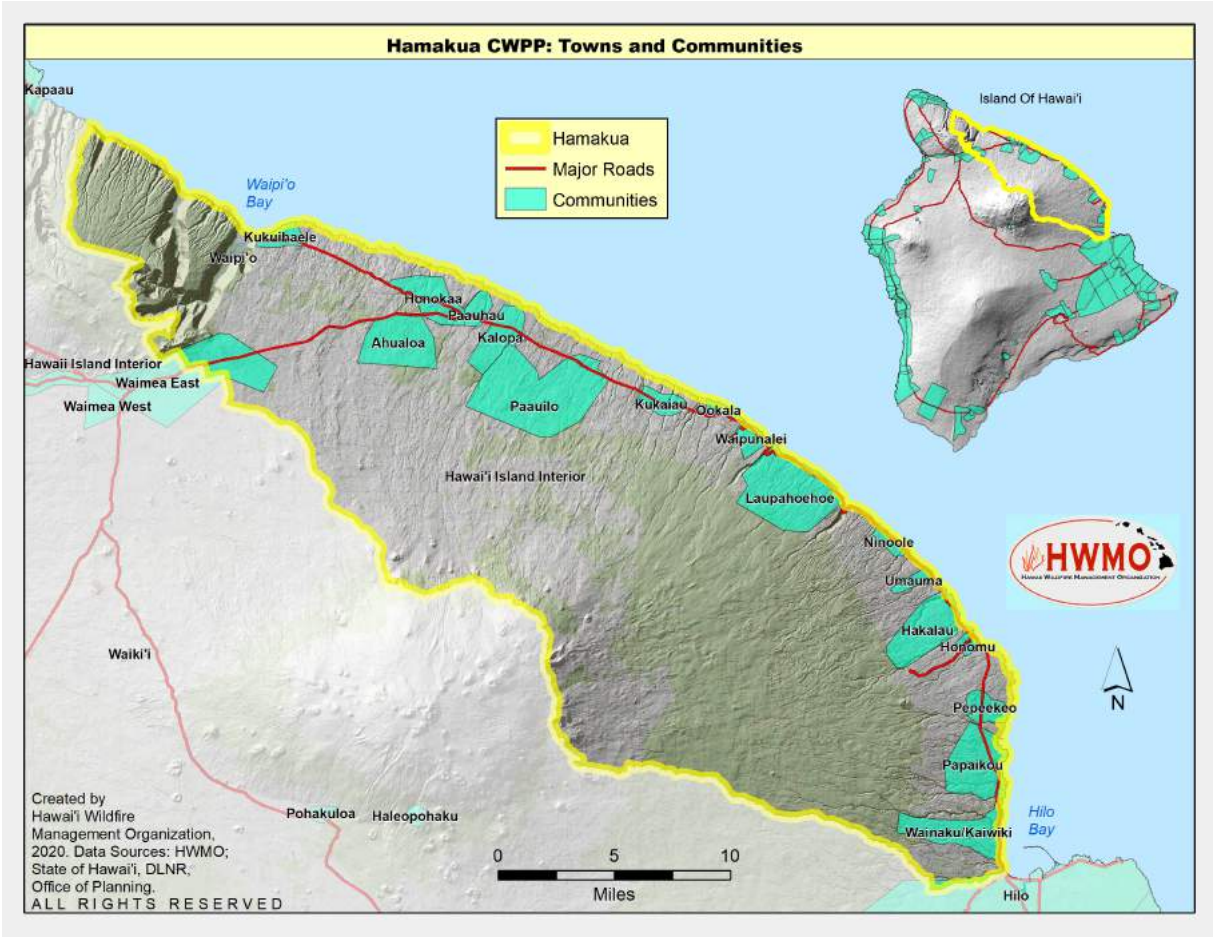
The Hāmākua CWPP (Map 1) is part of a series of CWPPs across the island of Hawai'i. To date, CWPPs have been developed for the following: Ocean View, North West Hawai'i, Ka'ū, Volcano, South and North Kona. The CWPP delineation for the Hāmākua plan follows the boundaries established for x neighborhood boards encompassing a total of 322,855 acres.




***Map 1. Hāmākua CWPP Planning Boundaries.***

## COMMUNITIES AT RISK

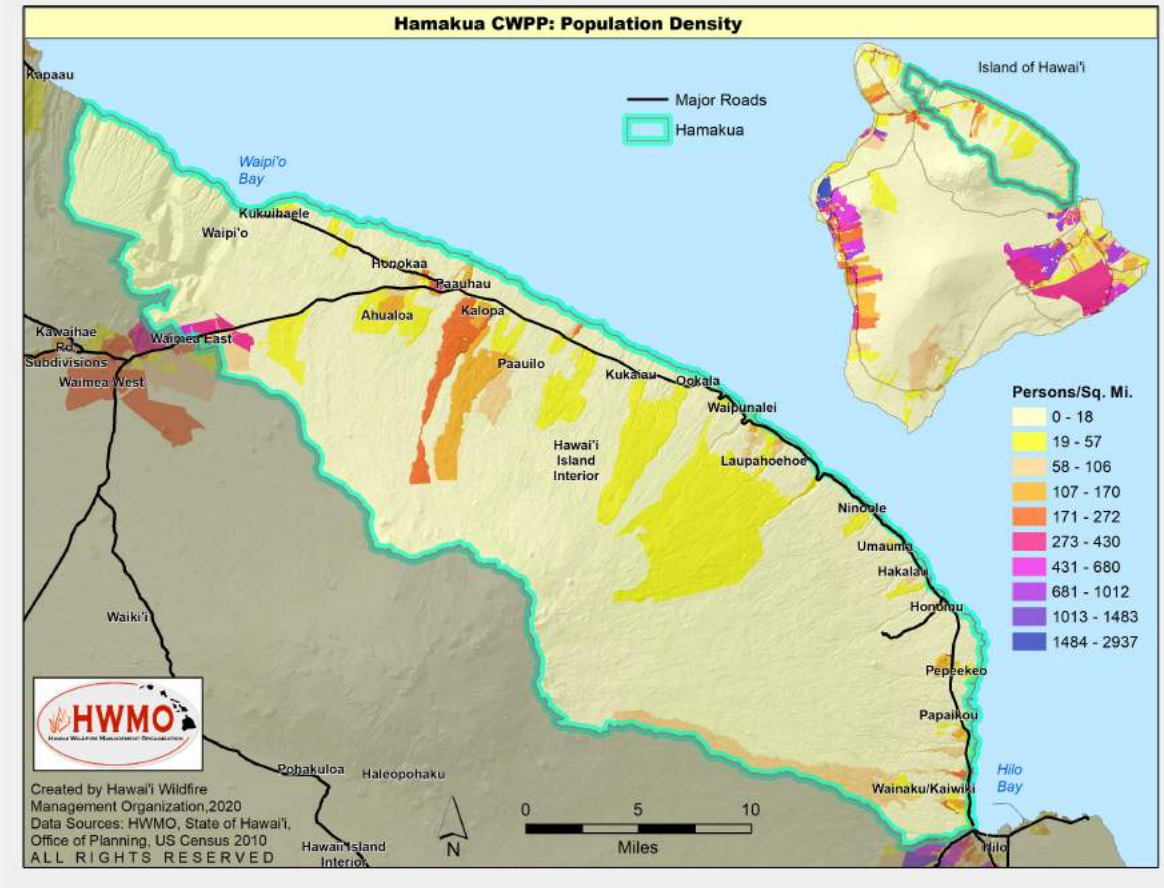
Located in one of the most rural, least densely populated parts of Hawai'i Island, Hāmākua is considered at risk of wildfire due to human-caused ignitions which are adjacent to vulnerable portions of the landscape. In addition, limited emergency response and difficult ingress/egress pose wildfire containment challenges than in more developed regions of the island.



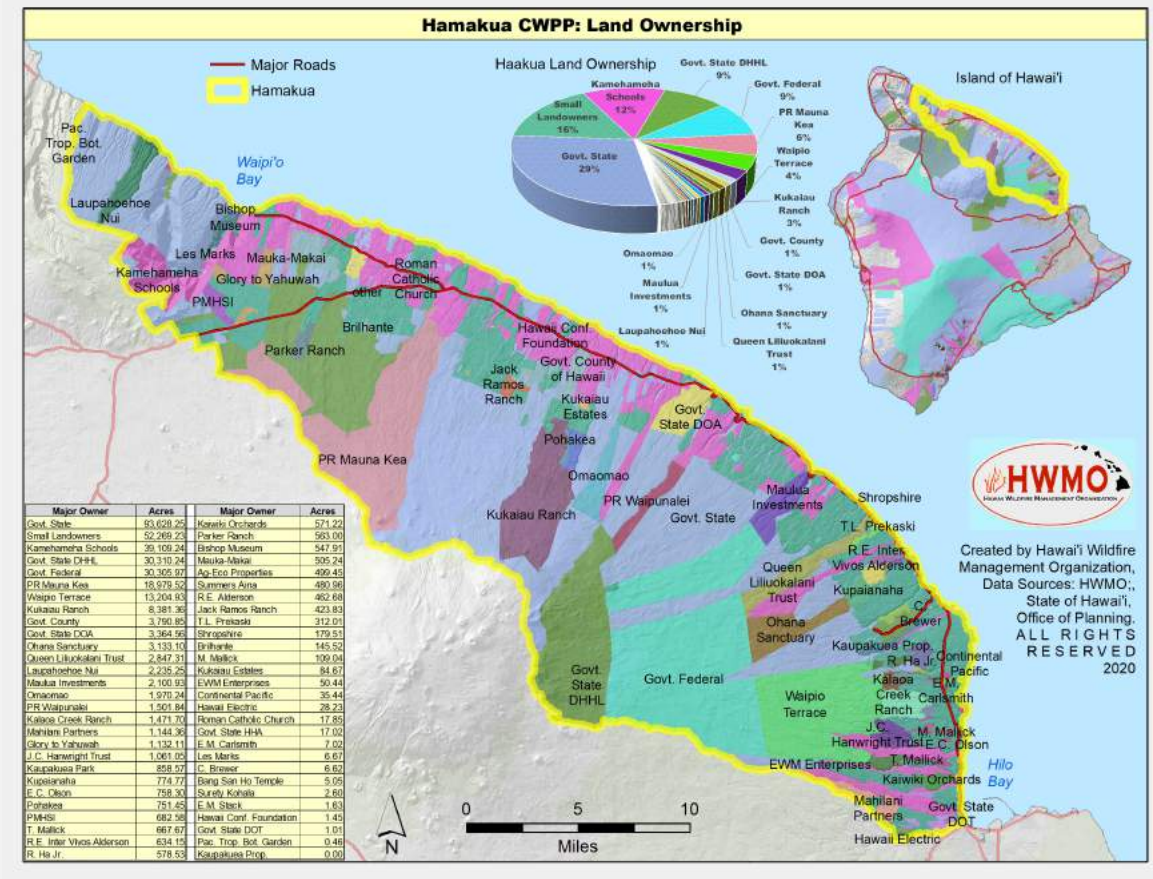

***Map 2. Towns and Communities in Hāmākua.***

There are 17 residential communities (Map 2) spread across the districts of Hāmākua, North Hilo and portions of South Hilo (collectively referred to as "Hāmākua" in this plan). These combined areas have a population total of 16,846 (per the 2010 U.S. Census). Located on the northeast flank of Mauna Kea volcano, Hāmākua is situated on the volcano's gentle, verdant slopes which are intersected by deep, u-shaped valleys and bounded by steep sea cliffs. Sparsely populated residential communities, schools, ranches, farms, and parks are spread across the coastline, all within close proximity to streams, lush vegetation, and rocky cliffs.

About 38% of the area under consideration in this plan is owned by the state of Hawai'i (Map 3),. This includes the Department of Hawaiian Homelands managed areas and the Department of Land and Natural Resources forest reserves and natural area reserves which are set aside for public hunting and ecological stewardship. Large and small private lands comprise just over a quarter of the land in the CWPP planning area, including Kamehameha Schools which is the single biggest landowner. The Pu'u Mali Restoration Area and the federally managed 30,000-acre Hakalau National Wildlife Refuge are both important ecological sanctuaries for native forest birds. Finally, Hāmākua's single coastal highway connects the 50 mile string of coastal rural communities to important natural areas, shorelines, and streams, as well as the larger towns of Waimea to the northwest and Hilo to the southeast.




***Map 3. Population density in Hāmākua, Hawai'i Island.***




| Major Owner | Acres | Major Owner | Acres |
|---|---|---|---|
| Govt. State | 53,628.25 | Kawaiki Orchards | 571.22 |
| Small Landowners | 52,269.23 | Parker Ranch | 563.06 |
| Kamehameha Schools | 39,109.24 | Bishop Museum | 547.91 |
| Govt. State DHHL | 30,310.24 | Mauka-Makai | 505.24 |
| Govt. Federal | 30,305.97 | Ag-Eco Properties | 499.45 |
| PR Mauna Kea | 18,979.52 | Summers Ajna | 480.96 |
| Waipio Terrace | 13,204.93 | R.E. Alderson | 462.68 |
| Kukaiau Ranch | 8,381.36 | Jack Ramos Ranch | 423.83 |
| Govt. County | 3,790.85 | T.L. Prekaski | 312.01 |
| Govt. State DOA | 3,364.56 | Shropshire | 179.51 |
| Ohana Sanctuary | 3,133.10 | Brilhante | 145.52 |
| Queen Liliuokalani Trust | 2,847.31 | M. Mallick | 109.04 |
| Laupahoehoe Nui | 2,235.25 | Kukaiau Estates | 84.67 |
| Maulua Investments | 2,100.93 | EWM Enterprises | 50.44 |
| Omaomao | 1,970.24 | Continental Pacific | 35.44 |
| PR Waipunalei | 1,501.84 | Hawaii Electric | 28.23 |
| Kalaoa Creek Ranch | 1,471.70 | Roman Catholic Church | 17.85 |
| Mahiliani Partners | 1,144.36 | Govt. State HHA | 17.02 |
| Glory to Yahuwah | 1,132.11 | E.M. Carlsmith | 7.02 |
| J.C. Hanwright Trust | 1,061.05 | Les Marks | 6.67 |
| Kaupakuea Park | 858.57 | C. Brewer | 6.62 |
| Kupaianaha | 774.77 | Bang San Ho Temple | 5.05 |
| E.C. Olson | 758.30 | Surety Kohala | 2.60 |
| Pohakea | 751.45 | E.M. Stack | 1.63 |
| PMHSI | 682.58 | Hawaii Conf. Foundation | 1.45 |
| T. Mallick | 667.67 | Govt. State DOT | 1.01 |
| R.E. Inter Vivos Alderson | 634.15 | Pac. Trop. Bot. Garden | 0.46 |
| R. Ha Jr. | 578.53 | Kaupakuea Prop. | 0.00 |

***Map 4. Land ownership in Hāmākua, Hawai'i Island.***

# PART II

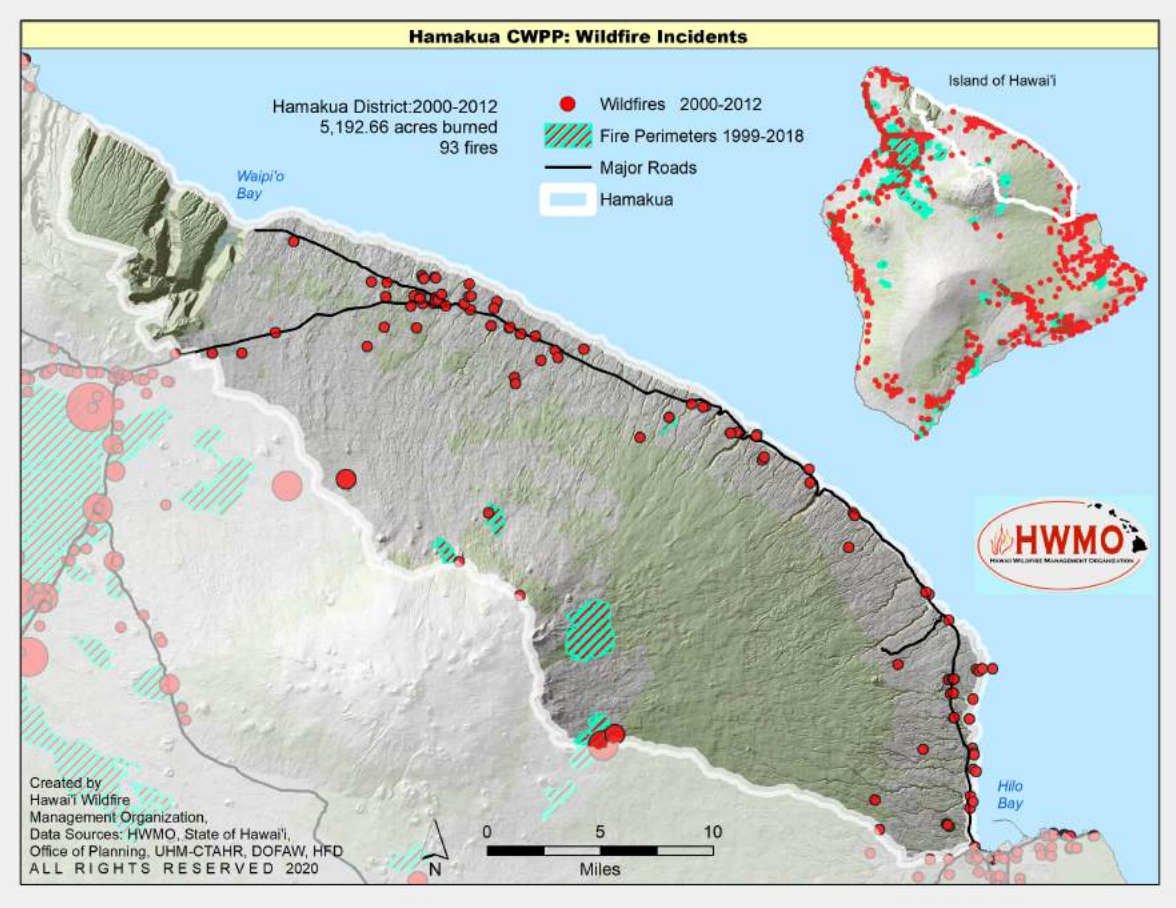
# WILDFIRE CHARACTERISTICS AND CONSIDERATIONS

# FIRE HISTORY

## WILDFIRE OCCURRENCE

The majority of wildfires on Hawai'i Island are caused by human error or arson, especially near developments, power lines right of way, and along roadsides. In Hāmākua, former agricultural lands once cultivated for sugar have been overtaken by fire-prone weeds while non-native grasses near developments and within tree plantations pose additional threats. Large tracts of planted eucalyptus also pose significant risk when conditions are dry. Once ignited along the interface, wildfire can spread rapidly through and around residential areas, threatening property, life, critical infrastructure, and both natural and cultural resources.

The fire history map below (Map 5) shows individual ignition locations over the past twenty years, including the perimeters of large fires in the upland regions between 1999 - 2018. Even with relatively high rainfall, areas of high human activity within Hāmākua may become repeat ignition hot spots, especially during dry periods. Across Hawai'i, humans are the cause of wildfires 99% of the time (only 1% are from natural causes such as lava or lighting). Reducing ignition is a major important component of reducing wildfire occurrence and damages.




***Map 5. Wildfire Incidents 2000-2012, Hāmākua, Hawai'i Island.***

## NOTABLE FIRES

Historically, wildfires have repeatedly been a problem in Hāmākua despite its location on the rainy, windward side of the island. Most notably, large-scale, unintended wildfires occurring during the sugar cane era began with the 30,000 acre fire in 1901 which was first intentionally set to clear brush for agriculture but escaped control. The fire was reported to have burned 15 miles long across a 2-4 mile stretch for three months until rains extinguished it. The Hāmākua fire combined with erosion from forest loss due to animal grazing prompted the Hawai'i Territorial government to take into consideration forest conservation and watershed health across all of the islands.

More than a century later, the loss of large-scale sugar cultivation which once dominated the Hāmākua coast has exacerbated the problem because of the transition of former croplands into alien grasslands. More challenging still is that these flammable areas are adjacent to roadways and human habitation. This, coupled with climate drying trends and a history of human-caused ignitions puts the area at increased risk of wildfire.

The closure of Hāmākua Sugar Company in 1995 prompted the sale and/or lease of the company's former 25,000-acre plantation lands to the public. Since then, the Hāmākua coast has seen an increase in both residential development, diversified agriculture, and accompanying infrastructure. This includes various small farms growing food and ornamental plant crops by private landowners and public cooperatives, most notably on lands leased to farmers. This proximity of increased human presence beside unsold or un-leased fallow lots poses an increased fire threat, combined with the historic use of the area for recreation, ranching, and farming.

For example, between 2000 - 2012, more than 5,000 acres burned in 93 wildfires. In 2000, multiple fires threatened the Hakalau Forest Reserve, an important refuge for rare and endangered native Hawaiian forest bird populations, scorching mesic (drier than wet) forest habitat. Likewise, fires started in the upper elevation dry and mesic forests and shrublands (near or on Mana Road) are an ongoing threat to state forest reserves, endangered birds, and plants. Hikers, dirt bikers, and campers are possible ignition sources. In 2021, drought was linked to a large 1,400 acre fire in which 66 personnel were

***Image 1. Pau'uilo firefighters back burning in anticipation of a nearing wildfire in June 2021. Photo Credit: DLNR***

deployed by land and air to protect life and property. The drought had been preceded by a rainy year in which vegetation build-up provided more potential fuel to burn. As the climate warms and periods of drought become more frequent, wet areas like these will require more vigilant attention in planning for wildfire mitigation.

Table 1 (below) summarizes the notable fires between 2000 - 2023.

| Location | Date | Size (acres) | Threatened Resources |
|---|---|---|---|
| Pau'uilo | 2022, 2023 | <100 acres ea. | Several grass fires in and around Pa'auilo area, contained quickly |
| Pau'uilo | June 2021 | 1400 | highway closure and 15 homes & 10 structures threatened by fire |
| Pu'u Mali | | 1,000 acres? | in mid elevation area |
| Pau'uilo - O'okala | June 2017 | 10 | wildfire set by vehicle spread to pasture and eucalyptus forests prompting temporary highway closure |
| Laupāhoehoe Natural Area Reserve | 2012 | 22.2 | Waipunalei Fire was probably started from a lightning strike. The fire burned near the koa mill in Waipunalei, between Laupāhoehoe Forest and the Humu'ula section of Hilo Forest Reserve (fuels were mainly kikuyu grass) |
| Pau'uilo - O'okala | Oct 2011 | 6-8 | wildfire threatened 1 home, destroyed a makeshift abandoned lean-to and swept through an abandoned cemetery |
| Laupāhoehoe Natural Area Reserve | 2008 | 2800 | "Piha fire" burned non-native grasses and koa canopy from Hopuwai Corral above Piha FR across to Laupāhoehoe FR and up to Mauna Kea FR |
| Hakalau | Aug 2000 | 200 | called the "Piihonua fire", the fire threatened Hakalau Forest Reserve |
| Hakalau | July 2000 | 5 | called the "Maulua fire" three fires threatened the Hakalau Wildlife Refuge, destroying 5 acres of native mesic forest and threatening rare birds |
| Hakalau | March 2000 | 3 | called the "Aahuwela II fire", the fire threatened Hakalau Forest Reserve |
| Hakalau | Feb 2000 | 1400 | called the "Aahuwela fire", the fire threatened Hakalau Forest Reserve |

***Table 1. Notable fires 2000 - 2023, Hāmākua, Hawai'i Island.***

# FIRE ENVIRONMENT
## WILDFIRE DRIVERS

The factors that contribute to wildfire occurrence and spread on the windward side of the island are a combination of abundant fuels ignited by people and periodic climate conditions favoring drought and high winds. During dry conditions in the Hāmākua region, these can stack up to yield a high risk of wildfire, rapid spread, and significant impacts from summit to sea.

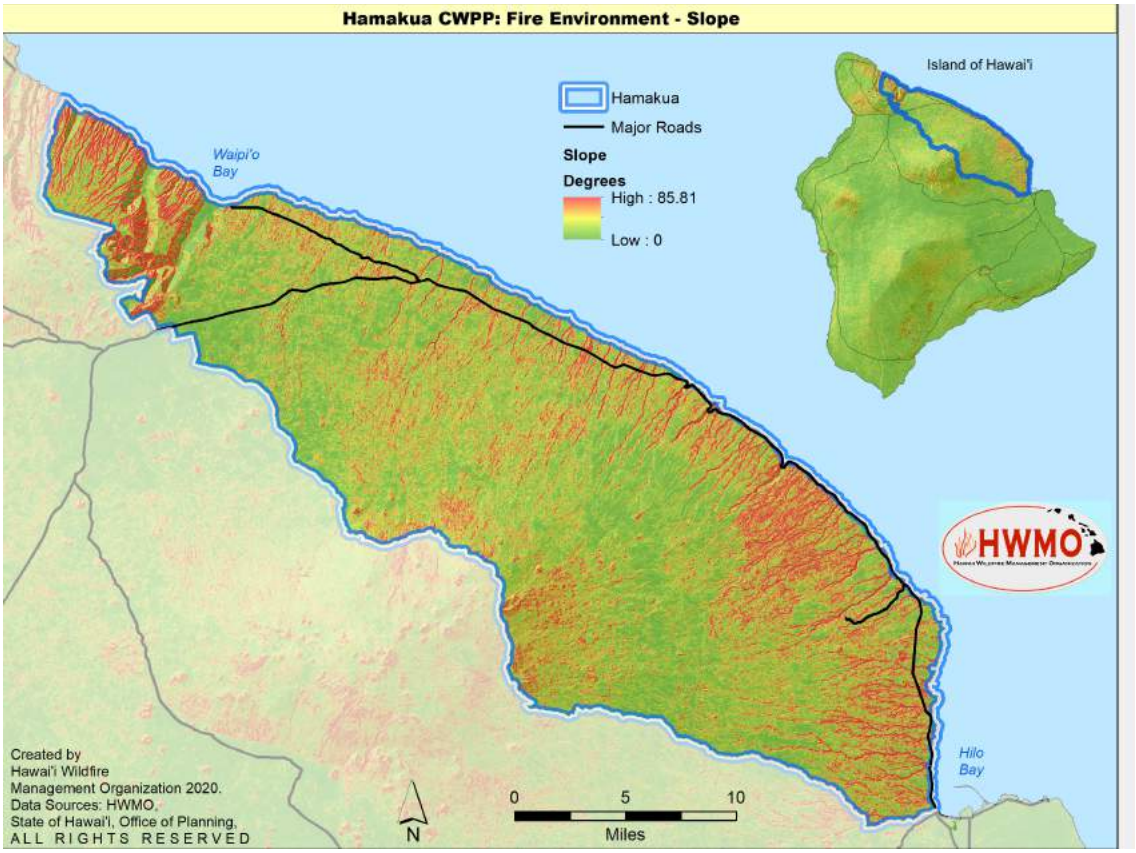
***TOPOGRAPHY***

Topography influences fire behavior principally by the steepness of the slope. However, the configuration of valleys and ridges can influence fire spread and intensity. In general, the steeper the slope, the higher the uphill fire rate spread and intensity.

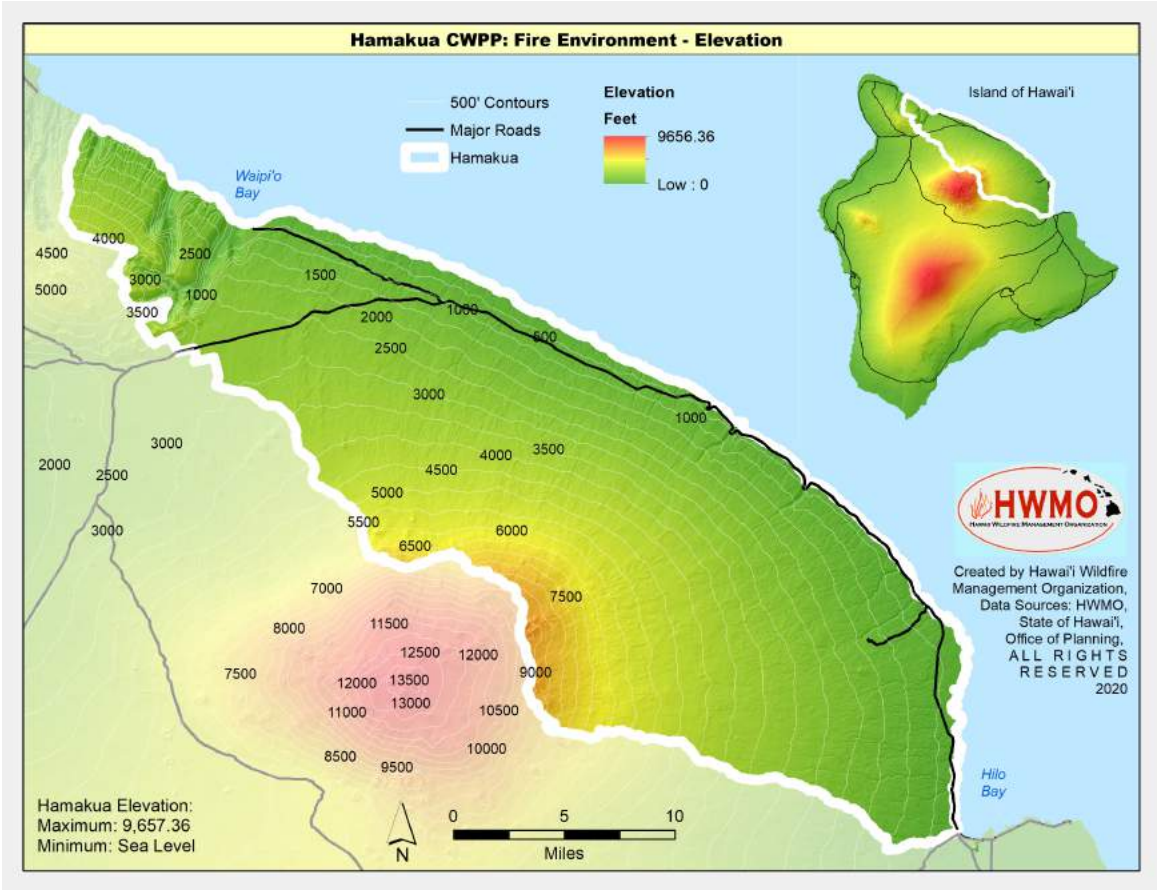

***Photo 1. The north-facing view of the CWPP area includes Mauna Kea's coastal areas***

The project area spans coastal sea cliffs and beaches dissected by u-shaped valleys on the northeastern flank of Mauna Kea, a gently sloping shield volcano (Map 6 next page), and the tallest of five on Hawai'i Island. Within the planning area, the coastline is characterized by rugged, and often inaccessible terrain rising from sea level to approximately 9,000 ft in elevation (Map 7 next page). Remote, sub-alpine shrublands at the highest elevations (Photo 1 above) are generally drier than the moisture-laden low-to-mid elevation rain forests which require drought conditions to burn, a more recent phenomenon. However, this topography can create dangerous conditions when wildfires do ignite in the lowlands since wildfires spread more quickly as they progress upslope.

The communities of Hāmākua have a single north-east and north-west egress option along the coastal two-lane Highway 19. Waipi'o Valley is even more isolated since it is four-wheel drive access only. In addition, many of the communities nested in valleys and built along ridges have limited access routes. These constraints may limit emergency response access to the wildland areas adjacent to rural homes, some of which are off-grid. Once wildfires spread into rugged, upland areas, the lack of roads and difficult terrain limit fire response to costly aerial operations (i.e., bucket drops by helicopters), as conditions may prove difficult to deploy firefighters on the ground.




***Map 6. Slope across the Hāmākua CWPP planning area.***

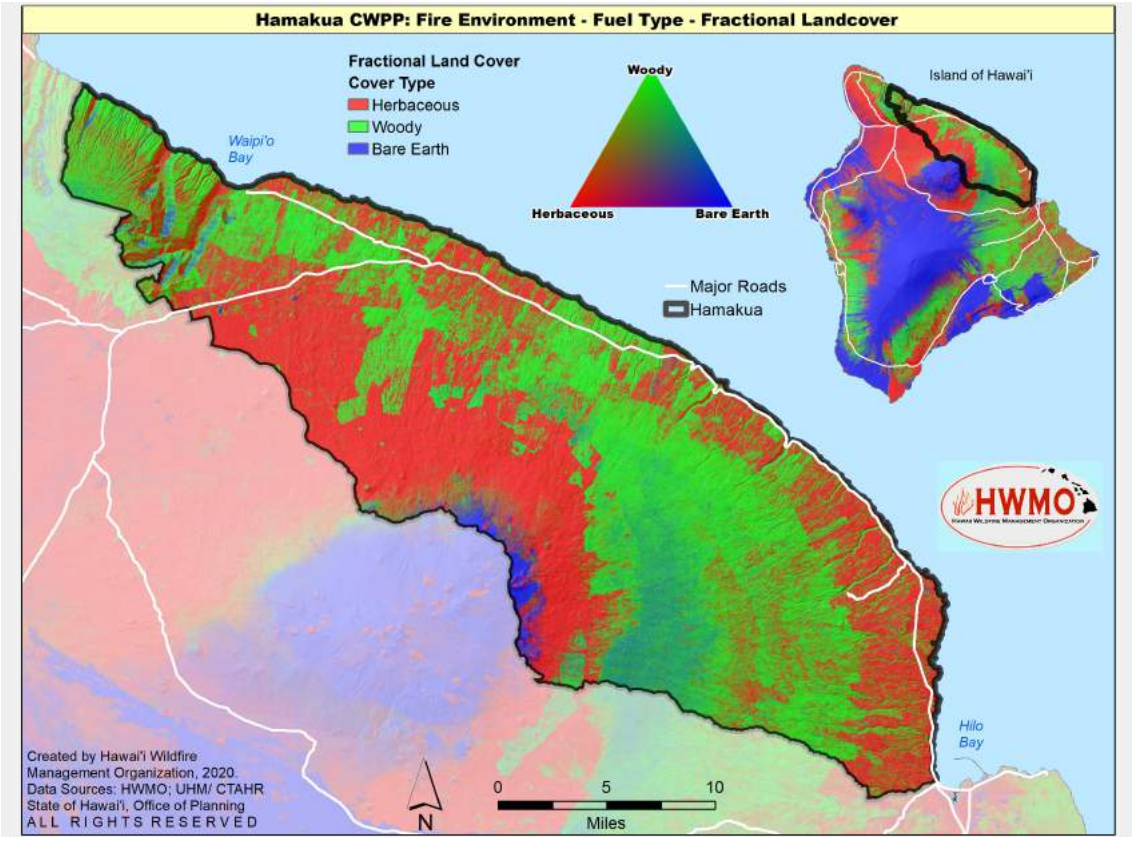



***Map 7. Elevation across the Hāmākua CWPP planning area.***

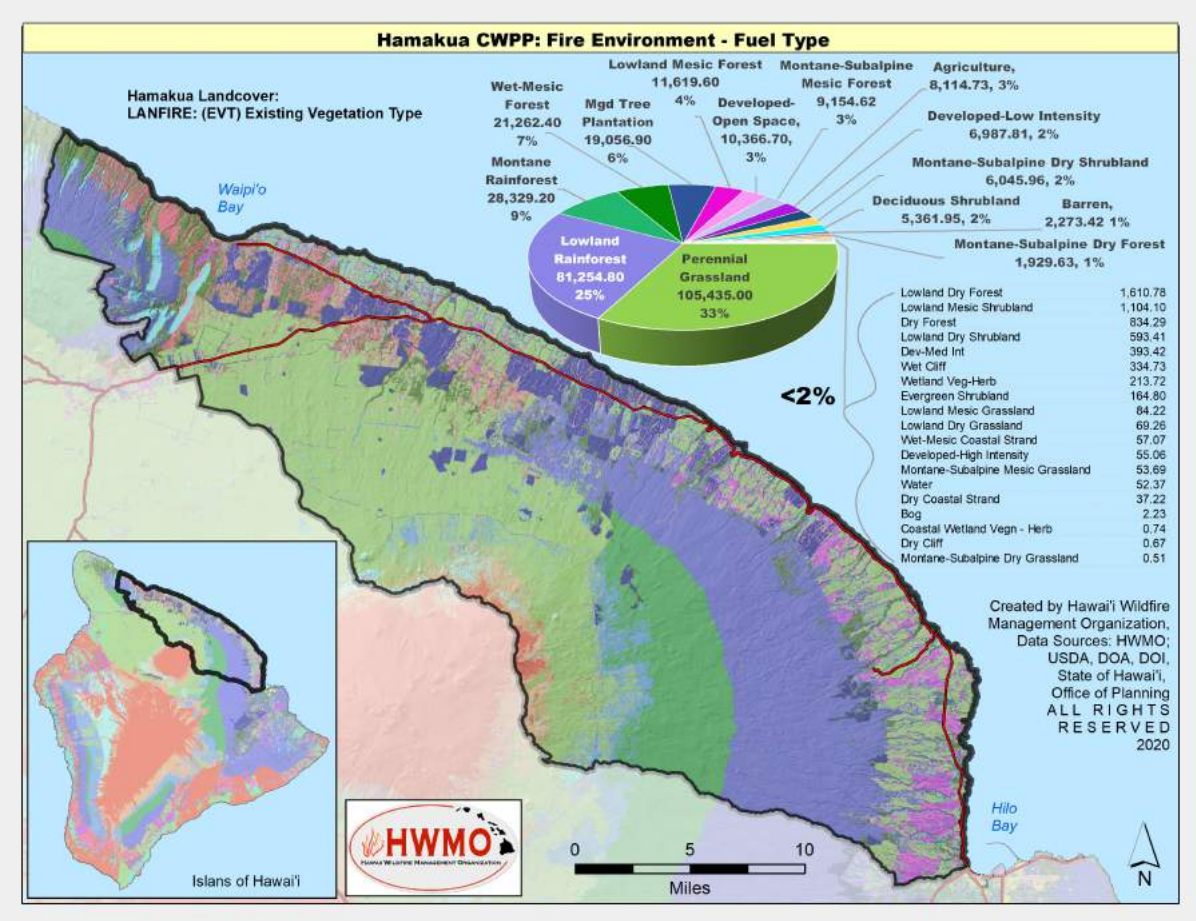
***FUEL***

Fine "flashy" fuels ignite more easily and spread faster with higher intensities than coarser fuels. For a given fuel, the more abundant and continuous it is, the faster the fire spreads and the higher its intensity. Fine fuels like grasses take a shorter time to burn out than coarser fuels like shrubs and trees.

Since Hāmākua covers various topographic and climatic characteristics from summit to sea, a mosaic of land cover types exists within the area. Map 8 below characterizes fuels in the CWPP area by indicating whether it is grass (herbaceous), woody, or bare ground. While the species also indicates the level of fire hazard, visualizing by class of vegetation such as in Map 8 is useful for understanding how easily fire will ignite. The lowland vegetation (< 2000 ft) is mostly herbaceous, consisting of non-native grasses and non-woody shrubs. The higher elevation areas consist of a mix of drier native and alien shrublands and grasslands. Under drought conditions in Hāmākua, grasses in particular can become flashy, dry easily, and ignite readily. Rainforest trees and woody vegetation (in green) span from the coast to about 8,000 ft and are less likely to readily burn in Hāmākua. In the best case scenario, patchy or non-contiguous fuel types could slow the spread of wildfire and provide options for fire control. Zooming into consider the specific vegetation types (Map 9), Guinea grass (Megathyrsus maximus), Elephant grass (Cenchrus purpureus), and Kikuyu grass (Pennisetum




***Map 8. Fuel type: Woody/green, herbaceous (grass, shrubs, forbs)/red, and bare earth across the Hāmākua CWPP planning area.***




***Map 9. Fuel types across the Hāmākua CWPP planning area.***

clandestinum), as well as non-native shrubs such as gorse (Ulex europaeus), are widespread throughout the low to mid-elevations. Although no detailed vegetation survey data exists for the entire planning area, Guinea grass is the dominant fire threat on former plantation lands. It provides abundant fuels that cure rapidly in dry conditions, are easily ignitable even in humid conditions, and allow fires to spread rapidly, creating dangerous conditions for fire responders. Guinea grass is particularly problematic as it is fast-growing, invades a wide range of ecosystems, and alters the flammability and fuel load of a given area. Natural resource managers have noted that Guinea grass produces extra-long flame lengths and generates a lot of heat during wildfires.

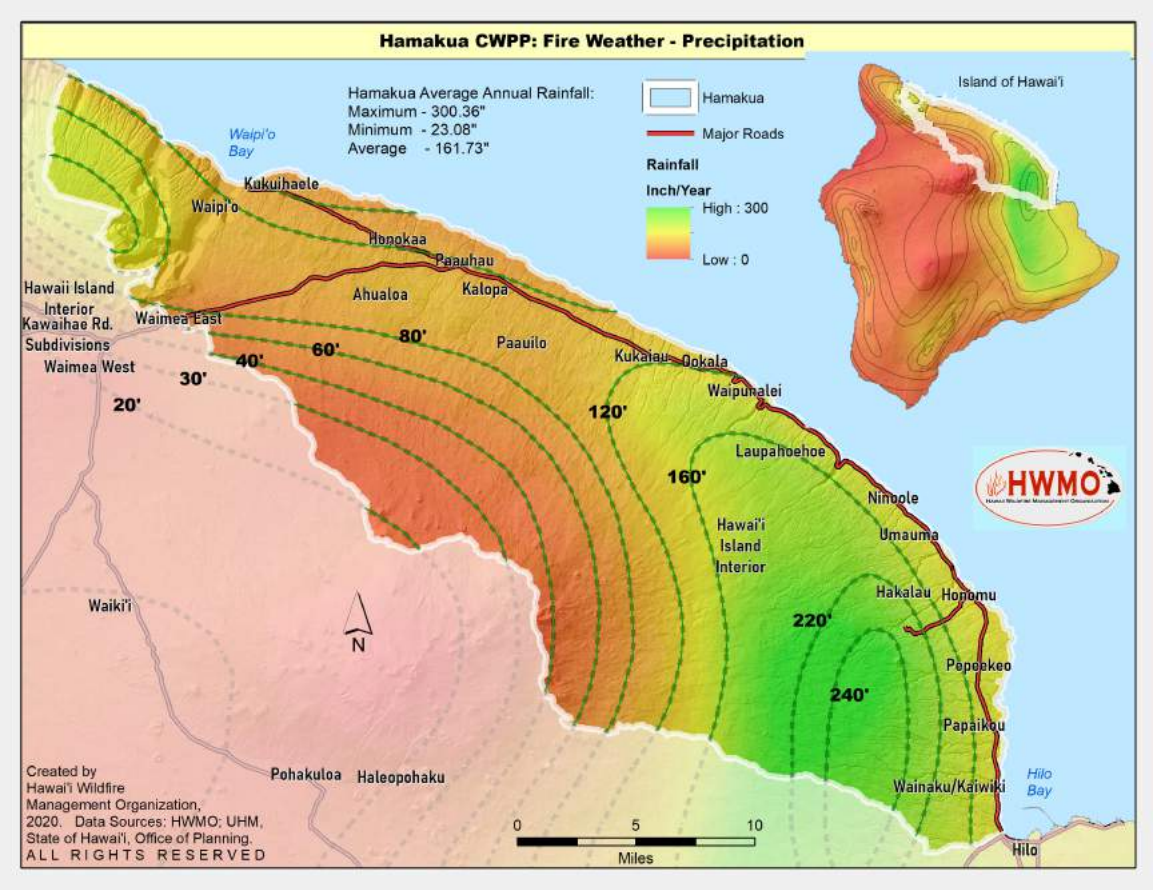
Lower elevation forests in Hāmākua contain various non-native tree species most notably (as it relates to wildfire) Eucalyptus grandis plantations, Ironwood (Causurina spp.), and some Silk oak (Grevillea robusta) now colonizing fallow old sugar cane lands. Although fire behavior in these mixed forests is poorly documented, natural resource managers and firefighters have observed certain problematic fire-promoting characteristics. For example, ironwood can be problematic because of the needle litter and duff which burns easily and spreads fire along underground root systems, making suppression efforts difficult. The chemical content in some eucalyptus species' leaves and bark may prevent decomposition, resulting in large and persistent fuel loads beneath live trees. These

increased fuel loads can result in high-intensity fires that result in 'torching' or vertical fire spread into tree canopies as has been observed in eucalyptus stands during some wildfires across the state.

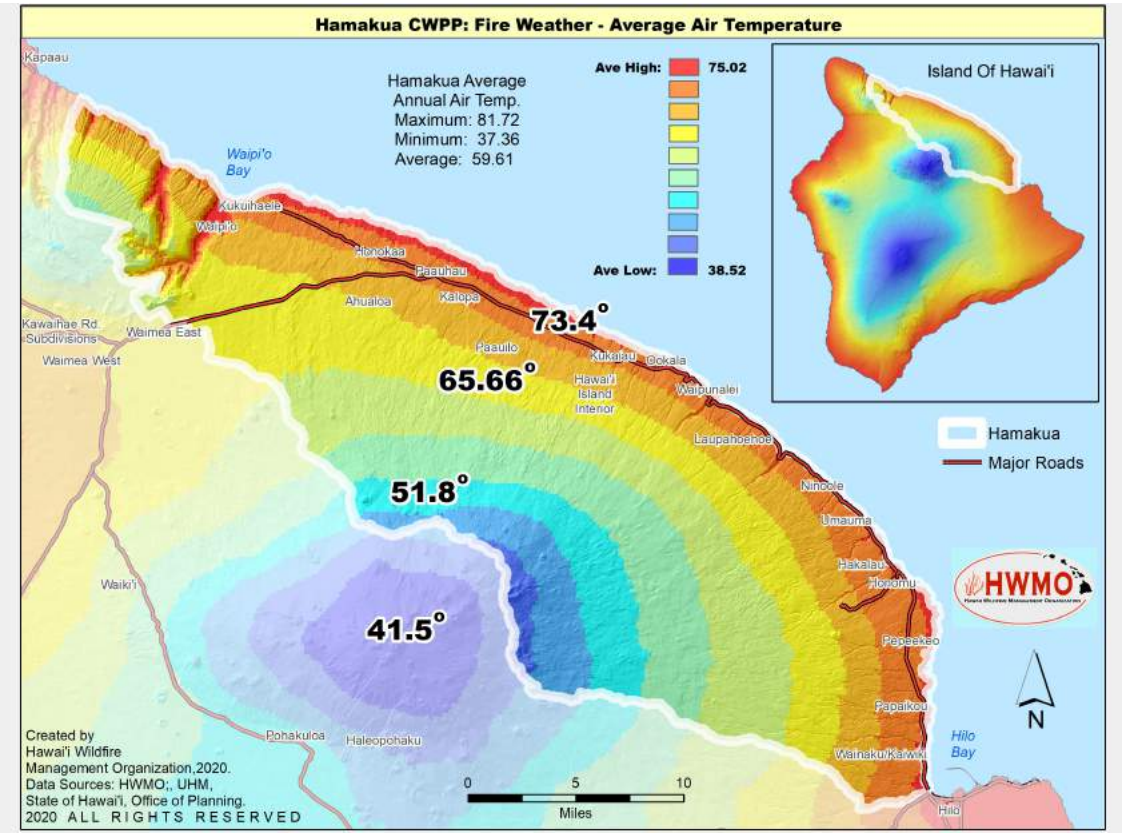
In addition, fuels from lowland grasslands and shrublands can carry a wildfire upslope much more quickly than a flat area due to convection, or the pre-heating of fuels at higher elevations. As a result, recurrent fires in these lower-elevation grasslands and shrublands could effectively 'erode' the edges of upper forested areas. Once replaced by grasses, these areas increase the risk of future fires over time. Upper-elevation forests contain important native mesic forests, rainforests, and forest bird populations, all of which are directly threatened by ignitable, ungrazed, adjacent pasture lands.

### *CLIMATE AND WEATHER*

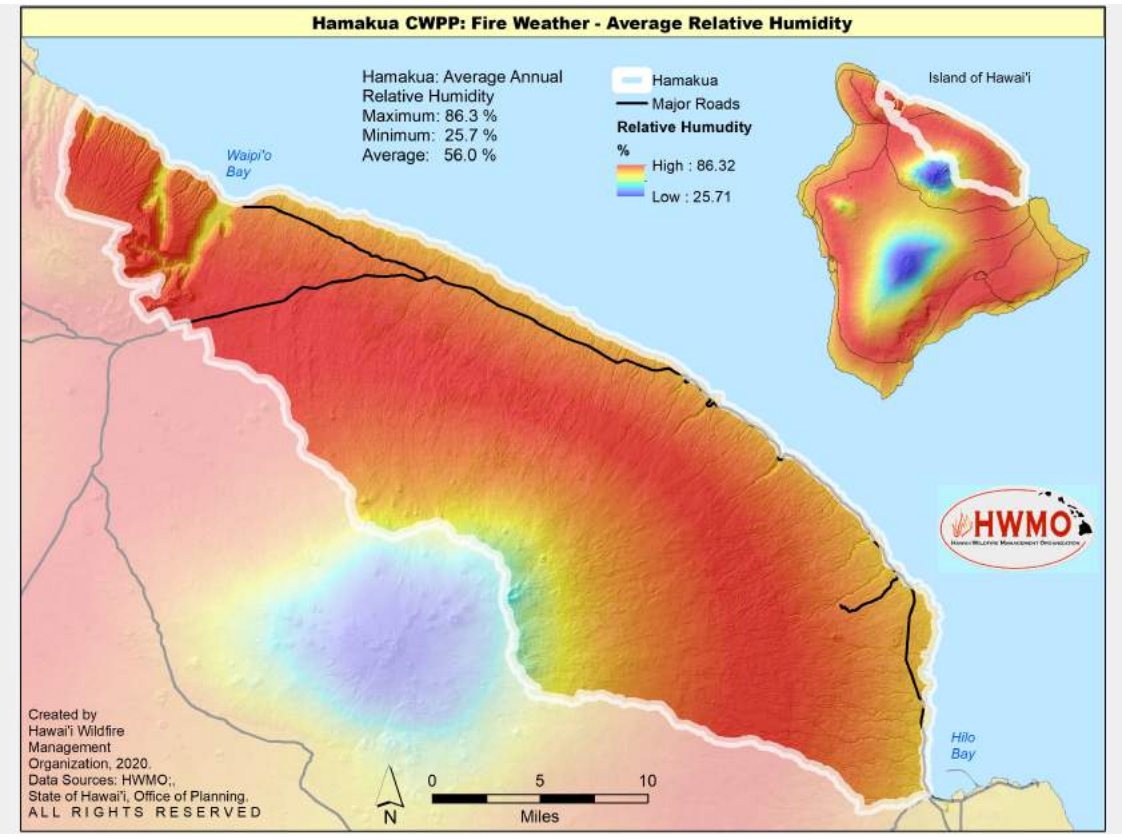
Hāmākua is directly exposed to prevailing moisture-laden northeast trade winds, which are intercepted by the northeast slopes of Mauna Kea. As a result, the majority of the planning area has moderate to extremely high rainfall and humidity, most notably at the eastern end (Map 10). Moderate sun exposure results in cooler air temperatures overall. Maps 11 and 12 (next page) illustrate this relationship.



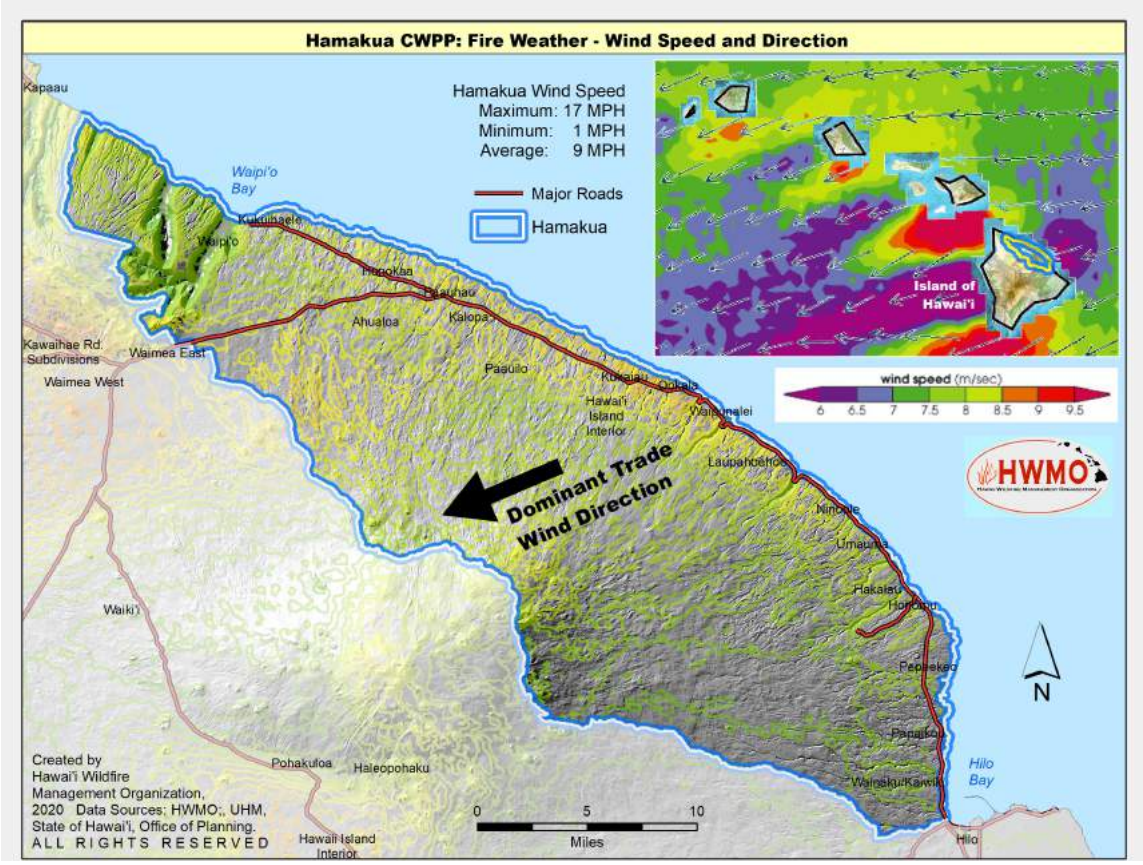

***Map 10. Precipitation across the Hāmākua CWPP planning area.***




***Map 11. Average Air Temperature across the Hāmākua CWPP planning area.***




***Map 12. Relative Humidity across the Hāmākua CWPP planning area. Note that in Hawai'i, wildfires can ignite and carry across the landscape even in high humidity.***




***Map 13. Dominant wind direction (from the northeast) and associated average wind speeds across the Hāmākua CWPP planning area. Winds are driven by the trade wind pattern with localized disruptions due to topography, seasonal anomalies, and storms, often making then erratic.***

Since rainfall is greater across the planning area than in leeward areas, this typically results in lower fire risk on average for Hāmākua. However, drought conditions can persist and create a potential fire hazard, especially with abundant vegetation as a fuel source. Wet periods such as those seen in 2020 increase the quantity of available vegetative fuels, leading to an increase both in fire risk and in the frequency that mitigation measures such as firebreaks and fuel reduction need to be applied. Since climate change in the Pacific predicts more extreme weather events such as droughts and floods, this could increase both vegetative fuel loads during rainy periods and the likelihood of wildfires during extended dry conditions.

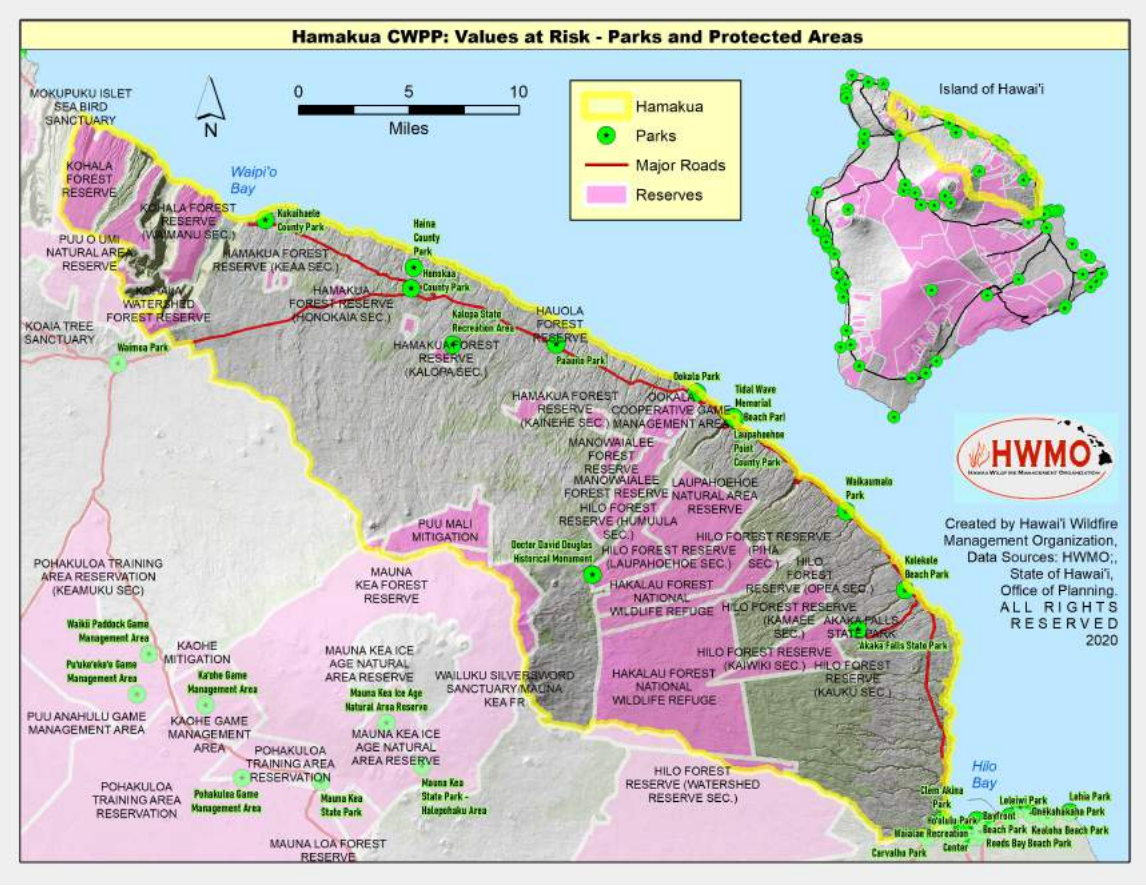
Other wildfire risk factors include wind speed and direction. The planning area is subject to daily weather patterns including diurnal thermal winds which cause sea breezes during the day as the land warms and land breezes at night as it cools. Gentle breezes vary only slightly across Hāmākua (Map 13) depending on whether one is within a gulch, ravine, along the coast or at higher elevations. For example, in more sheltered, inland areas, the average wind speed hovers between 2 - 6 mph. However, in more exposed locations such as the coastlines and mountain ridges, wind speeds range between 10 - 16 mph, with gusts even higher. As noted earlier, fires that begin in the lowlands can easily be pushed into the upland areas, particularly if winds are stronger and drier than normal.

# WILDFIRE IMPACTS

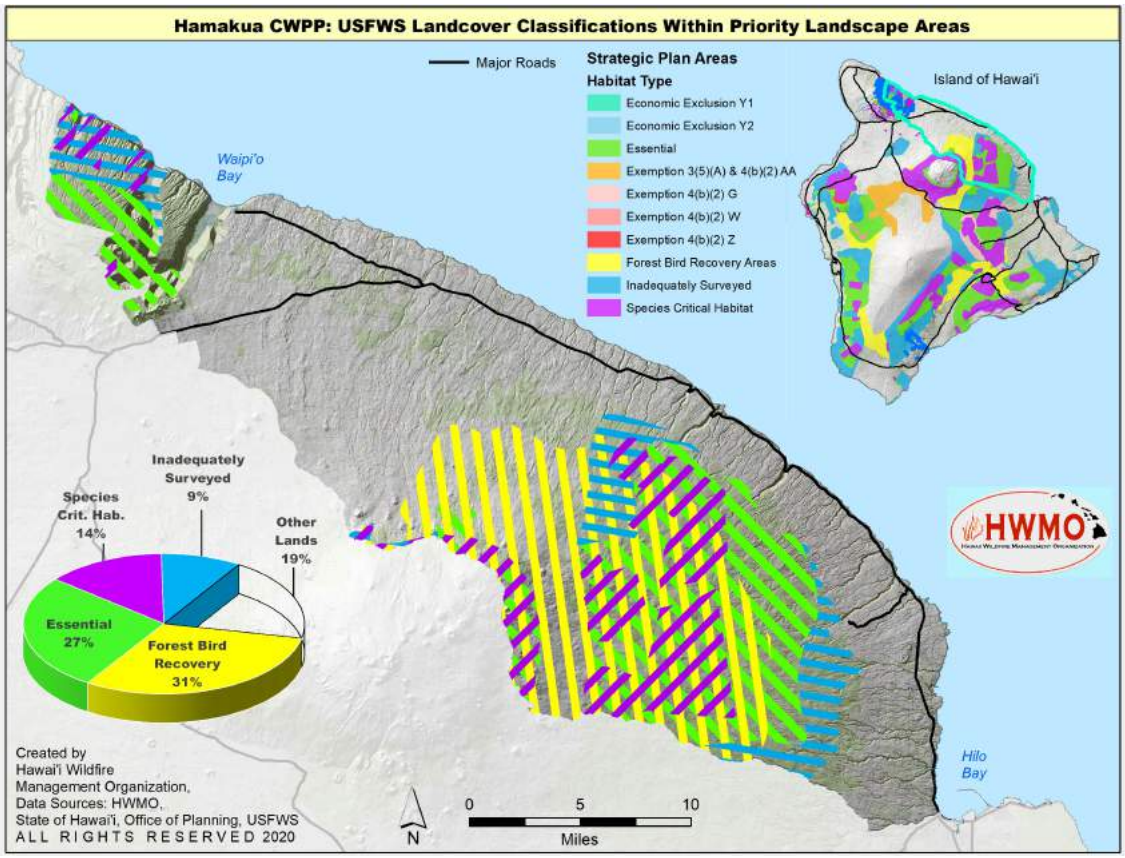
The economic, natural, and cultural resources in Hāmākua are increasingly exposed to wildfire impacts, especially with the predictions of a drying, hotter climate. Although land-based, aquatic, and marine-based natural and cultural resources are spread across the region, wildfire is a direct threat to vulnerable populations of rare species, culturally significant sites (such as Hawaiian trails, shelters, terraces, and platforms) as well as community access to important shorelines, recreation and subsistence hunting and fishing.

### *IMPACTS TO NATURAL RESOURCES*

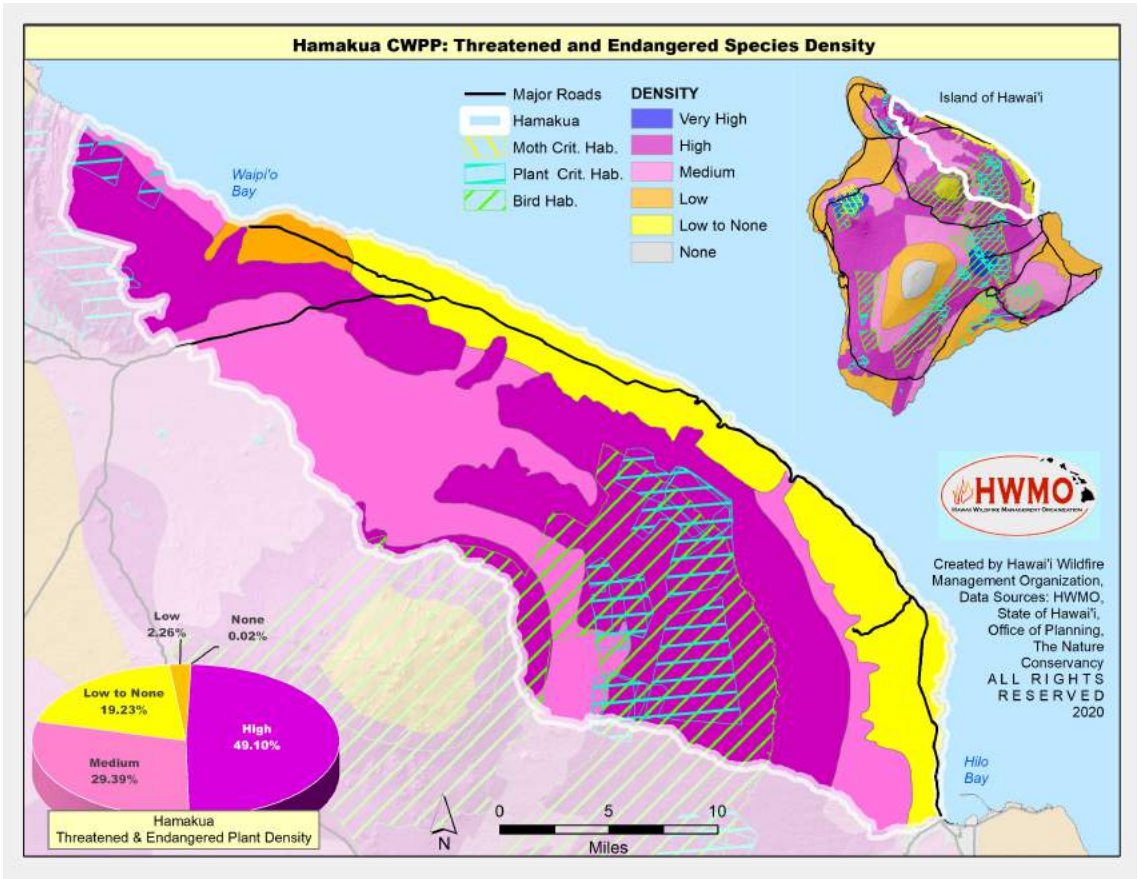
Wildfire is a major cause of native ecosystem loss and degradation in Hawai'i. Across the state, recurrent wildfires result in the conversion of both native and non-native forested areas to fire-adapted grasslands and shrublands. As a result, these fire-prone ecosystems are expanding. As temperatures rise in the Pacific, the risk of wildfire to native ecosystems such as those in wet areas of Hāmākua—areas previously considered low risk—must now be considered. To date, Hāmākua has already been impacted by fire given the repeated human-caused ignitions near roads and the dominance of highly flammable fuels at lower elevations.




***Map 14. Parks and protected areas within the Hāmākua CWPP planning area.***




***Map 15. Landcover Classifications within the Hāmākua CWPP planning area.***




***Map 16 . Density of Threatened and Endangered Plants within the Hāmākua CWPP planning area.***

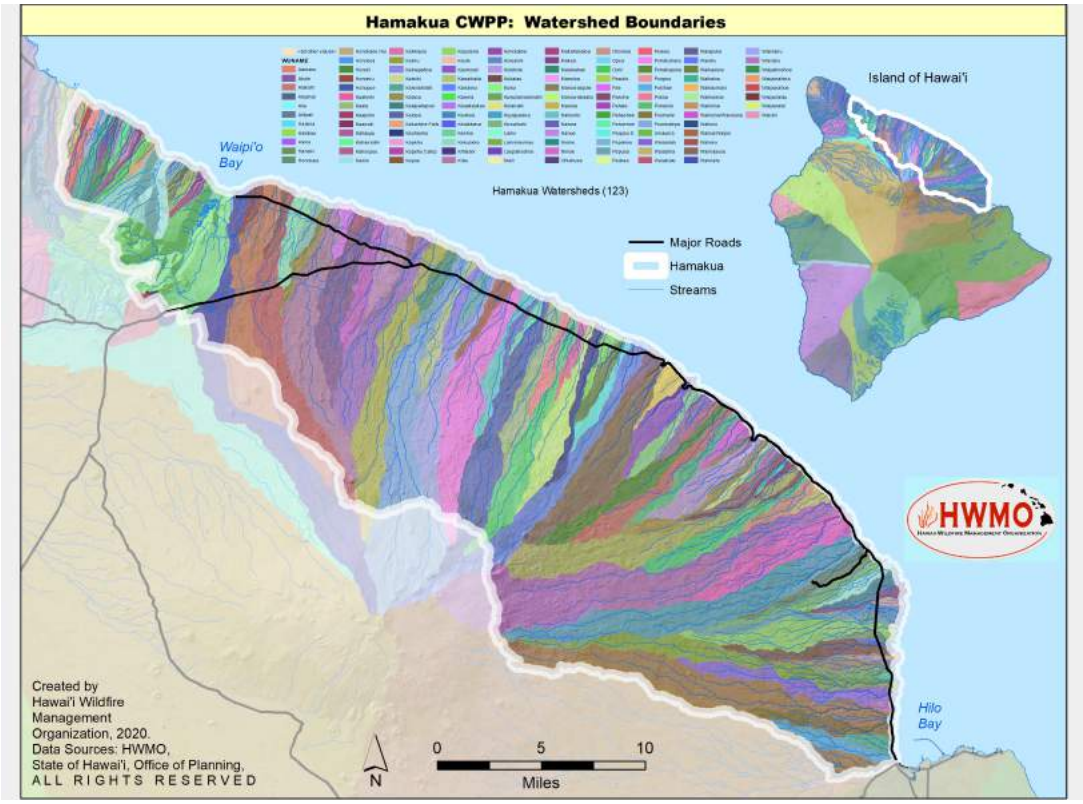
For example, upland areas including Hakalau Forest Reserve (Map 14, above) contain expanses of native rain forests dominated by ʻŌhiʻa (Metrosideros polymorpha) and Koa (Acacia koa) trees, as well as mesic and dryland forests consisting of both koa and Mamane (Sophora chrysophylla), and associated understory species. Hakalau is a refuge for a superb array of 14 endemic bird species including rare honeycreepers, native waterbirds, raptors, and the endangered Hawaiian hoary bat for which US Fish and Wildlife Service has designated critical habitat (Maps 15 and 16, previous page).

Likewise, neighboring Department of Hawaiian Homelands and Department of Land and Natural Resources (DLNR) forest reserves also provide habitat for these same rare or endangered plants and animals. In addition, DLNR manages five forest reserves across the planning area for multi-use purposes (public hunting and hiking) as well as two designated Natural Area Reserves for special ecological protection and preservation including Laupāhoehoe and Pu'u O Umi. nesting sea birds, plants, and Partulina snails are known from Pu'u O Umi which also contains the native ʻUluhe fern, known to easily burn. The proximity of these sensitive areas to both roads and fallow agriculture lands poses an ongoing wildfire threat.

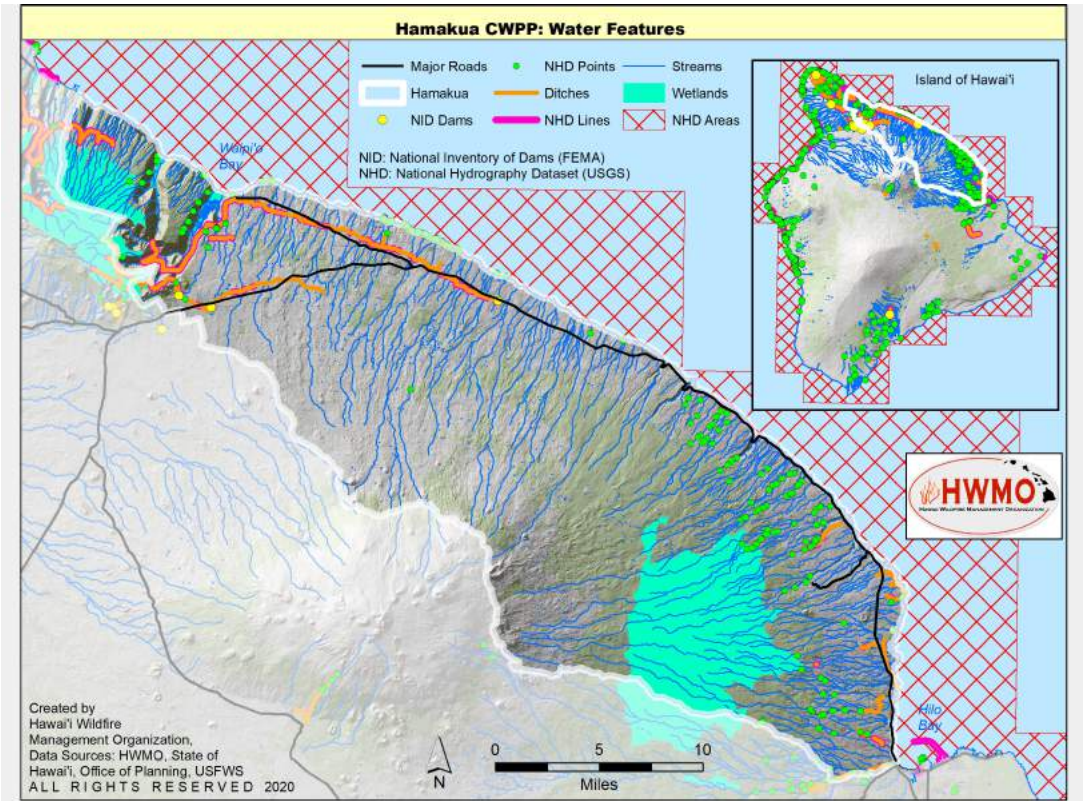
Higher-elevation, drier native mesic forests, and shrublands are perhaps most likely to be impacted by wildfire. Portions of Mana Road (just south of the CWPP planning area border) wrap around Mauna Kea'and provides access to dirt bikers, camping, and hunting. Wildfire ignitions from campfires and off-road vehicles are an ongoing threat, especially during drought. As a result, fires that begin on Mana Road may burn uphill towards the summit or downhill into the state forest reserves (i.e., the CWPP planning area) and the high-elevation Pu'u Mali mitigation area. The latter serves as a restoration and future re-introduction site for the endangered Hawaiian Palila (Loxioides bailleui), a species of honeycreeper found only on Hawai'i Island. In response, the Mauna Kea Forest Restoration (a project of DLNR) is doing extensive koa tree planting and fire mitigation such as mowing fire breaks in anticipation of future wildfires.

The native forests and ecosystems on Hawai'i Island including those in this CWPP represent the largest expanses of native-dominated ecosystems remaining in the islands. However, the habitats for those species described above have been greatly reduced across their respective ranges. These Hawaiian plant and animal species do not survive and/or recover from wildfires. More generally, the conversion of their habitat to alien-dominated ecosystems due to fire not only increases the threat of species extinction but also the potential for future and larger fires by expanding the availability of fine fuels.

Wildfire also increases the potential for erosion and sediment delivery from upland to coastal and nearshore areas. The immediate loss of vegetation after a wildfire directly exposes soils to rainfall, which could potentially increase erosion in the watershed. Hāmākua contains no less than 123 watersheds (Map 17), replenishing streams, springs, wetlands, and their aquatic life forms while providing a main source of both surface and ground drinking water. The region is home to a




***Map 17 . Watersheds within the Hāmākua CWPP planning area.***



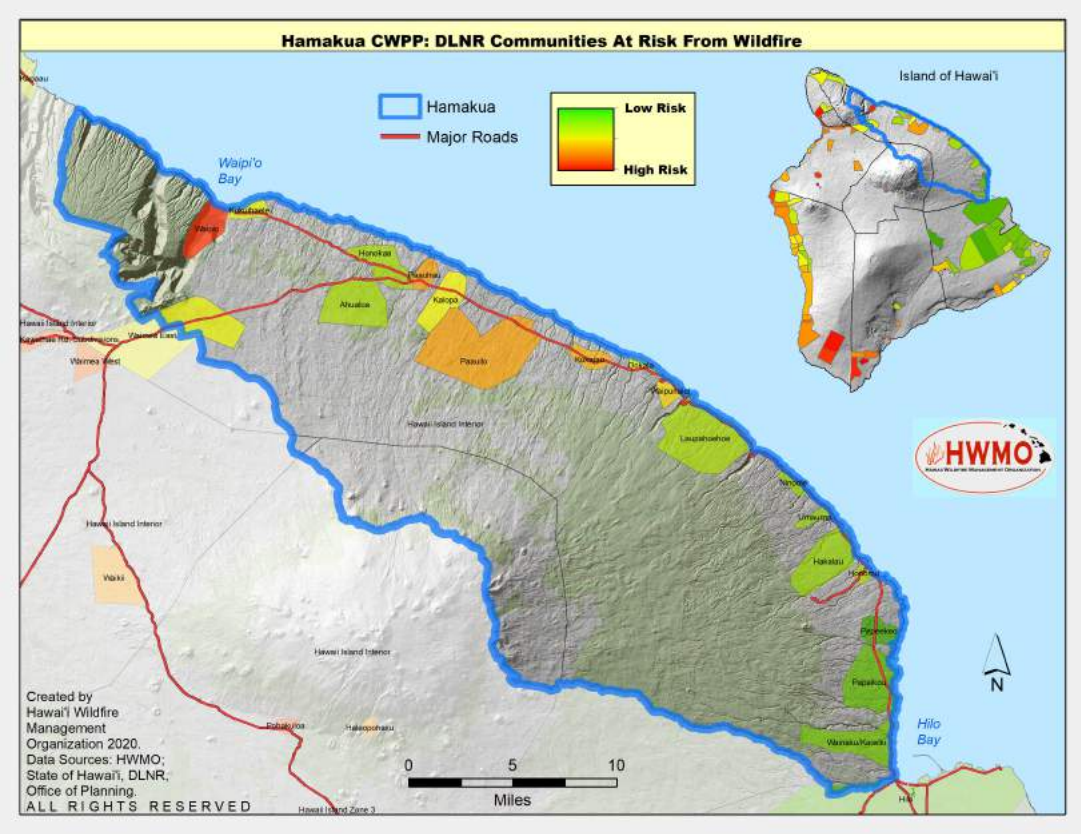

***Map 18. Water features within the Hāmākua CWPP planning area.***

complex ditch system which delivers an estimated 42 million gallons per day of fresh water. Burned soil from wildfires is also known to decrease groundwater recharge. Loss of vegetation can increase downstream flooding and sediment delivery thereby impacting not only valuable freshwater resources but also the marine environment (Map 18). In particular, Hāmākua contains numerous streams, waterfalls, and sea cliffs that empty into bays, valleys, and fishing grounds which are actively farmed and fished. Siltation of these productive land and sea resources not only affects subsistence but also their recreational enjoyment.

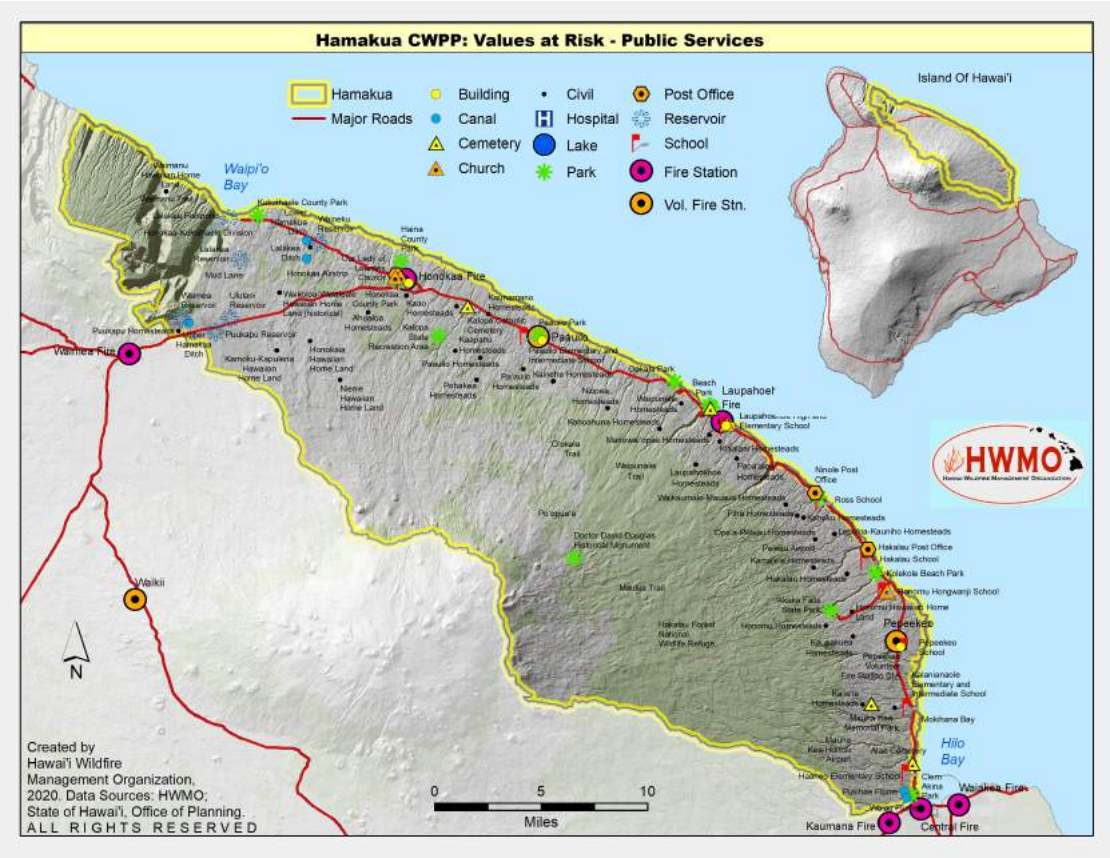
In addition, burned areas can remain closed to the public for days to months due to landslide and tree-fall danger, limiting important public access to these areas. This includes opportunities for hiking, hunting, gathering plants, and tending cultural sites. Although fire may have limited, direct impacts on these resources, suppression efforts, such as water drops and bulldozing can damage these important landscape features.

### *IMPACTS TO COMMUNITIES AND MUNICIPAL RESOURCES*

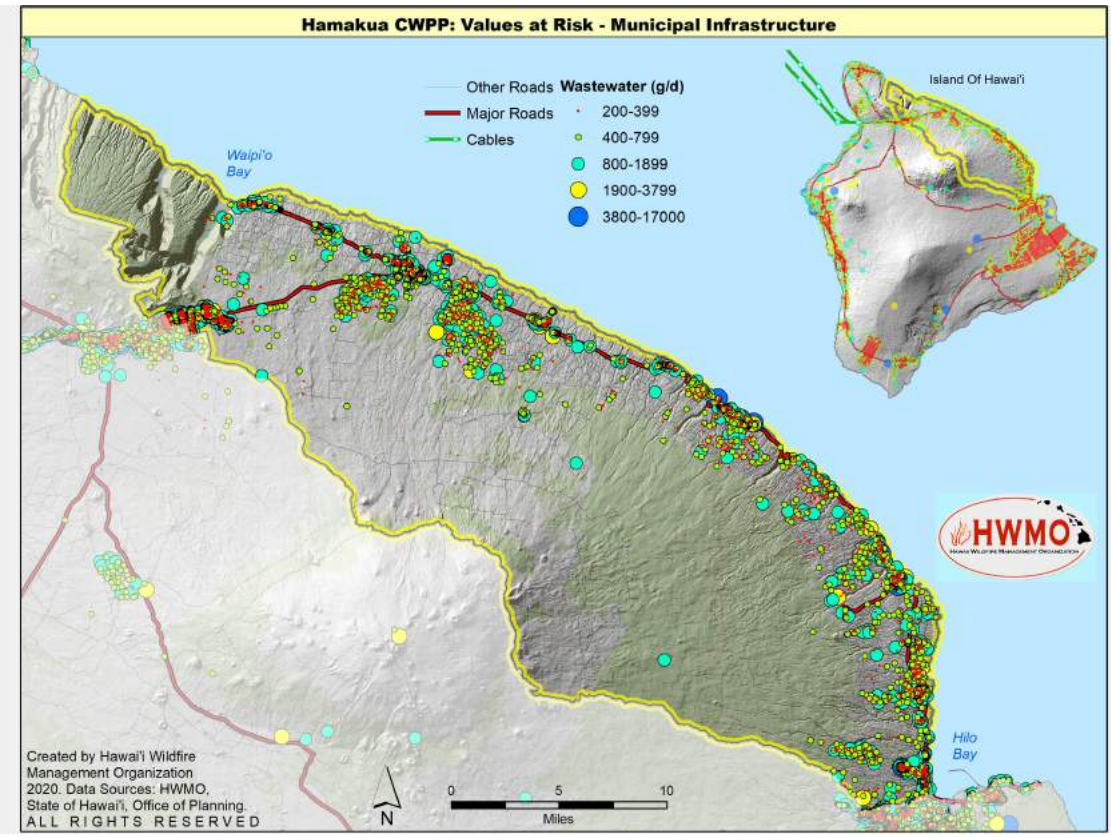
Wildfires threaten lives, homes, and human health not only through the potential loss of life, property, and vital infrastructure but also through the degradation of soil, air, and water quality. In the past, fires have prompted highway shutdowns and evacuations of communities. The communities of Waipio, Pa'auhau, Pa'auilo, and Kukaiau identified in Map 19 are rated at moderate to high risk of wildfire. Traffic and road closures during fire events and post-fire flooding can also block access




***Map 19. Communities at risk from wildfires within the Hāmākua CWPP planning area. Note Waipio, Pa'ahau, and Pau'uilo are all assessed and rated as high risk.***




***Map 20. Public services at risk by wildfire within the Hāmākua CWPP planning area.***




***Map 21. Municipal infrastructure at risk within the Hāmākua CWPP planning area.***

routes and keep people from their homes and work and are costly to local government. Frequent fires also impact power lines, and communication infrastructure, which can lead to road closures, cutting off remote communities in Hāmākua from schools, hospitals, and needed provisions (Maps 20 - 21).

# HAZARD ASSESSMENT

### *COMMUNITIES AT RISK FROM WILDFIRE*

For the purposes of assessing hazards and wildfire threats to resources, residential areas within the CWPP planning area were simplified into seventeen "communities" (Maps 2 and 19). The boundaries depict the areas determined by DLNR-DOFAW to have similar features in terms of wildfire hazard characteristics and have long been the boundaries used in the DLNR-DOFAW's Communities at Risk from Wildfire maps, maps created from comprehensive assessments to depict wildfire threats to developed areas and communities.

In the 2013 Communities at Risk from Wildfires map (the most recent), the majority of communities within Hāmākua are rated as either high or extremely high risk (previous section, Map 19). (Please note this map ONLY rates areas where there are residents living in built structures, neighborhoods, and established communities. Gray areas on the map indicate that no humans inhabit the area, and therefore were not assessed using this method).

### *WILDFIRE HAZARD ASSESSMENT*

The purpose of the required community risk assessment is to:

- Provide site-specific information to the public to promote wildfire awareness.
- Help identify and prioritize areas for treatment.
- Determine the highest priority uses for available financial and human resources.

The methods for this plan's community wildfire risk assessment followed the guidelines established by the HFRA. The wildfire risk assessment also follows the guidelines and requirements of the FEMA Pre-Disaster Mitigation program and the National Fire Plan. Locally, we have opted to name the effort Wildfire Hazard Assessment, rather than Wildfire Risk Assessment.

In partnership with DLNR-DOFAW, HWMO assessed the communities within Hāmākua using a process that rates 21 wildfire hazard characteristics, which have been further grouped into three categories: Subdivision Hazard, Vegetation Hazard, and Building Hazard.

The purpose of looking in depth at each category and specific hazard is to identify the factors that put each community most at risk and to enable mitigation action plans and activities that are targeted toward reducing risk in the factors that most need attention per area.

Table 2 provides the ratings per area per hazard category. Table 3 below provides the detailed categories assessed within each of the three categories. A weighted calculation determines the final rating for the category.

| Hazard Ratings: (Subtotals) | Subdivision | Vegetation | Building |
|---|---|---|---|
| **Kukuihaele** | MOD | HIGH | MOD-HIGH |
| **Honokaa** | MOD | HIGH | MOD |
| **Kukaiau** | MOD | MOD-HIGH | LOW-MOD |
| **Paauilo South *Near Danna's Cookies - 6 lots** | MOD-HIGH | HIGH | MOD |
| **Paauilo (South Mauka) (incl. homesteads+ranches)** | MOD-HIGH | HIGH | LOW |
| **Paauilo (Mauka) *Close to hwy enclave plus near school** | MOD | MOD-HIGH | LOW-MOD |
| **Paauilo (Makai)** | MOD-HIGH | HIGH | MOD-HIGH |
| **Lakeland*** | LOW-MOD | LOW-MOD | MOD |
| **Ahualoa** | MOD-HIGH | MOD-HIGH | MOD-HIGH |
| **Ookala** | MOD-HIGH | HIGH | MOD-HIGH |
| **WaiPunalei** | HIGH | HIGH | MOD-HIGH |
| **Laupahoehoe (Mauka)** | MOD-HIGH | HIGH | MOD |
| **Laupahoehoe (Makai)** | HIGH | HIGH | MOD-HIGH |
| **Ninoole** | MOD-HIGH | MOD-HIGH | MOD |
| **Umauma** | MOD | HIGH | MOD |
| **Hakalau** | MOD | MOD-HIGH | LOW-MOD |
| **Honomu** | MOD | MOD | LOW-MOD |
| **Pepeekeo** | MOD-HIGH | MOD-HIGH | LOW-MOD |
| **Papaikou** | MOD-HIGH | MOD | LOW-MOD |
| **Wainaku** | MOD-HIGH | MOD | LOW-MOD |

***Table 2. Hazard assessment ratings per subdivision/community area within the Hāmākua CWPP planning area. Priority hazards to address are shown in red.***

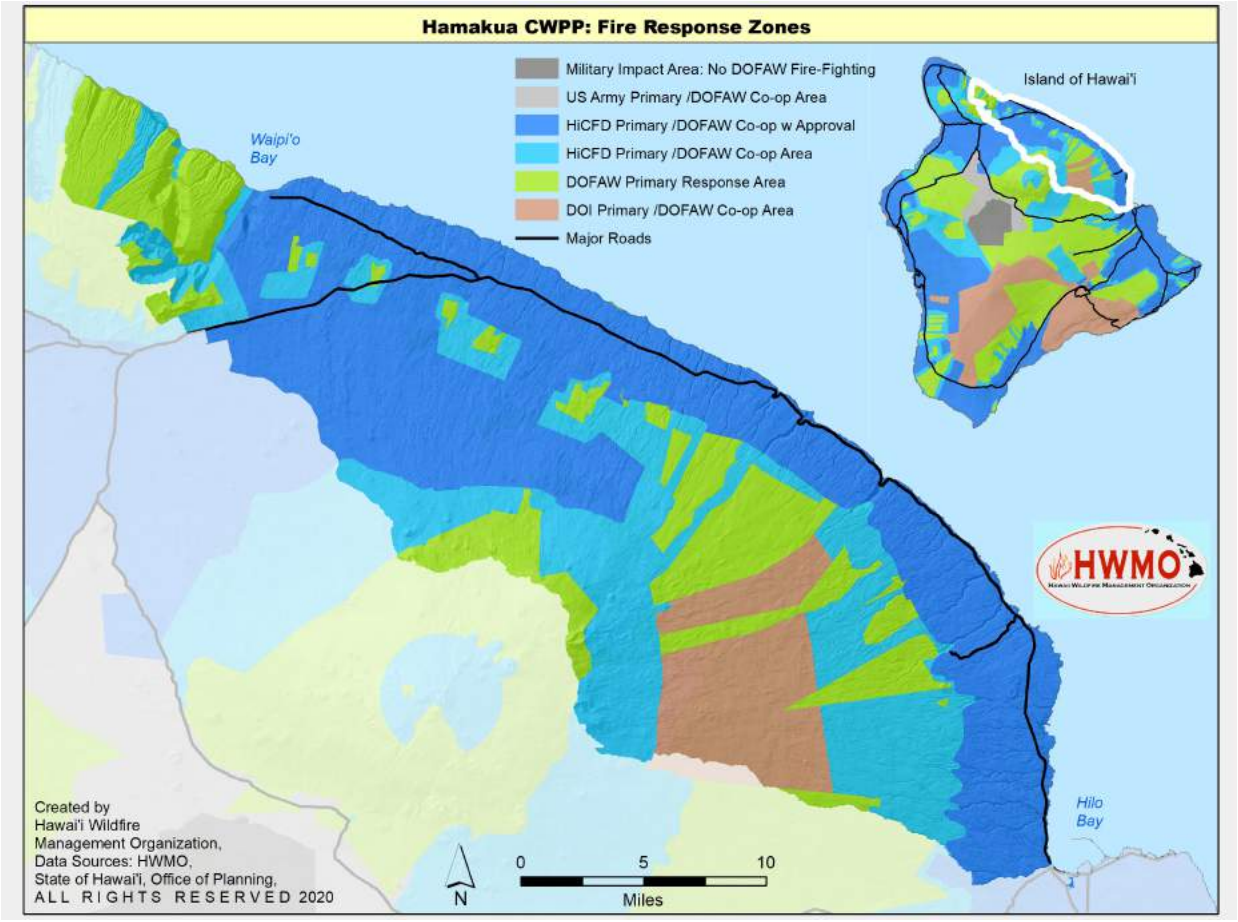
| Hazard Category | Individual Hazards Assessed Within Category |
|---|---|
| **Subdivision Hazard** | Fire Service Access<br>Home Setbacks<br>Ingress/Egress<br>Private/Landowner Firewise Landscaping and Defensible Space<br>Proximity of Subdivision to Wildland Areas<br>All Season Road Condition<br>Road Maintenance<br>Road Width<br>Street Signs<br>Structure Density<br>Unmanaged, Untended, Undeveloped Land |
| **Vegetation Hazard** | Defensible Space: Fuels Reduction Around Homes & Structures<br>Fuel Loading<br>Fuel Structure & Arrangement<br>Proximity of Flammable Fuels Around Subdivision<br>Vegetation Within 300‘ of Homes |
| **Building Hazard** | Siding/Soffits<br>Roofing Assembly<br>Structural Ignitability<br>Under-Skirting Around Decks, Lanai, Post & Pier Structures<br>Utilities Placement: Gas & Electric |

***Table 3. Overview of hazard assessment categories and the individual hazards that comprise them.***

# EMERGENCY RESPONSE

## FIRE SUPPRESSION

Initial response to the majority of wildfires (as well as all medical and other emergencies) is the responsibility of Hawai'i Fire Department (HFD). State Division of Forestry and Wildlife (DLNR-DOFAW) responds to wildfire events on state lands and provides additional wildland firefighting assistance when state lands are threatened and/or mutual aid agreements are invoked. Federal partners, such as U.S. Army Garrison Fire & Emergency Services, and the Department of Interior (National Park Service and US Fish & Wildlife Service) respond to fires on their lands and provide assistance via mutual aid requests.




***Map 22. Fire Response Zones within the Hāmākua CWPP planning area. Indicates areas where fires are suppressed by Hawai'i County Fire Department and/or DLNR-DOFAW.***

**HFD** has resources and equipment that are spread across the entire island and made available when needed if they are not already in use. Within the CWPP planning area, there are two staffed fire stations (and an additional volunteer fire station in Pepe'ekeo) as well as one in Waimea and three in Hilo just outside the CWPP boundaries. The HFD suppression force lies within the Fire Operations division of HFD. The Fire Operations division responds to fires, hazardous materials incidents, technical rescues, natural disasters, and emergency medical calls. HFD also participates in many

wildfire-relevant nonemergency activities to enhance public safety and maintain response readiness: commercial and public school fire inspections; pre-incident planning; public education (including prevention); community risk reduction; and code enforcement.

**DLNR-DOFAW** is the primary responder for wildfires on lands managed by the state, which accounts for 29% of the Hāmākua CWPP boundaries. DLNR-DOFAW also co-responds with the county fire agencies, which is determined by mutual aid agreements and memoranda of agreement or understanding. In addition to suppression, DLNR-DOFAW manages and protects natural and cultural resources, as well as public use and recreation on lands within DLNR-DOFAW jurisdiction.

**USAG-FES-PTA** responds to wildfire incidents on their property and mutual aid requests. While active in the protection of life and property from fire, the U.S. Army also works toward the protection of the state's endangered plant and animal species through numerous prevention and protective initiatives.

### *EMERGENCY MANAGEMENT DOCUMENTS AND OTHER PLANS*

The CWPP is non-regulatory and cooperative in nature. The plan provides (1) a foundation for increased communication, coordination, and collaboration among agencies and the public, (2) identification and prioritization of areas for hazardous fuel reduction projects and wildfire mitigation actions, and (3) assistance meeting federal and state planning requirements and qualifying for assistance programs.13 The CWPP is designed to work in conjunction with other county and state plans, operational policies, assessments, programs, etc., including but not limited to:

#### ***County of Hawai'i:***

County of Hawai'i Drought Mitigation Strategies
County of Hawai'i Multi-Hazard Mitigation Plan and Hazard Mitigation Plan Update (draft)
County of Hawai'i Water Use and Development Plan Update
Hawai'i Island General Plan

#### ***State of Hawai'i:***

State Drought Plan (2017)
State of Hawai'i Multi-Hazard Mitigation Plan
State Division of Forestry and Wildlife Operational Policy for Wildfire Control
DLNR Forest Action Plan (2016)

### *MULTIPLE-AGENCY AGREEMENTS*

On Hawai'i Island, there is a coordinating group established to deal with and discuss wildfire issues, mitigation, and response. The Big Island Wildfire Coordinating Group (BIWCG) was established to coordinate the programs of the participating federal, state, and local fire agencies and non-governmental organizations on Hawai'i Island and provide a forum for leadership, cooperation and

the exchange of information. Additionally, it serves to further inter-agency cooperation, communications, and coordination, and to implement directions and standards for various incident management activities. By pooling the resources of the various agencies, the combined strength and efforts would afford the people of the Island of Hawai'i more extensive and effective protection of lives, property, natural and cultural resources. The BIWCG provides a forum for leadership to coordinate programs, exchange ideas, and develop consistent policies by establishing an interagency approach to fire management programs.

Core members include Hawai'i Fire Department, Hawai'i County Civil Defense Agency, Dept. of Land & Natural Resources - Division of Forestry and Wildfire, National Park Service, U.S. Fish & Wildlife Service,U.S. Army, Hawai'i Community College, Hawai'i Wildfire Management Organization, University of Hawai'i, and Dept. of Transportation -Airports Div., Hawai'i District.

Additionally, all agencies have cooperative agreements in place to promote, enable, and coordinate mutual aid for fire suppression purposes.

### *EVACUATION PROTOCOLS AND NEEDS*

Evacuation protocols for neighborhoods and areas in Hāmākua have been determined for natural hazards such as tsunamis and can be found in the documents listed below. However, fire safety zones for all neighborhoods and areas of Hāmākua are yet to be determined and are a priority action determined by the public as part of this CWPP process.

The following resources are available for disaster preparedness information:

- County of Hawai'i Island Civil Defense Agency Website
    - Sign up page for County Civil Defense Emergency Alerts
- Guidance for Disaster Preparedness in Hawai'i
- Hurricane Information and Tips
- Tsunami Maps, Information, and Tips

### *STATE FIRE CODE*

The Hawai'i State Fire Code is adopted by the State of Hawai'i according to Chapter 132 of the Hawai'i Revised Statutes, with modifications to the 2018 National Fire Protection Association 1 Fire Code. The Fire Code of the County of Hawai'i is adopted with modifications from the State Fire Code.

The State Fire Code that took effect most recently (January 19, 2021) can be found at:
https://labor.hawaii.gov/wp-content/uploads/2021/02/2018-NFPA-1-Amendments-Jan_20_21.pdf

All county fire departments have two years from this date to adopt the State Fire Code as their county fire code and may amend this code as it applies to their jurisdiction.

***WILDFIRE PREVENTION***

Several agencies are working both independently and collaboratively on wildfire prevention activities in the Hāmākua CWPP area.

**HFD Fire Prevention Branch** The Fire Prevention Branch responsibilities include code enforcement, plan review and inspections, public education, and fire investigation. The Fire Prevention Branch office in Hilo and Kona is not staffed at all times during normal business hours, so the public is asked to call for an appointment. HFD Fire Prevention personnel work closely with Hawaii Wildfire Management Organization (HWMO, described below) to provide wildfire prevention education and support for risk reduction.

**DLNR-DOFAW** is statutorily mandated to take measures for the prevention of wildland fires within DLNR-DOFAW managed lands and to cooperate with county and federal fire agencies in developing plans and programs for prevention assistance of wildfires on additional lands. DLNR-DOFAW is involved with and committed to the following community risk reduction initiatives: supporting the development and action plans of Community Wildfire Protection Plans, locally administering the U.S. Forest Service Wildland-Urban Interface grant program, serving as the state liaison for the Firewise USA™ community risk reduction program (in partnership with HWMO), and administering State Legislature Grant-In-Aid awards given to local organizations who are working on wildfire-related projects (in 2021, these include HWMO and Ka'ala Farm, Inc.)

**HWMO** is a nonprofit organization founded in 2000 to focus on wildfire prevention and risk reduction activities. The organization serves as a hub of wildfire information, mitigation, and project assistance across Hawai'i. HWMO supplements and complements agency wildfire efforts aims to meet community hazard reduction needs, and coordinates/leads multi-jurisdictional and multi-partner wildfire projects. HWMO develops and offers educational wildfire prevention, preparedness, and planning workshops for diverse audiences and stakeholder groups; leads the development of Community Wildfire Protection Plans and fire management plans; serves as the community liaison for the Firewise USA program (in partnership with DLNR-DOFAW), assisting communities with their applications, renewals, and offering learning and connecting opportunities among the 15 Firewise-recognized communities across Hawai'i; leads multi-partner wildfire collaboration projects and groups; and implements cross-boundary fuels management projects. HWMO also collaborates closely with the Cohesive Wildland Fire Management Strategy, Western Region, and the Fire Adapted Communities network, liaising with and sharing best practices between Hawai'i and national partners. HWMO works together with the University of Hawai'i to implement the Pacific Fire Exchange project, a fire science communication project that develops, collates, and shares the best available wildfire information on behalf of a broad partnership that includes DLNR-DOFAW, USDA Forest Service, County Fire Departments, and other forestry and fire entities.

**University of Hawai'i at Mānoa College of Tropical Agricultural and Human Resources (UHM-CTAHR)** has several researchers, extension specialists, and some graduate students who synthesize and develop new information on topics pertaining to wildfires. Faculty expertise includes range

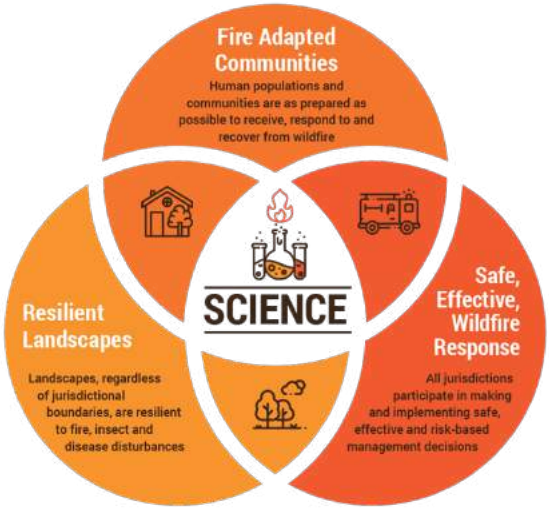
management, forestry, ecology, social science, and fire science which has contributed to a range of wildfire-related products such as fuels data, maps, risk models, and other information. HWMO and UHM-CTAHR Cooperative Extension partner to implement the Pacific Fire Exchange project (PFX). PFX is a fire science communication project that works to improve the availability and sharing of fire science relevant to the Pacific Island region to support and inform the wildfire mitigation work of land managers and emergency responders.

Together, **all of the above entities** participate in and support the multi-agency statewide Wildfire and Drought Lookout! awareness and preparedness campaign each year; conduct wildfire hazard assessments (often in partnership with each other); and collaborate whenever possible to protect life, property, and natural resources from the impacts of wildfire.

# PART III
# WILDFIRE ACTION PRIORITIES

# WILDFIRE ACTION PRIORITIES

## NATIONAL COHESIVE WILDLAND FIRE MANAGEMENT STRATEGY




The ***National Cohesive Wildland Fire Management Strategy*** (subsequently referred to as Cohesive Strategy) encourages communities to develop a dynamic approach to planning for, responding to, and recovering from wildland fires. It provides a framework for wildfire-related discussions, efforts, and goals across the United States. The overarching national strategy is further divided into three regions for tighter collaboration and coordination in each area. Hawai'i falls into the Western Region. The three categories are Fire-Adapted Communities; Resilient Landscapes, and Safe and Effective Wildfire Response. ***Considering each and addressing all three is necessary for effective wildfire preparedness and protection***.

Public and government agency participants identified hazard reduction priorities for Hāmākua within the Cohesive Strategy categories, after first having an opportunity to learn more about each category of wildfire preparedness and safety challenges and goals. This participant input was collected via two live virtual workshops and a web-based survey. The live workshops were facilitated toward the discussion and recording of wildfire-related concerns, priorities, and recommended actions per category. Additional focused conversations were also facilitated per residential area, to capture each area's unique wildfire issues and next-step priorities. A web-based survey followed the format of the live workshops, asking participants who were unable to attend the workshops for their highest priority wildfire-related concerns per category, along with suggested actions for addressing those concerns.

Both live workshop and web survey input have been combined and integrated into the discussion and priorities provided below for addressing wildfire in Hāmākua. An independent summary of data from the web-based survey is provided in Appendix B.

## *RESILIENT LANDSCAPES*

DISCUSSION

Across Hāmākua, vegetation is dense, dry, and very flammable during dry conditions. CWPP workshop participants discussed the need for sustained maintenance of fuels and an increased capacity to manage vegetation for the long term. A critical lack of water in higher-elevation areas impacts firefighting. The area is remote, with long distances to travel along a lone highway, impacting fuel management, firefighting response time, and creating a challenging combination of illegal dumping and the abandonment of cars without consistent enforcement or regulation.

GOALS

Landscapes (natural and cultural resources) across all jurisdictions and land ownerships must be supported to become resilient to fire-related disturbances in accordance with management objectives. This includes the following:

1. Risk of wildfire occurring and impacting lands and waters is diminished.
2. Pre-fire hazards are managed and mitigated (reducing ignitions/managing vegetative fuels).
3. Sensitive resources are minimally or not damaged during wildfire events by the firefighting effort.
4. Post-fire recovery, rehabilitation, and restoration are supported.

ACTION PRIORITIES

- Implement fuel reduction projects to reduce ignition and spread, including all methods where appropriate: mechanical, chemical, animal, by hand, etc. Priority areas are at the interface between residential areas and eucalyptus woodlands; around sensitive natural resources, such as Hakalau Wildlife Refuge and Pu'u Mail State Forest Reserve; and in targeted areas to strategically prevent post-fire erosion.
- Mitigate roadside/highway fuels, especially by grazing.
- Support increased grazing for sustained fuel management.
- Pursue projects that increase/improve water availability for grazing, farming, and firefighting use, especially by establishing tanks, cisterns, and other water resources in rural areas.
- Add animal husbandry projects/operations in strategic places, such as grassland areas near roads and the 17 community areas. Projects can include goats, fencing, ranching, etc.
- Develop, maintain, and prioritize the creation of fuelbreaks, especially those made during fires.
- Develop clear fuel reduction corridors that also serve as firefighting access.
- Establish green breaks where appropriate.
- Implement fuel conversion projects to reduce wildfire risk and support native plant restoration and ecosystem function in both lower and upper-elevation areas.
- Work among partners and landowners to design and implement cross-boundary fuels management corridors at the landscape scale to reduce fire spread and provide firefighting access.
- Conduct collaborative planning and mapping of firefighting resources, infrastructure, sensitive areas, water resources, access, fuelbreaks, etc.
- Develop a fire management plan for the area.

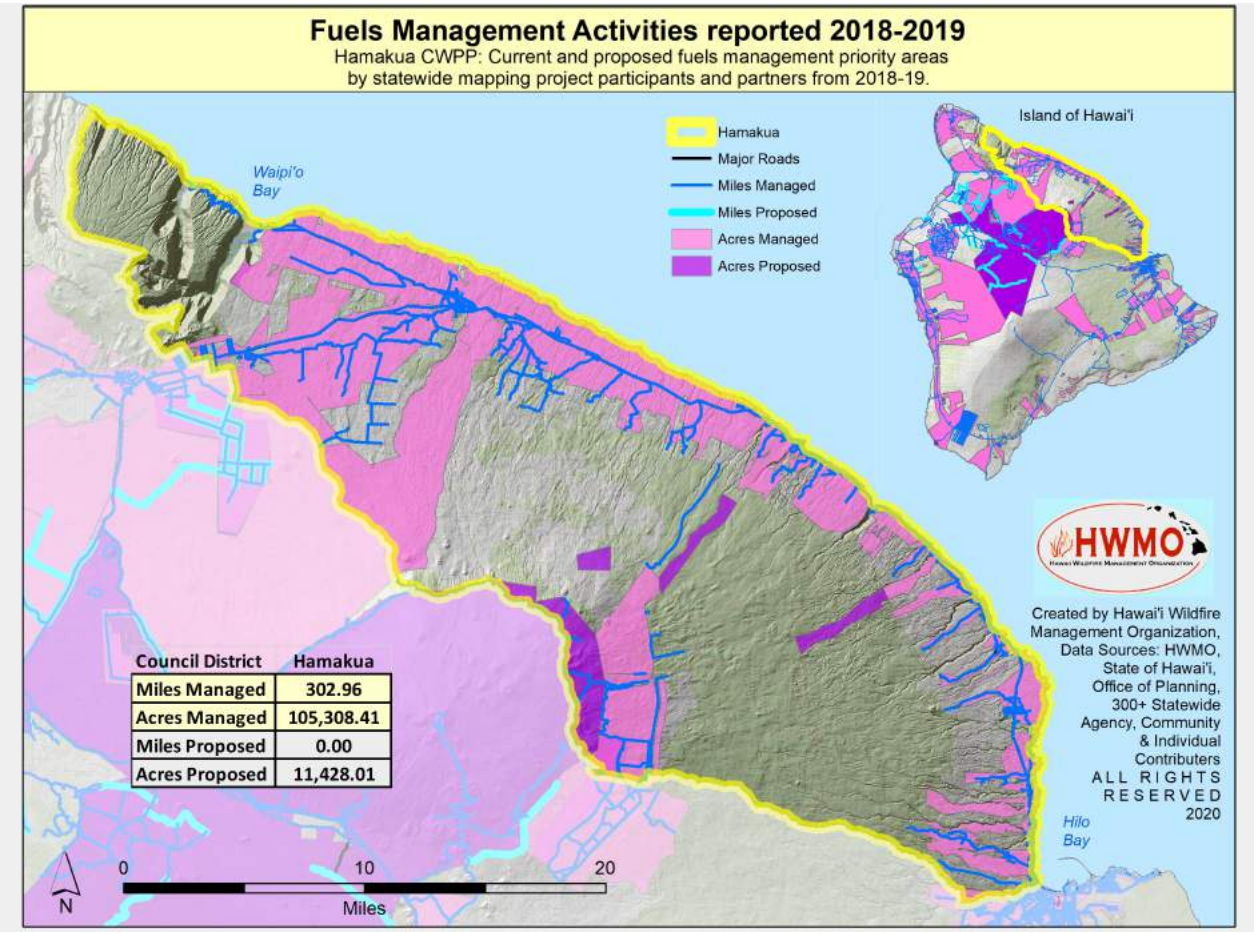
- Develop and implement ignition and fuel reduction programs, including abandoned car removal, green waste removal, and dumping.
- Improve deteriorating infrastructure that inhibits firefighting on the landscape.
- Address fire fuels build up on fallow lands.
  - Remove vegetation empty lots, especially on former sugar cane land;
  - Reduce eucalyptus and grass cover by planting diverse trees;
  - Provide a fire break (that is free of eucalyptus) next to the highway;
  - Explore livestock grazing while understanding that fencing & infrastructure are needed to maintain animals;
  - Reference existing plans for dealing which outline establishing greenbreaks while dealing with weeds (such as gorse).
- Improve community infrastructure and create defensible space.
  - Consider opening up overgrown plantation roads and grazing around homes;
  - Ensure access to Kamehameha school lands for fire prevention/suppression purposes (e.g., dip tanks);
  - Monitor roads and address weight limitations for bridges to allow fire engines and dozers.
- Prevent human-caused ignitions from improperly disposed debris.
  - Remove abandoned cars;
  - Provide signage and education for community debris removal;
  - Take preventive measures to limit the spread of invasives (i.e., little fire ant, two-line spittlebug) during collaborative disposal.

Additionally, a CWPP must identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure. Based on the fuel hazard ratings acquired during the hazard assessment, recommendations for the type and method of vegetative fuel reduction treatments for high fuel hazard areas are listed in Table 4 below:

| Resource, Structure, or Value at Risk | Fuel Hazard Rating | Type of Treatment |
|---|---|---|
| **Homes, structures with large lots or heavy vegetation, and historical sites** | Moderate to Extreme | Firewise strategies around the home/ structure ignition zones. Reduce fuel along property boundaries and roadsides. Weedwhip, hand-pull, mow, grazing, herbicide, trim branches. Clear debris piles. Convert fuels to drought-tolerant, fire-resistant (preferably native) plants. Reduce ladder fuels. Complement vegetation management strategies with home hardening (replace ignitable/burnable materials with non combustible materials). |

| Resource, Structure, or Value at Risk | Fuel Hazard Rating | Type of Treatment |
|---|---|---|
| **Roadsides** | Moderate to Extreme (depending on location and weather conditions) | Conduct roadside fuels treatments at frequency that matches fuel growth (keep low), maximize width of roadside reduction areas. Develop a grazing corridor/buffer for long-term fuels management. Convert roadside fuels to fire-resistant plants that require little or no maintenance and are less ignitable. |
| **Mauka forest lands, parks, reserves** | High or Extreme if unmanaged and weather conditions dry | Mechanical, hand labor, chemical, fuels conversion, animals if strategically managed |
| **Gentle sloping grasslands and scrublands** | High or Extreme if unmanaged and weather conditions dry | Mechanical, hand labor, chemical, fuels conversion, animals if strategically managed |
| **Unmaintained Agricultural lands** | Moderate to Extreme (depending on location and weather conditions) | Mechanical, animal, chemical, re-establish active agriculture. |

***Table 4. Hazardous Fuels Treatments***




**Map 23. 2018 - 2019 fuels management activities as identified by Hāmākua participants and partners.**

In 2018, land managers across Hawai'i contributed to a fuels management mapping project, wherein those who chose to participate indicated areas that have some level of active fuels management occurring. The project was coordinated by HWMO, also the coordinator and writer of this CWPP. Participants in the mapping project also indicated additional areas they believe would be necessary to address with fuels management activities to achieve optimal fire mitigation. While participation was voluntary, and therefore, not a complete representation of all that is occurring and needed in Hāmākua, it does provide a starting point for discussion and fuels management project planning (Map 23).

### ***FIRE ADAPTED COMMUNITIES***

DISCUSSION

Despite frequent fires, many residents across Hāmākua are not as informed, engaged, or active in wildfire preparedness and hazard reduction as is necessary for optimal safety and prevention. Community outreach and education programs, technical assistance, opportunities, and capacity-building are needed. Abandoned vehicles and rubbish are building up in remote areas. Many areas are not designed for safe and effective firefighting.

<u>GOALS</u>

Human populations and infrastructure must be able to withstand wildfires without loss of life or property. Communities must become as prepared as possible to endure, respond to, and recover from wildland fires. Everyone must know they play a role in prevention and safety and must do their part. This includes the following:

1. Roles and responsibilities established in all jurisdictions and across all communities and landownership for mitigating fire threats and impacts.
2. People accept and act upon their responsibility to prepare families and properties.
3. Risk to community areas and resources, including municipal resources, is diminished.
4. Effectiveness of activities is monitored and shared and is relevant to local mitigation and other plans.

<u>ACTION PRIORITIES</u>

- Improve education in wildfire prevention among Hāmakua residents.
    - Target information towards new residents;
    - Include pamphlets in a welcome package;
    - Encourage community leaders to reach out directly to their neighbors;
    - Engage networks of community associations to hold in-person workshops;
    - Include information about what to do around home and yard, what to do during a fire, what different levels of evacuation mean;
    - Wildfire preparedness could tie into hurricane season safety campaigns.
- Improve neighborhood infrastructure to help with firefighting (see Wildfire Response section).
    - Establish access to water resources to support firefighting operations;

    - Ensure proper fittings for firefighting on existing water resources and catchment tanks, can be done individually;
    - Expand volunteer firefighting opportunities.
- Establish community wildfire preparedness standards.
    - Encourage communities to become a Firewise certified;
    - Prepare community plans specific to wildfire safety for each neighborhood while ensuring plans most accurate, up-to-date data on community and community communication status;
    - Document and conduct home assessments to assess pre-fire risks;
    - Improve neighborhood infrastructure to help with firefighting.*

* Strategies for treating structural and home/yard ignitability in Hawai'i have been established through the Hawai'i version of the Ready, Set, Go! Action guide. This informational resource is included as Appendix A of this document and should be used by residents in Hāmākua to treat structural, home, and yard ignitability.

### ***SAFE AND EFFECTIVE WILDFIRE RESPONSE***

DISCUSSION

Due to the remoteness of the area and the limited infrastructure throughout, many residential areas are poorly set up for wildfire response. The most pressing issue is a lack of water, but long response times due to distance, ingress/egress issues, inadequate road signage for location homes, and an increasing number of lots being developed contribute to firefighting challenges.

GOALS

All jurisdictions will continuously work together toward making and implementing safe, effective, efficient risk-based wildfire management decisions to ensure that:

1. Injuries and loss of life for the public and firefighters are diminished.
2. Adequate infrastructure and capacity: water, access, equipment, training.
3. Pre-fire multi-jurisdictional planning occurs.
4. Response, esp. when jurisdiction is shared, is efficient and effective.

<u>ACTION PRIORITIES</u>

- Establish communication protocols between emergency responders and communities.
    - Improve methods of getting the word out (social media, web-based applications);
    - Ensure basic information is communicated: where is the fire, where is it going, and who is being recommended for evacuation.
- Ensure community emergency / evacuation plan(s) are complete and up-to-date.
    - Have written evacuation plans that reference exiting preparedness and hazard mitigation plans;
    - Determine chain of command and information flow;
    - Know who will cut locks, and fences in the event of an evacuation;
    - Work with large landowners for access (Kamehameha Schools);
    - Determine evacuation routes and make available public shelters.
- Improve firefighting infrastructure & wildland fire response by response agencies.

  - Exempt fire trucks from weight limits on bridges (or improve their load capacities);
  - Consider air water drop support from Air-1;
  - Consider establishing east-west connecting road infrastructure;
  - Consider widening one-lane roads;
  - Create turnarounds and pull-outs;
  - Prioritize fire response by the Hawai'i County Fire Department in Hāmakua.
- Ensure the continuity, training, and coordination among Community Emergency Response Teams (CERTs).
  - Establish clear roles and responsibilities between County police, CERT, HFD, and Civil Defense and advocate for funding to support positions (such as a County PIO);
  - Establish a volunteer firefighting force, especially in remote areas;
  - Provide supplemental ICS and CERT training focused on wildfire;
  - Assess if personal equipment is available to create and maintain fuel breaks and buffer zones.

# CWPP IMPLEMENTATION AND MAINTENANCE

HFRA requires that the HFD, Hawai'i County Civil Defense Agency, and DLNR-DOFAW all agree on the final contents of the Hāmākua CWPP. The plan is signed by each agency in order to meet HFRA and FEMA requirements.

Across the state and country, there is a changing understanding and paradigm related to wildfire: reducing wildfire occurrence and impacts takes the participation and action of all who live and work in an area. There is a role for everyone to play to reduce risk, enhance preparedness, and ensure the safety and integrity of our community and natural resources. Firefighting is the last line of defense, with much to also be done ahead of time to reduce fire's ability to ignite and spread and to prepare homes and people to withstand wildfire.

It is for these reasons that the Hāmākua CWPP was developed: to collaborate, co-determine priorities, and encourage participation by all parties. ***Because of the non-regulatory nature of the CWPP, the relevance and effectiveness of the Hāmākua CWPP will rely heavily upon initiative and involvement by individuals, groups, organizations, and government in the Hāmākua area.***

HWMO and DLNR-DOFAW intend to provide technical support, identify and coordinate funding when possible, and serve as a centralized resource for wildfire risk reduction efforts in Hāmākua. Together, representatives will identify sources of funding for projects, document the successes and lessons learned from those projects, and evaluate and update the CWPP as needed and as possible. Area residents are urged to contribute time and effort toward creating defensible space, reducing structural ignitability, and working at the community level to initiate and maintain wildfire protection projects. Decision-makers and elected officials are encouraged to support these efforts through appropriate budgets and policies.

Additionally, as Hawai'i's community liaison to the national Firewise program, and in partnership with HFD and DLNR-DOFAW, HWMO will work with any community in Hāmākua that is interested in undergoing the Firewise USA® recognition process. This includes forming a local Firewise committee and action team, completing a comprehensive hazard assessment specific to their subdivision, and sustaining neighborhood-level action toward risk reduction.

Many Hāmākua CWPP action items will require continuing support for wildfire risk mitigation projects. This will involve actively pursuing funding for projects, staying informed and in contact with one another, and updating this CWPP regularly so that it remains a "living" document. **Updated project priorities and additionally identified priorities will be added as appendices to this foundational document whenever possible, in an effort to keep the plan current and to support ongoing collaborative learning, planning, and implementation of projects.** All who have been involved in the development of this CWPP are committed to building community awareness of these issues so that Hāmākua will continue to make progress toward the goals of having Fire Adapted Communities, Resilient Landscapes, and Safe and Effective Wildfire Response across Hāmākua.

# APPENDIX

APPENDIX A:

READY, SET, GO! HAWAI'I VERSION WILDFIRE ACTION GUIDE

APPENDIX B:

HĀMĀKUA COMMUNITY MEETING INPUT

APPENDIX C (AND BEYOND):

ADDITIONS AND UPDATES TO PROJECT PRIORITIES

# APPENDIX A

## READY, SET, GO! HAWAI'I VERSION
## WILDFIRE ACTION GUIDE

Includes the following key information:

- Wildfire in Hawai'i Overview
- 🏠 Firewise Landscaping Recommendations
- 🏠 Home Hardening
- Family Emergency Planning
- Situational Awareness
- Evacuation

🏠 *Items with this symbol fulfill the CWPP requirement for strategies to reduce structural ignitability.*

# READY, SET, GO!

## YOUR PERSONAL WILDLAND FIRE ACTION GUIDE

Rev. 2021


HWMO
HAWAII WILDFIRE MANAGEMENT ORGANIZATION
HawaiiWildfire.org

This guide was developed by Hawaii Wildfire Management Organization, in partnership with:

READY, SET, GO!

# READY, SET, GO!

## Wildland Fire Action Guide

Saving Lives and Property
Through Advanced Planning

The fire season is now a year-round reality in many areas across the Hawaiian Islands, requiring firefighters and residents to be on heightened alert for the threat of wildland fire.

Each year, wildland fires consume hundreds of homes across the nation in the Wildland-Urban Interface (WUI), and Hawaii is at a similar risk. Studies show that as many as 80 percent of the homes lost to wildland fires could have been saved if their owners had only followed a few simple fire-safe practices. In addition, wildland fire related deaths occur because people wait too long to leave their home.

In the event of a wildland fire, our first responders take every precaution to help protect you and your property. However, the reality is that in a major wildland fire event, there will simply not be enough fire resources or firefighters to defend every home.

Successfully preparing for a wildland fire enables you to proactively take personal responsibility for protecting yourself, your family and your property. In this Action Guide, we hope to provide the tips and tools you need to prepare for a wildland fire threat (Ready), have situational awareness when a fire starts (Set), and to act early (Go!).

The Ready, Set, Go! Program works in complimentary and collaborative fashion with the Firewise USA® program and other existing wildland fire public education efforts. Utilizing firefighters and local wildland fire prevention expertise, it amplifies their messages to individuals to better achieve the common goal of wildland fire preparedness.

Many residents have built homes and landscaped without fully understanding the impact a fire can have on them and few have adequately prepared their families for a quick evacuation.

It's not a question of **if** but **when** the next major wildland fire will occur. Through advanced planning, understanding and preparation, we can all be partners in the wildland fire solution. We hope you find the tips in the following pages helpful in creating heightened awareness and a more fire-safe environment for you, your family and firefighters.

## INSIDE



This publication was produced by Hawaii Wildfire Management Organization (HWMO), made possible through a grant from the USDA Forest Service and with the help of HWMO's partners from Hawaii Department of Land and Natural Resources - Division of Forestry and Wildlife, College of Tropical Agriculture and Human Resources of the University of Hawaii at Manoa, Hawaii Fire Department, Honolulu Fire Department, Kauai Fire Department, and Maui Fire Department, and the Pacific Fire Exchange project, in a cooperative effort with the International Association of Fire Chiefs. HWMO is an equal opportunity employer. The national RSG! Program is managed by the International Association of Fire Chiefs, funded by the United States Department of Agriculture Forest Service, the United States Department of the Interior, with partner support from the United States Fire Administration, Firewise USA, and the Insurance Institute for Business and Home Safety. For more information on the RSG! Program, please visit www.wildlandfireRSG.org. This Hawaii version of the RSG Action Plan is being funded in part by The Cooperative Fire Program of the U.S. Forest Service, Department of Agriculture, Region 5. In accordance with Federal law and U.S. Department of Agriculture policy, this institution is prohibited from discriminating on the basis of race, color, national origin, sex, age, or disability. (Not all prohibited bases apply to all programs.) To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

# Living in the Wildland Urban Interface and the Ember Zone

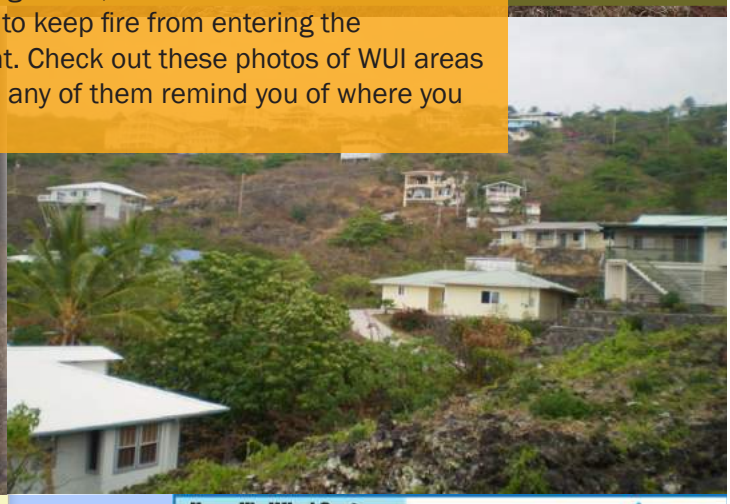
Ready, Set, Go! Begins with a House That Firefighters Can Defend

## Defensible Space Works!

If you live next to a natural area, the Wildland Urban Interface, you should provide firefighters with the defensible space they need to protect your home. The buffer zone you create by removing weeds, brush and other vegetation helps keep the fire away from your home and reduces the risk from flying embers. Firewise Communities and other wildland fire preparedness education programs provide valuable guidance on property enhancements.

## Consider This

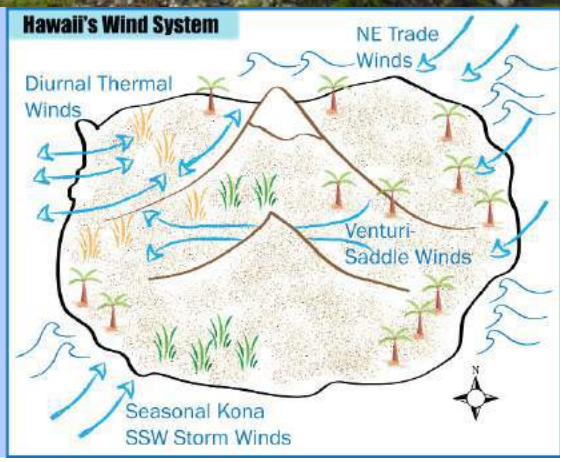
Unmanaged vegetation between and around homes increases the risk of wildland fire spreading throughout the community, endangering lives and property. Pre-fire planning, fuels management, and sufficient fuelbreaks allow firefighters the space they need to keep fire from entering the community during a wildland fire event. Check out these photos of WUI areas from different parts of the islands. Do any of them remind you of where you and your family live?



### Not Only the Homes on the Wildland Boundary are at Risk

A home within one mile of a natural area is in the Ember Zone. Wind-driven embers can attack your home. You and your home must be prepared well before a fire occurs. Ember fires can destroy homes or neighborhoods far from the actual flame front of the wildland fire. These threats are amplified in Hawaii due to the culmination of thermal, saddle, storm, and trade winds that create a complex system of strong, erratic winds (see diagram on right).

Fire is wind-driven.
Know your wind-related risks.

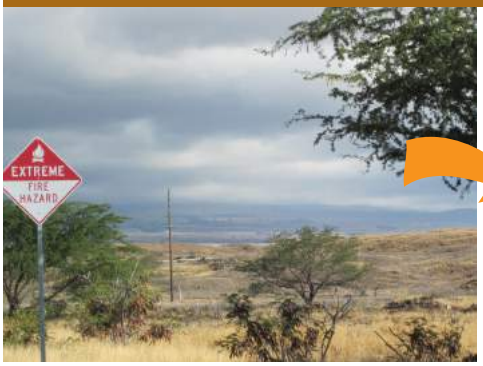


# Hawaii's Growing Wildland Fire Problem

## And Why We Should Be Concerned

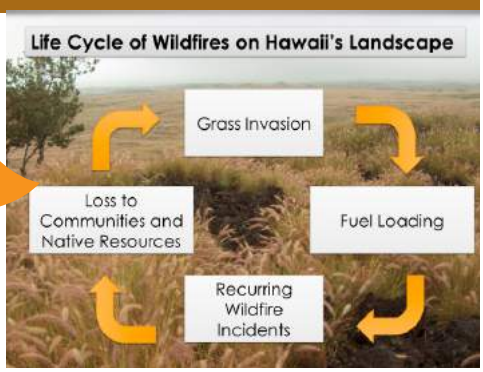
Traditionally, Hawaii ecosystems existed with a very limited presence of wildland fire. However, as climate conditions and land uses have changed over recent time, non-native, fire-adapted vegetation have rapidly spread through our wildland landscapes and toward community boundaries. In addition, communities are expanding further into fire-prone areas, increasing the risk of wildland fires that threaten natural resources, including native habitats, and people's lives and homes.

## Impacts on Natural Resources




Invasive vegetation such as guinea and fountain grass spread easily and rapidly.

These plants also ignite easily. After the fire, they re-sprout and out-compete native plants, spreading over a larger area than before.




All it takes is another spark and the same area will burn hotter, more intensely, and over a larger area than before. This creates a vicious fire cycle.

Wildland fire, fueled by the build-up of dry vegetation and driven by a complex system of hot dry winds, are extremely difficult, expensive, and dangerous to control. Hawaii's wide diversity of challenging terrains add to the challenge for firefighters.

### Did You Know?

26% of the state land cover is nonnative grassland. These grasses are fire-prone and spread more and more with each fire.

## Mauka Fires Affect Makai Health and Safety


Large fires destroy vegetation that help hold down soil. Heavy winds can lift the soil and create dust storms that impact air quality and human health.

In addition, Hawaii's high-intensity rain events can sweep away soil through erosion, runoff and landslides.

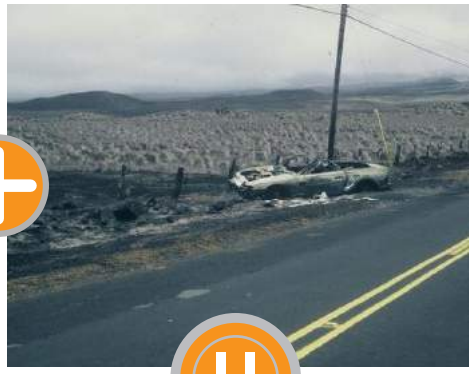
Rivers and streams carry the debris and sediment into the ocean polluting coral reefs and negatively affecting sea life. This adversely affects commerce such as fishing and marine/coastal-based tourism.

# Impacts on People & Communities

Towns and cities expanding outwardly into formerly undeveloped areas...

and large areas of fallow, invasive, or un-managed vegetation...

and a steady increase in human ignition sources via human error and intention...



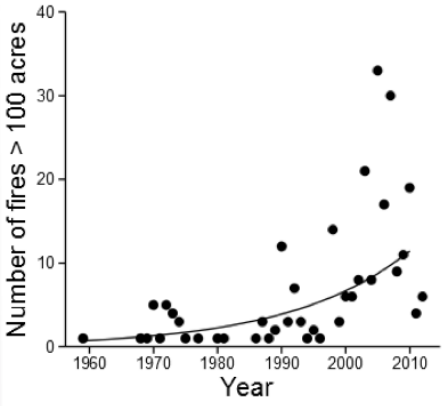
## Did You Know?

Hawaii experiences more than 1,000 wildfires per year, burning an average of 20,000- 40,000 acres each year.

On average, every island has at least one 1,000 acre fire every year.

Wildfires in Hawaii are increasing in size, frequency, and impacts.

Every island and every area (windward, leeward, mauka, makai) can be at risk under the right conditions, mainly during periods of dry weather and high winds.

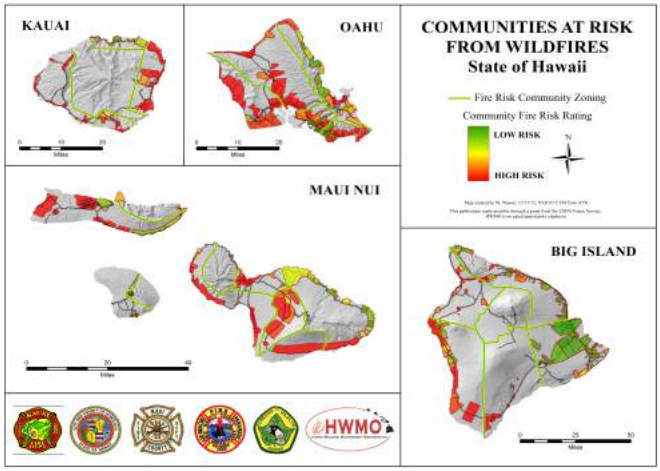



...are increasing the size, frequency, and intensity of fires across all of the islands on both wet and dry sides.

# Future Outlook

Climate change is increasing the length and frequency of drought periods, creating drier conditions. Scientists predict these trends will continue and even worsen, which will result in larger fires that are more severe and intense. As more areas become drier, they will become more prone to wildfire. If your area is currently low risk in the map below, it likely is still at risk during very dry periods. Under certain conditions, such as dry periods and heavy winds, anywhere can burn, and we are seeing that occur. As a result, it's best if you take action now, rather than later, when it may be too late.

The Communities at Risk from Wildfires Map (on right) was the result of an effort that looked at 36 hazard characteristics that contribute to wildfire risk for neighborhoods and communities (gray areas were NOT assessed). Many of Hawaii's communities are at moderate to high risk of wildfire for reasons ranging from climate to lack of water to lack of community awareness and action. Many of the challenges are ones we can address with collaborative action.




## How You Can Make a Difference

We need to create **resilient landscapes and communities** across Hawaii. You can play a significant role by increasing resilience in and around your own home and preparing your family for a potential wildland fire event. Use the following pages as a guideline.

# What is Defensible Space?


Defensible space is the required space between structures and the wildland area that, under normal conditions, creates a sufficient buffer to slow or halt the spread of wildfire to a structure. It protects the home from igniting due to direct flame or radiant heat. Defensible space is essential for structure survivability during wildland fire conditions. For more information about defensible space zones and preparedness techniques within each, visit the Firewise USA® website, www.firewise.org.

## ZONE ONE

Zone One extends 30 feet out from buildings, structures, decks, etc.

- Remove all dead or dying vegetation.
- Remove "**ladder fuels**" (low-level vegetation that allows the fire to spread from the ground to the tree canopy). Create at least 6 feet of separation between low-level vegetation and tree branches. This can be done by reducing the height of low-level vegetation and/or trimming low tree branches.
- Create "fire-free" area within 5 feet of home, using non-flammable landscaping materials and/or high-moisture content, drought-resistant vegetation.
- Trim tree canopies regularly to keep their branches a minimum of 10 feet from structures and other trees.
- Remove leaf litter (dry leaves/pine needles) from yard, roof and rain gutters.
- Relocate woodpiles or other combustible materials into Zone Two.
- Remove combustible material and vegetation from around and under decks, lanai, or the entire house if foundation is post-and-pier.
- Remove or prune vegetation near windows.

## ZONE TWO *

Zone Two extends 30 to 100 feet out from buildings, structures and decks. You can minimize the chance of fire jumping from plant to plant by removing dead material and removing and/or thinning vegetation. The minimum spacing between vegetation is three times the dimension of the plant.

- Remove "ladder fuels."
- Cut or mow annual grass down to a maximum height of 4 inches.
- Trim tree canopies regularly to keep their branches a minimum of 10 feet from other trees/cluster of trees.

* For larger properties, consider areas outside of Zone Two as a third zone to address. Continue reducing ladder fuels, managing fuels, hardening structures, and properly storing combustible materials.

# Actions You Can Take Today!

Weed around the property regularly, especially areas that a lawn mower is not appropriate for (tall dry grasses, rocky terrain, etc.)

Remove leaf litter and other debris that accumulate around the building, under vegetation, and other collection areas.

Remove leaf litter, straw and other debris from under and around propane tanks to create 10 feet of clearance around it.

Eliminate ladder fuels by pruning tree branches on trees around the property to within at least 6 feet of the ground, using a bypass lopper (seen above), pruner saw, or long reach/hand pruner.

Remove flammable materials from underneath the house, decks, porches, and lanai. Common flammables include scrap-wood, firewood, and combustible furniture.

Mow the lawn regularly to keep grasses shorter than 4 inches tall around the home. Do not mow in the heat of the day or when the wind is blowing. Never mow in dry vegetation.

## Watch Out for Exotic Vegetation

Non-native trees, such as ironwood (seen below) constantly drop needles, leaves, branches, and other debris, so it's best to stay on top of removing them from the ground before the pile becomes a major project. Consider reforesting these areas with native trees that don't drop large amounts of debris.

Invasive grasses such as guinea and fountain grass grow rapidly when un-managed and can dry out very quickly, creating a major fire hazard. Weed them often and consider replanting with low-lying, drought-tolerant, native ground cover.

# Defensible Space - Hawaiian Style

**Consider selecting native plants from this list that are most relevant to your area:**


Mamaki


Kolea


Maia Pilo


‘Ilima Papa


Bonamia


‘Ākia


‘A‘ali‘i


‘Akoko


‘Ihi


Nānū


Pōhinahina


Ma‘o Hau Hele


Koki‘o


‘Ūlei


Wiliwili


Koai‘a


Uhiuhi


Hala Pepe


‘Ohi‘a Lehua


Ko‘oko‘olau


‘Ohe Makai


‘Iliahi


Nehe


Alahe‘e


‘Ala‘ala Wai Nui


Kolomona


Koai‘a

Creating defensible space does not necessarily mean eliminating the presence of greenery on your property. You can still landscape around your home to make it fire-safe without compromising beauty and aesthetics. By planting native, drought-tolerant plants (**xeriscaping**) around your home, you can:

- Protect your home from wildland fire ignition and spread
- Beautify your property
- Perpetuate an important natural and cultural resource
- Decrease the maintenance needs of your landscaping

For the drier areas of Hawaii, consider that native dryland plants are specially adapted to local conditions and require less upkeep, water, and fire maintenance, saving yourself a great deal of time, money, and resources. Non-native, lush plants often drop hazardous debris and can become fire prone in drought conditions.

## Homes with Great Xeriscaping

### Did You Know?

The same winds that blow hazardous debris toward a collection area (underneath shrubs, under the lanai, next to outer edges of home, etc.) will likely carry embers during a wildland fire to that same spot, and ignite that pile. That’s why it’s incredibly important to consistently remove debris from these areas long before a wildland fire occurs.

# What is a Hardened Home?

Construction materials and the quality of the defensible space surrounding it are what give a home the best chance to survive a wildland fire. Embers from a wildland fire will find the weak link in your home's fire protection scheme and gain the upper hand because of a small, overlooked or seemingly inconsequential factor. However, there are measures you can take to safeguard your home from wildland fire. While you may not be able to accomplish all the measures listed below, each will increase your home's, and possibly your family's, safety and survival during a wildland fire.

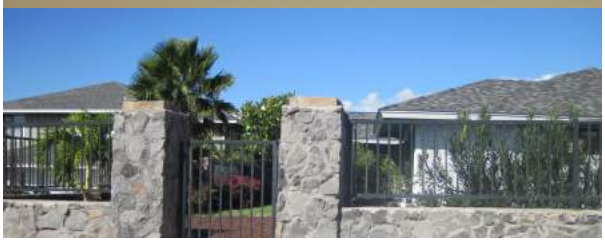
## Home Improvements

Gutter Guards or Screens

Enclosed Eaves

Screened Vents

Non-Combustible Fencing



Windows Clear of Vegetation

### ROOFS

Roofs are the most vulnerable surface where embers land because they can lodge and start a fire. Roof valleys, open ends of barrel tiles and rain **gutters** are all points of entry.

### EAVES

Embers can gather under open **eaves** and ignite exposed wood or other combustible material.

### VENTS

Embers can enter the attic or other concealed spaces and ignite combustible materials. Vents in eaves and cornices are particularly vulnerable, as are any unscreened **vents**.

### WALLS and FENCING

Combustible siding or other combustible or overlapping materials provide surfaces or crevices for embers to nestle and ignite. Combustible **fencing** can become engulfed and if attached to the home's sidings can carry the fire right to the home.

### WINDOWS and DOORS

Embers can enter gaps in doors, including garage doors. Plants or combustible storage near **windows** can be ignited from embers and generate heat that can break windows and/or melt combustible frames.

### BALCONIES and DECKS

Embers can collect in or on combustible surfaces or the undersides of decks, lanai, and balconies, ignite the material and enter the home through walls or windows. Post-and-pier homes, common throughout Hawaii, are especially vulnerable since most, if not all, of the underside of the house is exposed.

To harden your home even further, consider protecting your home with a residential fire sprinkler system. In addition to extinguishing a fire started by an ember that enters your home, it also protects you and your family year-round from any fire that may start inside your home.

# Creating a Safe Ho

**Roof:** Your roof is the most vulnerable part of your home because it can easily catch fire from wind-blown embers. Homes with wood-shake or shingle roofs are at high risk of being destroyed during a wildland fire.

Build your roof or re-roof with fire-resistant materials such as composition, **metal** (as seen in picture) or tile. Block any spaces between roof decking and covering to prevent ember intrusion.

Clear pine needles, leaves and other debris from your roof and gutters.

Cut any tree branches within ten feet of your roof.

**Deck/Patio Cover**: Use heavy timber or non-flammable construction material for decks.

Enclose the underside of balconies and decks with fire-resistant materials to prevent embers from blowing underneath.

Keep your deck clear of combustible items, such as baskets, dried flower arrangements and other debris.

The decking surface must be ignition resistant if it's within 10 feet of the home.

**Inside**: Keep working fire extinguishers on hand.

Install smoke alarms on each level of your home and near bedrooms. Test them monthly and change the batteries twice a year.

**Non-Combustible Fencing:** Make sure to use non-combustible fencing to protect your home during a wildland fire.

**Home Site and Yard:** Ensure you have at least a 100-foot radius of defensible space (cleared vegetation) around your home. Note that even more clearance may be needed for homes in severe hazard areas. This means looking past what you own to determine the impact a common slope or neighbors' yard will have on your property during a wildland fire.

Cut dry weeds and grass before noon when temperatures are cooler to reduce the chance of sparking a fire.

Landscape with fire-resistant plants that have a high moisture content and are low-growing.

Keep woodpiles, propane tanks and combustible materials away from your home and other structures such as garages, barns and sheds.

Ensure that trees are far away from power lines.

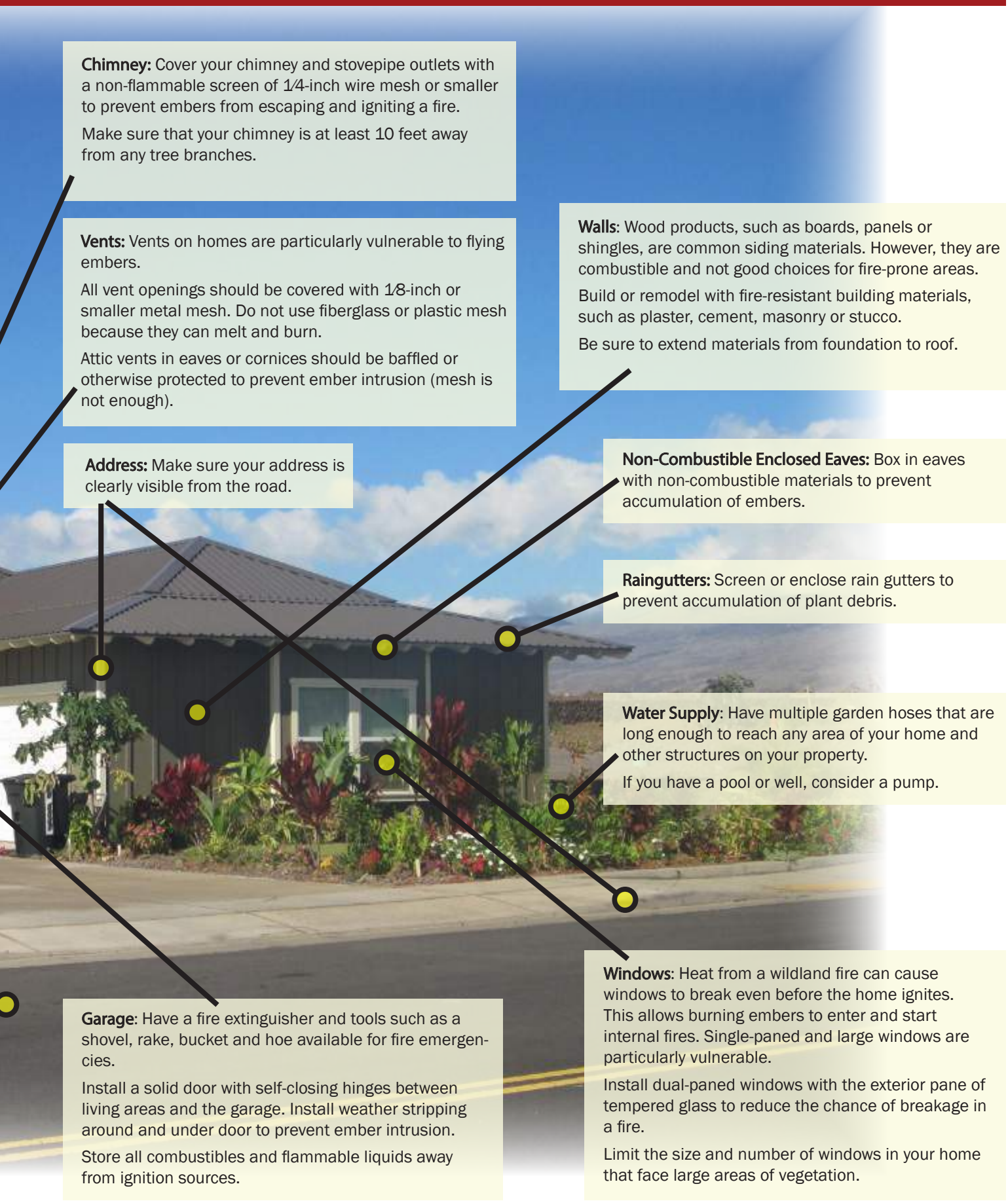
**Driveways and Access Roads**: Driveways should be designed to allow fire and emergency vehicles and equipment to reach your house.

Access roads should have a minimum 10-foot clearance on either side of the traveled section of the roadway and should allow for two-way traffic.

Ensure that all gates open inward and are wide enough to accommodate emergency equipment.

Trim trees and shrubs overhanging the road to a minimum of 13 1⁄2 feet to allow emergency vehicles to pass.

# ome in the WUI



**Chimney:** Cover your chimney and stovepipe outlets with a non-flammable screen of 1⁄4-inch wire mesh or smaller to prevent embers from escaping and igniting a fire.

Make sure that your chimney is at least 10 feet away from any tree branches.

**Vents:** Vents on homes are particularly vulnerable to flying embers.

All vent openings should be covered with 1⁄8-inch or smaller metal mesh. Do not use fiberglass or plastic mesh because they can melt and burn.

Attic vents in eaves or cornices should be baffled or otherwise protected to prevent ember intrusion (mesh is not enough).

**Address:** Make sure your address is clearly visible from the road.

**Walls**: Wood products, such as boards, panels or shingles, are common siding materials. However, they are combustible and not good choices for fire-prone areas.

Build or remodel with fire-resistant building materials, such as plaster, cement, masonry or stucco.

Be sure to extend materials from foundation to roof.

**Non-Combustible Enclosed Eaves:** Box in eaves with non-combustible materials to prevent accumulation of embers.

**Raingutters:** Screen or enclose rain gutters to prevent accumulation of plant debris.

**Water Supply**: Have multiple garden hoses that are long enough to reach any area of your home and other structures on your property.

If you have a pool or well, consider a pump.

**Garage**: Have a fire extinguisher and tools such as a shovel, rake, bucket and hoe available for fire emergencies.

Install a solid door with self-closing hinges between living areas and the garage. Install weather stripping around and under door to prevent ember intrusion.

Store all combustibles and flammable liquids away from ignition sources.

**Windows**: Heat from a wildland fire can cause windows to break even before the home ignites. This allows burning embers to enter and start internal fires. Single-paned and large windows are particularly vulnerable.

Install dual-paned windows with the exterior pane of tempered glass to reduce the chance of breakage in a fire.

Limit the size and number of windows in your home that face large areas of vegetation.

# READY, SET, GO!

## Create Your Own Action Guide

Now that you've done everything you can to protect your house, its time to prepare your family. Your **Wildland Fire Action Guide** must be prepared with all members of your household well in advance of a fire. Use these checklists to help you gain a situational awareness of the threat and to prepare your Wildland Fire Action Guide. For more information on property and home preparedness before a fire threat, review the preparedness checklist on the Firewise Communities website, www.firewise.org.

# Ready – Preparing for the Fire Threat

### Take Action for Your Community

- ☐ Talk to your community members and community association about creating a Community Wildfire Protection Plan (CWPP). Hawaii Wildfire Management Organization can assist with this process.
- ☐ Coordinate with local county CERT teams.
- ☐ Get to know your neighbors. If there are any elderly or handicapped residents, or others with limited mobility, plan with them on how you can best assist them in the event of a wildland fire.

- ☐ Create a **Family Disaster Plan** that includes meeting locations and communication plans and rehearse it regularly. Include in your plan the evacuation of pets and large animals such as horses.
- ☐ Have fire extinguishers on hand and train your family how to use them.
- ☐ Ensure that your family knows where your gas, electric and water main shut-off controls are and how to use them.
- ☐ Plan several different evacuation routes.
- ☐ Designate an emergency meeting location outside the fire hazard area.
- ☐ Assemble an emergency supply kit as recommended by the American Red Cross (www.redcross.org).
- ☐ Appoint an out-of-area friend or relative as a point of contact so you can communicate with family members who have relocated.
- ☐ Maintain a list of emergency contact numbers posted near your phone and in your emergency supply kit.
- ☐ Keep an extra emergency supply kit in your car in case you can't get to your home because of fire.
- ☐ Have a portable radio or scanner so you can stay updated on the fire.
- ☐ Have a clear list and easy access location for necessary medications, glasses and other health aids.

# Set – Situational Awareness When a Fire Starts

- ☐ Evacuate as soon as you are set! Do not wait for evacuation orders. Get out early - you can always return home if it is safe. This protects you, decreases traffic, and allows firefighters to focus on fire suppression. See more under the "Go" section.
- ☐ Alert family and neighbors.
- ☐ Dress in appropriate clothing (i.e., clothing made from natural fibers, such as cotton, and work boots). Have goggles and a dry bandana or particle mask handy.
- ☐ Ensure that you have your emergency supply kit on hand that includes all necessary items, such as a battery powered radio, spare batteries, emergency contact numbers, and ample drinking water.
- ☐ Stay tuned to your TV or local radio stations for updates, or check the fire department Web site.
- ☐ Remain close to your house, drink plenty of water and keep an eye on your family and pets until you are ready to leave.

## If You are Trapped: Survival Tips

- ☐ Shelter away from outside walls.
- ☐ Bring garden hoses inside house so embers don't destroy them.
- ☐ Patrol inside your home for spot fires and extinguish them.
- ☐ Wear long sleeves and long pants made of natural fibers such as cotton.
- ☐ Stay hydrated.
- ☐ Ensure you can exit the home if it catches fire (remember if it's hot inside the house, it is four to five times hotter outside).
- ☐ Fill sinks and tubs for an emergency water supply.
- ☐ Place wet towels under doors to keep smoke and embers out.
- ☐ After the fire has passed, check your entire property and extinguish any fires or embers.
- ☐ If there are fires that you can not extinguish with a small amount of water or in a short period of time, call 9-1-1.

## Outside Checklist

- ☐ Gather up flammable items from the exterior of the house and bring them inside (e.g., patio furniture, children's toys, door mats, etc.) or place them in your pool.
- ☐ Turn off propane tanks.
- ☐ Don't leave sprinklers on or water running - they can waste critical water pressure.
- ☐ Leave exterior lights on.
- ☐ Back your car into the driveway. Shut doors and roll up windows.
- ☐ Have a ladder available.
- ☐ Patrol your property and extinguish all small fires until you leave.
- ☐ Seal attic and ground vents with pre-cut plywood or commercial seals if time permits.

## Inside Checklist

- ☐ Shut all windows and doors, leaving them unlocked.
- ☐ Remove flammable window shades and curtains and close metal shutters.
- ☐ Remove lightweight curtains.
- ☐ Move flammable furniture to the center of the room, away from windows and doors.
- ☐ Shut off gas at the meter. Turn off pilot lights.
- ☐ Leave your lights on so firefighters can see your house under smoky conditions.
- ☐ Shut off the air conditioning.

# Go – Leave Early

By leaving early, you give your family the best chance of surviving a wildland fire. You also help firefighters by keeping roads clear of congestion, enabling them to move more freely and do their job in a safer environment.

## WHEN TO LEAVE

Leave early enough to avoid being caught in fire, smoke or road congestion. Don't wait to be told by authorities to leave. In an intense wildland fire, they may not have time to knock on every door. If you are advised to leave, don't hesitate!

## WHERE TO GO

Leave to a predetermined location (it should be a low-risk area, such as a well-prepared neighbor or relative's house, a Red Cross shelter or evacuation center, motel, etc.). Your local Community Wildfire Protection Plan will also have locations listed.

## HOW TO GET THERE

Have several travel routes in case one route is blocked by the fire or by emergency vehicles and equipment. Choose an escape route away from the fire.

## WHAT TO TAKE

Take your emergency supply kit containing your family and pet's necessary items.

## EMERGENCY SUPPLIES

The American Red Cross recommends every family have an emergency supply kit assembled long before a wildland fire or other emergency occurs. Use the checklist below to help assemble yours. For more information on emergency supplies, visit the American Red Cross Web site at www.redcross.org.

- ☐ Three-day supply of water (one gallon per person per day).
- ☐ Non-perishable food for all family members and pets (three-day supply).
- ☐ First aid kit.
- ☐ Flashlight, battery-powered radio, and extra batteries.
- ☐ An extra set of car keys, credit cards, cash or traveler's checks.
- ☐ Sanitation supplies.
- ☐ Extra eyeglasses or contact lenses.
- ☐ Important family documents and contact numbers.
- ☐ Map marked with evacuation routes.
- ☐ Prescriptions or special medications.
- ☐ Family photos and other irreplaceable items.
- ☐ Easily carried valuables.
- ☐ Personal computers (information on hard drives and disks).
- ☐ Chargers for cell phones, laptops, etc.

Note: Keep a pair of old shoes and a flashlight handy in case of a sudden evacuation at night.

# READY, SET, GO!

## For Large Landowners & Land Managers

# Ready

## Prepare Your Family, Employees, and Visitors

- ☐ Go through the previous guidelines (pgs. 12-14) with your family in addition to this section.
- ☐ Have at least two exits for your headquarters and primary residence for your evacuation plan.
- ☐ If you have a GPS device, pre-program it with multiple escape routes.
- ☐ Keep an emergency supply kit in all ranch and personal vehicles.

## Prepare Your Animals

- ☐ Create a livestock evacuation plan.
- ☐ Ensure proper registering and branding of livestock.
- ☐ Establish a back-up plan for feeding livestock if grazing land is destroyed by fire.

### Know Your Area's Conditions

- ☐ Track the weather daily. Take note of changing conditions.
- ☐ If the weather is too dry: close the area, avoid risky equipment operations, or driving over dry vegetation. Fires can start by simply idling your car over grass. Make sure all vehicles' catalytic converters are in working order.

## Prepare Your Property

- ☐ Create and maintain firebreaks (vegetation removed down to bare, mineral soil) each year prior to fire season around pastures and structures. This will allow access for suppression. The width of the firebreaks should be at least 3x the fuel height.
- ☐ Reduce vegetation and remove combustible material around all structures.
- ☐ When selecting for understory vegetation (below trees), choose those that are less fire-prone and don't dry out quickly, and those that don't create ladder fuels.
- ☐ Prioritize assets by assessing the risk and value of each and the effort it would take to protect them.
- ☐ Maintain your equipment (power tools, mowers, catalytic converters, etc.) Make sure working spark arrestors are installed and maintained on equipment.
- ☐ Reinforce fences with metal posts, if applicable.
- ☐ Create a safe zone clear of all vegetation for equipment.
- ☐ Clear vegetation around fuel tanks and other highly combustible equipment.
- ☐ Create a fire pre-plan for your property that includes insights from your fire department and wildland fire experts. Discuss your plan and property specifics with local firefighters ahead of time. (See pre-plan insert on next page).

# For Large Landowners & Land Managers

## Set

### Your Family, Employees, and Visitors

- ☐ Follow guidelines from page 13.
- ☐ Alert family, ranch hands, field workers, or anyone else who is on your property.
- ☐ Make sure you have a contact list or meeting location coordinated ahead of time to ensure everyone's safety.

### Your Animals

- ☐ Hook up your stock trailer and load your animals.
- ☐ Unlock and open gates so livestock can escape flames and firefighters can gain access.
- ☐ Close all barn doors so horses and livestock will not go into a burning building.

### Your Property

- ☐ Follow guidelines from page 13.
- ☐ Move equipment into a safe zone that is clear of combustible fuels.
- ☐ Close all doors, windows, and turn on exterior/interior lights in barns and other structures.
- ☐ Shut off gas supply and propane tanks.

#### Catch the Fire Before it Burns Out of Control

Have suppression tools & methods available on site:

- ☐ Fire extinguisher
- ☐ Water
- ☐ Fire tools
- ☐ Phone on site
- ☐ Keys to the dozer

## Go

- ☐ Follow guidelines from page 14.
- ☐ Ensure all people have safely evacuated.
- ☐ Stay in communication with fire operations. Ask questions, offer assistance, and give permission. Your invaluable knowledge of the area will prove useful for firefighters who are there to help protect your land and resources. Fire crews can then run an operation that meets your needs as well as theirs.

#### Pre-Plan: Ensure Firefighters Have Access

- ☐ Make sure address posts are clearly visible and marked in contrasting colors.
- ☐ Keep copies of gate keys and a written list of combinations in a known location.
- ☐ Make sure your property is properly mapped out and that your county fire department has a copy of the map.
- ☐ Maintain roads far in advance of fire season. Make sure there is enough room for fire trucks to drive through and that large turn-outs for emergency vehicles are available. Hazards to look out for include: overhanging trees, low power lines, bridges with weight restrictions, boggy areas, and rural residence internal fencing.
- ☐ Establish "safety zones" (large areas free of vegetation and other hazardous conditions for firefighters to retreat to).
- ☐ Maximize water source access and availability (hydrants, ditches, reservoirs, water tanks, etc.). Ensure pumps and hoses are available and that the size and type of outlets are standard fittings.
- ☐ If you would like to offer your equipment (water, tank, tractor) for firefighting, make arrangements and contacts prior to use for proper tracking and reimbursement.

Post in a location where **every** member of your family can see it, such as on the fridge or front door.

# Our Family's Wildland Fire Action Guide

Well before fire danger is HIGH, prepare your family and residence for potential wildfires. Monitor your local media for the latest information on any incident, and make certain your mobile phones have "In Case of Emergency" (ICE) information loaded.

**Our family members will call this out-of-area/state contact to report that we are safe:**
Name: _____ Phone number(s): _____
Pre-program this into cell phones. Keep it current. Make sure the person agrees to be available/responsive.

**If separated and unable to access our home or neighborhood, our family will meet at this safe location:**
Primary: _____
Secondary: _____

**If our children are in school during an emergency, they will be evacuated to this/these locations:**
School 1: _____
Child(ren): _____ School Contact Info: _____
School's Evacuation Protocol: _____

School 2: _____
Child(ren): _____ School Contact Info: _____
School's Evacuation Protocol: _____

**Our emergency go-bag is located:** _____

**Essential items to grab before leaving (medication, glasses, etc.):** _____
_____

**We will do this with our pets:** _____
Our pet emergency go-kit (food, water, bowl, leash, crate, etc.) is located: _____

**Neighbors/others in our area we have agreed to help or check on during an emergency or evacuation:**
Name: _____ Address: _____ Phone: _____
How we have agreed to assist and/or make sure they are ok: _____
_____

Name: _____ Address: _____ Phone: _____
How we have agreed to assist and/or make sure they are ok: _____

## Local Fire Department Information Numbers
## (Circle the appropriate contact)

| Hawaii (County) Fire Dept. | Honolulu Fire Dept. | Maui Fire Dept. | Kauai Fire Dept. |
|---|---|---|---|
| (808) 932-2912 | (808) 723-3473 | (808) 876-4690 | (808) 241-4985 |

### Safety Tip

Remember to PRACTICE your evacuation plan each year with your family, and keep it up to date!

# Emergency Plan Notes

Use the space below to add any additional information to your family's evacuation plan.

# Off-island plans during fire season? Plan ahead!

If you are a seasonal resident or property owner, or if you know you will be away, it is critical that you take personal responsibility for your property and the safety of those who may occupy it during your absence. Unmitigated hazards on your property can significantly affect an entire neighborhood, especially adjacent homes and yards. Remember, if an ember lands and ignites a fire on your property, that fire can easily spread and threaten additional lives and homes within the community, whether you are physically present or not. It is up to you to ensure your home, yard, and property are READY at all times.

## Essential preparedness actions for part-time and traveling residents:

**1. Ensure your vegetation and structures will be managed and maintained to withstand embers and mitgate wildfire ignition and spread while you are away.**

Keeping your yard lean (via strategic, Firewise planting methods and trimmed grasses and trees), green (meaning watered and alive, not dry or dead), and clean (regularly maintained, no debris or leaf piles) applies all year long. What is your property and vegetation maintenance plan? How will you know if your plan is successfully occurring?

**2. Create a wildfire information packet for any seasonal or temporary guests who will be staying at your property, familiarizing yourself with all potential evacuation routes and how they may have changed over the year.**

Introduce your guests to neighbors that may need their help evacuating. Who are those neighbors, in which houses do they live, and what are their contact numbers? Where can guests find your emergency supplies box or evacuation go-bag?

**3. Be a good neighbor. Be active in your community, even if you only consider yourself a part-time or seasonal resident.**

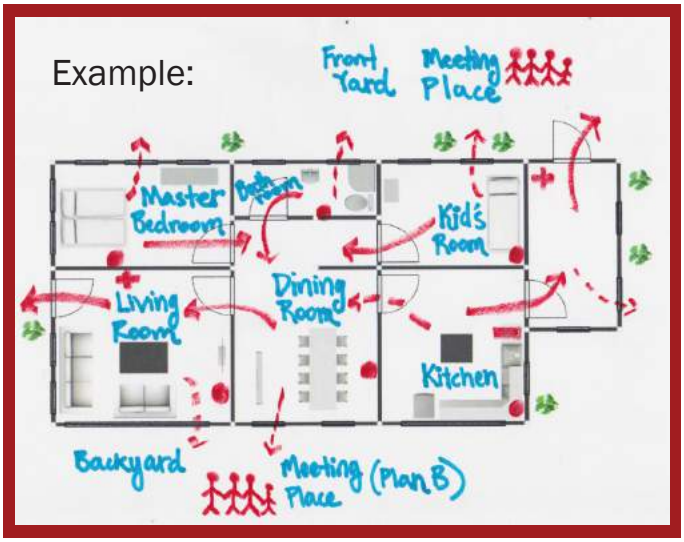
Get to know your neighbors and provide your contact information to them, so that you can work together to find solutions to unexpected risks or hazards within the community, particularly any stemming from your property or that may endanger your property while you are away.

Post in a location where **every** member of your family can see it, such as on the fridge or next to a phone.

# Our Family's Home Evacuation Plan

Draw a floor plan or map of your home with the space provided below:

- Show all doors and windows.
- Mark two ways out of each room with arrows (1st choice: solid and 2nd choice: dotted).
- Mark all smoke alarms in the house with a ● . Mark all fire extinguishers with a ▬ .
- Mark your emergency kit with a ✚ . Keep kits close to your 2 main exits.
- Pick and mark a main meeting place (and a backup alternative) outside the house where everyone can meet, away from any hazards.
- Remember to practice your plan at least twice a year.



# READY, SET, GO!

Residential Safety Checklist

Tips To Improve Family and Property Survival During A Wildland Fire

| Home | Yes | No |
|---|---|---|
| 1. Does your home have a metal, composition, or tile (or other non-combustible) roof with capped ends and covered fascia? | ☐ | ☐ |
| 2. Are the rain gutters and roof free of leaves, needles and branches? | ☐ | ☐ |
| 3. Are all vent openings screened with 1/8 inch (or smaller) mesh metal screen? | ☐ | ☐ |
| 4. Are approved spark arrestors on chimneys? | ☐ | ☐ |
| 5. Does the house have non-combustible siding material? | ☐ | ☐ |
| 6. Are the eaves "boxed in" and the decks, lanai, and/or pier-and-posts enclosed? | ☐ | ☐ |
| 7. Are the windows made of at least double-paned or tempered glass? | ☐ | ☐ |
| 8. Are the decks, porches, lanai, and other similar areas made of non-combustible material and free of easily combustible material (e.g. plastic furniture)? | ☐ | ☐ |
| 9. Is all firewood at least 30 feet from the house? | ☐ | ☐ |

| Defensible Space | Yes | No |
|---|---|---|
| 1. Is dead vegetation cleared 100 feet from the house? (Consider adding distance due to slope of property.) | ☐ | ☐ |
| 2. Is there separation between shrubs? | ☐ | ☐ |
| 3. Are ladder fuels removed? | ☐ | ☐ |
| 4. Is there a clean and green area extending at least 30 feet from the house? | ☐ | ☐ |
| 5. Is there a non-combustible area within five feet of the house? | ☐ | ☐ |
| 6. Is there separation between trees/tree clusters? | ☐ | ☐ |

| Emergency Access | Yes | No |
|---|---|---|
| 1. Is the home address visible from the street? | ☐ | ☐ |
| 2. Is the home address made of fire-resistant materials? | ☐ | ☐ |
| 3. Are street signs present at every intersection leading to the house? | ☐ | ☐ |
| 4. Are street signs made of fire-resistant materials? | ☐ | ☐ |
| 5. Is flammable vegetation within 10 feet of the driveway cleared and are overhanging obstructions removed? | ☐ | ☐ |
| 6. If a long driveway is present, does it have a suitable turnaround area? | ☐ | ☐ |

--This is a high value resource-- Please pass this on to others instead of throwing in the trash. It could save a life or home!

Ready, Set, Go!
www.wildlandfireRSG.org

Hawaii Wildfire Management Organization
www.hawaiiwildfire.org

# APPENDIX B

## HĀMĀKUA COMMUNITY MEETING INPUT

### BACKGROUND

Input was gathered from community members as to their highest priority concerns related to wildfire, along with suggested actions for addressing those concerns. Responses were solicited in each of the National Wildland Fire Management Strategy categories- **Fire Adapted Communities**, **Safe & Effective Firefighting**, and **Resilient Landscapes** to correspond to, and mimic, the discussion that took place during virtual workshops for seamless integration of all participant input. HWMO held two meetings with key community contacts and leaders on November 9, 2021.

### RESULTS

Overall, 27 community members of the Hāmakua area attended workshops. These included agricultural operators/farmers/ranchers; representatives of a community group or nonprofit organization; private company/business representatives; residents, government agency representatives; and natural resource/ forestry/soil managers. Their concerns, comments and recommended actions are as follows:

| Fire Adapted Communities | |
|---|---|
| **Concern** | **Specific comment and/or recommended actions** |
| Lack of education in wildfire prevention and evacuation among residents | 1. Newer residents do not have an understanding of risks, actions, and/or wildfire response limitations. Action: develop and distribute information for new residents via pamphlets in a welcome package.<br>2. Need to support and encourage community leaders to reach out directly to their neighbors and make sure they have information.<br>3. Community associations have widest networks of people and can hold in-person workshops.<br>4. Information to residents could include: what to do around home and yard, what to do during a fire, what different levels of evacuation mean.<br>5. Wildfire preparedness could tie into hurricane season. |
| Lack of community wildfire preparedness standards | 1. Encourage communities to become a Firewise certified (for example, Ahualoa).<br>2. Prepare community plans specific to wildfire safety for each neighborhood.<br>3. Document and conduct home assessments to assess pre-fire risks (with pictures & local knowledge).<br>4. CWPP need to have most accurate, up-to-date data on community and community communication status. |

| | |
|---|---|
| Lack of neighborhood infrastructure to help with firefighting | 1. Communities throughout (both mauka and makai) may have restricted vehicular access which in turn limits access to water resources in the event of a fire.<br>2. Need to establish (re-establish access via the county) water resources to support fire fighting operations.<br>3. Need to establish proper fittings for firefighting on existing water resources and catchment tanks, can be done individually.<br>4. Improve road infrastructure: for example, Pa'auilo Community Assn & HFD need to explore what can be done to get people out of areas, especially where there are dead-end roads.<br>5. Consider establishing east-west connecting road infrastructure.<br>6. Consider widening one-lane roads (such as Kahana area).<br>7. Create turn-arounds and pull-outs.<br>8. Identify hotspots in remote areas and how they can be addressed. |
| Lack of defensible space | 1. Concern for homes in and around Pau'uilo and Honoka'a which are close to individual stands of trees.<br>2. Community needs better access to Kamehameha schools lands for fire prevention/suppression purposes (e.g., dip tanks).<br>3. Need to consider grazing around homes. |

| Safe & Effective Firefighting | |
|---|---|
| **Recommendation** | **Specific comment and/or recommended action** |
| Lack of continuity, training and coordination among Community Emergency Response Teams (CERTs) | 1. Establish clear roles and responsibilities between CERT, HFD and Civil Defense. For example: (a) know that HFD does make the call on evacuation and informs CD, (b) IC on scene runs info up to FD chief, then to EOC, EOC disperses through web, media.<br>2. Request HFD budget include wildland lead and PIO for wildfire incidents.<br>3. Establish a volunteer firefighting force, especially in remote areas (mauka of the road) which is closely tied into existing Fire Stations (Honoka'a) and police (note that Laupahoehoe has one currently).<br>4. Designate a point of contact for each CERT team.<br>5. Provide supplemental ICS and CERT training focused on wildfire (e.g., task book certifications).<br>6. Assess personal equipment (e.g., bull dozers & operators) to make fuel breaks and buffer zones. |
| Lack of community emergency / evacuation plan(s) | 1. Have written evacuation plans (Refer to Hāmakua 'Ohana Preparedness Plan and the 2020 Hawaii County multi-hazard mitigation plan)-who makes the decision and how is the information flow.<br>2. Know who will cut locks, fences in the event of an evacuation.<br>3. Work with large landowners for access in the event of an emergency (Kamehameha Schools). |
| Slow and unclear communication between emergency responders and communities | 1. Need more public information during a fire event (e.g., what's going on?), particularly from a designated county PIO.<br>2. Need improved methods of getting the word out (i.e., NextDoor or similar). For example, FD has facebook and Instagram account to disperse information.<br>3. Hawaii County Civil Defense could assist in instantaneous communications: where is fire, where is it going, who is being recommended for evacuation.<br>4. Determine where to go during an evacuation (e.g., Laupahohoe school?) and work to figure out the liability issues/concerns so that schools and other public facility areas can be used. |
| Lack of firefighting infrastructure & slow wildland fire response | 1. Fire trucks need to be exempt from weight limits on bridges.<br>2. Establish emergency muster and triage points.<br>3. Prioritize brush fire response by Hawaii County Fire Department (not only structural fires) in Hāmakua, since the perception remains that wet conditions doesn't necessitate the same level of response.<br>4. Consider air water drops support from Air-1. |

| Resilient Landscapes | |
|---|---|
| **Concern** | **Specific comment and/or recommended action** |
| Fire fuels, fallow lands and recent fires (e.g., 2021 fire in Pau'uilo) | 1. Old Pau'uilo airstrip has lots of vegetation and airstrip was on fire. In places where trees were harvested, there was more grass.<br>2. Need vegetation removal in adjacent, empty lots, specifically reduce eucalyptus and grass cover by planting diverse trees.<br>3. Focus on removal of eucalyptus within a distance from the belt highway to prevent disruption of power lines, and to provide a fire break for the highway.<br>4. On former sugar cane land, it would be valuable to work with that landowner to increase livestock grazing (no commercial ventures yet, but there was one person with goats). There might be producers who are interested in pursuing that, but it requires fencing & infrastructure.<br>5. Refer to `Āina Mauna Legacy Plan (Dept of Hawaiian Homelands) for dealing with gorse and establishing greenbreaks. |
| Human-caused ignitions from improperly disposed of debris | 1. Abandoned cars can be a source of ignitions.<br>2. Need resources and education for community debris removal.<br>3. Need to be aware that collaborative disposal could lead to spread of invasives (i.e., little fire ant, two line spittle bug). |
| Deteriorating infrastructure | 1. Current status of roads is unknown or questionable (lack of monitoring). For example: roads (which are only one in/out) are privatized.<br>2. Certain bridges have weight limitations for fire suppression (fire engines) and brush abatement (dozers)<br>3. Consider opening up overgrown plantation roads. |

# APPENDIX C

## 2024 CWPP UPDATE: ADDITIONAL PROJECT PRIORITIES IDENTIFIED

| Project | Anticipated Costs | Anticipated Project leads and partners |
|---|---|---|
| Fuels management and/or perimeter fuelbreaks around high risk subdivisions throughout East Honolulu CWPP area, at the WUI interface, to reduce ignition and rapid fire spread risks and to provide firefighting access and/or additional egress options | Varies per community, per method. TBD per project. Ranges $30K- $4M | At-Risk Communities, HWMO, Firewise Communities, HFD, DLNR-DOFAW, Dept. of Hawaiian Homelands (DHHL), Board of Water Supply, Watershed Partnership, Hawaiian Electric |
| Defensible Space Inspection Program for large land parcels and subdivisions in high risk areas | $Up to $2M per year depending on number of inspectors and area covered by program | HFD, City & County of Honolulu and other partners |
| Firewise Communities Program Coordination for area- to support communities pursuing or maintaining Firewise recognition, and to offer educational programming and mitigation assistance | $100K/year | DLNR-DOFAW, HWMO, HFD, DEM |
| Community Mitigation & Defensible Space-vegetation removal projects and home hardening mini-grants | $200K/year | At-Risk or Firewise Communities, DLNR-DOFAW, HWMO, HFD, DEM |
| Wildfire Resilient Landscapes Program Coordinator for area- to support mitigation projects and activities, provide technical guidance and trainings, coordinate multi-partner project implementation | $100K/year | HWMO, DLNR-DOFAW |
| Wildfire preparedness education via community workshops and educational campaigns (PSAs, printed materials, etc.) | $100K/year | DLNR-DOFAW, HWMO, HFD, DEM |
| Community mitigation projects for defensible space | Varies per community, per method. TBD per project. Ranges $30,000- $4M | At-Risk Communities, HWMO, Firewise Communities, HFD, DLNR-DOFAW, Dept. of Hawaiian Homelands (DHHL), Board of Water Supply, Watershed Partnership, Hawaiian Electric |

| Project | Anticipated Costs | Anticipated Project leads and partners |
|---|---|---|
| Evacuation planning per community | Cost TBD | At-Risk Communities, HWMO, Firewise Communities, HFD, DLNR-DOFAW, Dept. of Hawaiian Homelands (DHHL), Board of Water Supply, Watershed Partnership, Hawaiian Electric |
| Develop secondary egress and/or safety zones for communities with limited ingress/ egress | Varies per community, per method. TBD per project. Ranges $50K– $20M | DEM, DLNR-DOFAW, HWMO, HFD, at-risk communities |
| Fuels management and/or perimeter fuelbreaks auto protect sensitive natural resource areas | Varies per community, per method. TBD per project. Ranges $30K- $10M | Impacted Communities, HWMO, Firewise Communities, HFD, DLNR-DOFAW, Dept. of Hawaiian Homelands (DHHL), Board of Water Supply, Watershed Partnership, Hawaiian Electric |
| Install fencing and water infrastructure to support grazing of fire prone grassland areas | TBD per project. Ranges $50K- $4M | Impacted Communities, HWMO, Firewise Communities, HFD, DLNR-DOFAW, Dept. of Hawaiian Homelands (DHHL), Board of Water Supply, Watershed Partnership, Hawaiian Electric |
| Install water cisterns, helicopter dipatnks, or other water resources to improve suppression capacity | TBD per project. Ranges $50K- $10M | HFD, DLNR-DOFAW, Dept. of Hawaiian Homelands (DHHL), Board of Water Supply, Watershed Partnership, Hawaiian Electric, HWMO |
| Harden electrical infrastructure, make grid more resilient, enhance community educational programs, minimize impacts of power shutoffs through micro gridding and back up power options for sensitive municipal and medical operations | $10-$50M | Hawaiian Electric, in partnership with agencies and communities |
| Establish a fuels management partnership for All Hands All Lands approach to reducing fire fuels | $100K/year | HWMO, DLNR-DOFAW, Univ. of Hawaii |
| Fuels conversion through reactivating agricultural production/operations or through ecological restoration on fire prone unmanaged landscapes | Varies per project. Ranges $25K- $4.5M | At-Risk Communities, HWMO, Firewise Communities, HFD, DLNR-DOFAW, Dept. of Hawaiian Homelands (DHHL), Board of Water Supply, Watershed Partnership, Hawaiian Electric |

| Project | Anticipated Costs | Anticipated Project leads and partners |
|---|---|---|
| Establish a fire weather forecasting coordinating group, weather stations, and a technological system to increase fire weather monitoring and red flag warning resolution. Develop necessary technology and data collection/analysis. | Some costs TBD. Coordination and planning costs $150K. Research costs TBD. Technology and weather station costs TBD. | Univ. of Hawaii, NOAA-NWS, HFD, DLNR-DOFAW, HWMO, HECO, |
| Establish wildfire mitigation plans for City and State Lands not managed by DOFAW, to include Department of Education (all campuses), Department of Hawaiian Homelands (DHHL), County PONC lands and Parks, etc. | Cost varies per site and project | Agency leadership, facilities managers, communities at risk, DLNR-DOFAW, HFD, HWMO |
| Implement mitigation plans and projects on DHHL lands and Homestead Communities | $500K/year | Agency leadership, facilities managers, communities at risk, DLNR-DOFAW, HFD, HWMO |
| Implement mitigation plans and projects on school campus | Cost TBD | Agency leadership, facilities managers, communities at risk, DLNR-DOFAW, HFD, HWMO |
| Implement mitigation plans and projects on State and County park and other lands | Cost TBD | Agency leadership, facilities managers, communities at risk, DLNR-DOFAW, HFD, HWMO |

The following county, state, and federal representatives have a high level of interest in the protection of the Hāmākua area from wildfire, and have reviewed and support this Community Wildfire Protection Plan.

State Department of Land and Natural Resources- Division of Forestry and Wildlife
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1151 Punchbowl St. Room 325 Honolulu, HI 96813

Hawai'i Fire Department
25 Aupuni Street Suite 2501. Hilo, HI 96720

Hawai'i County Civil Defense Agency
920 Ululani St, Hilo, HI 96720

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