KAUA'I COMMUNITY WILDFIRE PROTECTION PLAN

ISLAND OF KAUA'I, HAWAI'I

COMPREHENSIVE PLAN UPDATE: 2016 (*FIRST PLAN: 2009*)

This document represents the collective efforts of community members, agencies, and stakeholders to reduce wildfire risks and enhance resilience. With a complete redevelopment of the plan, to include new hazard assessments, community and agency meetings, and all new content in 2016, the CWPP established a comprehensive framework for wildfire hazard assessment, community values, and recommended strategies for risk reduction.

PRIORITY PROJECTS UPDATED: 2024

In 2024, the plan was updated to include a detailed list of priority projects, making it a dynamic, living plan that evolves with the community's needs and priorities. The CWPP remains a cornerstone for wildfire risk mitigation, project planning, and funding, ensuring a collaborative and proactive approach to wildfire resilience.

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.

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PLEASE READ BEFORE CONTINUING

Introduction to the Community Wildfire Protection Plan (CWPP) and Updates

The Community Wildfire Protection Plan (CWPP) is a vital tool for guiding communities, agencies, and stakeholders in reducing wildfire risks and enhancing resilience across our landscapes. Since its inception, the CWPP has provided a comprehensive foundation for understanding wildfire hazards, the characteristics of our landscapes, the values at risk, and the community and agency concerns that shape our wildfire mitigation strategies. The CWPP has always been designed to serve as a dynamic, living document that remains relevant and actionable over time.

Foundational Elements of the CWPP

The foundational elements of the CWPP were established during the original completion of the CWPP document. These remain steadfast and include:

- Detailed assessments of wildfire hazards and risks.
- Descriptions of the local and regional landscape.
- Identification of community values at risk, including natural resources, homes, infrastructure, and cultural heritage.
- Documentation of community and agency concerns regarding wildfire impacts.
- General recommended next steps and strategies to address wildfire risk.

When there are significant changes in risk, values, emergency operations, or similar, an entirely new CWPP document will be developed. Until such time, these core components ensure that the CWPP continues to provide a reliable, broad-based framework for understanding and addressing wildfire challenges.

The Evolution of the CWPP: Annual Priority Projects and Actions Updates

To ensure that the CWPP remains an actively utilized tool for project planning and funding, we have adopted a system of annual updates to the appendix. These updates focus specifically on identifying and prioritizing shovel-ready projects that align with the overarching goals of the CWPP. This approach allows us to:

- Keep the CWPP alive and relevant by incorporating evolving community needs and priorities.
- Enhance its utility as a foundational resource for securing funding and implementing wildfire mitigation projects.
- Ensure that project lists remain current, specific, and actionable.

While the foundational elements of the CWPP persist as written, the priority projects and actions list naturally shift and evolve over time. This flexibility ensures that the CWPP remains both a strategic guide and a practical resource for action.

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Mutual Agreement Signature Page

The following three entities mutually agree to the final contents of this Community Wildfire Protection Plan and the subsequent List of Priority Projects and Actions: State of Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife; Kauai Emergency Management Agency; and Kauai Fire Department.

This plan:

- Was collaboratively developed by agencies, entities, community members, and individuals with interest or jurisdiction within the CWPP area.
- 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.
- Includes both foundational information and updated lists of projects.

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

Acknowledgment of the 2024 Update

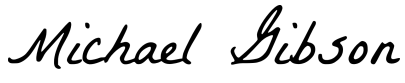
This 2024 update represents the latest step in the CWPP's evolution. It includes a brand-new list of priority projects and actions, each identified with detailed specifications to guide implementation.

By signing this document, we affirm our collective commitment to the CWPP's foundational principles and to the ongoing process of refining and advancing our wildfire mitigation project priorities and implementation efforts.

12/19/2024

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

Date



12/20/2024

Michael Gibson, Fire Chief
County of Kauai
Kauai Fire Department

Date

12/23/2024

Elton Ushio, Administrator
Kauai Emergency Management Agency

Date

ACKNOWLEDGEMENTS

From Original 2016 CWPP Development Process.

Project Developed and Coordinated by: Hawai'i Wildfire Management Organization (HWMO), a 501 (c)3 nonprofit organization dedicated to protecting communities and natural resources in Hawai'i and the Pacific from wildfire. hawaiiwildfire.org

Plan written by: Elizabeth Pickett and Pablo Beimler, HWMO.

Public Input Process Coordinated and Led by: Elizabeth Pickett and Ilene Grossman, HWMO, with assistance and participation from agency partners and community members.

Maps Created by: Orlando Smith, HWMO.

Special thanks to: Chief Robert Westerman, Captain Daryl Date, and Lieutenant Kilipaki Vaughan of the Kaua'i Fire Department; Patrick Porter of State Division of Forestry and Wildlife; Elton Ushio of the Kaua'i Emergency Management Agency; and Dr. Clay Trauernicht of the University of Hawai'i Cooperative Extension, CTAHR.

Completed using funds from: 2014-16 US Forest Service Competitive Western WUI Grant from the Cooperative Fire Program of the U.S. Forest Service, Department of Agriculture, Pacific Southwest Region.

Table of
CONTENTS

GOALS AND OBJECTIVES

This Community Wildfire Protection Plan (CWPP) Update 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 Kaua'i. Kaua'i Fire Department (KFD), Hawai'i Department of Land and Natural Resources- Division of Forestry and Wildlife (DLNR-DOFAW), and Kaua'i Emergency Management Agency (KEMA) were the primary partners in developing this plan. It is an update to the first Kaua'i CWPP, sponsored by KFD in 2009, and attached as Appendix E.

This plan addresses elements of fire protection, hazard assessment, wildfire mitigation priorities, and community outreach and education. 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 federal programs such as the Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation program and the National Fire Plan (NFP).

The goals and objectives of this plan follow the intent and requirements of the *Healthy Forests Restoration Act (HFRA) of 2003– HR 1904,* which describes a CWPP as a fire mitigation and planning tool for an at-risk community that:

- Is developed within the context of the collaborative agreements and the guidance established by the Wildland Fire Leadership Council and agreed to by the applicable local government, local fire department, and state agency responsible for forest management, in consultation with interested parties and the Federal land management agencies managing land in the vicinity of the at-risk community.
- Identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment on Federal and non-Federal land that will protect one or more at-risk communities and essential infrastructure.
- Recommends measures to reduce structural ignitability throughout the at-risk community.[1]

Stakeholder participants in the development of this plan agree that wildfire threats are imminent and can have widespread damage to Kaua'i watersheds, natural resources, and human communities. The danger of fire is related to high numbers of human-caused fires, dry conditions, strong winds, and high fire potential of vegetation. In the last decade, numerous areas of Kaua'i have burned. This CWPP Update is intended to bolster public-private collaborative action toward wildfire preparedness and protection.

In 2015, KFD and HWMO determined that an update would be an important tool for reinvigorating

community organizing and action related to wildfire protection and preparedness. Since the initial 2009 CWPP, several community concerns and priorities have changed over time due to changing environmental conditions, fire hazards, and community needs. Wildfire potential is predicted to increase due to high vegetative fuel loads and continued drought episodes across the state. For these reasons, KFD and HWMO decided to update the Kauaʻi CWPP, and use the process as a means to learn from, inspire, and support additional wildfire preparedness and mitigation efforts across the island.

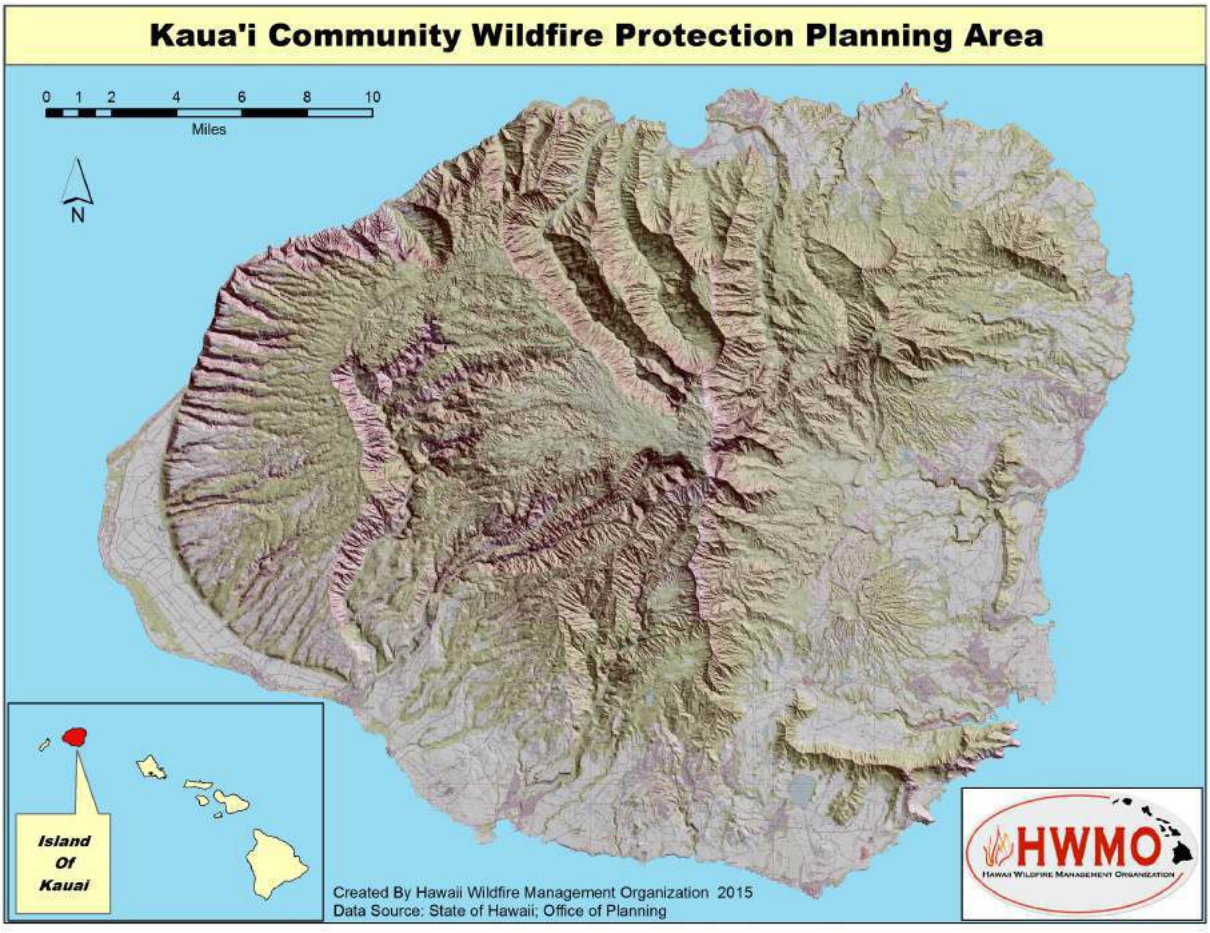
In 2013, HWMO worked with DLNR-DOFAW and county fire department representatives to assess and rate every subdivision across the state for 36 hazard characteristics that contribute to wildfire hazard. HWMO also completed Hawaiʻi's first-ever statewide wildfire history map that shows wildfire ignitions per island. Both of these products have been incorporated into the Kauai CWPP Update and were used in the planning process to provide a baseline of information to CWPP participants and partners for identifying and prioritizing projects.

Continued community input is critical to making the plan a living document that can be used as a resource to help guide community associations, fire agencies, landowners, and natural resource agencies toward meeting fire protection goals. The Kauaʻi CWPP Update process included four community meetings and two agency meetings. These provided a venue for residents and agency personnel to discuss wildfire concerns and brainstorm solutions together. The results of these meetings are included in the *Hazard Reduction Priorities* and *Action Plan* sections of this CWPP update.

PLANNING AREA BOUNDARIES

The Kauaʻi CWPP planning area is comprised of the entire Island of Kauaʻi, which includes government and privately owned lands. The CWPP planning boundaries also comprehensively define the entire island of Kauaʻi as a wildland-urban interface (WUI) at-risk area. The simultaneous definition of WUI and CWPP planning boundaries ensure adequate protection of natural areas and associated human communities from the threat of wildfire. The Kauaʻi CWPP Update planning boundaries remain the same as those defined in the initial 2009 CWPP.

The Kauaʻi CWPP is part of a series of new and updated CWPPs across the state of Hawaiʻi. These include several on Hawaiʻi Island, across the County of Maui, and in Western Oʻahu. Additional CWPPs across the State of Hawaiʻi may be developed as communities gain interest in wildfire preparedness planning and as funds become available to complete the planning process. See Map 1 for the Kauaʻi CWPP planning area, which covers the entire island of Kauaʻi.



Map 1. *Kaua'i CWPP Planning Area Map.*

PLANNING PROCESS, METHODS, AND PARTICIPANTS

CWPP UPDATE AND METHODS

The process of developing a CWPP helps to clarify and refine priorities for the protection of life, property, and critical infrastructure in WUI areas. Local residents, landowners, fire suppression agencies, and community leaders have participated in valuable discussions regarding wildfire history, resources at risk, areas of concern, and priority mitigation actions. The methods used to create this CWPP followed the guidelines established by the HFRA, which requires the involvement of decision makers, federal, state, and local agencies, and interested parties.

The Kaua'i CWPP Update process followed these guidelines and additionally satisfies the requirements of the FEMA Pre-Disaster Mitigation program and NFP.

PARTICIPANTS

State and Local Agencies

The representatives of the state and local agencies that have jurisdictional responsibilities on Kauaʻi, and who have been involved in the development of the Kauaʻi CWPP are:

Agency	Representative(s)
Kauaʻi Fire Department	Robert Westerman, Fire Chief Daryl Date, Captain, Fire Prevention Bureau Kilipaki Vaughan, Lieutenant Several firefighters who attended public meetings
Hawaiʻi Department of Land and Natural Resources- Division of Forestry and Wildlife	Patrick Porter, Forest Management Supervisor I David G. Smith, Administrator Robert Hauff, State Protection Forester
Kauaʻi Emergency Management Agency	Elton Ushio

Table 1. *CWPP Participants: State and Local Agencies.*

Federal Agencies

The following federal agencies were consulted for area-specific and regional fire and environmental information and expertise:

Agency	Representative(s)
US Fish and Wildlife Service (USFWS)	Dawn Bruns, Acting Assistant Field Supervisor Section 7 & Habitat Conservation Plans

Table 2. *CWPP Participants: Federal Agencies.*

Decision Makers

The decision-makers contacted for input and involvement in the development of the Kauaʻi CWPP are represented in the following table.

Local Government	Name	Representing
Kauaʻi County Council	Mason Chock Arryl Kaneshiro KipuKai Kualiʻi Mel Rapozo	Councilmember Councilmember Councilmember Council Chair

Table 3. *CWPP Participants: Decision Makers.*

nterested Parties

The parties from our community that have shown interest in forest/fire management and contributed input into the Kauaʻi CWPP Update are:

Interested Parties	Affiliation
Local Associations and Large Landowners	Grove Farm Kaua'i Coffee Farm Princeville Ranch
Private Citizens	General Public

Table 4. *CWPP Participants: Interested Parties.*

Photo 1. *Four community meetings were held in Kaua'i to review the most current fire history and hazards, and to identify residents' wildfire-related concerns.*

Photo 2. *KEMA, DLNR-DOFAW, and KFD also participated in the public meetings, providing additional input to the plan and answering questions posed by community participants.*

Photo 3. *Agency representatives met in early stages of the CWPP Update process and discussed wildfire-related hazards and recommended mitigation and prevention actions.*

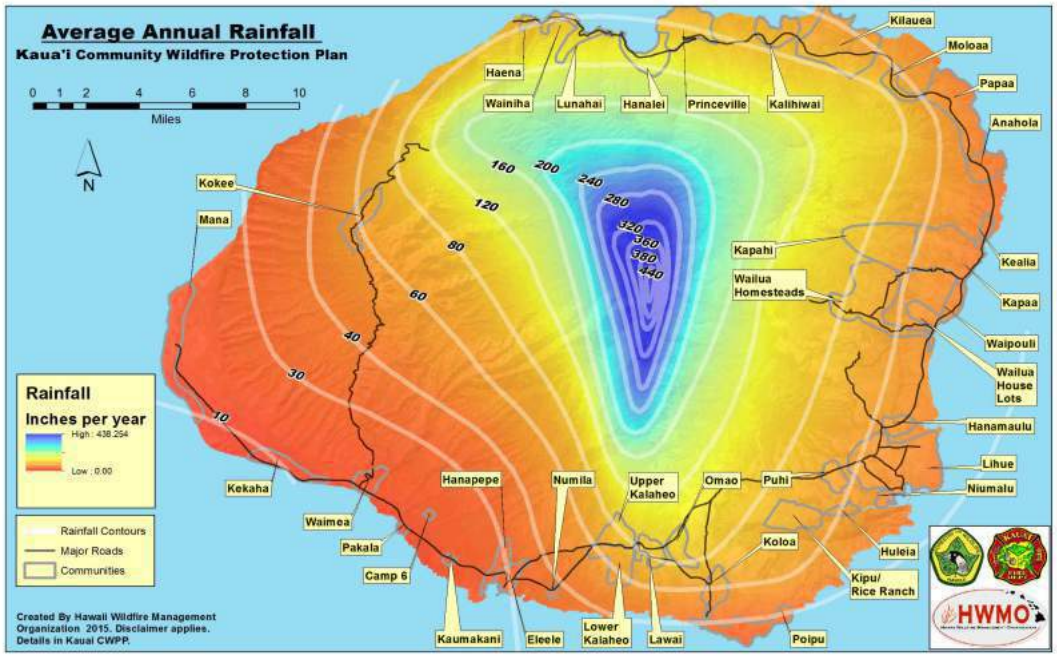
Photo 4. *Firefighters and State Forestry and Wildlife representatives helped to identify wildfire-related priority projects.*

WILDFIRES IN KAUA'I
BACKGROUND

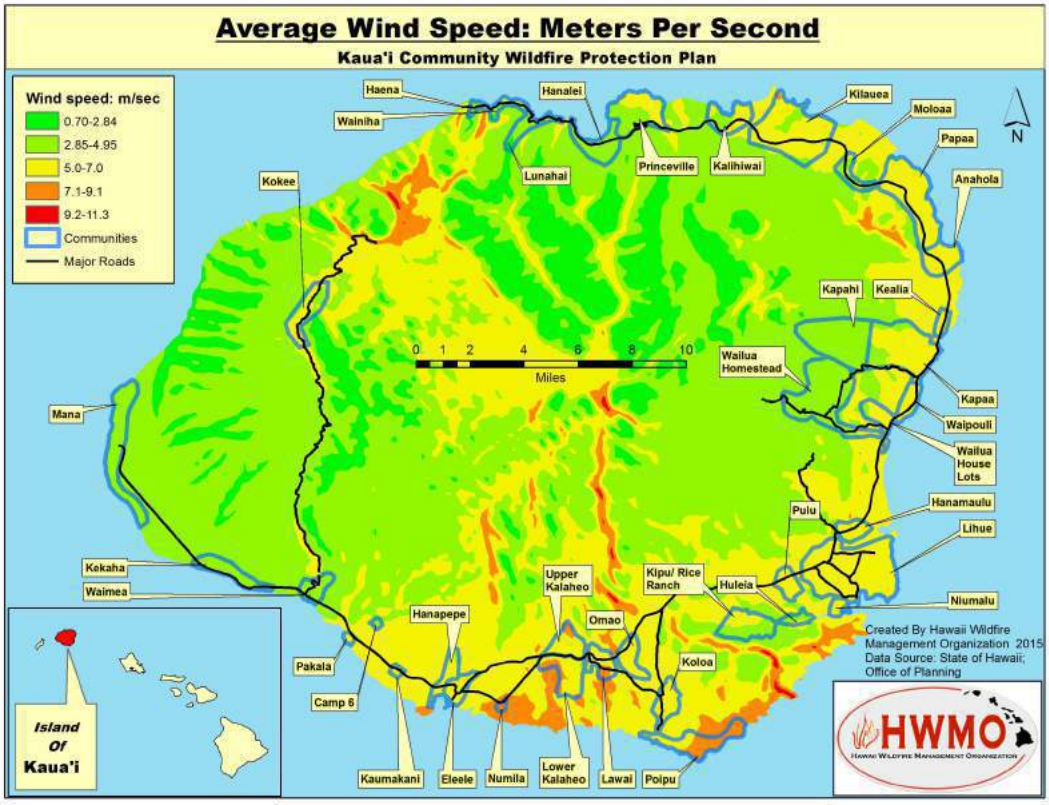
Steep slopes, rough terrain, difficult access, and a large percentage of highly ignitable invasive grasses, and numerous threatened and endangered native species characterize the Kaua'i landscape. This, coupled with warm weather, recurring drought conditions, changes in land use, and a history of human-caused fires puts the area at increased risk of wildfire. The proximity of development to fire-prone wildlands present hazardous conditions that now threaten Kaua'i communities and natural resources. Overgrown vegetation close to homes, pockets of open space within subdivisions, and an increase of non-native high fire-intensity plants around developed areas and native forests pose increasing threats to commercial, community, environmental, and residential resources. Together, these factors create the fire environment that puts Kaua'i at risk of wildfire.

Maps 2- 8 update and supplement the 2009 Kaua'i CWPP maps, and provide an overview of the fire environment, to include climatic, topographic, and vegetative influences on wildfire.

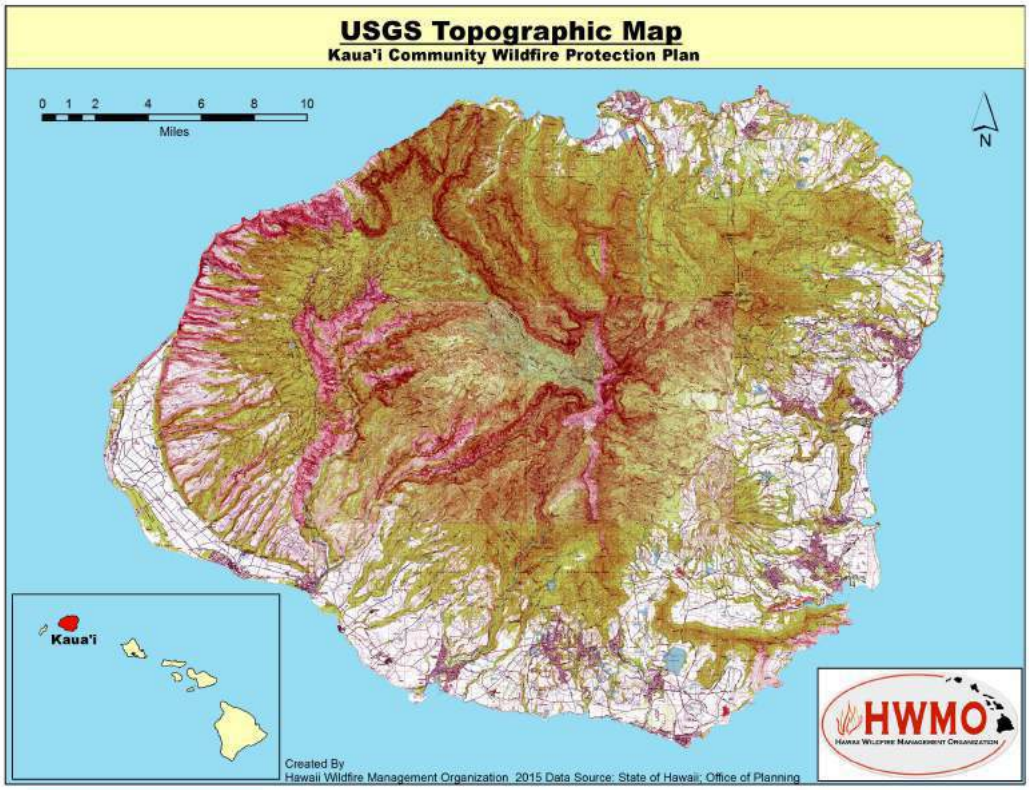
Map 2- Average annual precipitation
Map 3- Average wind speed
Map 4- Topography
Map 5- Land cover types, which depicts the types of vegetation that exists within the CWPP planning area.
Map 6- Densities of threatened and endangered species.
Map 7- Areas classified by USFWS as priority habitat conservation areas.
Map 8- Types of vegetation within the US Fish and Wildlife priority landscapes area.



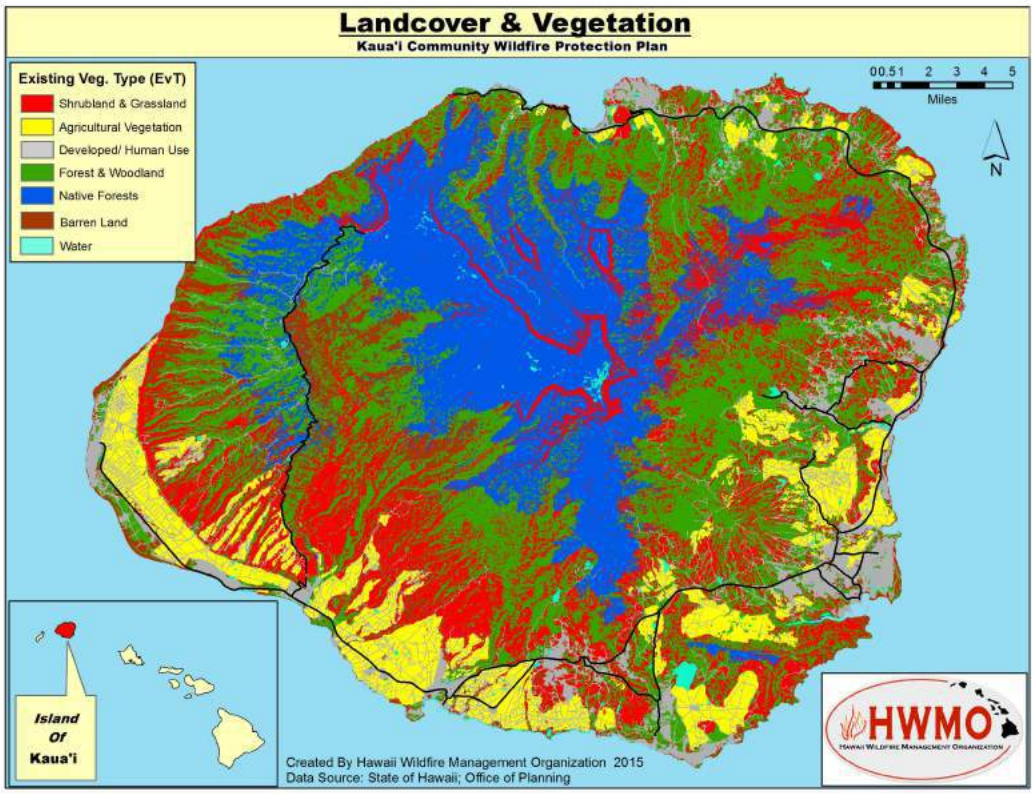
Map 2. *Average Annual Precipitation Map.*



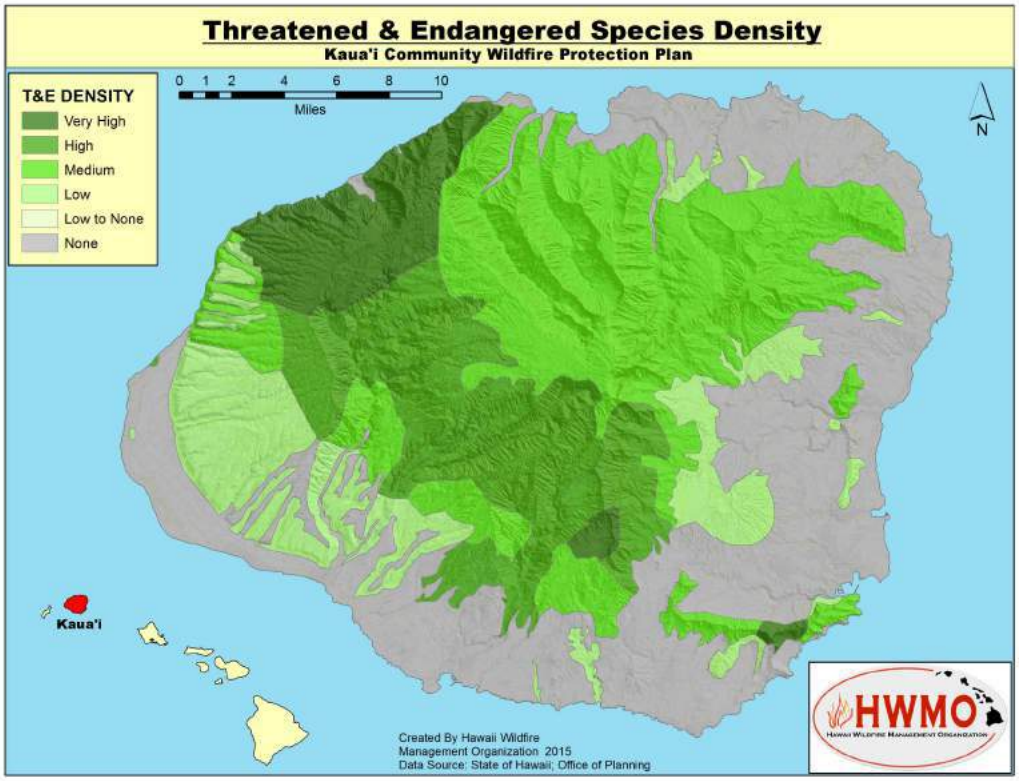
Map 3. *Average wind speed map.*



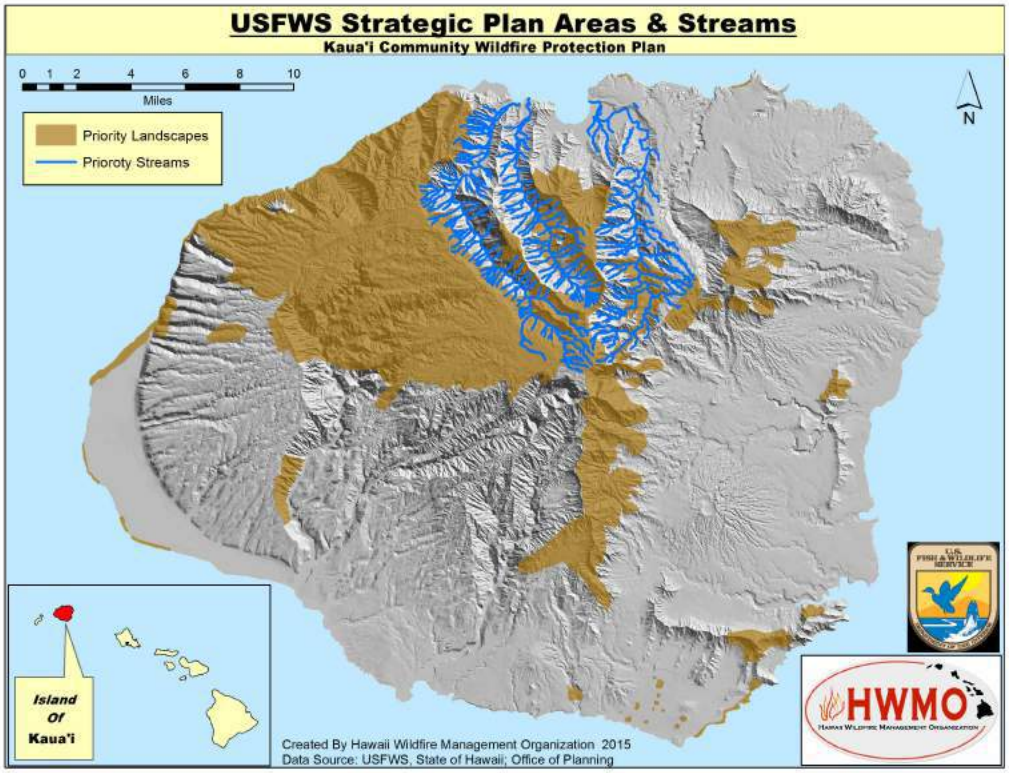
Map 4. *Topographic map of Kaua'i CWPP planning area, based on US Geological Survey data.*



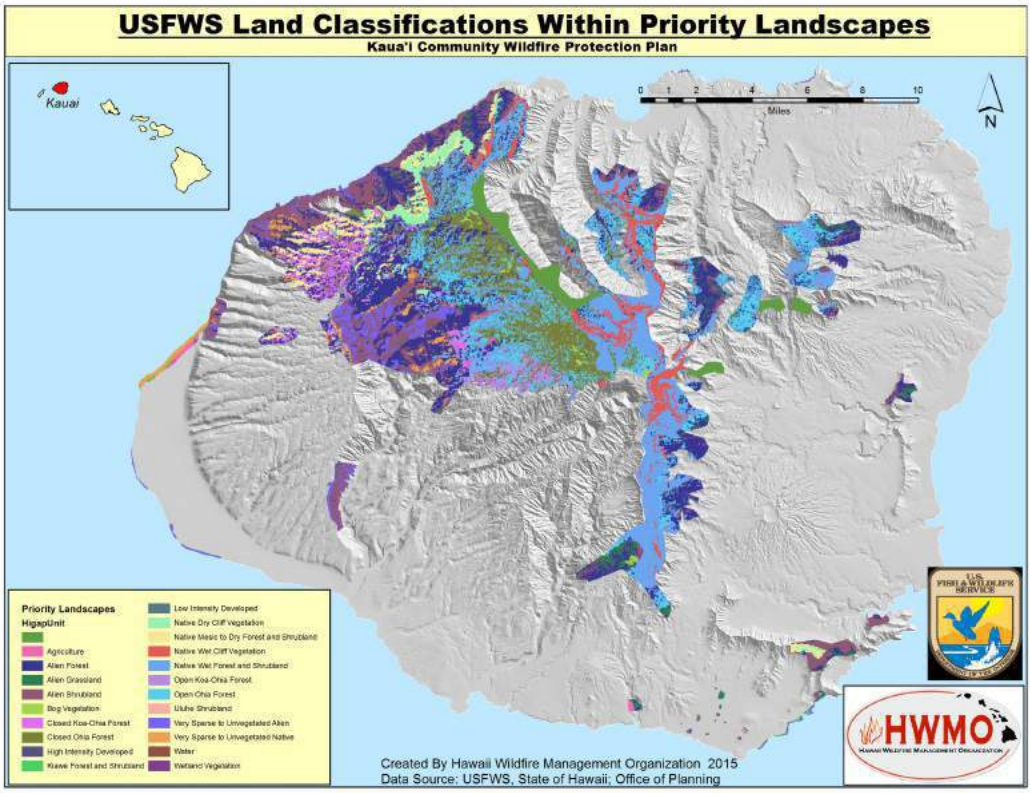
Map 5. *Land cover/ vegetation map for Kaua'i CWPP planning area.*



Map 6. *Threatened and Endangered Species densities across Kaua'i.*



Map 7. *USFWS map of Priority Landscapes within the CWPP planning area.*



Map 8. *USFWS map of land cover type within their Priority Landscapes areas of Kaua'i.*

WILDFIRE OCCURENCE

IGNITIONS

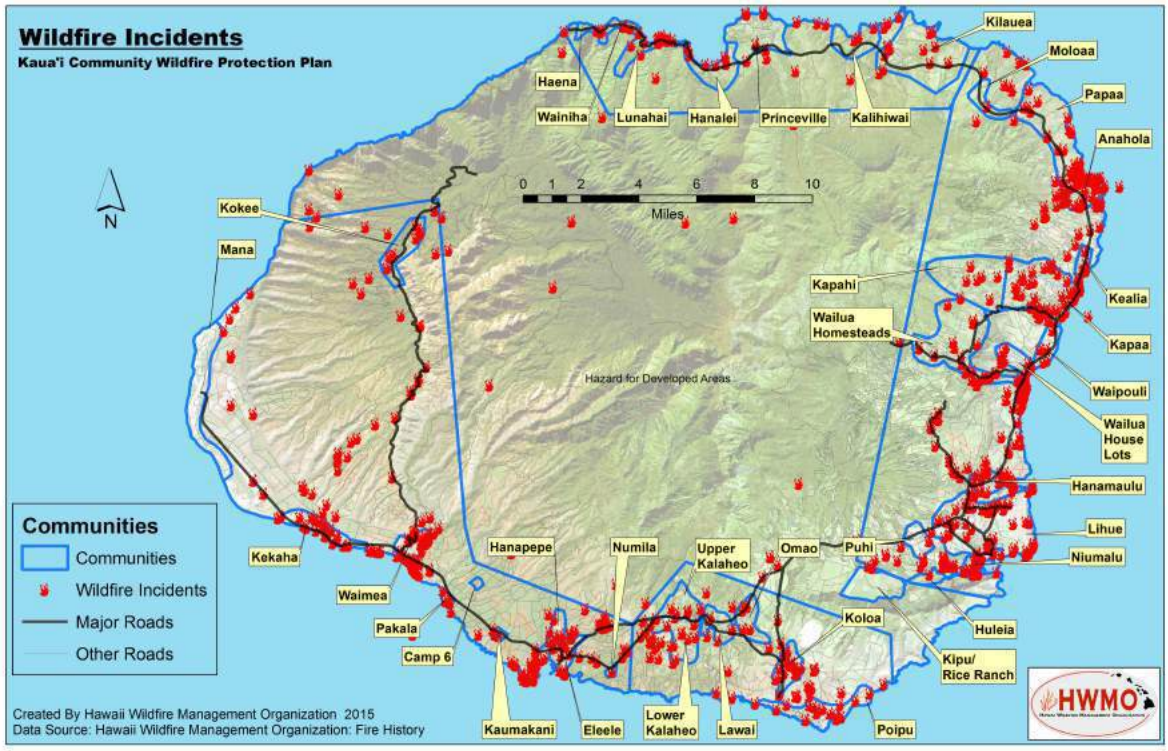
The WUI— the wildland-urban interface area where developed areas, roads, and community infrastructure abuts undeveloped land— is where the majority of wildfire ignitions occur in all of Hawai'i. The Island of Kaua'i is no exception. Because of this, WUI areas often experience the greatest risk of loss of property, life, and natural resource function due to wildfire. The majority of wildfires on Kaua'i are caused by human error or arson, especially near developments, power line right of ways, and along roadsides. Additionally, sprawling dry nonnative grasslands surround many communities. Once ignited along the interface, wildfire can spread rapidly through and around residential areas, threatening both property and life. Wildfires in lesser developed areas, fallow agricultural lands, and in the higher elevations also spread and threaten natural areas, and the native and protected species they may contain.

FIRE INCIDENT MAP

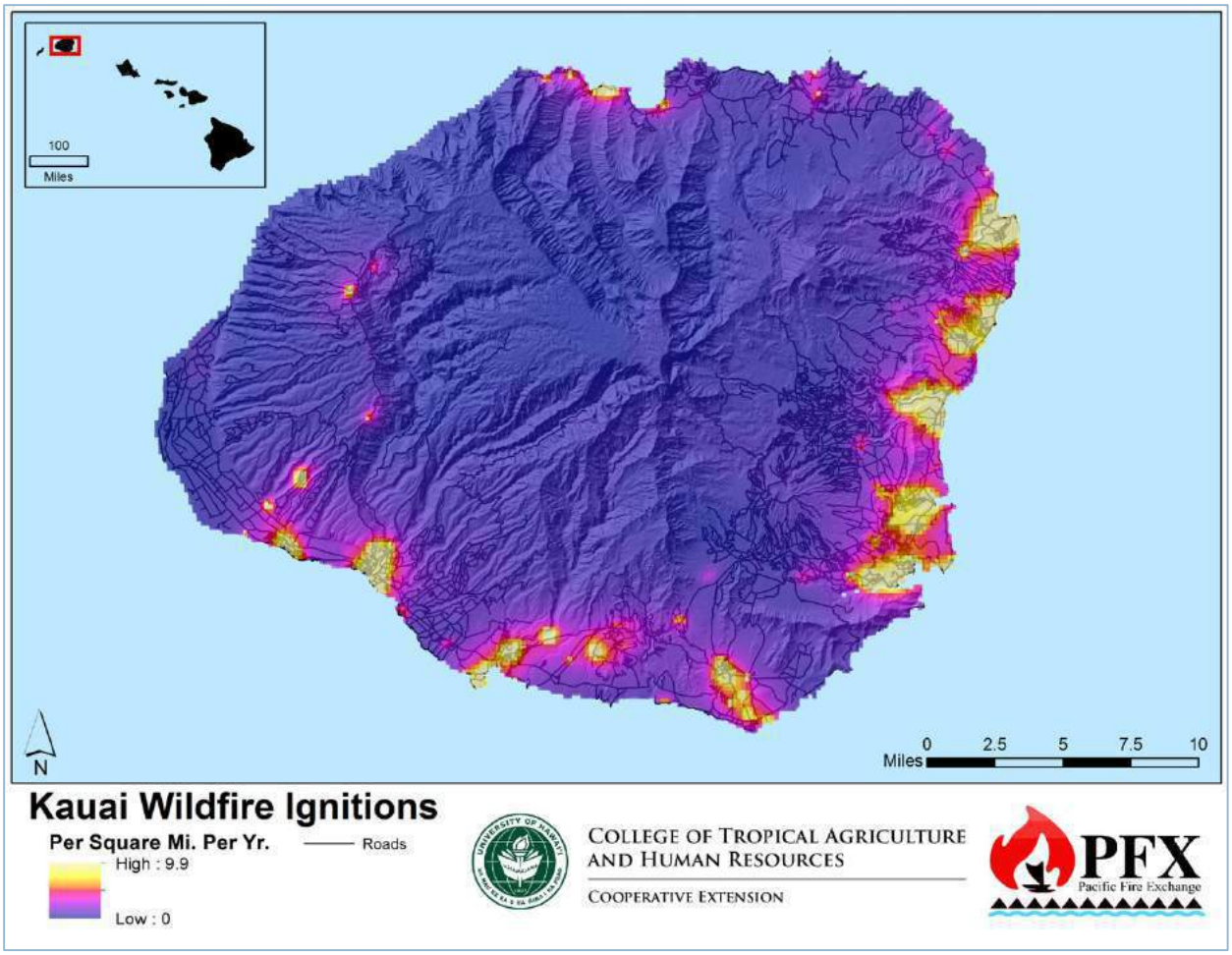
The Kaua'i Wildfire Incident Map (Map 9) displays results from an HWMO-led effort to compile wildfire records from fire suppression agencies across the state, which resulted in a statewide wildfire database, as well as region-specific wildfire incident maps. Map 9 includes KFD's documented responses to

wildfires between January 2000 and January 2012 and wildfire ignition points recorded by DLNR-DOFAW from 1998-2012. The map displays ignition points, and does not indicate the final perimeter of burned areas.

Ignitions are important for understanding trends and patterns of fires. Map 9 demonstrates that WUI, roadside, and human access area fire starts are important trends across Kaua'i. While larger fires tend to occur in the drier areas with unmanaged vegetative fuels, the high frequency of ignitions along every WUI is of concern. As drought conditions become more frequent (and they are predicted to increase), there are concerns that large fires in dense unmanaged vegetation will concurrently increase. Additionally, the density of ignitions plays an important role in predicting fire occurrence. Areas with dense wildfire ignitions are priority areas for focusing prevention and mitigation activities. Map 10 depicts ignition densities, showing where the highest concentration of wildfire starts have occurred across Kaua'i.



Map 9. *Kaua'i Fire Incident Map. Incidents recorded from 1988-2011. Points displayed are ignition sites only and do not indicate perimeter boundaries of burned areas. Note that ignitions occur island wide along roads and human-accessed areas.*



Map 10. *Kaua'i Wildfire Ignition Density Map. Lighter areas depict regions with the highest occurrence of ignitions. Source: Trauernicht, University of Hawai'i, CTAHR and Pacific Fire Exchange. (Source UH-CTAHR/PFX).*

WILDFIRE IMPACTS

Many of the community, economic, natural, and cultural resources on Kaua'i are exposed to wildfire impacts. These impacts are compounded by the fact that land-based, aquatic, and marine-based natural and cultural resources all lie within close proximity across the region.

IMPACTS TO NATURAL RESOURCES

Across Hawai'i, recurrent wildfires result in the conversion of both native and nonnative forested areas to fire-adapted grasslands and shrublands – and are one of the reasons these fire-prone ecosystems are expanding in many parts of the state. Wildfire is a major cause of the loss and degradation of native forest and other habitat. Most of the plant and animal species within native ecosystems in Hawai'i do not survive and/or recover from wildfires. More generally, the conversion of forests to grasslands due to fire

and the conversion of active agricultural areas into fallow unmanaged weed fields increases the potential for future and larger fires by expanding the availability of fine fuels.

Wildfires also increase 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 can dramatically increase erosion. Wildfire can also alter the physical and chemical properties of soils, making them more prone to surface run-off which can increase the downstream flooding and sediment delivery. Forest conversion to grassland due to recurrent wildfires over the long-term also alters water cycling. The replacement of deep-rooted trees by shallow, matted root systems of grasses results in a higher water table and reduces the ability of rainfall to infiltrate into the soil. This causes an increase in surface runoff during rainfall events and thus the risk of flooding and sediment delivery downstream.

Forest loss and increased downstream sediment delivery to nearshore reefs have important implications for cultural resources as well in terms of tourism, recreation, food resources, and spiritual practices. Sediment loading destroys reefs and impacts nearshore fisheries which are critical subsistence resources to many Kaua‘i families. Burned areas can remain closed to the public for days to months due to landslide and tree-fall danger, limiting access to areas for hiking, hunting, gathering plants, and tending cultural sites. Even when nearby fires have limited direct impacts on these resources, suppression efforts, such as the use of bulldozers, can damage important landscape features. Frequent fires also impact powerlines, communication infrastructure and lead to road closures – exacerbating the already congested traffic areas.

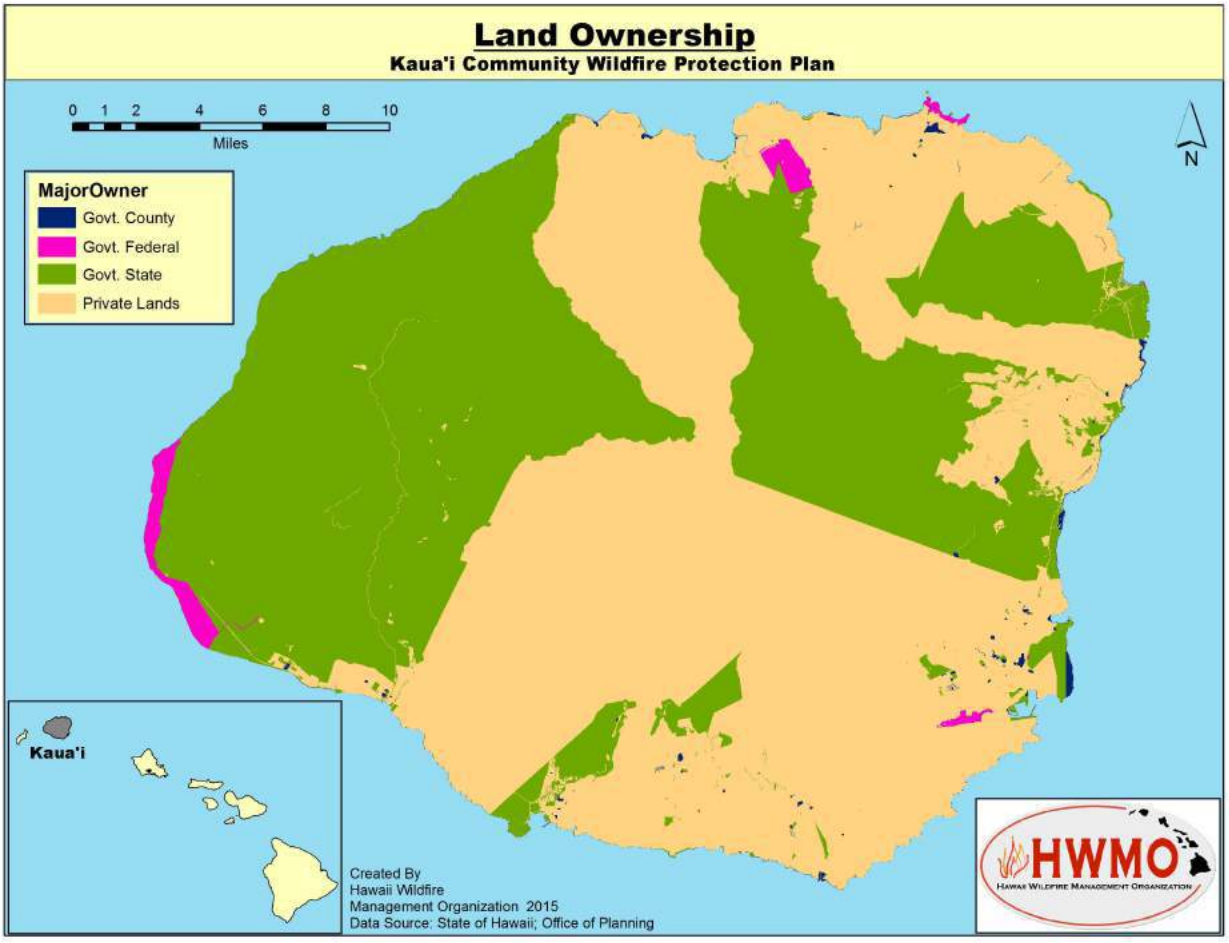
IMPACTS TO COMMUNITIES AND MUNICIPAL ACTIVITIES

Wildfires threaten lives, homes, and human health in several ways. Many neighborhoods have unmanaged/untended fire fuels interspersed within developed areas, promoting fire spread through communities and into surrounding areas. This creates an increased hazard to lives and homes in the area. Air quality is greatly reduced from smoke during fires and for months to years after fire due to high levels of wind-born dust. This dust is due to fire-caused changes to soil that leaves it water-repellant, and therefore easily lifted into the air. This is in addition to increased sediment in local waters.

Wildfires also impact economic and municipal infrastructure and activities. Burned soil from wildfires decreases groundwater recharge, which can affect drinking water supplies. As noted above, post-fire rain events cause erosion that damages nearshore resources (coral reefs, fisheries), which can have effects on one of the area‘s primary economic bases— coastal and marine-based tourism, as well as resident and visitor sustenance and recreational activities. Traffic and road closures during fire events and post-fire flooding can block access routes and keep people from their homes and work, and are costly to local government.

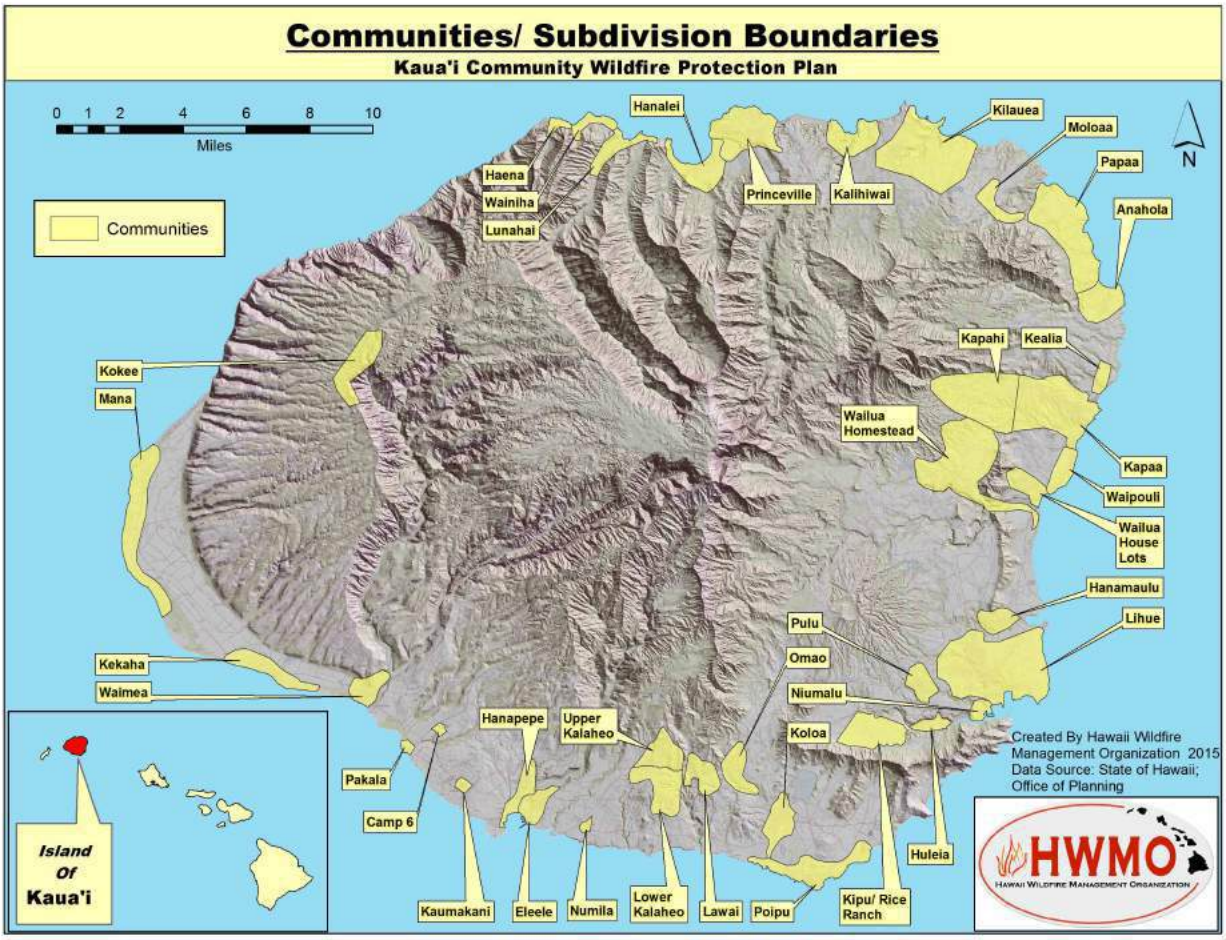
GENERAL OVERVIEW OF CWPP PLANNING AREA
KAUA‘I

The area comprising the Kaua‘i CWPP Update includes government and privately owned lands (see Map 11). The CWPP planning boundaries also define Kaua‘i’s WUI at-risk areas, and cover the entire island. This ensures adequate protection of natural areas and associated human communities. The planning area remains the same as the original 2009 CWPP planning area.



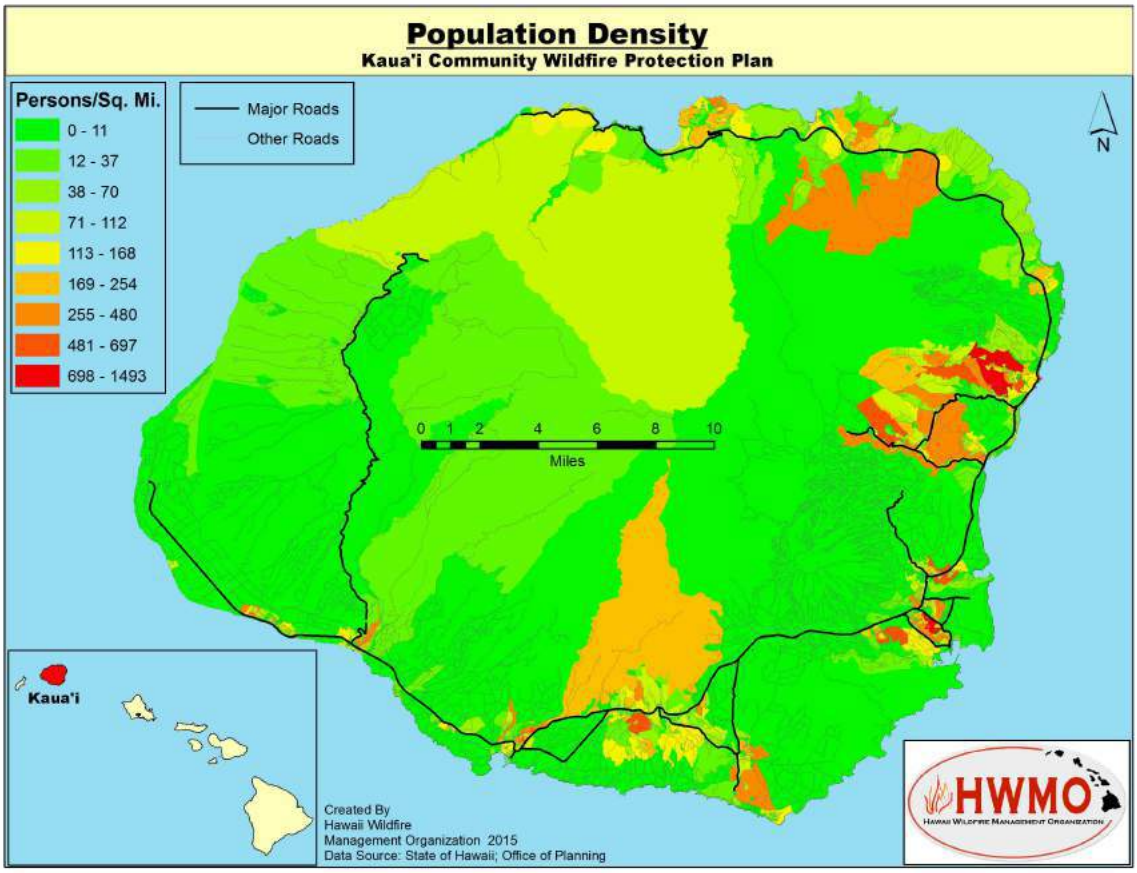
Map 11. *Land ownership map for Kaua‘i CWPP planning area.*

For the purposes of assessing hazards and wildfire threats to resources, residential areas on Kaua‘i were simplified into several “communities” (see Map 12). 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 Division’s Communities at Risk from Wildfire Maps, which are developed every few years to assess Hawai‘i’s communities for wildfire threats (See next section, *Communities at Risk from Wildfires* for more information and maps).

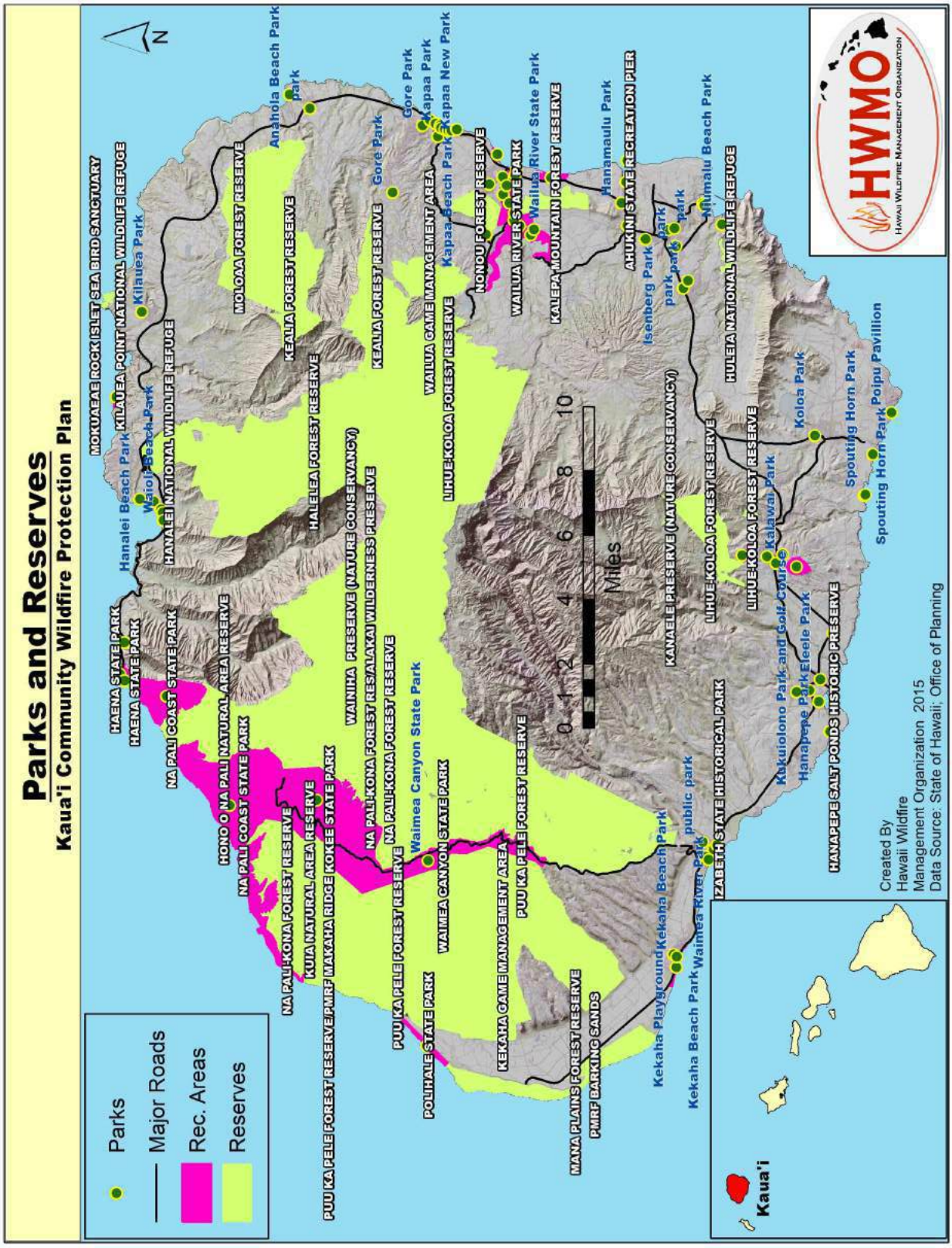


Map 12. *Simplified community delineations used on Kaua'i.*

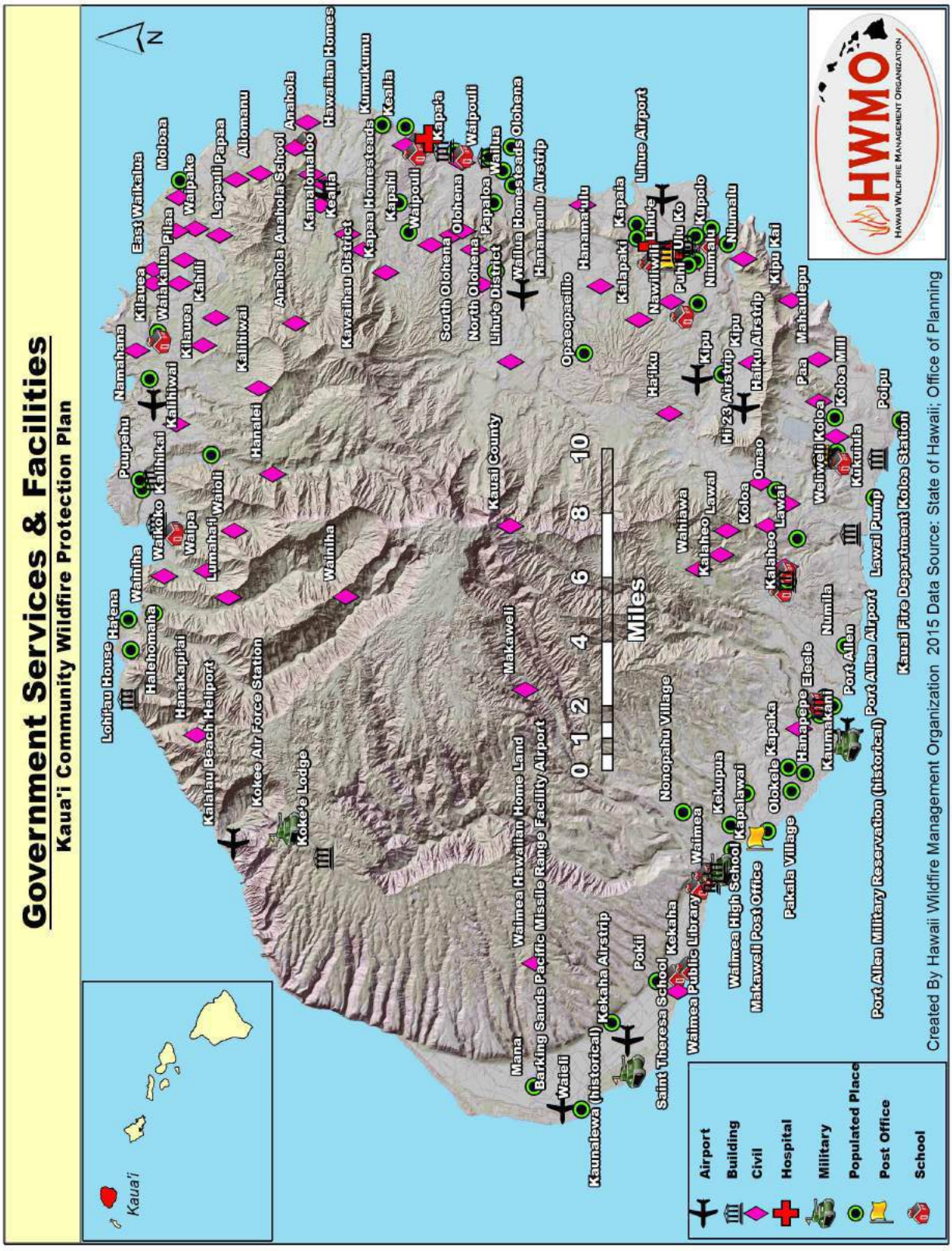
Kaua'i exemplifies a WUI, in that it contains both undeveloped fire prone wildland areas adjacent to populated subdivisions and developed areas (for population, see Map 13). There are numerous community assets, resources, and infrastructural features at risk of wildfire on Kaua'i, to include civil, industrial, medical, educational, recreational, and environmental features. These are depicted on Maps 14-17. These features may or may not be directly threatened by the flames of wildfire, but all are subject to the broader impacts of wildfire such as changes in water quality and availability, post-fire erosion and mudslides, smoke and dust, changes in access, traffic, and more.



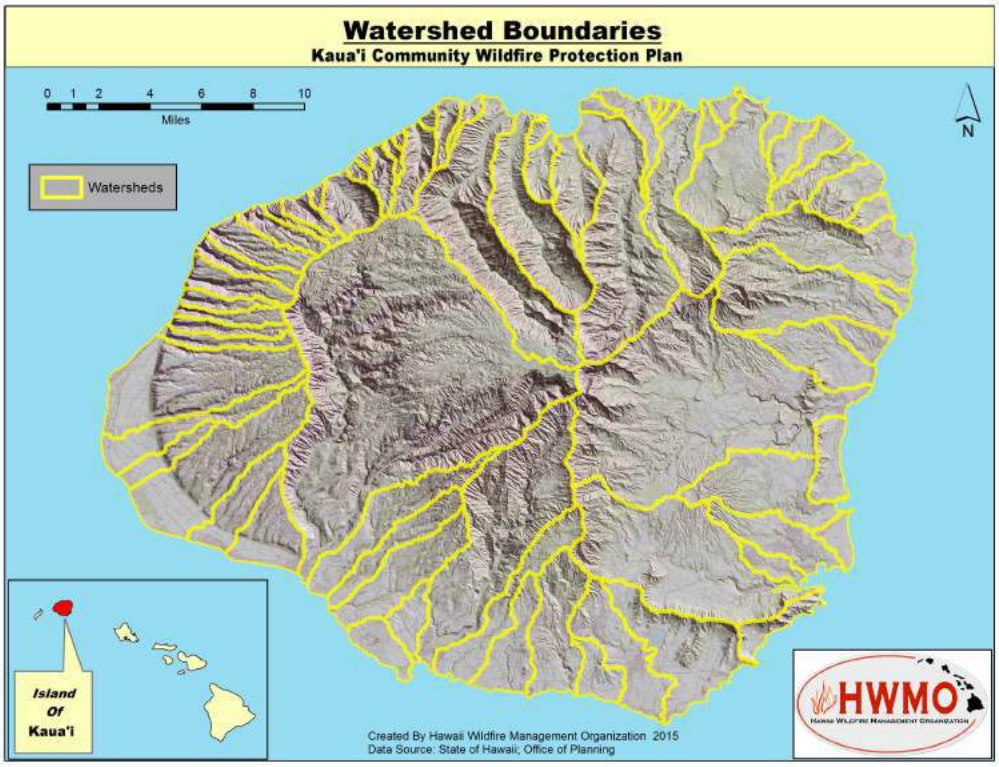
Map 13. *Kaua'i Population Density Map.*



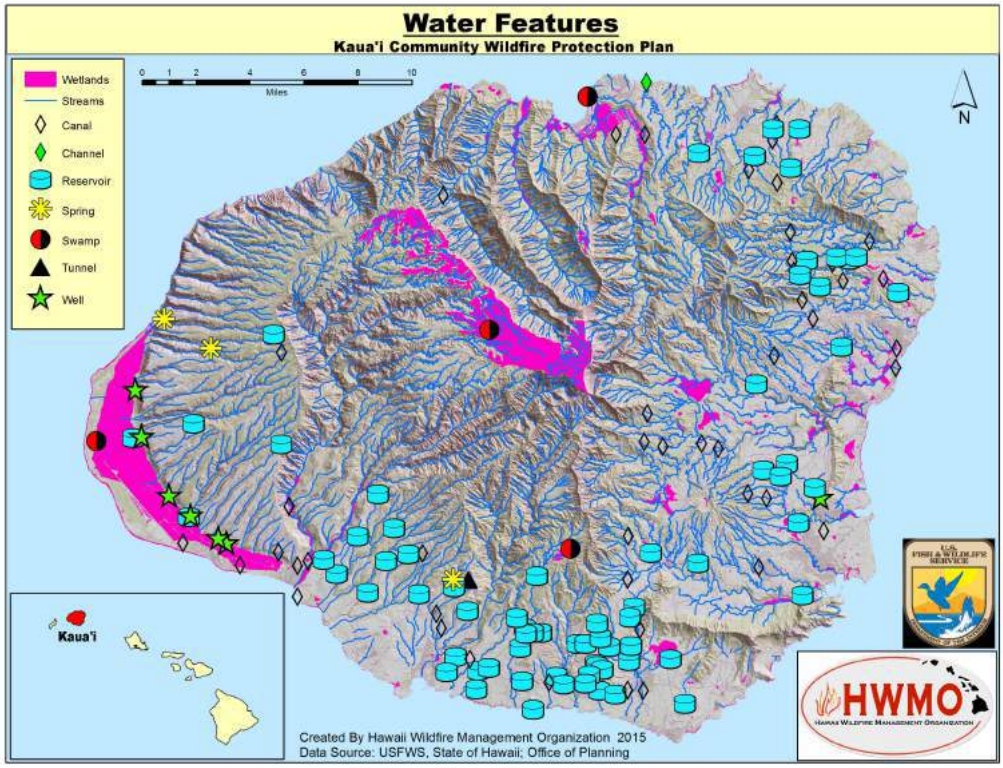
Map 14. *Parks and Reserves in Kaua'i CWPP planning area. (Rotated to improve legibility).*



Map 15. *Community/government service features on Kaua'i. (Rotated to improve legibility).*



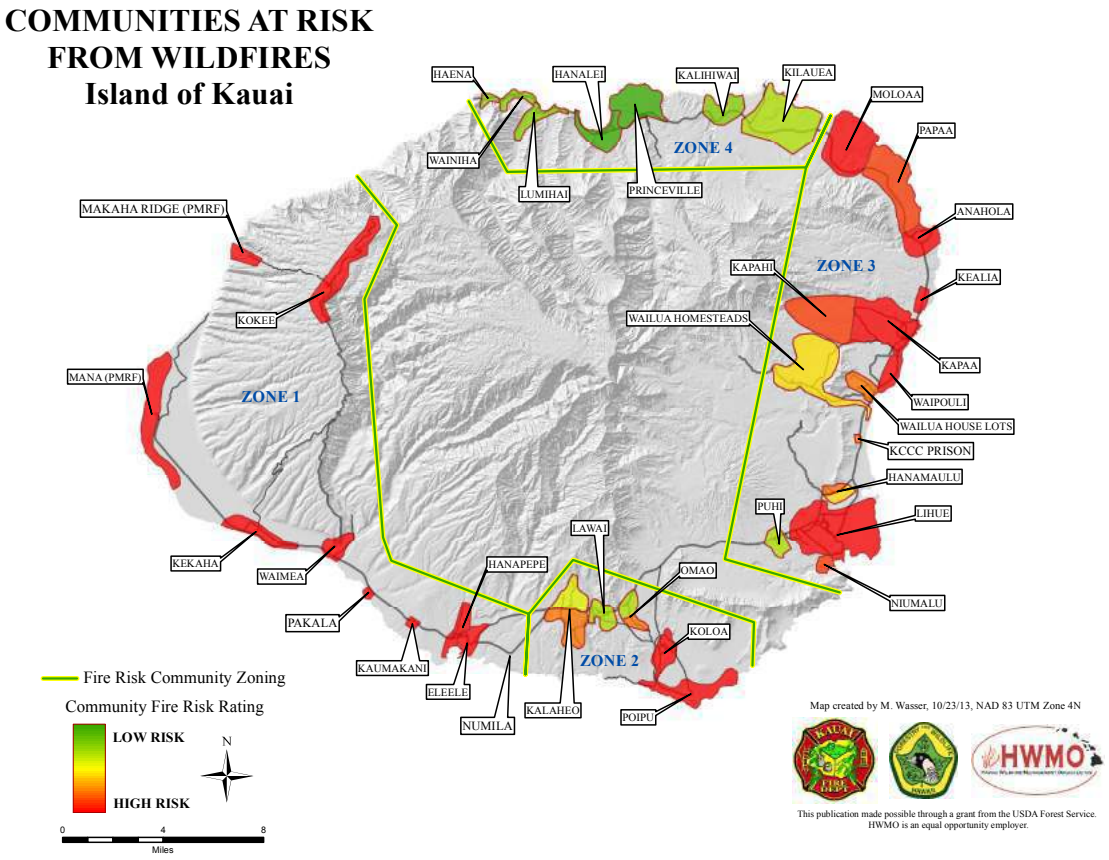
Map 16. *Watersheds on Kaua'i.*



Map 17. *Water features on Kaua'i.*

COMMUNITIES AT RISK FROM WILDFIRE

Nationally, Communities at Risk from Wildfires (CARW) Maps delineate communities that share similar environmental conditions, land use characteristics, fuel types, hazards, and general wildfire issues, and provide ratings to characterize generalized hazards in each area. DLNR-DOFAW has been developing Hawai'i CARW maps for more than a decade, and has developed streamlined community boundaries for the purposes of the Hawai'i CARW map. In 2013, HWMO partnered with DLNR-DOFAW and the county fire departments across Hawai'i to update the Hawai'i CARW maps. The original community boundaries were replicated in the 2013 map update, with changes made to reflect current hazards and subdivision expansions. Map 18 depicts the hazard ratings for Kaua'i's developed areas. It is important to note that many factors were weighed into developing the hazard level, so areas with like environmental conditions may be rated differently based on other hazard or protection factors, like ingress/egress, community Firewise activities, etc.



Map 18. *Island of Kaua'i 2013 Communities at Risk from Wildfires Map.*

WILDFIRE HAZARD ASSESSMENT

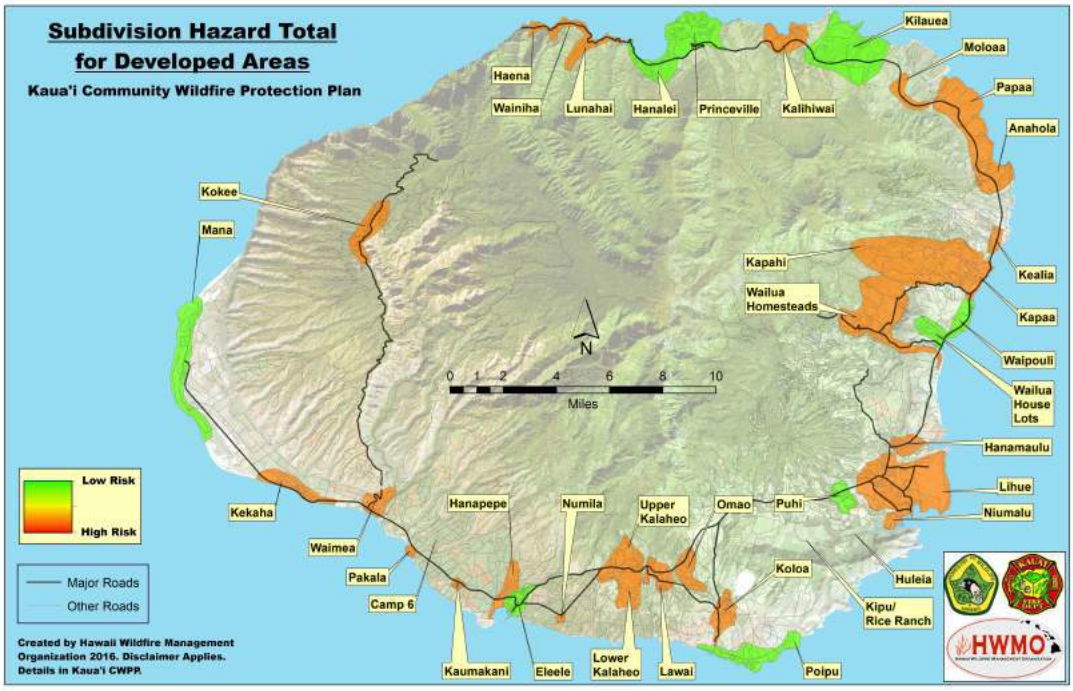
In partnership with DLNR-DOFAW and KFD, HWMO assessed the communities within Kaua'i for 36 wildfire hazard characteristics, which have been further grouped into 5 categories. As described in detail above, community delineations for the assessment followed those for the CARW map. The five categories assessed for wildfire hazard are as follows.

- Subdivision Hazard
- Vegetation Hazard
- Building Hazard
- Fire Environment Hazard
- Fire Protection Hazard

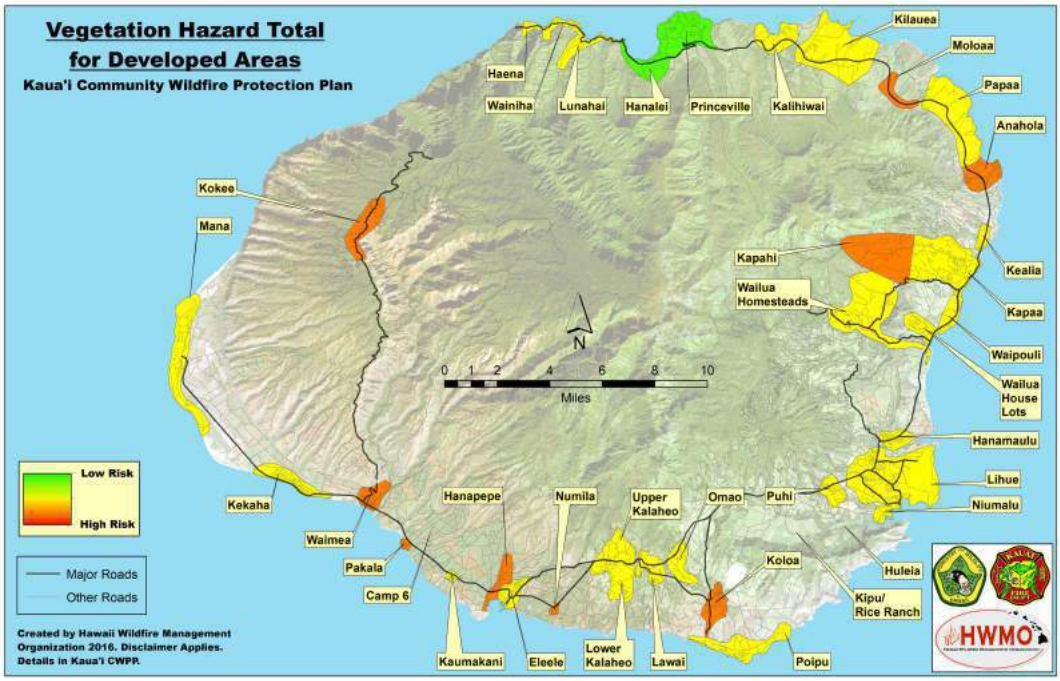
Maps are provided for each of the five categories (Maps 19-23), and demonstrate the total hazard per category based on a calculation of that category's individual hazards, as detailed in Table 5.

Hazard Category	Individual Hazards Assessed (Maps for each individual hazard included in Appendix B)
Subdivision Hazard Total	• Fire Service Access • Home Setbacks • Ingress/Egress • Private Landowner Firewise landscaping & Defensible Space • Proximity of Subdivision to Wildland Areas • All Season Road Condition • Road Maintenance • Road Width • Street Signs • Structure Density • Unmanaged, Untended, Undeveloped Lands
Vegetation Hazard Total	• Defensible Space: Fuels Reduction Around Homes & Structures • Fuel Loading • Fuel Structure & Arrangement • Proximity of Flammable Fuels Around Subdivision • Vegetation Within 300' of Homes
Building Hazard Total	• Siding/Soffits • Roofing Assembly • Structural Ignitability • Under-Skirting Around Decks, Lanais, Post & Pier Structures • Utilities Placement; Gas & Electric
Fire Environment Hazard Total	• Average Rainfall • Prevailing Wind Speeds & Direction • Slope • Topographic Features that Adversely Affect Wildland Fire Behavior • Seasonal or Periodic High Hazard Conditions • Ignition Risk
Fire Protection Hazard Total	• Response Time • Community Planning Practices & Ordinances • Community Fire Safe Efforts & Programs Already in Place • Fire Department Structural Training & Expertise • Local Emergency Operations Group or Citizen Group • Proximity to Fire Stations • Water Source Availability • Wildland Firefighting Capacity of Initial Response Agency • Interagency Cooperation

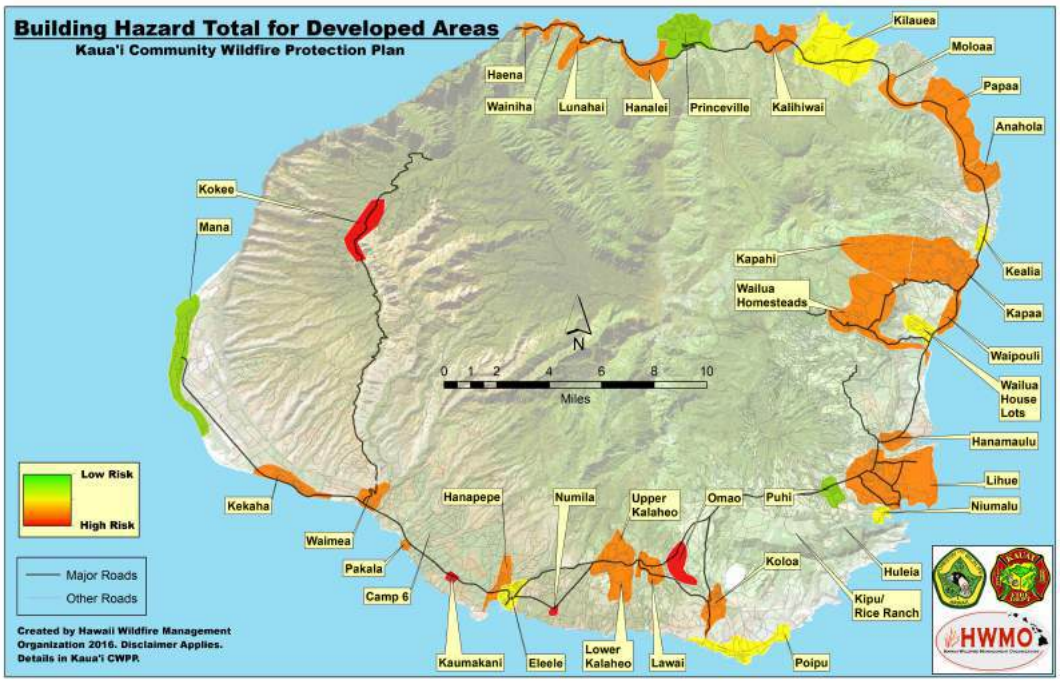
Table 5. *Overview of hazard assessment categories and the individual hazards that comprise them.*



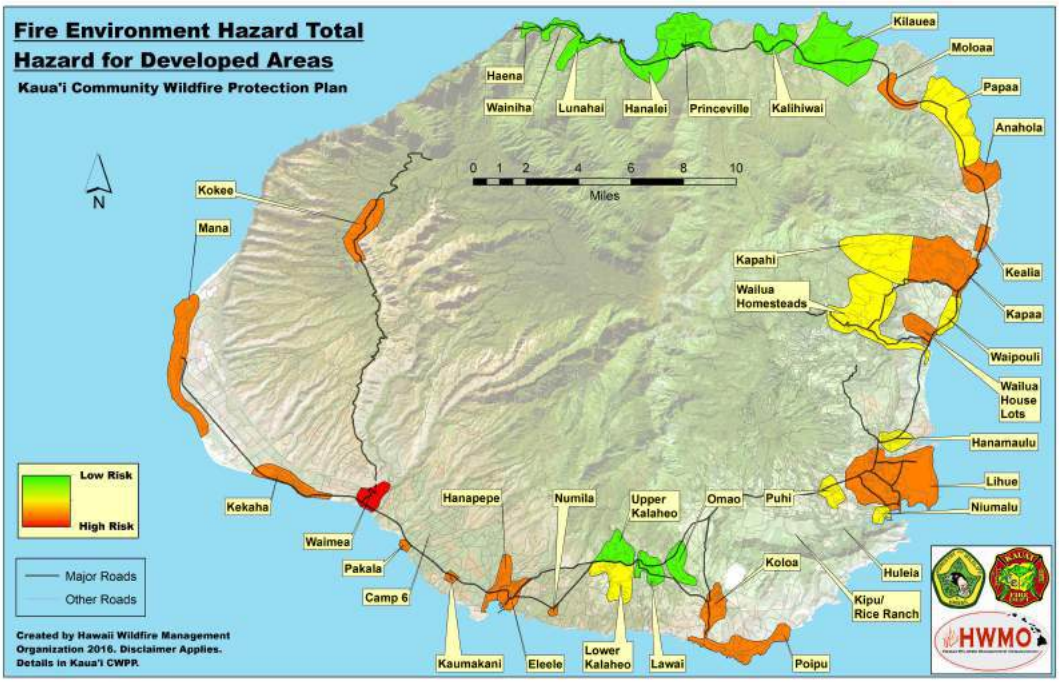
Map 19. Subdivision Hazard Total for Developed Areas of Kaua'i CWPP planning area. *Reflects hazard assessment findings related to the following categories: Fire Service Access; Home Setbacks; Ingress/Egress; Private Landowner Firewise landscaping & Defensible Space; Proximity of Subdivision to Wildland Areas; All Season Road Condition; Road Maintenance; Road Width; Street Signs; Structure Density; and Unmanaged, Untended, Undeveloped Lands.*



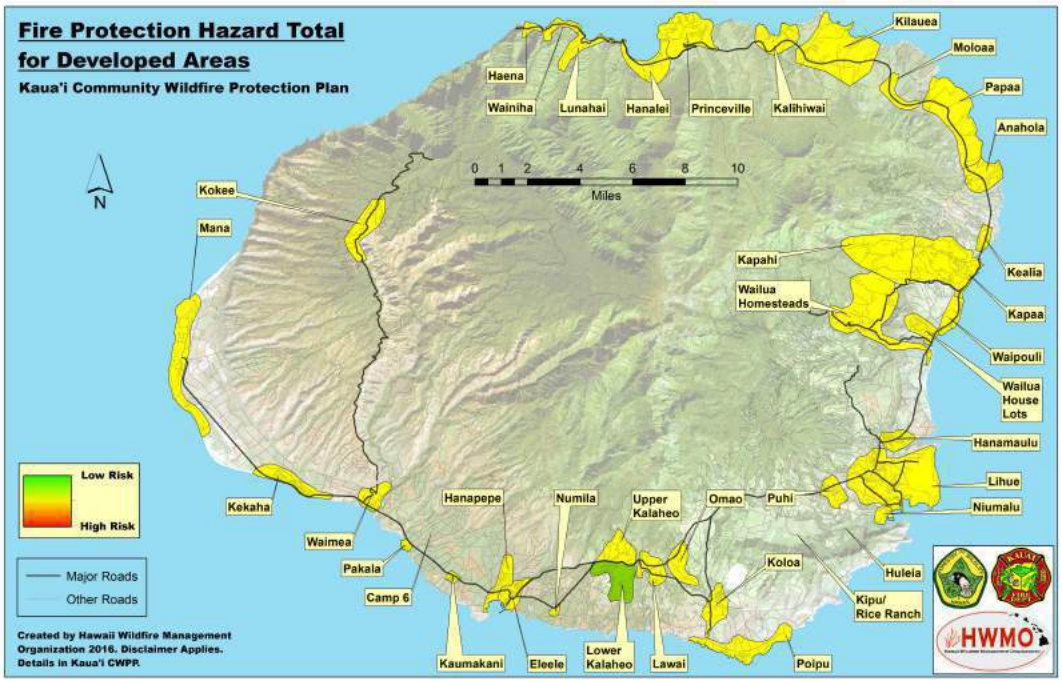
Map 20. Vegetation Hazard Total for Developed Areas of Kaua'i CWPP planning area*. Reflects hazard assessment findings related to the following categories: Defensible Space: Fuels Reduction Around Homes & Structures; Fuel Loading; Fuel Structure & Arrangement; Proximity of Flammable Fuels Around Subdivision; Vegetation Within 300' of Homes.*



Map 21. Building Hazard Total for Developed Areas of Kaua'i CWPP planning area*. Reflects hazard assessment findings related to the following categories Siding/Soffits; Roofing Assembly; Structural Ignitability; Under Skirting Around Decks, Lanais, Post & Pier Structures; and Utilities Placement for Gas & Electric.*



Map 22. Fire Environment Hazard Total for Developed Areas of Kaua'i CWPP planning area*. Reflects hazard assessment findings related to the following categories: Average Rainfall; Prevailing Wind Speeds & Direction; Slope; Topographic Features that Adversely Affect Wildland Fire Behavior; and Seasonal or Periodic High Hazard Conditions; and Ignition Risk.*

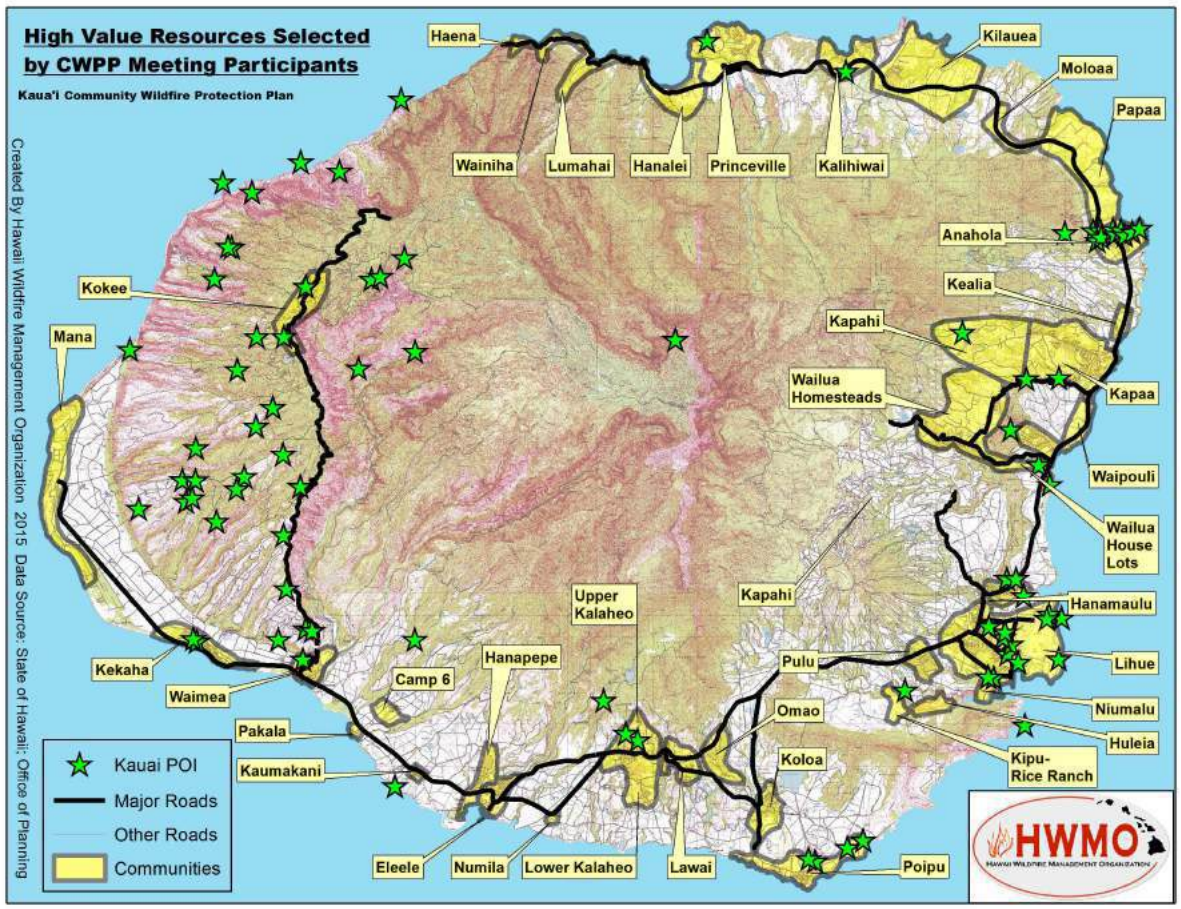


Map 23. Fire Protection Hazard Total for Developed Areas of Kaua'i CWPP planning area. *Reflects hazard assessment findings related to the following categories: Firefighter Response Time; Community Planning Practices & Ordinances; Community Fire Safe Efforts & Programs Already in Place; Fire Department Structural Training & Expertise; Local Emergency Operations Group or Citizen Group; Proximity to Fire Stations; Water Source Availability; and Wildland Firefighting Capacity of Initial Response Agency*

COMMUNITY VALUES

Civic, environmental, and cultural values were determined by stakeholders during input meetings. Meeting participants placed stickers on a map of Kaua'i to indicate their highest priority areas, community assets and natural resources geographically. Map 24 demonstrates the points on the map selected by the public and agency participants (Photos 5-7) during CWPP meetings as high priorities for mitigation/ protection based on their personal, cultural, and community values, priorities, and overall risk of wildfire. Due to the sensitive nature of cultural resources in Hawai'i, participants were not required to name the priority resources, only to share the area or location of the valued resources by marking the map poster with stickers.

Photo 5. *Firefighters mark the map with their input regarding high value resources to protect.*



Map 24. *Stakeholder-determined High Value Priority Resources to Protect from Wildfire on Kaua'i.*

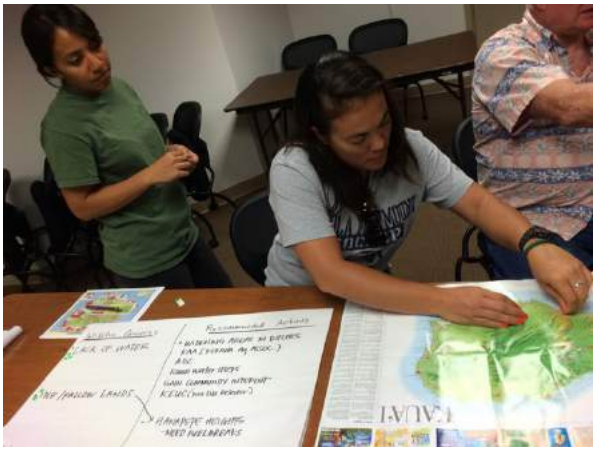
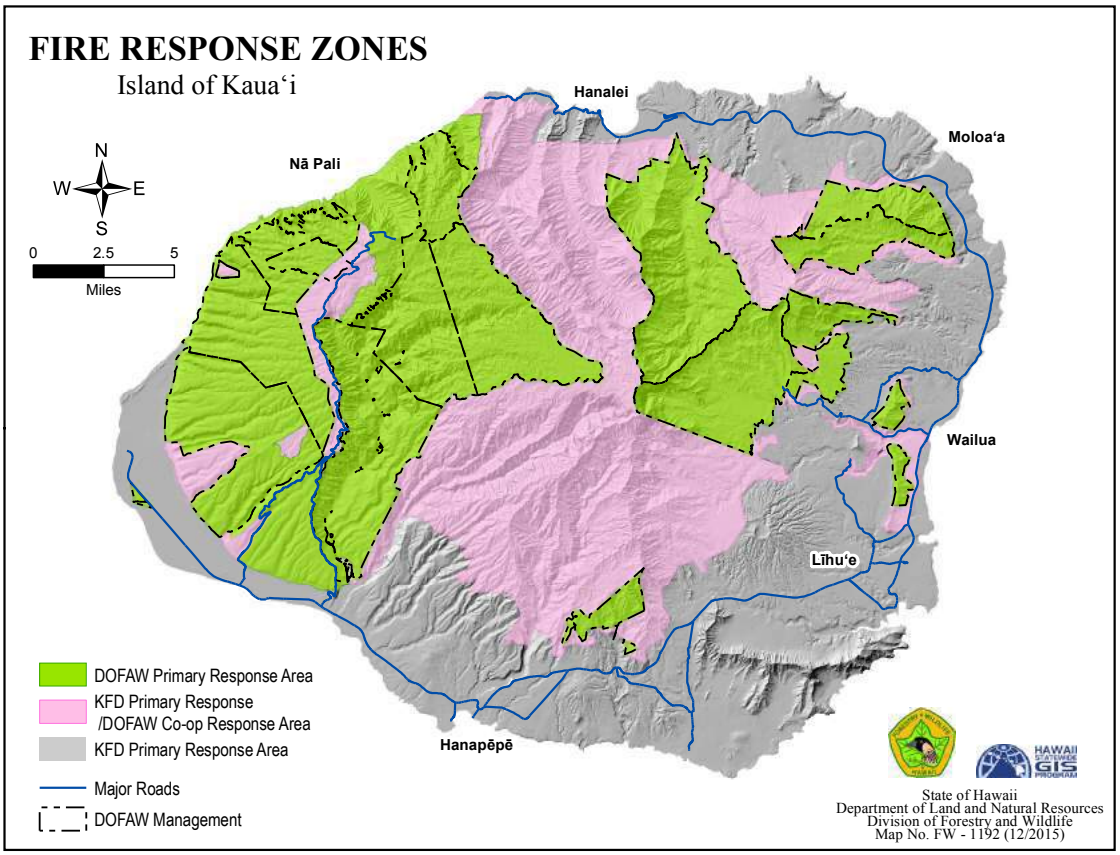


Photo 6 (above left). *Priority areas for fire protection were determined during meetings via paper maps that were then digitized. (See Map 24).* ***Photo 7 (above right).*** *Meeting participants discussed fire-related priorities as they identified places of high community importance.*

FIRE SUPPRESSION CAPABILITIES AND RESOURCES

The mission of KFD is to protect life, preserve property and enhance the environment of the County of Kaua'i from all hazards. Administration, Operations, Prevention, Training, Ocean Safety, and Community Emergency Response Teams make up the entire KFD emergency response force.

Initial response to the majority of wildfires (as well as all medical and other emergencies) is the responsibility of KFD. DLNR-DOFAW responds to wildfire events on state lands and provides additional wildland fire fighting assistance when state lands are threatened and/or mutual aid agreements are invoked. Map 25 was developed by DLNR-DOFAW and demonstrates the independent and shared response zones of each agency in the CWPP planning area.



Map 25. *Fire suppression response zones. (Source DLNR-DOFAW)*

Table 6 details KFD and DLNR-DOFAW wildland fire suppression resources are available for use in the event of a wildfire on Kaua'i. Appendix C provides a full list of KFD Apparatus.

Kaua'i DLNR-DOFAW/KFD Firefighting Resources	
Air Resources	DLNR-DOFAW Contract - Airborne Aviation (1) Type III Hughes 500 (120 gal.) KFD Contract – Air 1 (1) Type III Hughes 500 (120 gal.) Other Available on Island – Jack Harter Helicopters (1) Type III Hughes 500 (120 gal.) (1) Type III A-Star (225 gal.)
Engines/Tenders	DLNR-DOFAW Engines (1) M62 Engine (500 gal.) (1) M52 Engine (300 gal.) (4) 4x4 Brush Truck (Type 6 Engine, 300 gal.) KFD Tenders (2) Water Tender (Type 2, 1500 gal.)
Heavy Equipment	DLNR-DOFAW Equipment (1) D7 Dozer (1) Back Hoe (1) Excavator (14 ton) (1) Skid Steer (Tracked) (1) Grader
Misc. Resources	DLNR-DOFAW Equipment (4) High Pressure Portable Pumps (1) High Volume Portable Pump (1) Helicopter Dip Tank 6' (3000 gal.) (4) Portable Dip Tanks (1500 gal.) (3) Utility Terrain Vehicles (UTVs)

Table 6. *KFD and DLNR-DOFAW Suppression Resources (provided by DLNR-DOFAW).*

FIRE CODE

The Hawaii State Fire Code is based on the 2012 NFPA 1, Uniform Fire Code, which is amended at both state and county levels. The state amendments contribute to the State Fire Code. Each county then adopts amendments to the State Fire Code to create the County Fire Code. Most relevant to the discussion and public input for the Kaua'i CWPP Update is the chapter on the WUI, which is described in 2012 NFPA 1, Chapter 17.

EMERGENCY MANAGEMENT DOCUMENTS AND 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.[2]

The CWPP is designed to work in conjunction with other county and state plans, programs, policies, etc., including but not limited to:

County of Kauaʻi:

County of Kauaʻi Drought Mitigation Strategies[3]

County of Kauaʻi Multi-Hazard Mitigation Plan[4] and Hazard Mitigation Plan Update (2015)[5]

County of Kauaʻi Water Use and Development Plan Draft[6]

Kauaʻi County General Plan[7] (In pre-planning process at time of writing)

State of Hawaiʻi:

State Drought Plan and the County Drought Mitigation Strategies[8]

State of Hawaiʻi Multi-Hazard Mitigation Plan[9]

State Division of Forestry and Wildlife Operational Policy for Wildfire Control[10]

Hawaiʻi Statewide Assessment of Forest Conditions and Resource Strategy[11]

EVACUATION PROTOCOLS AND NEEDS

Evacuation protocols for neighborhoods and areas in Kauaʻi have been determined for natural hazards such as tsunamis, and can be found in KEMA informational resources. However, fire safety zones and evacuation details for all neighborhoods and areas of Kauaʻi are yet to be determined, and are a priority action determined by the public as part of this CWPP Update.

The KEMA website has several resources and pages dedicated to natural hazard preparedness: http://www.kauai.gov/CivilDefense

HAZARD REDUCTION PRIORITIES
KAUA‘I

Public and agency participants during the Kaua‘i CWPP Update process identified hazard reduction priorities for Kaua‘i. The wildfire-related concerns and actions provided by stakeholders were focused toward enhancing wildfire response capabilities, addressing priority public concerns and wildfire impacts, and reducing risk and hazards through pro-active wildfire mitigation. HFRA guidelines were followed by including community hazard reduction priorities, hazardous fuels reductions, and recommendations to reduce structural ignitability.

STAKEHOLDER CONCERNS AND RECOMMENDED ACTIONS

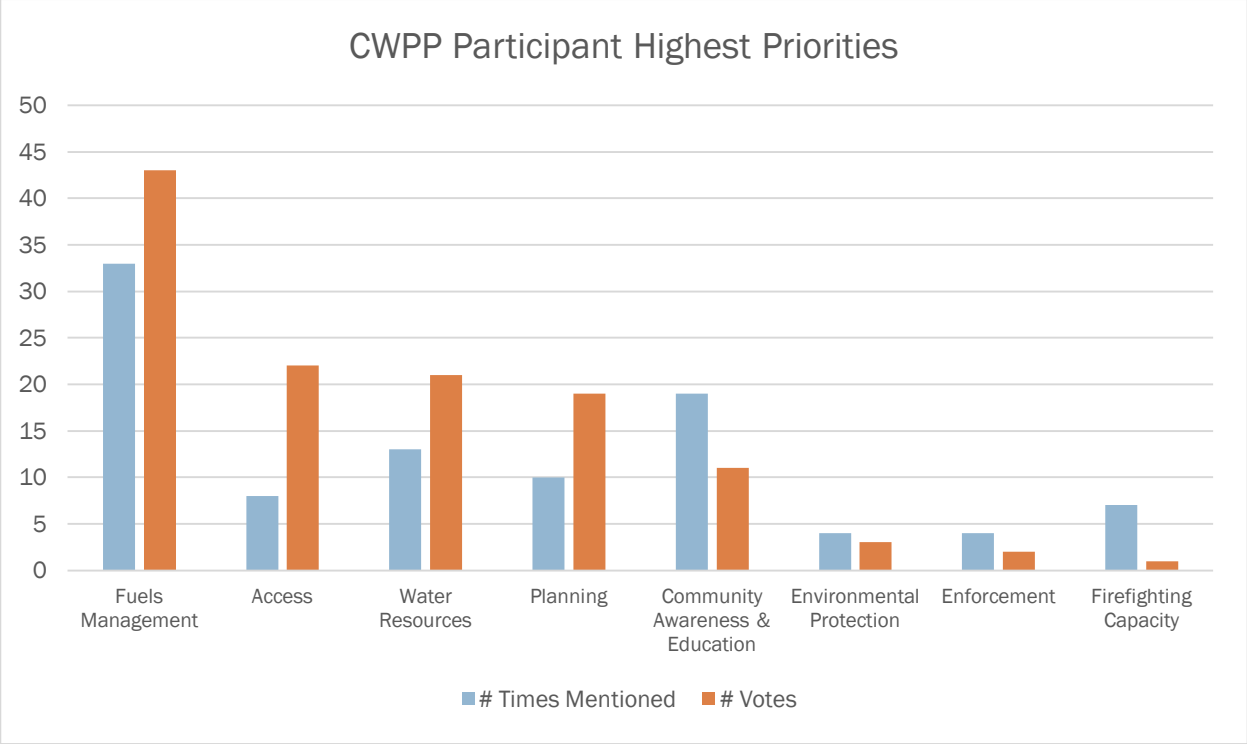


Figure 1. *Kaua‘i CWPP Participant Highest Wildfire-Related Priorities.*

HWMO held four meetings for the general public and several meetings with fire response agencies and natural resource managers to collect input and record wildfire-related concerns and recommended actions. Additional input was solicited from decision makers, large landowners, and other stakeholders as noted in the *Planning Process* section of this document.

While Kaua‘i CWPP participant input yielded diverse and broad concerns and recommended actions, certain topics came up with greater frequency. All input was aggregated and analyzed to capture an overview of the most frequently raised concerns. Concerns were recorded two ways: 1) number of times it was mentioned as an issue, and 2) number of overall votes it received once participants were asked to vote on the entire set of topics to indicate the highest priorities. Figure 1 displays both.

THREE CATEGORIES OF STAKEHOLDER CONCERNS AND RECOMMENDED ACTIONS

Public, agency, and decision maker input yielded stakeholder-prioritized feedback regarding wildfire-related concerns and recommended actions. The input was extensive and has been organized to align with the categories used within the National Cohesive Wildland Fire Management Strategy.[12] Refer to Appendix A for detailed public input per category.

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 discussion, 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. Public input details for Kaua'i are organized according to the following categories so that they fit into the national framework of priorities and funding opportunities.

- Fire-Adapted Communities
- Resilient Landscapes
- Safe and Effective Wildfire Response

Figure 2 indicates how much of the participant concerns for Kaua'i fall within each category. Each category is explored more fully in subsequent sections.

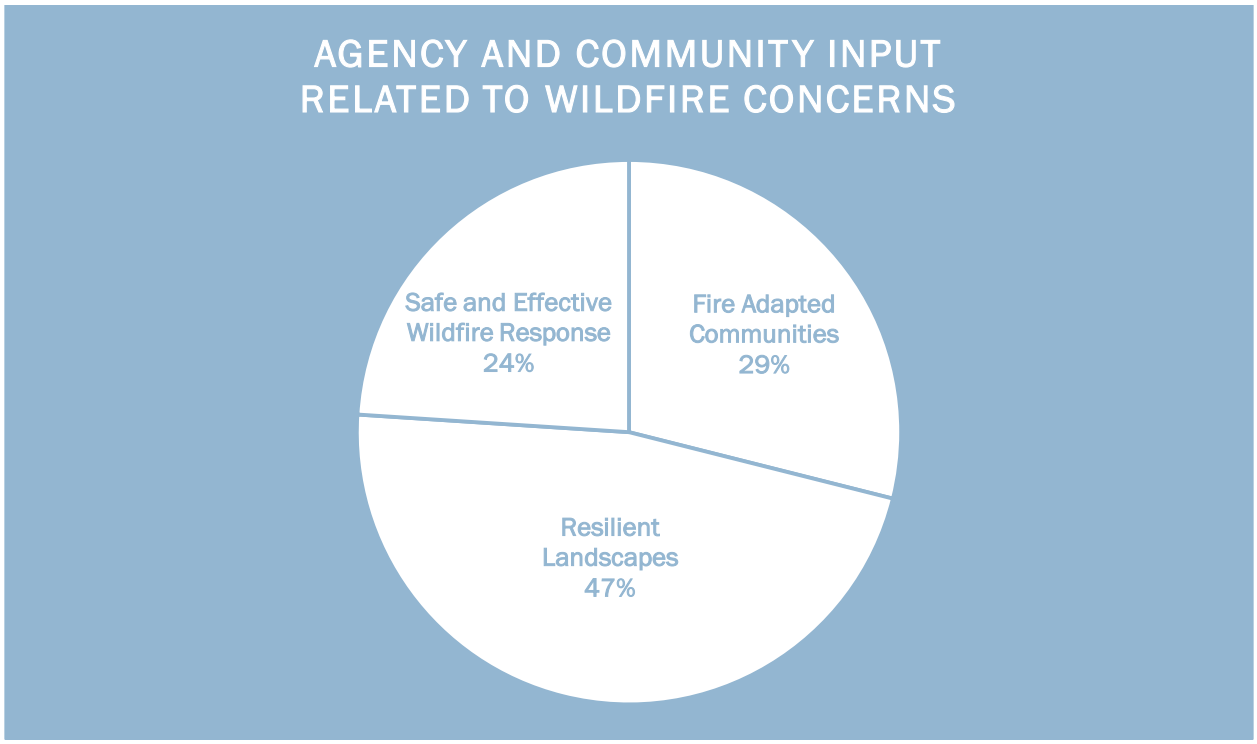


Figure 2. *Kaua'i Agency and Community Concerns Organized by Cohesive Strategy Categories.*

FIRE-ADAPTED COMMUNITIES

29% of Kauaʻi CWPP participant input was related to the need to work toward fire awareness, readiness, prevention, and general fire adaptation by communities and residents. These goals support the concept of Fire-Adapted Communities, defined by the United States Forest Service as "a knowledgeable and engaged community in which the awareness and actions of residents regarding infrastructure, buildings, landscaping, and the surrounding ecosystem lessens the need for extensive protection actions and enables the community to safely accept fire as a part of the surrounding landscape."[13] The Wildland-Urban Interface Mitigation Committee of the National Wildfire Coordinating Group defines a Fire-Adapted Community as "a human community consisting of informed and prepared citizens collaboratively planning and taking action to safely coexist with wildland fire."[14]

The primary goal of working toward fire adaptation is that wildfire preparedness and readiness efforts in a community become an ongoing and broadly supported part of living in, working in, and civically managing an area, and that all activities, from roadside fuels management and agriculture to development designs and community activities, work together to consistently and regularly support wildfire protection. This is opposed to the idea that wildfire preparedness is seasonal or can wait until the last minute, or that it is the responsibility of only one party (community association, fire department, etc.) to aid the community in wildfire preparedness. Generally across Hawaiʻi, wildfires are addressed on an as-needed, reactive basis. With the development of this and other CWPPs across Hawaiʻi, communities, organizations, and agencies are coming together to move toward becoming proactive, consistent, and collaborative, which is aligned with the framework and objectives for Fire-Adapted Communities (see Figure 3).

This CWPP was developed with a diversity of stakeholders with homes, businesses, personal interests, and jurisdictions on Kauaʻi. The wildfire-related concerns and recommended actions demonstrate the range of responsible parties, timelines, and actions that need to be taken toward comprehensive wildfire prevention, preparedness, and protection of Kauaʻi. These are the basic tenets of becoming fire-adapted. For the purposes of analyzing and presenting the Kauaʻi CWPP stakeholder input, stakeholder concerns and recommendations related to the **human side** of fire adaptation are presented in this section. Managing vegetation and increasing fire suppression capacity are presented below individually (See *Resilient Landscapes* and *Safe and Effective Wildfire Response* sections).

Figure 4 depicts the breakdown of CWPP meeting participant concerns in the Fire-Adapted Communities category for Kauaʻi.

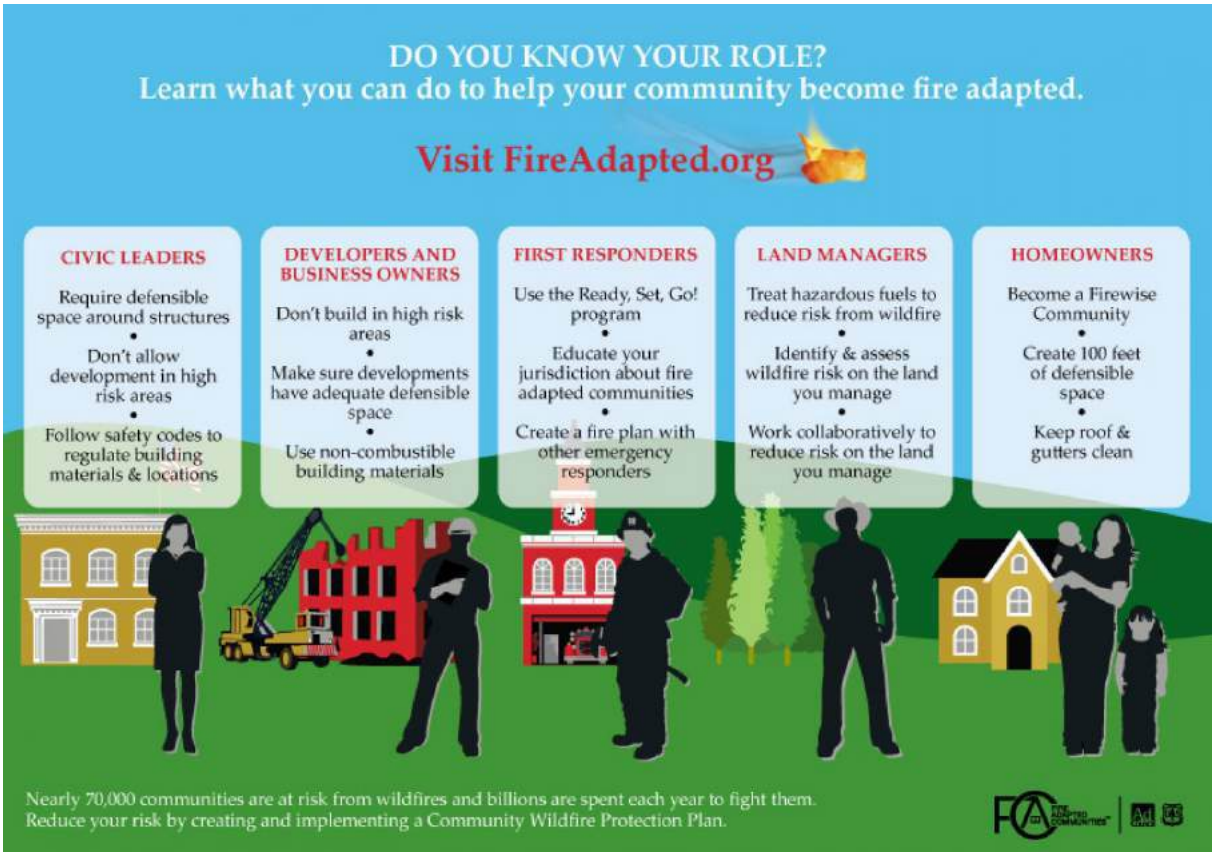


Figure 3. *Fire-Adapted Communities Infographic.*[15] *There is a role for everyone when working toward a region becoming Fire-Adapted, as seen in this infographic from the Fire-Adapted Communities website, FireAdapted.org.*

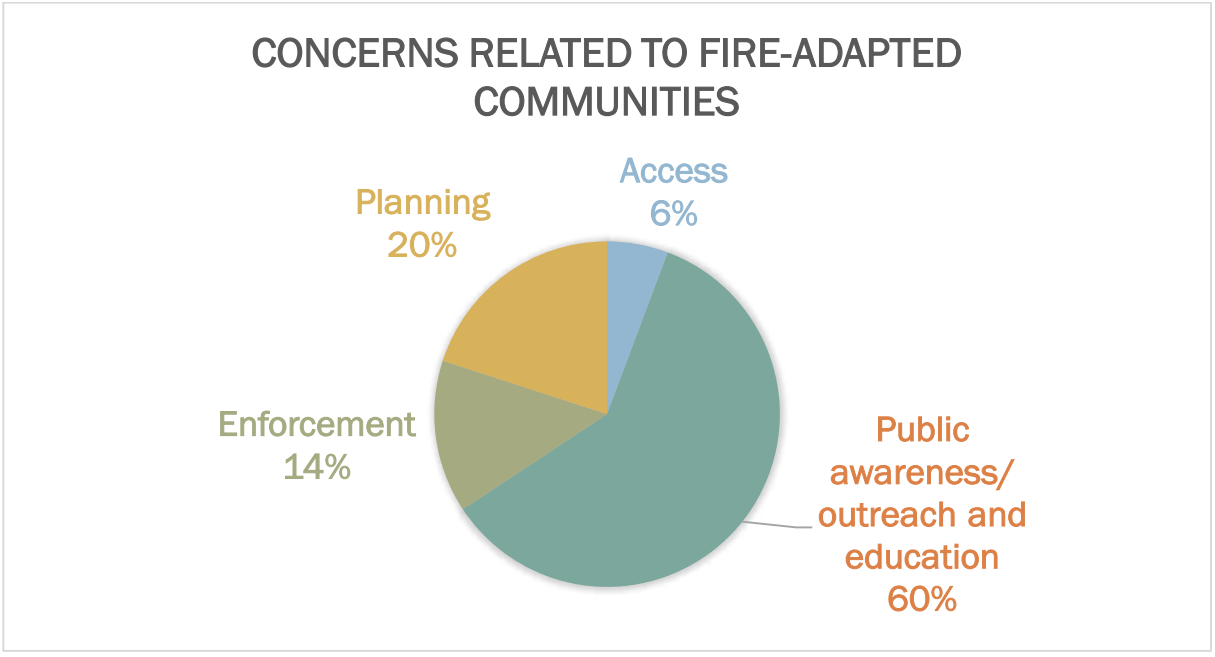


Figure 4. *Community concerns related to the human side of wildfire preparedness and protection, as part of working toward Fire-Adapted Communities goals.*

60% of all community-focused input was related to increasing community awareness. There was an urgency and emphasis of participant concerns regarding the general lack of awareness of the threats and impacts of wildfire among all community members from residents to decision makers. Further analysis revealed a more detailed understanding of the recommended strategies for bolstering wildfire awareness. This yielded the following breakdown of suggested outreach methods (see Figure 5), which can inform community awareness efforts across Kaua'i:

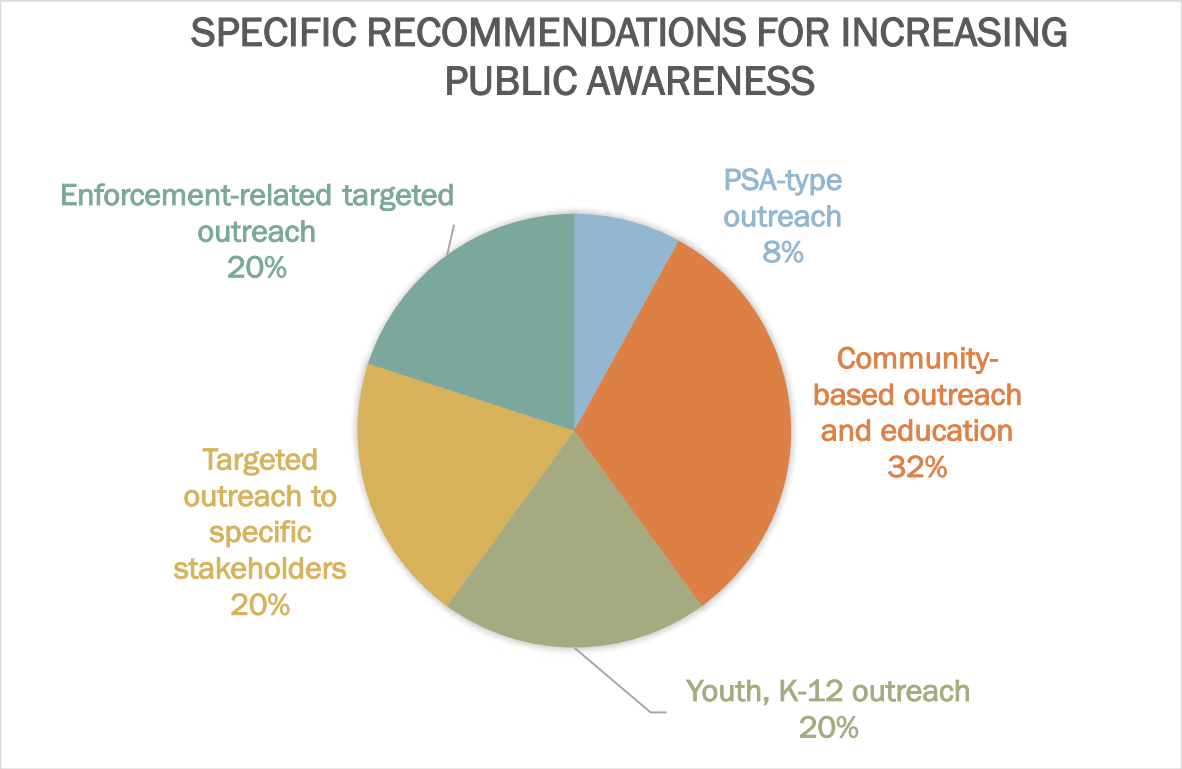


Figure 5. *CWPP participant recommended methods for increasing public awareness regarding wildfire threats, impacts, and preparedness strategies.*

The next highest percentages of concerns related to the goals of Fire-Adapted Communities were the need for improved planning and enforcement.

Input related to improved planning included the need for fire management plans, the need for an established process for residents to address wildfire related concerns and fuels management assistance needs, and the participation of the community members, planners, and policy makers in wildfire protection regulations and building/development requirements.

Enforcement-related concerns covered arson, vegetation management along highways and by large landowners, illegal dumping, collaboration among decision makers and residents toward improved wildfire legislation, and improved investigation and prosecution of arson.

RESILIENT LANDSCAPES

The Resilient Landscapes category of CWPP participant input focuses on all input related to restoring, protecting, or maintaining landscapes. This includes the protection of native species and watersheds from wildfire impacts and the management of vegetation to reduce the ignition capacity and spread of wildfire. 47% of all community and agency input on Kaua'i (of all three National Cohesive Strategy categories) fell into the Resilient Landscapes category. The majority of that input focused on fuels management, at 82%. The concerns and recommended actions were focused as depicted in Figure 6.

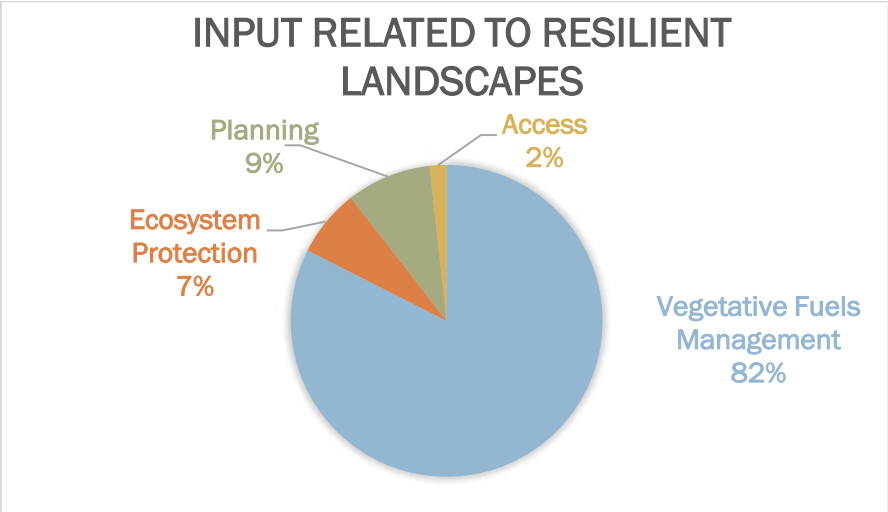


Figure 6. *CWPP participant input related to restoring and maintaining landscapes to reduce wildfire threats and impacts.*

Residents were concerned about unmanaged vegetation on vacant lots, fallow lands, along roadsides, and around communities. Employing grazing to manage fuels and increasing landowner and community capacity in general to manage fuels were the highest priorities of Kaua'i CWPP Update participants. A frequently discussed topic was the coordination, permission, and implementation of grazing and agricultural methods as an important method for addressing fuels. Residents who attended meetings in Waimea proposed a grazing cooperative as one solution to reducing vegetative overgrowth. Additionally, increasing other types of fuels management practices and improving the public and large landowners' capacity to carry them out were high priority concerns.

Improved fuels-related planning, codes, and policies, as well as their enforcement (such as brush abatement enforcement) were also top priorities. While there were several recommended solutions, reducing hazardous vegetation, in general, was the most frequently raised concern and highest priority at every Kaua'i CWPP Update meeting. Figure 7 depicts the priorities for fuels management provided by participants.

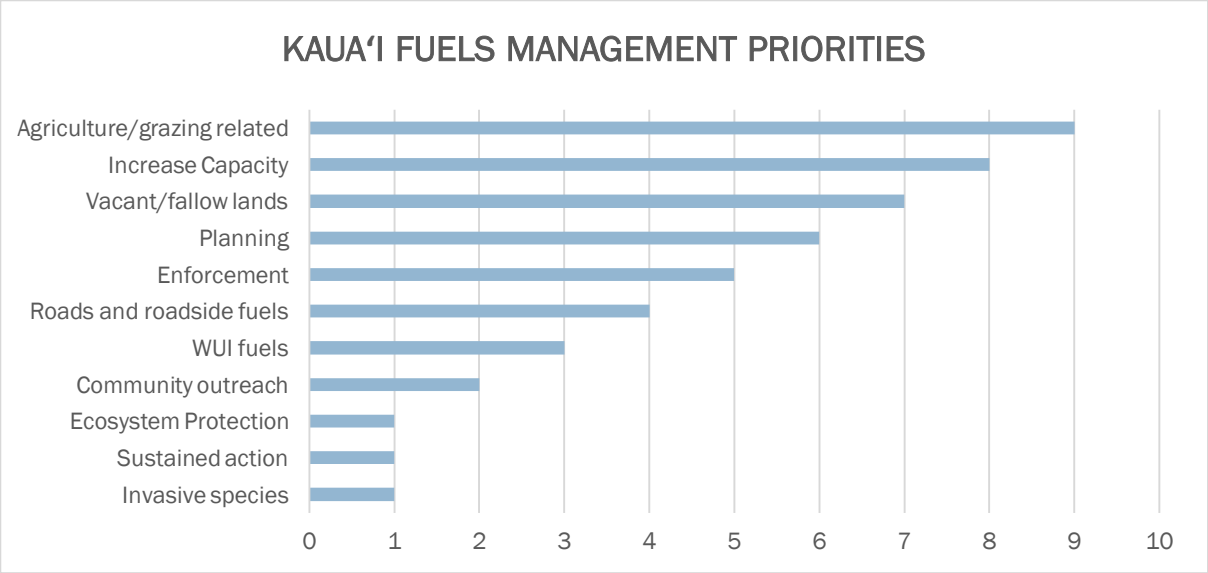


Figure 7. *CWPP participant recommendations and priorities for methods for addressing fuels management issues*.

SAFE AND EFECTIVE WILDFIRE RESPONSE

Comprehensive and effective wildfire preparedness and protection includes preventing ignitions, minimizing the ability of fire to travel across structures and landscapes, and maximizing the likelihood for fires to be suppressed quickly to keep them as small and minimally impacting as possible. Since the majority of all fires in Kaua'i (and 'ii'i in general) are human-caused, ignition prevention largely is a matter of community outreach and education (addressed in *Fire-Adapted Communities* section). Minimizing vegetative fuels and structural ignitability can help keep fires from spreading (see *Resilient Landscapes* section and *Reducing Structural Ignitability* section). Once a fire is ignited, however, the responsibility for taking action rests solely on fire suppression and emergency management departments and personnel. While prevention and preparedness are key to reducing the threats and impacts of wildfire, suppression is the final piece of the protection equation that needs to be capable, effective, and adequately supported.

Kaua'i CWPP Update participants demonstrated an understanding of this and provided their concerns and priorities related to wildfire response (firefighting). Additionally, while the protection of life, property, and natural resources are the functions of fire and emergency management efforts, the safety and health of firefighters is also of utmost importance and consideration, and was also discussed and prioritized by CWPP participants. The input was clustered into like categories and resulted in the following set of highest priorities (see Figure 8):

1. Increasing capacity such as personnel, training, and resources such as equipment and vehicles.

2. Increasing water resource infrastructure and availability for suppression.
3. Improving and increasing firefighting access (through road and firebreak development and maintenance.

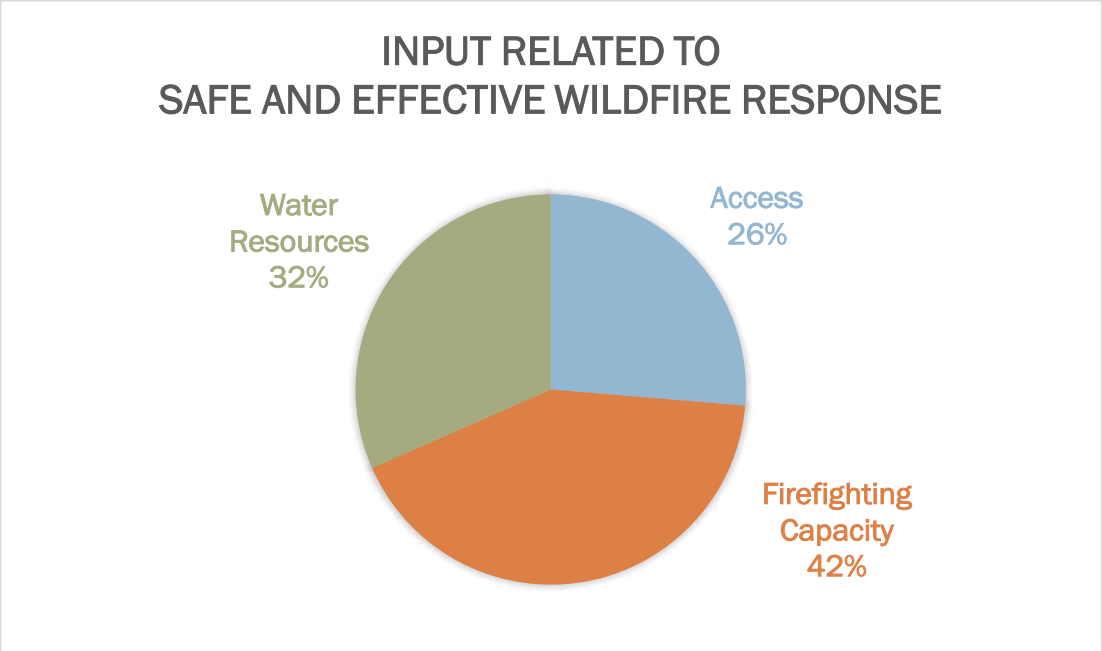


Figure 8. *Public input related to safe and effective wildfire response.*

COMMUNITY INPUT SUMMARY

In summary, the CWPP Update yielded the several high priorities, falling within all three focal areas of the Cohesive Strategy goals. They are:

- Increased, consistent, and coordinated fuels management
- Increased community awareness and wildfire education
- Improved planning related to wildfire preparedness and mitigation
- Improved and increased enforcement (especially of brush abatement)
- Increased environmental protection (and recovery) from wildfire impacts
- Increased firefighting capacity
- Improved firefighting access
- Improved water resources.

Projects identified to address these priorities are listed in the *Action Plan* section.

HAZARDOUS FUELS REDUCTION

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 fuels reduction treatments for high fuel hazard areas are listed in Table 7.

Community Resource, Structure, or Value at Risk	Fuel Hazard Rating	Type of Treatment	Treatment Method Options
Mauka forested lands, parks, and reserves	HIGH OR EXTREME IF UNMANAGED	Mechanical, hand labor, chemical, animal, fuels conversion	Utilize well-managed grazing, weed whip, mow, hand-pull, herbicide where appropriate with follow-up vegetation removal. Reforestation and restoration. Fuels conversion and "living" or "shaded" fuelbreaks.
Homes and structures with large lots	MOD-EXTREME	Mechanical, hand labor, chemical, animal, fuels conversion	Firewise home ignition zones. Reduce fuel along property boundaries and roadsides. Convert fuels to drought-tolerant, fire-resistant (preferably native) plants. Reduce ladder fuels.
Densely arranged homes and structures	MOD-EXTREME	Mechanical, hand labor, chemical, fuels conversion	Firewise home ignition zones. Weed whip, mow, hand-pull, and herbicide where appropriate. Convert fuels to drought-tolerant, fire-resistant (preferably native) plants. Reduce ladder fuels.
Historical sites throughout Kaua'i	MOD-EXTREME	Hand labor, chemical, animal, fuels conversion	Weed whip, mow, hand-pull, well managed grazing, and herbicide where appropriate. Convert fuels to drought-tolerant, fire-resistant plants.
Roadsides	MOD-EXTREME IF UNMANAGED	Mechanical, chemical, animal, fuels conversion	Conduct roadside fuels treatments in accordance with fuel growth (keep low), maximize width of roadside reduction areas. Convert roadside fuels to fire-resistant plants that require little or no maintenance and are less ignitable.
Resorts	LOW-MOD	Mechanical, hand labor, chemical, fuels conversion	Continue regular maintenance and irrigation. Convert fuels to drought-tolerant, fire-resistant plants.
Fallow Agricultural lands	HIGH OR EXTREME IF UNMANAGED	Mechanical, animal, chemical, re-establish active agriculture	Install fuelbreaks along roads and property boundaries, or in lines perpendicular to slope to provide access and minimize erosion. Reduce fuels in patches to create fuel mosaics. Utilize well-managed grazing. Re-establish active agriculture. Initiate reforestation and/or restoration while also maintaining fuels.

Table 7. *Hazardous Fuels Treatment Recommendations.*

REDUCING STRUCTURAL IGNITABILITY

A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures. Individuals and community associations can reduce structural ignitability throughout their community by taking the following measures recommended by the Firewise, Ready, Set, Go!, and HWMO outreach programs, summarized below.[16, 17, 18]

The following pages are written with the resident in mind, and can be removed and used independently from the CWPP as a general set of guidelines for reducing hazards in the home ignition zone. It is highly recommended that individuals and communities conduct a simple native vegetation assessment and/or consult with appropriate biologists or foresters before clearing trees and significant amounts of vegetation that may be important to protect.

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 Kaua‘i, 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.

DEFENSIBLE SPACE ZONES AROUND STRUCTURES

To reduce structural ignitability, it is recommended that residents think in zones around their home, and begin addressing risk reduction activities in Zone 1, working out from there to Zone 2 and beyond.

The following actions are recommended per zone:

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, see Figure 10). 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.

Figure 9. *Defensible space zones around structures.*[28]

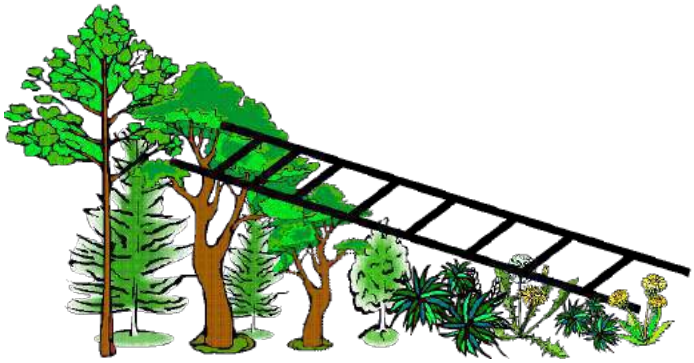


Figure 10*. Ladder Fuels Diagram.*[1] *Ladder fuels form a pathway for ground fires to climb vegetation and become crown fires, which are much more difficult to suppress. It is important to limb low hanging branches and keep ground vegetation short so that vegetation is separated inhibiting fire from easily "climbing" up to canopy where wind is often stronger.*

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" (see Figure 10).
- 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.

GENERAL DEFENSIBLE SPACE RECOMMENDATIONS

- As stated above, ensure you have at least a 100-foot radius of defensible space (cleared, managed, and maintained 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 drought-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.
- 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, 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.
- Non-native trees, such as ironwood 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.

HARDEN YOUR HOME

Creating defensible space, as detailed above, decreases the likelihood of wildfire spreading through vegetation that surrounds structures on the home site or yard. The second and equally important set of actions to reduce wildfire-caused ignitions of residences and structures is to harden the home or structure with non-combustible building materials and ignition-reducing strategies. The following is a step-by-step list of recommended actions per component of a structure or home. Some of these actions are inexpensive and some are costly. All are important. It is recommended that residents take the simple and easier steps right away, and prioritize hardening the rest of the home or structure as soon as possible. Note: relying on the ability to water the roof when fire is approaching will not necessarily provide adequate structural protection, and it puts you in danger. It also takes water and personnel resources away from firefighters, who need the water and full attention toward firefighting rather than search and rescue for late evacuators. Preparation and early evacuation are key actions recommended by the national Ready, Set, Go! Program. Prepare your home as follows:

Figure 11*. Covering vents with 1/8-inch or smaller metal mesh blocks embers from entering a home or structure.*

Figure 12. *Keep windows free of vegetation to reduce likelihood of heat-caused breakage that lets embers into your home.*

Figure 13. *Make sure your eaves are enclosed with non-combustible materials to prevent ember entry.*

Figure 14*. Rain gutters should have screens to keep leaf debris from accumulating. Maintain gutters to keep them clear and clean.*

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 composite, metal, or tile. Block any spaces between roof decking and covering to prevent ember intrusion. Clear leaves and other debris from your roof and gutters. Cut any tree branches within 10 feet of your roof.

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).

Figure 15. *Wood fencing can act like a fire wick straight to a home. Use non-combustible materials for all fencing and yard structures.*

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.

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.

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

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.

Rain Gutters: Screen or enclose rain gutters to prevent accumulation of plant debris.

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.

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.

Non-Combustible Fencing: Make sure to use non-combustible fencing materials, and to keep combustible fences away from homes. Wooden fences leading straight to the home act as wicks and bring the fire straight to the structure, greatly increasing the likelihood of the home igniting.

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.

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

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 getting a pump.

Inside: Keep fire extinguishers on hand and in good working order. Install smoke alarms on each level of your home and near bedrooms. Test them monthly and change the batteries twice a year.

The Kaua'i CWPP Update Action Plan follows the guidelines of HFRA. It was developed through an analysis of the issues identified in the hazard assessments and overall risk assessment, public and agency meetings, and through a review of other Community Wildfire Protection Plans throughout Hawai'i. Federal, state, and county agencies, private entities and landowners, and area residents and homeowners were invited to submit projects that provide protection and reduce risk. Public concerns and input served as the basis for the projects listed below that will guide hazard reduction efforts in the future.

Landowners and agencies are invited to continue to submit projects that provide community protection and mitigate wildfire risk. The agencies involved in developing this CWPP Update intend to regularly evaluate progress on projects and mutually agree on treatment priorities. Additional projects will be attached as appendices in updated versions of this plan.

NEAR-TERM ACTION PLAN

The following table details the projects that have been prioritized for the next five years.

Project	Anticipated Cost	When	Lead
Aid communities in applying for fuels management grants	Variable	ASAP	HWMO, DLNR-DOFAW
Install and maintain "Smokey Bear, Prevent Wildfire Signs" or other outreach signage throughout project area	$10,000/year	ASAP	DLNR-DOFAW
Assist interested communities in completing Firewise Communities certification process	$5,000/community	Ongoing	HWMO
Provide outreach to students at schools in fire prone communities	Varies, part of broader workplan and set of expenses	Ongoing	HWMO, KFD, DLNR-DOFAW
Develop wildfire prevention and drought awareness and preparedness materials	Variable	In Initial Phases	Multi-partner
Launch wildfire and drought awareness campaign	Variable	In Initial Phases	Multi-partner
Host wildfire preparedness information and materials for residents and decision makers on website	Variable	Ongoing	HWMO, KFD, DLNR-DOFAW
Utilize social media to promote wildfire awareness	Variable	Ongoing	HWMO, KFD, DLNR-DOFAW

Table 8. *Near-Term Action Plan and Projects.*

LONGER-TERM ACTION PLAN

In addition to projects that are ongoing or being initiated at the time of writing this CWPP, numerous other priority projects were proposed by participating agencies and organizations involved in the CWPP planning process. The Table 9 details the proposed projects in no priority order. Projects are to be completed as funding, personnel, and opportunities become available to implement them.

Proposed Project	Anticipated Cost	Lead
Improve national reporting of wildfires in Hawai'i	TBD	DLNR-DOFAW, USFS, HWMO
Improve initial attack capacity	Project dependent	TBD
Work to appropriately graze fallow areas where fuels are building, Fund fencing and water troughs to make lease areas more economically feasible to graze	200,000 for fencing multiple areas	TBD
Install water tanks around margins of communities to serve as dip tanks for helicopter fire suppression. Have tanks double as water troughs for ranching and conservation/restoration efforts	$20-60,000 per diptank	TBD
Increase outreach to community associations	Variable	HWMO, DLNR-DOFAW, KFD
Provide wildfire education for decision makers	TBD	HWMO, DLNR-DOFAW, KFD
Seed Collection and Storage for Post Fire Replanting	TBD	DLNR-DOFAW
Work with large landowners to encourage fuels management	TBD	HWMO, DLNR-DOFAW, KFD
Maintain and add RAWS	TBD	DLNR-DOFAW
Work with partners and residents to garner support for increasing DLNR-DOFAW's budget for fire response	TBD	HWMO, DLNR-DOFAW, KFD, Public
Submit WUI proposals for projects in the CWPP area	TBD	DLNR-DOFAW
Work with state and federal land-owner assistance programs to incorporate wildland fire concerns	TBD	TBD, Possibly DLNR-DOFAW

Table 9. *Proposed Future Projects.*

CWPP IMPLEMENTATION AND MAINTENANCE

PLAN IMPLEMENTATION AND MAINTENANCE

The Healthy Forest Restoration Act (HFRA) requires that KFD, KEMA, and DLNR-DOFAW all agree on the final contents of the Kaua‘i CWPP. The plan is signed by each agency in order to meet HFRA and FEMA requirements. Because of the non-regulatory nature of the CWPP, the relevance and effectiveness of the Kaua‘i CWPP Update will rely heavily upon community initiative and involvement. Expertise, technical support, and implementation assistance will be provided by the appropriate agencies and organizations involved in fire issues on Kaua‘i, and area residents are urged to contribute their time and effort to implement the actions they self-identified in the Kaua‘i CWPP Update planning process.

KFD, DLNR-DOFAW, and KEMA, and HWMO will provide technical support, identify and coordinate funding when possible, and serve as resources for wildfire risk reduction efforts in Kaua‘i. Together, representatives will prioritize and recommend funding for projects, document the successes and lessons learned from those projects, and evaluate and continue to update the CWPP as needed.

HWMO plans to provide outreach and educational programs to youth and adults through school programs, community events, homeowners/community association programs, and workshops in the coming year to support community involvement in implementing the actions identified in this plan. Additionally, HWMO will be working with interested communities to go through the Firewise certification process, to include forming local Firewise committees and action teams and completing comprehensive hazard assessments and plans specific to their subdivisions.

Many Kaua‘i 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 the CWPP regularly so that it remains a “living” document. Continuing to build community awareness of these issues and actions will assist with fostering individual and community investment in projects.

SIGNATORY CONTACT INFORMATION

The following government representatives have a high level of interest in the protection of Kauaʻi from wildfire, and have reviewed and support this CWPP. Contact information for principal government stakeholders is listed below.

2024 Note: The following contacts were those from the original 2016 CWPP document and process. The individual serving as signatory for Kauai Fire Department has been updated to reflect the current chief.

Kauaʻi Fire Department

Robert Westerman, Fire Chief 2024 Update: Michael Gibson, Fire Chief
Piʻikoi Building
4444 Rice Street
Suite 315
Lihue Hawaiʻi, 96766

Kauaʻi Emergency Management Agency

Elton Ushio, Emergency Management Administrator
3990 Kaana Street, Suite 100
Lihue, Hawaiʻi, 96766

State Department of Land and Natural Resources- Division of Forestry and Wildlife

David G. Smith, Administrator
Kalanimoku Building
1151 Punchbowl St. Room 325
Honolulu, HI 96813

The Signature Page presented at the beginning of this document demonstrates the required multi-agency participation and acknowledgement of this plan.

For inquiries related to the development of this plan, to add supplementary action plan projects, or for printed copies, please contact:

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Kamuela, HI 96743
Email: admin@hawaiiwildfire.org
Website: Hawaiiwildfire.org

LIST OF FIGURES, TABLES, PHOTOS

TABLES

FIGURES

MAPS

PHOTOS

REFERENCES

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APPENDICES

Appendix A: Public and Agency Concerns and Recommendations

Appendix B: Wildfire Hazard Assessment Maps for Developed Areas

Appendix C: Kauai Fire Department Brush Fire Apparatus

Appendix D: Photos of WUI Communities across Kaua'i

Appendix E: 2009 Kauai CWPP

Appendix A
Kaua'i Community Wildfire Protection Plan 2016 Update
Public and Agency Concerns and Recommendations

The following tables represent the input provided at CWPP meetings. Statements are organized per National Wildland Fire Cohesive Management Strategy category:

- Fire-Adapted Communities
- Resilient Landscapes
- Safe and Effective Wildfire Response

Note:
In some cases, multiple participants provided identical concerns and recommended actions. These have been combined to minimize redundancy in the table. However, input statements remain otherwise unmodified and unfiltered.

Fire Adapted Communities Category- Kauai Community Input	
Concerns	Recommended Actions
Access	
Access Issues - Large Landowners - Land Management (animals/hunting, access)	Map out access areas - appease large landowners needs to help them manage their lands
Alternate traffic routes when roads closed due to fire	Funding for rural road maintenance
Community Awareness/ Outreach & Education	
Possible fire setters intentional	Education/Awareness
Older homes construction type - easily flammable	Service projects by local High School students to help the elderly
Public Awareness	More information, edu, workshops, classes with large employers - lunch hour
Charter school students educated about dangers of fire (arsonists from the community)	Youth education at Charter school (Kanuikapono School)
Provide homeowners with the means to protect their property (fire extinguishers, smoke detectors)	
Community Awareness	Using fire safety trailer events, community meetings
Hot Spots:Hanapepe - 49 DHHL units near old cane fields; Wailua Marina; Anahola; Waimea; Salt Pond, Kipu Bypass; Kaumakani; Poipu; Kekaha/Waimea Canyon; Ahukini/Hanamaulu (near airport)	Outreach opportunities - schools, events; Identify critical infrastructure (highways, solar farms, power plants, hospitals, hotels)
Educating homeowners	Homeowner education, home safety, evacuating procedures (workshop, one-page flyer, Door to Door by HOA member
Lack of awareness	Public outreach (Workplace Ed. "Lunch and Learns" - 100+ employees, Chamber of Commerce mtgs.; Home Safety; Big West Side events (July 4th, Waimea Plantation Days - Feb., Kids - teach parents (K-6th gr.)
Multiple fires in Anahola	Model homestead in Anahola
Not much wildfire awareness (except for hunters & hikers)	Get hikers, hunters involved (recreational users) - Billy Vicosta - Waimea school teacher/rancher/hunter
	Rotary clubs - get on their agendas (N shore & Kapaa); Adopt a Club to clear vegetation at an elderly person's home
	Kids Ed.
Awareness; Juvenile Fire Starts	Community outreach/fire prevention outreach; K-12 classrooms
Lack of awareness	Educate everybody; Defensible space on their side; What to do as an individual; Flyers door to door in critical areas (areas next to Ag lands, threatened areas)
Lack of community involvement	Education - regular community meetings at community centers. Learn about what we are losing from fires
No more ordinances for farmers	Educate landowners & the state & tenants to lease = they are responsible to maintain the buffer; Have cows and goats near homes or mow for firebreaks
Enforcement	
Not enough enforcement staff (Police) to deal with potential arsonists	Work with County budgets & funding
Brush abatement laws	Educate police officers - fire hazard & brush abatement
Brush abatement laws	Educate Fire Dept to increase personnel for brush abatement laws
Vegetative Fuels Management/ Roads	
Maintaining vegetation in ditches	Access to machinery/$$ & landowners
Alternate traffic routes when roads closed due to fire	Funding for rural road maintenance
Toxicity of burning cultivated Ag lands affecting downwind communities	Ag owners and community should know the toxicity of their burning fuels/crops
Need to maintain vegetation education efforts	Additional funding; Liability coverage
Land management on larger holdings (>10 acres) - promote leasing out	Legislation requiring fire plan & veg. maintenance; Legislation make land holders pay for maintenance of vegetation
No more ordinances for farmers	Educate landowners & the state & tenants to lease = they are responsible to maintain the buffer; Have cows and goats near homes or mow for firebreaks
Funding	Grant help/support/guidance - share grant opportunities with landowners (state, etc.) to buy mower/tractor, maintenance costs, tires
Large Landowners - Land Management	large landowners- need to help them manage their lands
Planning	
New Phase II vacant lots and unmanaged vegetation	DHHL planning to clear those lots - in final Procurement process
Who will take this CWPP to the next step?	Continue community engagement
Better cooperation & communication among landowners & land users (grazers, hunters, etc.)	Meetings/workshops for planning and coordinating land use
Multiple fires in Anahola	Grant writer help in community, CERT training - DHHL Anahola Board Members

Resilient Landscapes- Kauai Community Input	
Concerns	Recommended Actions
Ecosystem Protection	
Fires on ridges threaten valleys -Section of ridges with fire breaks	Restore old cane roads - parallel along ridges and lateral roads
Invasive species - overgrown/suffocate natural vegetation	Reduce invasive species, replant native species
Need to address ecosystem protection & restoration	Integrate natural resource protection into other fire protection efforts
Long term impacts of fire	Monitor and study
Fuels Management	
Toxicity of burning cultivated Ag lands affecting downwind communities	Ag owners and community should know the toxicity of their burning fuels/crops
Unmanaged fallow lands - upkeep/ownership	Knowledge of Federal monies to help maintenance
High fuels along roads	Adopt-a-Highway for fuels mngt; Clearing along road edges; Involve DOT
Woody brush left along roadsides	Finish the job - clear it
Invasive species - overgrown/suffocate natural vegetation	Manage vegetation
Old pasture maintenance	Fencing to maintain grazing animals
High grass/fuels	Better access for grazing (leases with landowners)
Fallow lands	Strategically place farms (i.e. along Kokee Rd. with irrigation);
Unmaintained Lateral roads across ridges (cane rd)	Clearing would provide fire breaks
Unmanaged vegetation (mixed landowners, state, homeowners)	Create Buffer zones
Decommission Ag lands = no equip. operators and no road/veg maintenance	State Law 127A-18 "Mitigation of Hazardous Situations" - Addressed by legislative teams - states only trees are considered hazardous veg. - need to include grasses/shrubs too - so add to existing law if 'buffer' needs to be cleared - State Civil Defense could enforce it
Unmanaged fuels & Roadsides	Law - Every property must have a fire break if next to the highway. If property is >10 acres, you must have a Wildfire Plan for your land; Enforcement of fuel abatement laws
Grazing lands are not accessible to most people for grazing leases (ADC (state org.) land - old cane - now guinea grass) - not maintaining their fuels	Lease out areas as pasture; Create a grazing cooperative to have access to pasture lands; Need someone to drive and get the grazing association started (insurance, liability ($400/yr.)
Who manages what? Ag lands, Roads	Agencies open and clear lands every year
Unmanaged vegetation	Waimea Valley firebreak needs to be maintained; Kekaha firebreaks need to be maintained regularly; Waimea to Mana to Polihale firebreak to protect homes (see map drawing); Use existing old cane roads to maintain as fuel breaks (County & State lands); Kokee Rd. remove eucalyptus trees from touching each other
Fallow lands, overgrown pastures	Open (cheap) for grazing & Ag. to use the land, pasture maintenance, graze gulches
Vacant lots - high fuels; Cars burning	Enforce fuels management codes
Idle/Fallow Lands	Hanapepe Heights - Need fuel breaks
Vegetation out of control behind Koloa, Solar Farm-hwy. is close by and fire potential	Fire breaks near communities; $$ for Vegetation Control
Fuel in Urban Interface	Fire breaks in urban interface - Equip./Personnel to help landowners
Unmanaged fallow land	Actively manage lands
Vegetation Management started across Pilipoli street	Funding needed for gas, machine maintenance; Apply for funding (HWMO, DHHL for both small and larger scale projects)
Code Management	Hazardous trees
Fire breaks between/within large parcels/roads	Address at KFD Brushfire mitigation meeting.
Fire breaks between/within large parcels/roads	Encourage landowners to make fire breaks.
Fallow Ag. Lands	Fire breaks, maintain old roads; Require large landowners to maintain their veg.; New law - make landowners responsible (especially next to subdivisions) - fines vs. tax incentives; Vacant residential lots - public works; DHHL MOUs - equipment operators

Safe and Effective Firefighting- Kauai Community Input

Concern	Recommended Action
Access	
Lack of road maintenance since 1999	Open up & maintain roads as firebreaks
Access for fire fighters to rural locations	Improve access
Rural road maintenance	Moveable road blocks/gates on access roads
Road Access	Open roadways
Locked gates	(no suggestion)
Water Resources for Firefighting	
Lack of Water	Widening areas in ditches (Kekaha Ag Assoc>); ADC, Kauai water users, gain community interest; KIUC (Pu'u Lua Reservoir)
Suppression Water Resources	Dip tanks - to be filled by trucks; Reservoirs - resurrect - incentives for Ag.. & suppression purposes to offset costs to maintain reservoirs
Water Supply	Dip tanks
Wildland water sources	Maintain wildland roads for versatile access to potential water bladders filled by water tender
Water resources are limited	Portable tanks - make a requirement for ADC to install for fire suppression
Water resources are limited	Dip tanks - permanent along roadway on Waimea Canyon Rd. & 3 miles up (work with KFD on spacing) (use existing water lines that are underground)
No water for former Agricultural lands	Resurrect reservoirs
Hydrants - currently 60-70 PSI	Increase diameter/Age of piping/Check integrity of the line
Water Access	Locate existing water lines
Water Access	Maintain access to reservoirs (old cane reservoirs)
Change vegetation	Water source/reservoir restoration
Water Access	Fire Dept. fittings for water tanks; overhead water spigot for Lihue - for Fire Dept. to fill up
Water Access	Put in frog ponds instead of reservoir (size & requirements)
Water Resources	Improve
Firefighting Capacity	
Heavy drought in summer,timing of fire season can be predicted and prepared for	Equipment agreements set up in advance in case needed for fire suppression (1. Kobyashi Trucking - Hanalei; 2. Lance Fu - Tanaguchi Construction - Kilauea (water truck); 3. Kaiwa Construction - Kilauea (water truck); 4. Rick Hearst - Hearst Construction (N Shore)
Additional training	Funding/Grants/Bring Instructors
Increase firefighter manpower	Funding by partnership/Volunteer FD Personnel (training, educational, county cover liability)
Equipment needed; PPEs; Training - lessons learned	Facilitate passing of equipment between Army & Volunteer Fire Departments
Payment for helicopter time, fire fighting costs	DNA
Equipment needed; PPEs; Training - lessons learned	Develop & pursue a Volunteer Fire Dept. - lessons learned to help fill the gap
Multiple fires in Anahola	CERT training - DHHL Anahola Board Members
Fire suppression Capacity - Funding issue - labor intensive	Small dozer purchase; Agreements set up ahead of time for equipment use (already done)

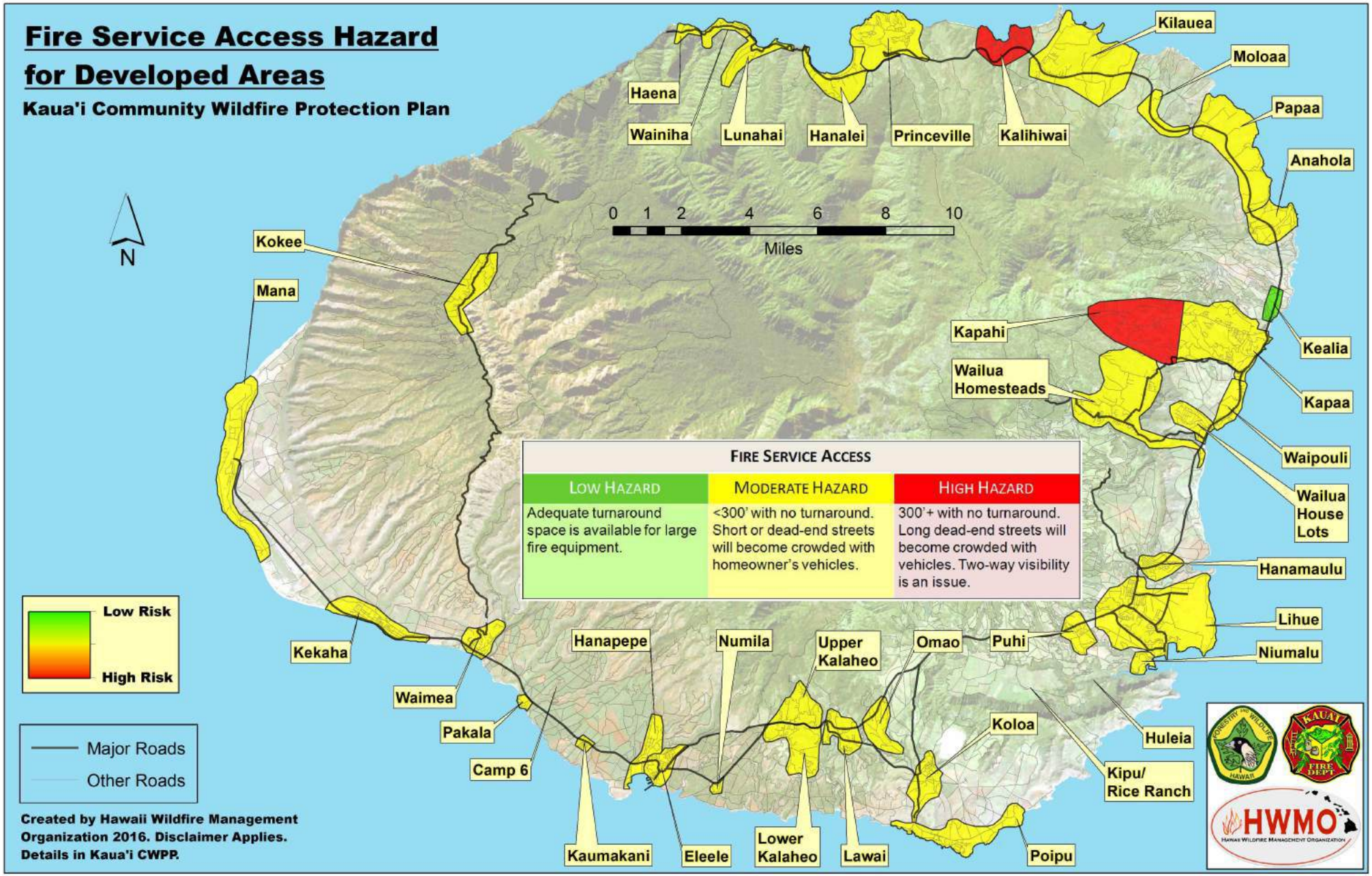
Appendix B
Kaua'i Community Wildfire Protection Plan Update
Wildfire Hazard Assessment Maps for Developed Areas

Hazard Category (Maps provided in CWPP main document)	Individual Hazard Maps (Maps provided below in the following order)
Subdivision Hazard Total	• Fire Service Access • Home Setbacks • Ingress/Egress • Private Landowner Firewise Landscaping & Defensible Space • Proximity of Subdivision to Wildland Areas • All Season Road Condition • Road Maintenance • Road Width • Street Signs • Structure Density • Unmanaged, Untended, Undeveloped Lands
Vegetation Hazard Total	• Defensible Space: Fuels Reduction Around Homes & Structures • Fuel Loading • Fuel Structure & Arrangement • Proximity of Flammable Fuels Around Subdivision • Vegetation Within 300' Of Homes
Building Hazard Total	• Siding/Soffits • Roofing Assembly • Structural Ignitability • Under Skirting Around Decks, Lanais, Post & Pier Structures • Utilities Placement; Gas & Electric
Fire Environment Hazard Total	• Average Rainfall • Prevailing Wind Speeds & Direction • Slope • Topographic Features That Adversely Affect Wildland Fire Behavior • Seasonal or Periodic High Hazard Conditions • Ignition Risk
Fire Protection Hazard Total (high capacity and capability= low hazard)	• Response Time • Community Planning Practices & Ordinances • Community Fire Safe Efforts & Programs Already In Place • Fire Department Structural Training & Expertise • Local Emergency Operations Group or Citizen Group • Proximity to Fire Stations • Water Source Availability • Wildland Firefighting Capacity of Initial Response Agency • Interagency Cooperation

SUBDIVISION HAZARD FOR DEVELOPED AREAS

Fire Service Access Hazard for Developed Areas

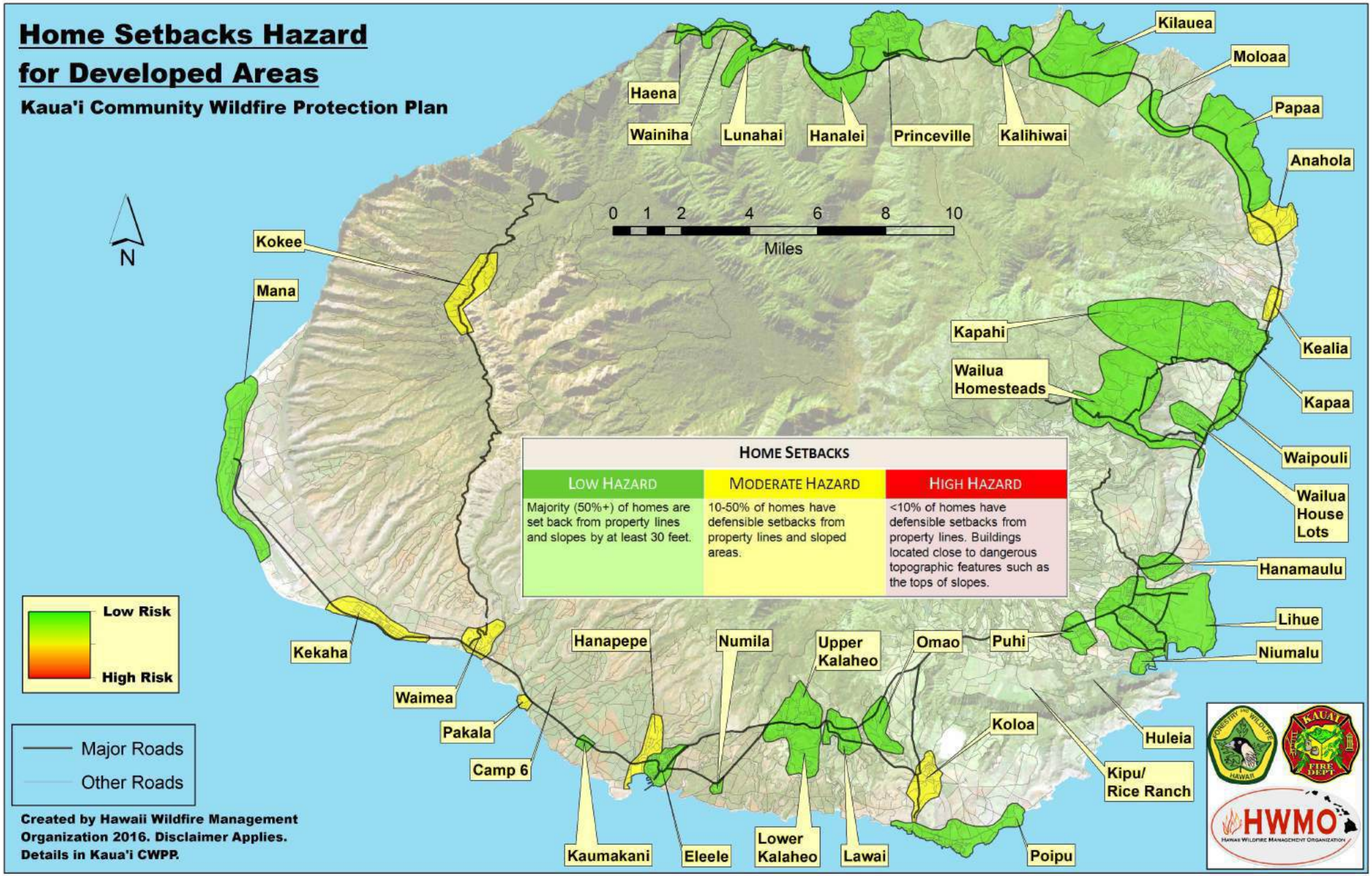
Kaua'i Community Wildfire Protection Plan



Fire Service Access		
Low Hazard	Moderate Hazard	High Hazard
Adequate turnaround space is available for large fire equipment.	<300' with no turnaround. Short or dead-end streets will become crowded with homeowner's vehicles.	300'+ with no turnaround. Long dead-end streets will become crowded with vehicles. Two-way visibility is an issue.

Home Setbacks Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan

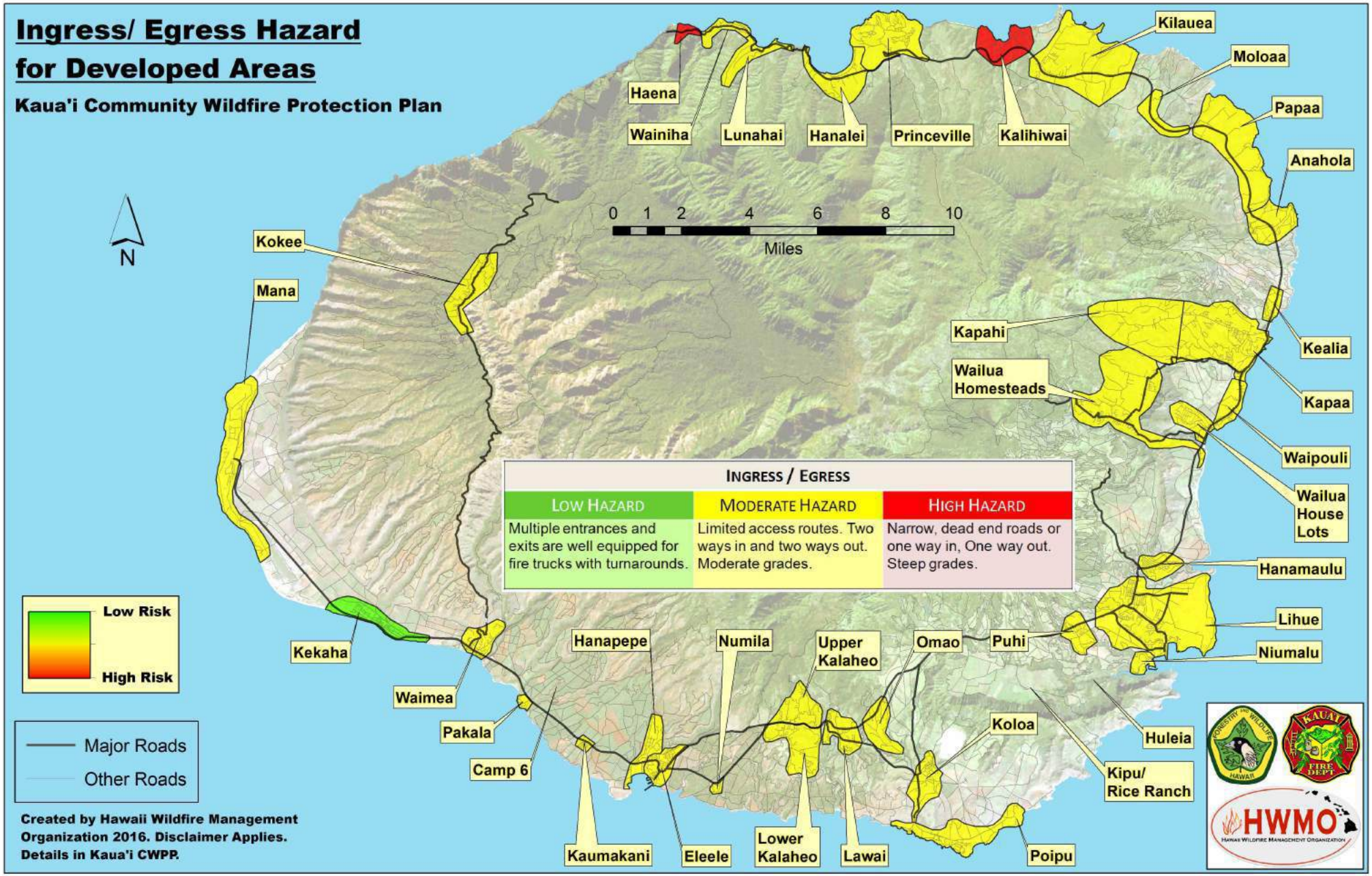


Home Setbacks

Low Hazard	Moderate Hazard	High Hazard
Majority (50%+) of homes are set back from property lines and slopes by at least 30 feet.	10-50% of homes have defensible setbacks from property lines and sloped areas.	<10% of homes have defensible setbacks from property lines. Buildings located close to dangerous topographic features such as the tops of slopes.

Ingress/ Egress Hazard for Developed Areas

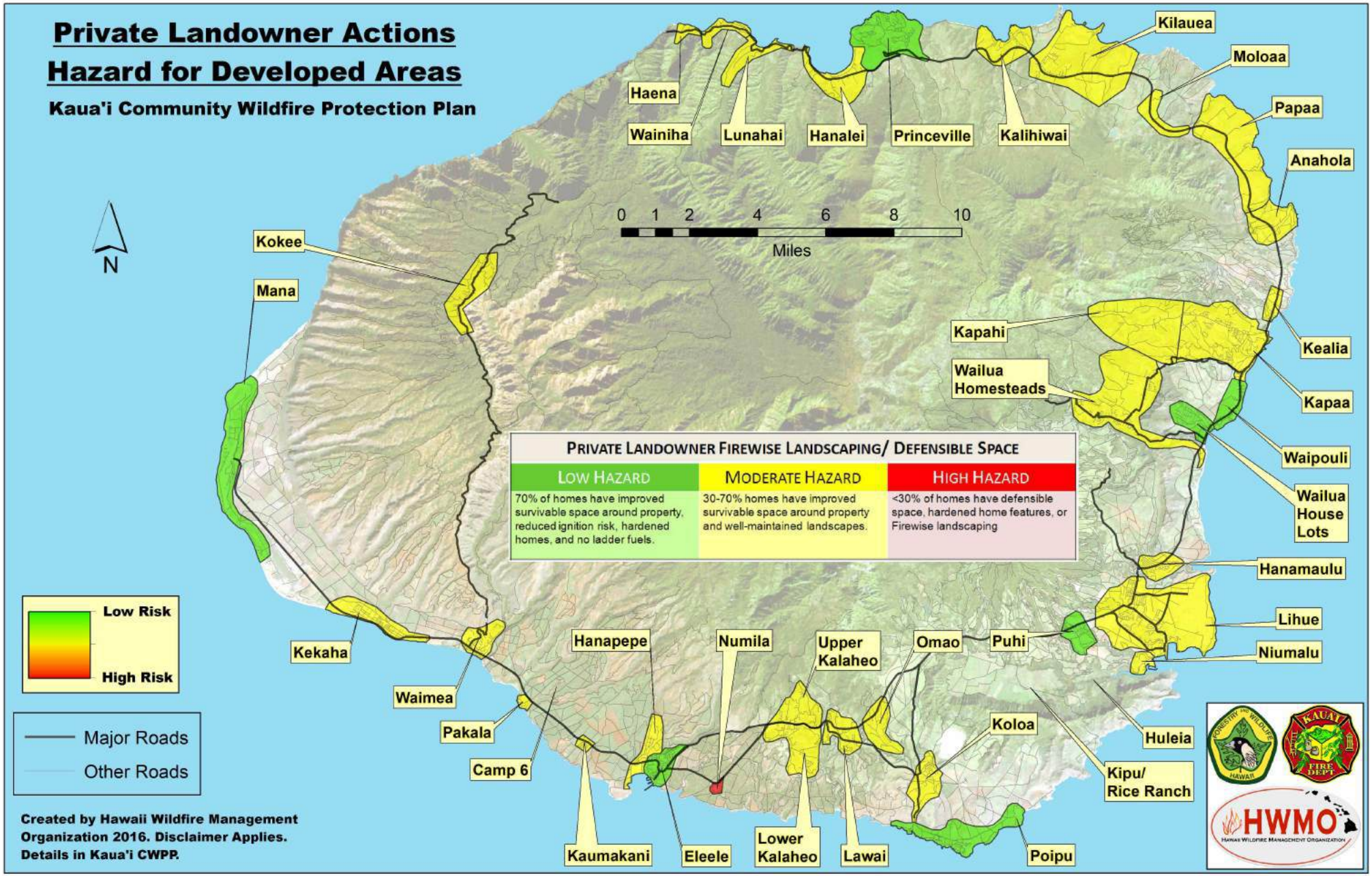
Kaua'i Community Wildfire Protection Plan



INGRESS / EGRESS		
LOW HAZARD	MODERATE HAZARD	HIGH HAZARD
Multiple entrances and exits are well equipped for fire trucks with turnarounds.	Limited access routes. Two ways in and two ways out. Moderate grades.	Narrow, dead end roads or one way in, One way out. Steep grades.

Private Landowner Actions
Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan



Private Landowner Firewise Landscaping/ Defensible Space

Low Hazard	Moderate Hazard	High Hazard
70% of homes have improved survivable space around property, reduced ignition risk, hardened homes, and no ladder fuels.	30-70% homes have improved survivable space around property and well-maintained landscapes.	<30% of homes have defensible space, hardened home features, or Firewise landscaping

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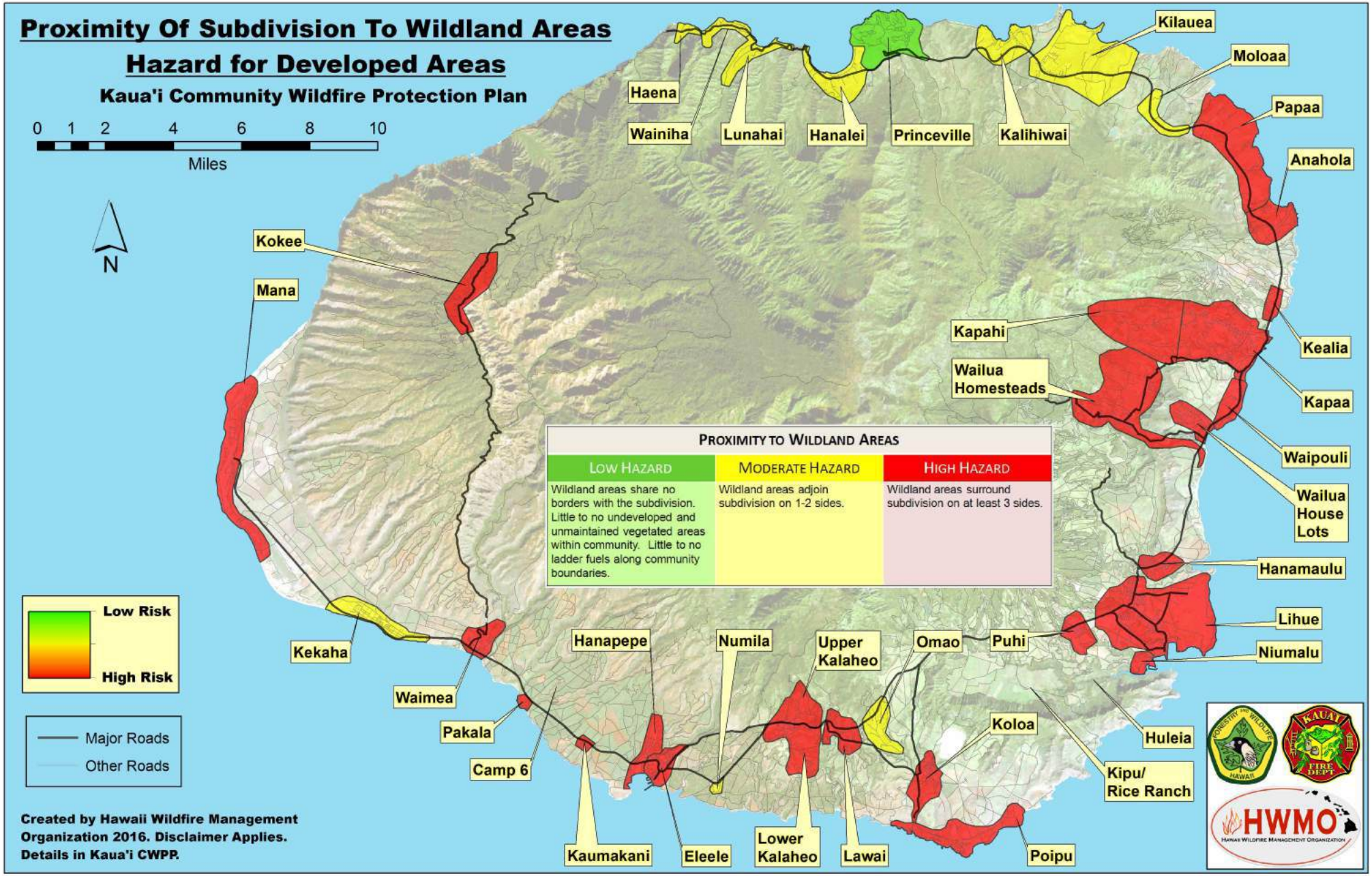
Proximity Of Subdivision To Wildland Areas

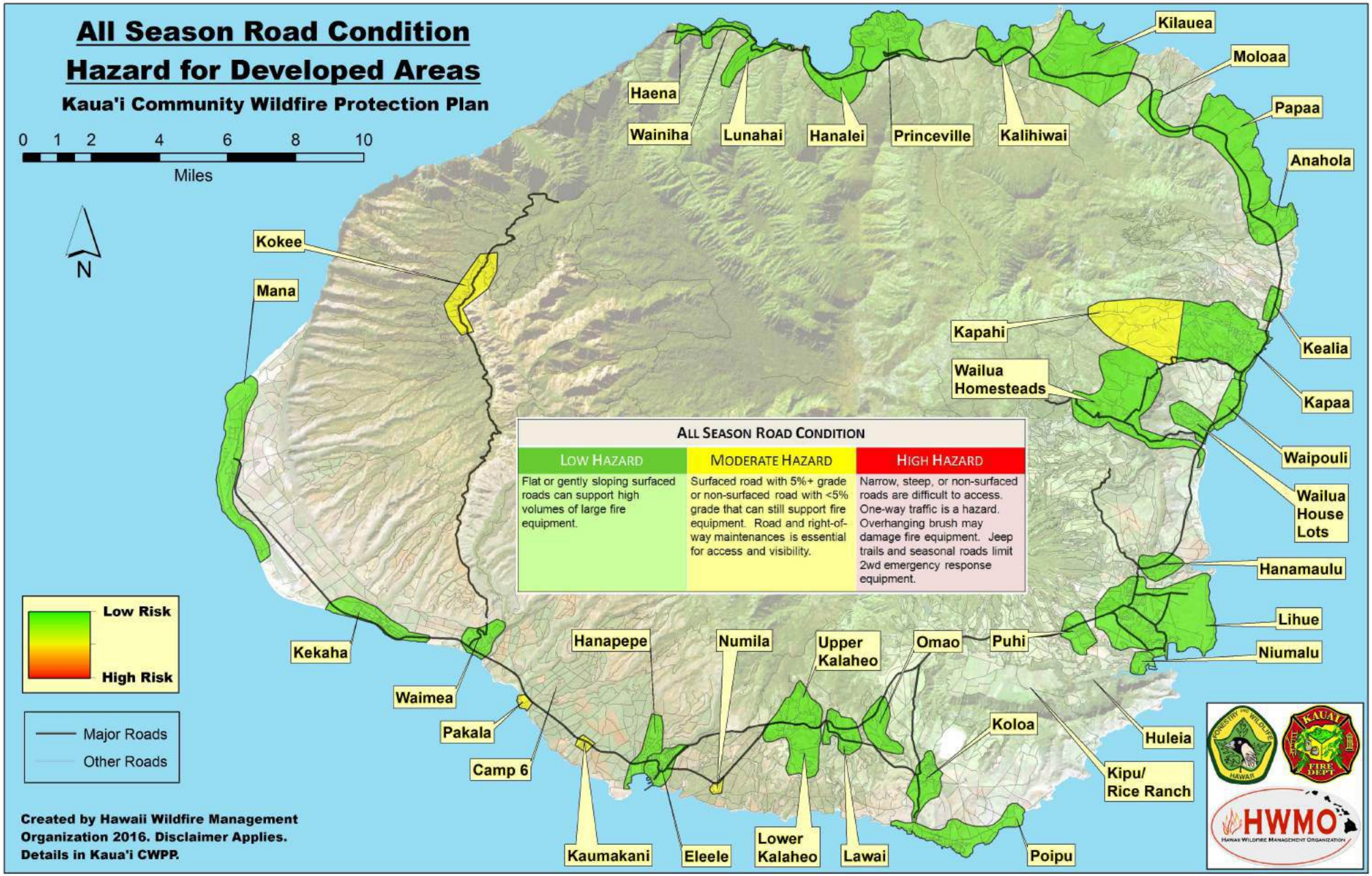
Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan



Proximity to Wildland Areas

Low Hazard	Moderate Hazard	High Hazard
Wildland areas share no borders with the subdivision. Little to no undeveloped and unmaintained vegetated areas within community. Little to no ladder fuels along community boundaries.	Wildland areas adjoin subdivision on 1-2 sides.	Wildland areas surround subdivision on at least 3 sides.


All Season Road Condition
Hazard for Developed Areas
Kaua'i Community Wildfire Protection Plan
0 1 2 4 6 8 10
Miles
N
Haena
Wainiha
Lunahai
Hanalei
Princeville
Kalihiwai
Kilauea
Moloaa
Papaa
Anahola
Kokee
Mana
Kapahi
Wailua Homesteads
Kealia
Kapaa
Waipouli
Wailua House Lots
Hanamaulu
Lihue
Niumalu
Huleia
Kipu/ Rice Ranch
Koloa
Poipu
Lawai
Lower Kalaheo
Upper Kalaheo
Omao
Puhi
Numila
Hanapepe
Kaumakani
Eleele
Camp 6
Pakala
Waimea
Kekaha
ALL SEASON ROAD CONDITION
LOW HAZARD
Flat or gently sloping surfaced roads can support high volumes of large fire equipment.
MODERATE HAZARD
Surfaced road with 5%+ grade or non-surfaced road with <5% grade that can still support fire equipment. Road and right-of-way maintenances is essential for access and visibility.
HIGH HAZARD
Narrow, steep, or non-surfaced roads are difficult to access. One-way traffic is a hazard. Overhanging brush may damage fire equipment. Jeep trails and seasonal roads limit 2wd emergency response equipment.
Low Risk
High Risk
Major Roads
Other Roads
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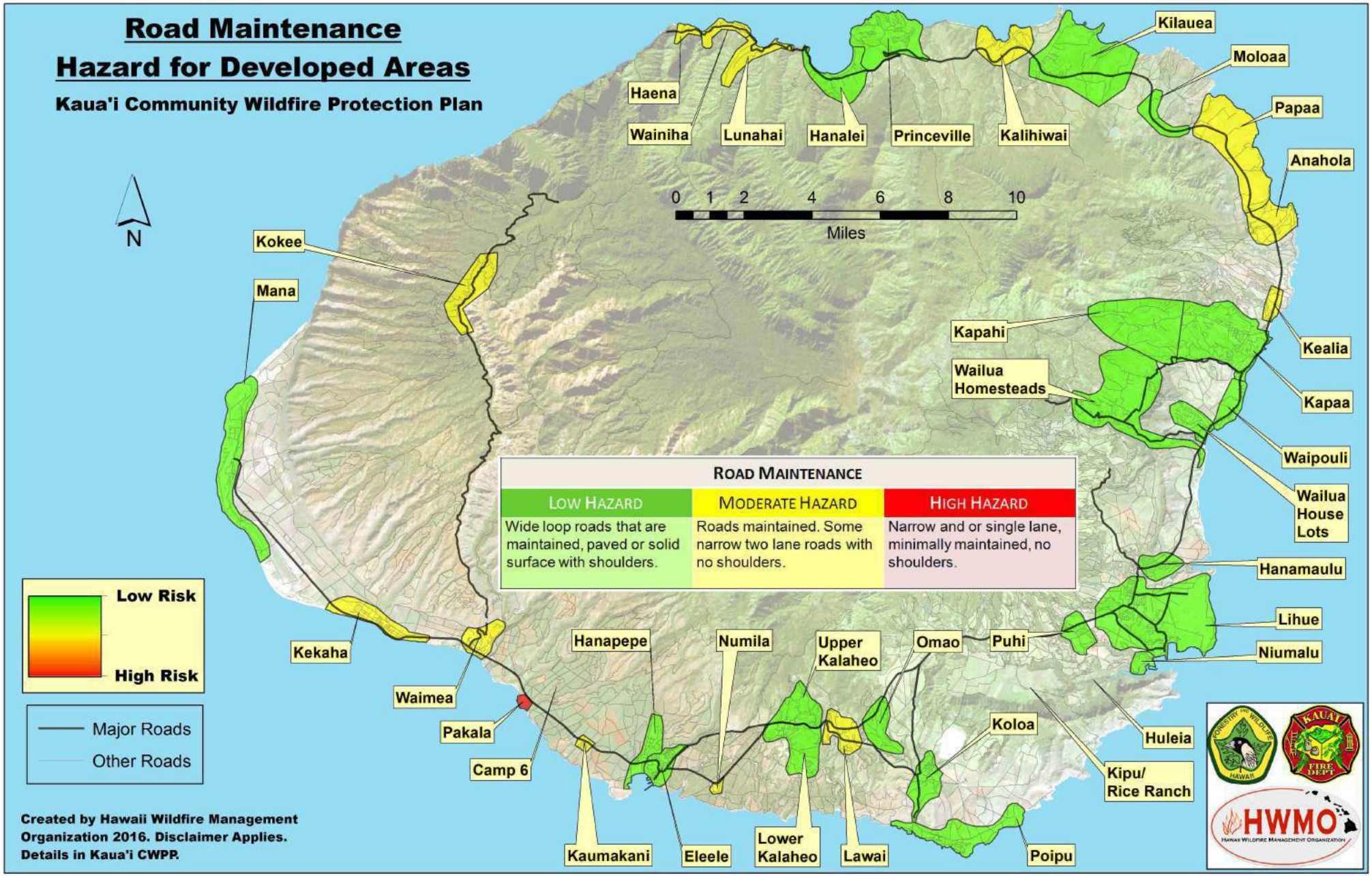
Details in Kaua'i CWPP.
HWMO

Road Maintenance
Hazard for Developed Areas

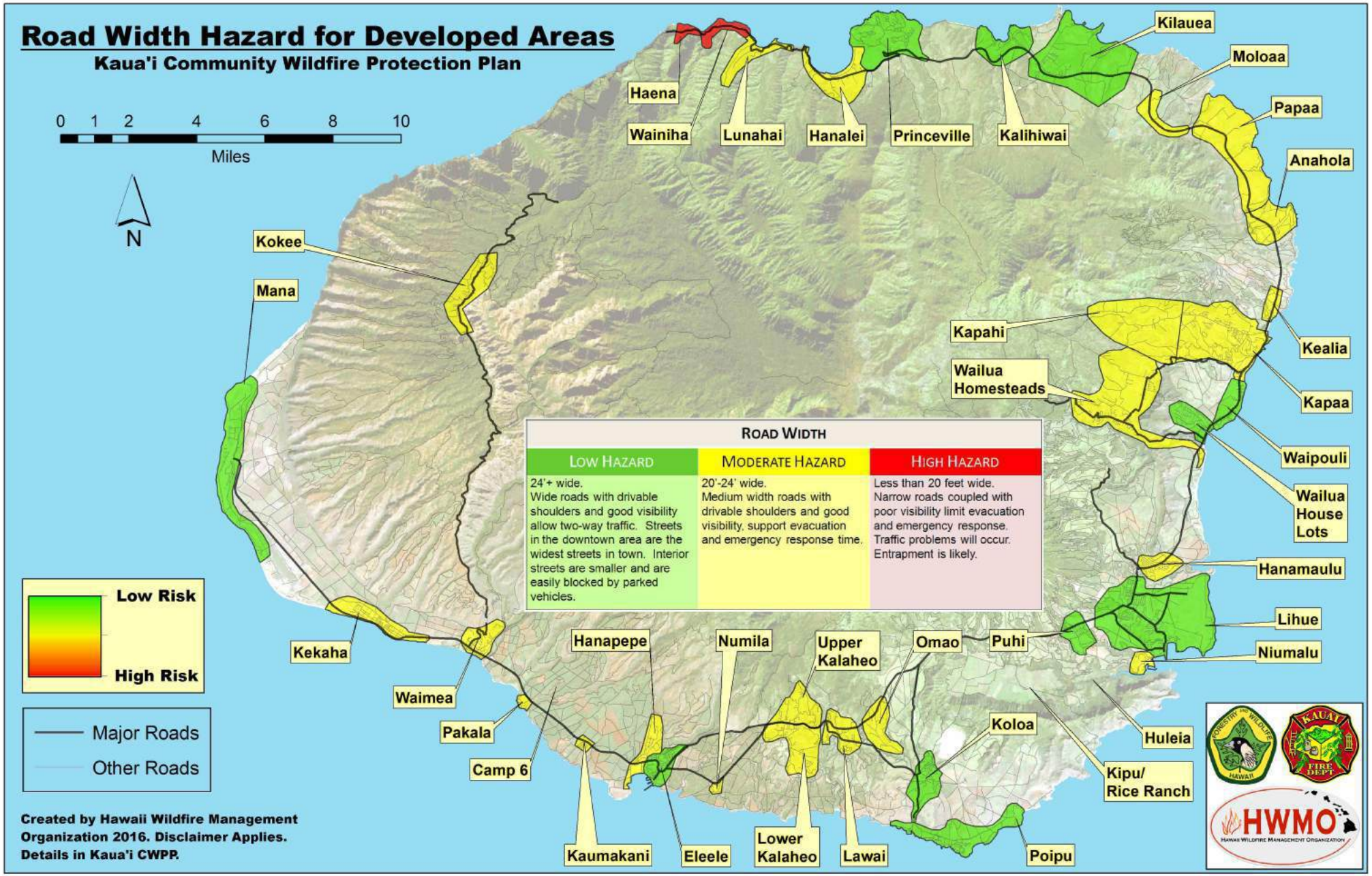
Kaua'i Community Wildfire Protection Plan



Road Maintenance		
Low Hazard	Moderate Hazard	High Hazard
Wide loop roads that are maintained, paved or solid surface with shoulders.	Roads maintained. Some narrow two lane roads with no shoulders.	Narrow and or single lane, minimally maintained, no shoulders.

Road Width Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan

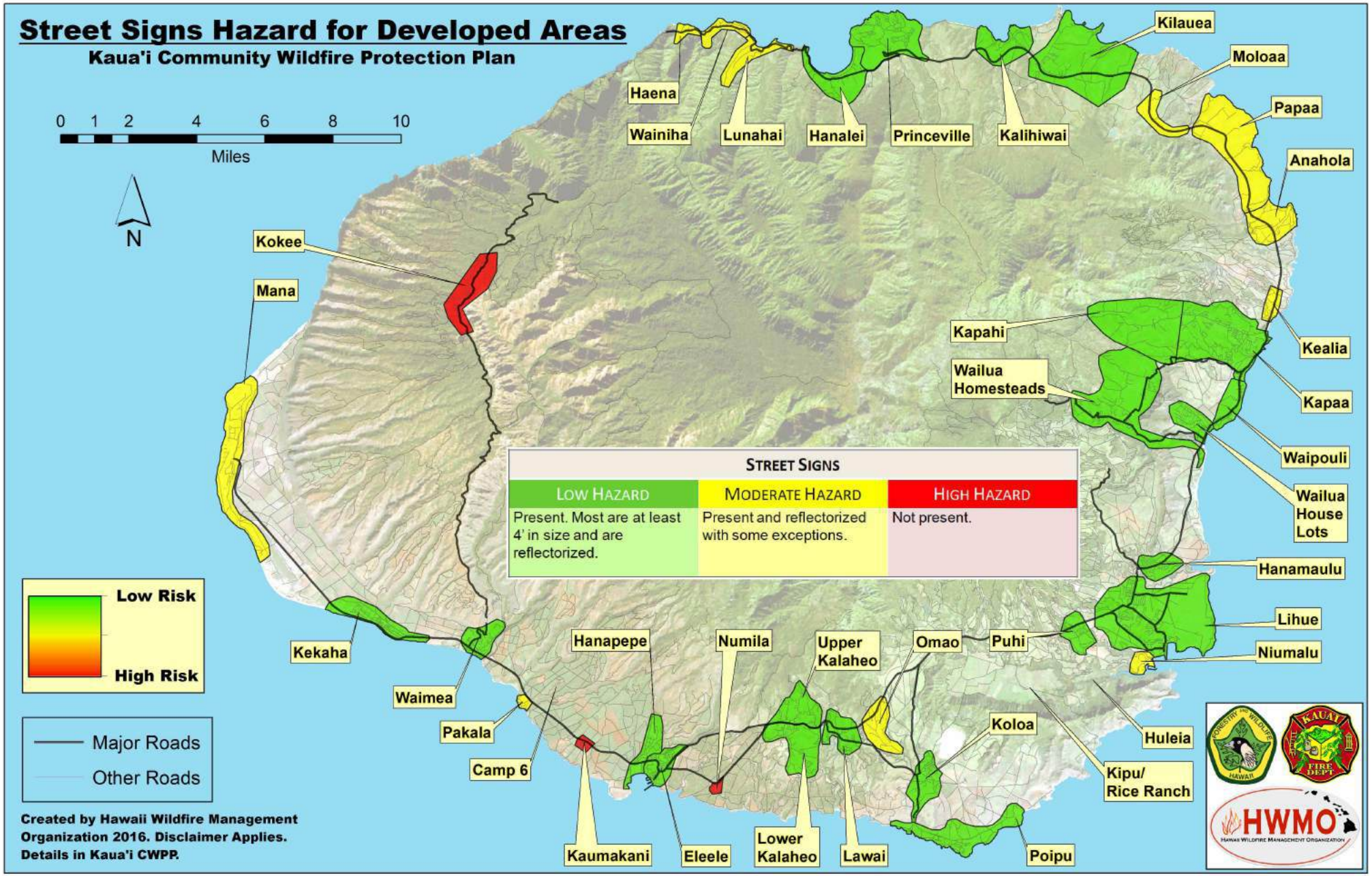


Road Width

Low Hazard	Moderate Hazard	High Hazard
24'+ wide. Wide roads with drivable shoulders and good visibility allow two-way traffic. Streets in the downtown area are the widest streets in town. Interior streets are smaller and are easily blocked by parked vehicles.	20'-24' wide. Medium width roads with drivable shoulders and good visibility, support evacuation and emergency response time.	Less than 20 feet wide. Narrow roads coupled with poor visibility limit evacuation and emergency response. Traffic problems will occur. Entrapment is likely.

Street Signs Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan



STREET SIGNS		
LOW HAZARD	MODERATE HAZARD	HIGH HAZARD
Present. Most are at least 4' in size and are reflectorized.	Present and reflectorized with some exceptions.	Not present.

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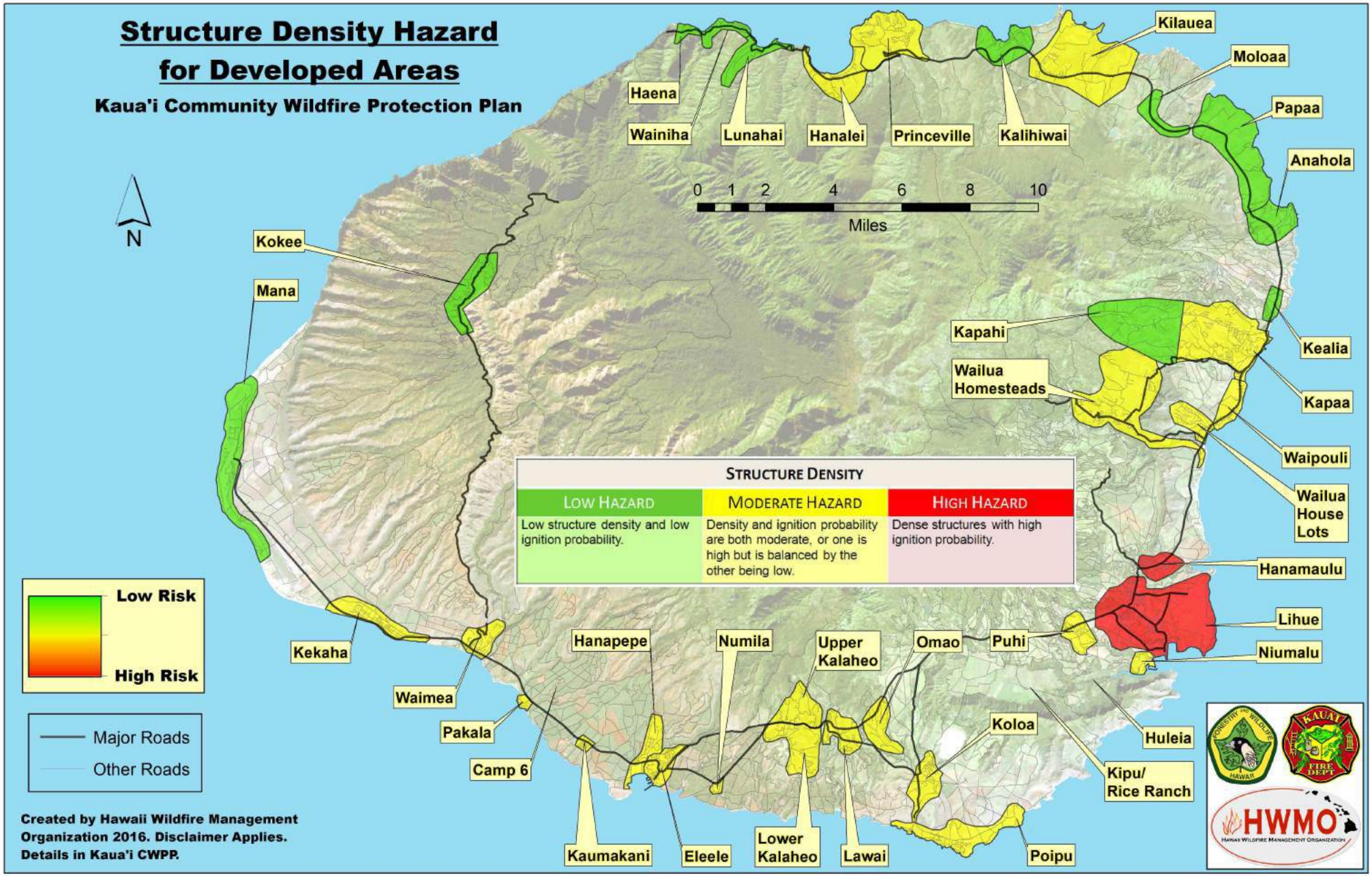
Structure Density Hazard for Developed Areas
Kaua'i Community Wildfire Protection Plan
N
0 1 2 4 6 8 10
Miles
Haena
Wainiha
Lunahai
Hanalei
Princeville
Kalihiwai
Kilauea
Moloaa
Papaa
Anahola
Kokee
Mana
Kapahi
Wailua Homesteads
Kealia
Kapaa
Waipouli
Wailua House Lots
Hanamaulu
Lihue
Niumalu
Huleia
Kipu/ Rice Ranch
Koloa
Omao
Puhi
Upper Kalaheo
Numila
Hanapepe
Kekaha
Waimea
Pakala
Camp 6
Kaumakani
Eleele
Lower Kalaheo
Lawai
Poipu
STRUCTURE DENSITY
LOW HAZARD
Low structure density and low ignition probability.
MODERATE HAZARD
Density and ignition probability are both moderate, or one is high but is balanced by the other being low.
HIGH HAZARD
Dense structures with high ignition probability.
Low Risk
High Risk
Major Roads
Other Roads
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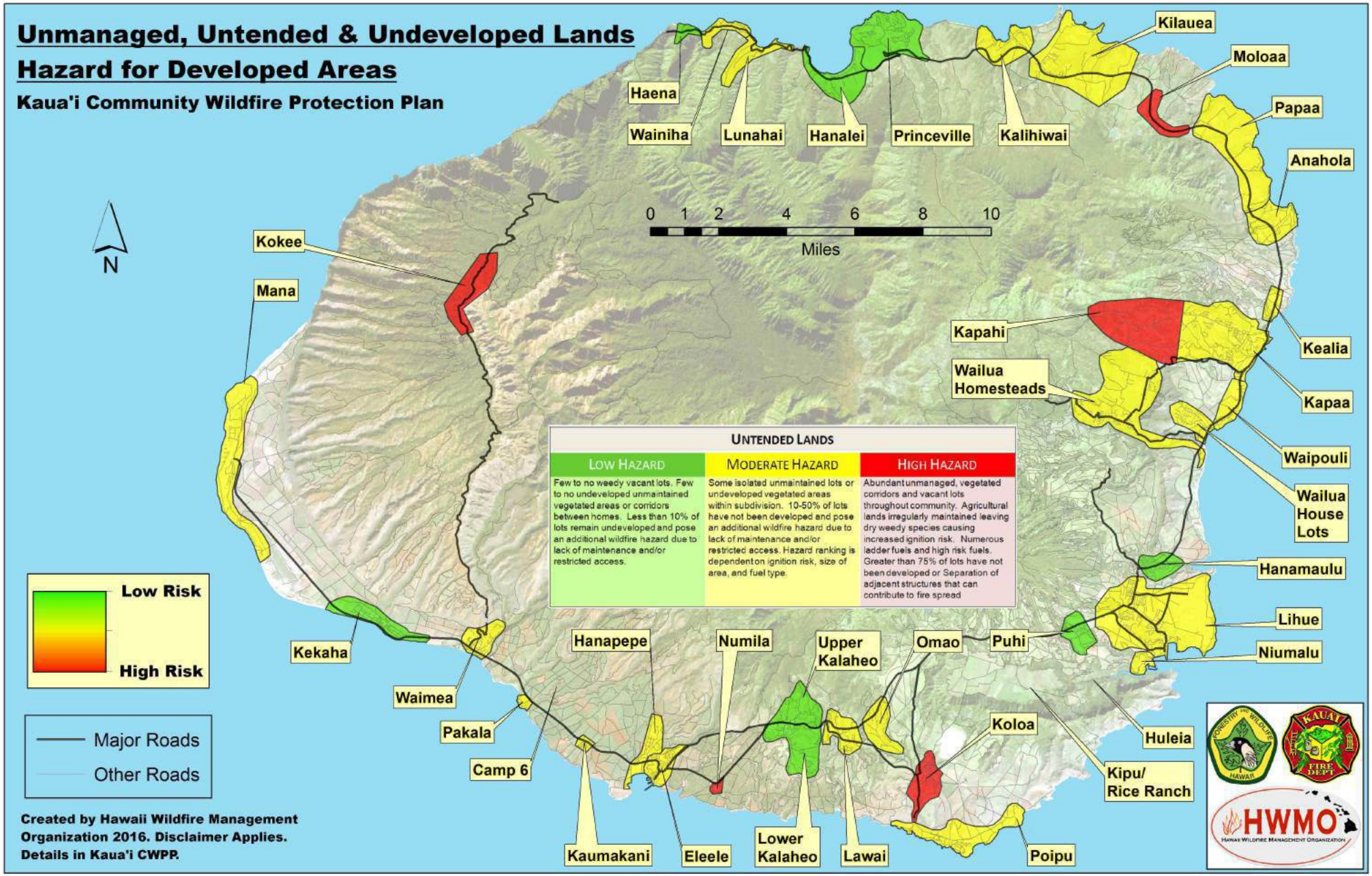
Details in Kaua'i CWPP.
HWMO

Unmanaged, Untended & Undeveloped Lands Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan



Untended Lands

Low Hazard	Moderate Hazard	High Hazard
Few to no weedy vacant lots. Few to no undeveloped unmaintained vegetated areas or corridors between homes. Less than 10% of lots remain undeveloped and pose an additional wildfire hazard due to lack of maintenance and/or restricted access.	Some isolated unmaintained lots or undeveloped vegetated areas within subdivision. 10-50% of lots have not been developed and pose an additional wildfire hazard due to lack of maintenance and/or restricted access. Hazard ranking is dependent on ignition risk, size of area, and fuel type.	Abundant unmanaged, vegetated corridors and vacant lots throughout community. Agricultural lands irregularly maintained leaving dry weedy species causing increased ignition risk. Numerous ladder fuels and high risk fuels. Greater than 75% of lots have not been developed or Separation of adjacent structures that can contribute to fire spread

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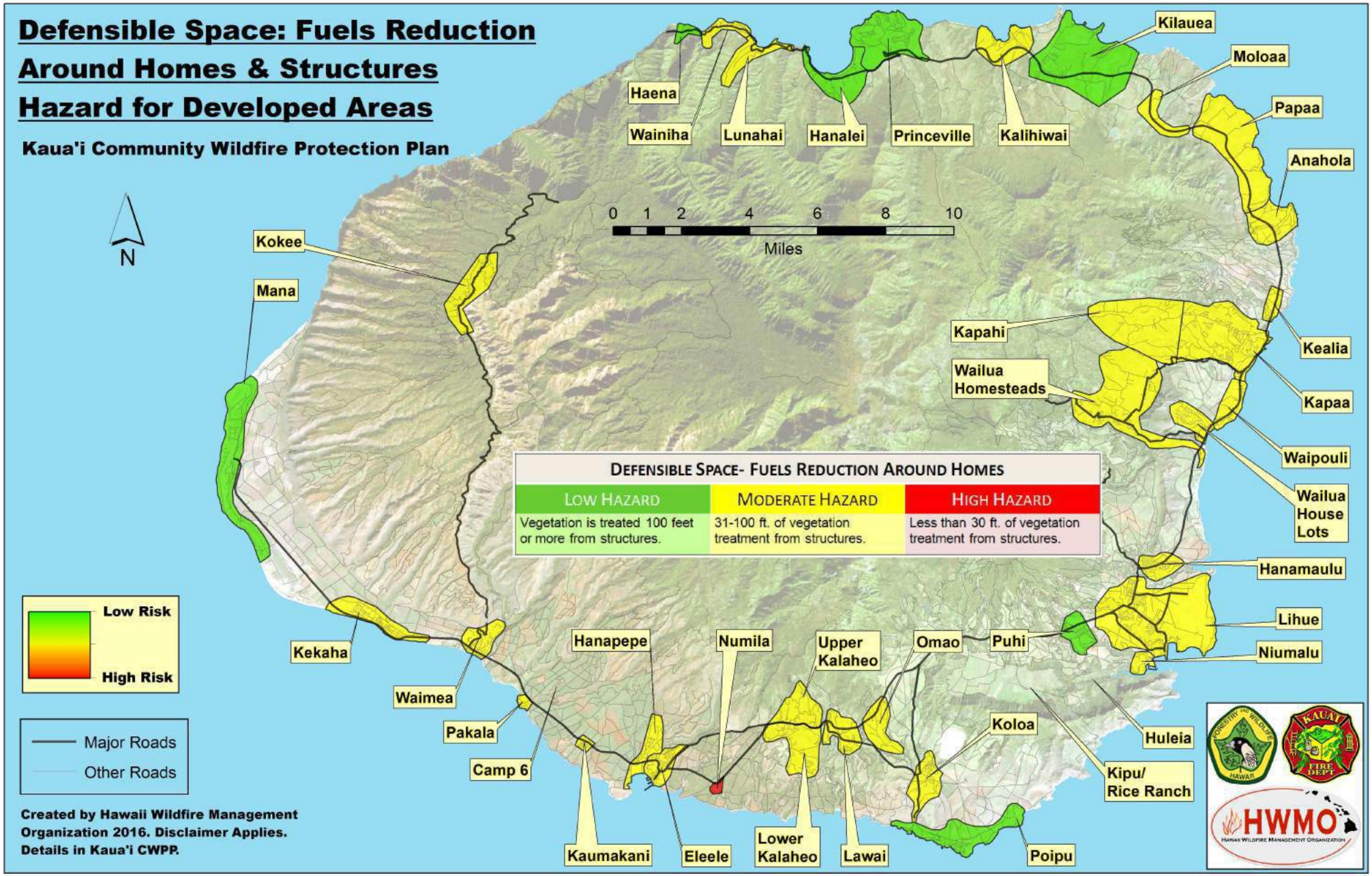
VEGETATION HAZARD FOR DEVELOPED AREAS

Defensible Space: Fuels Reduction Around Homes & Structures Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan



Defensible Space- Fuels Reduction Around Homes		
Low Hazard	Moderate Hazard	High Hazard
Vegetation is treated 100 feet or more from structures.	31-100 ft. of vegetation treatment from structures.	Less than 30 ft. of vegetation treatment from structures.

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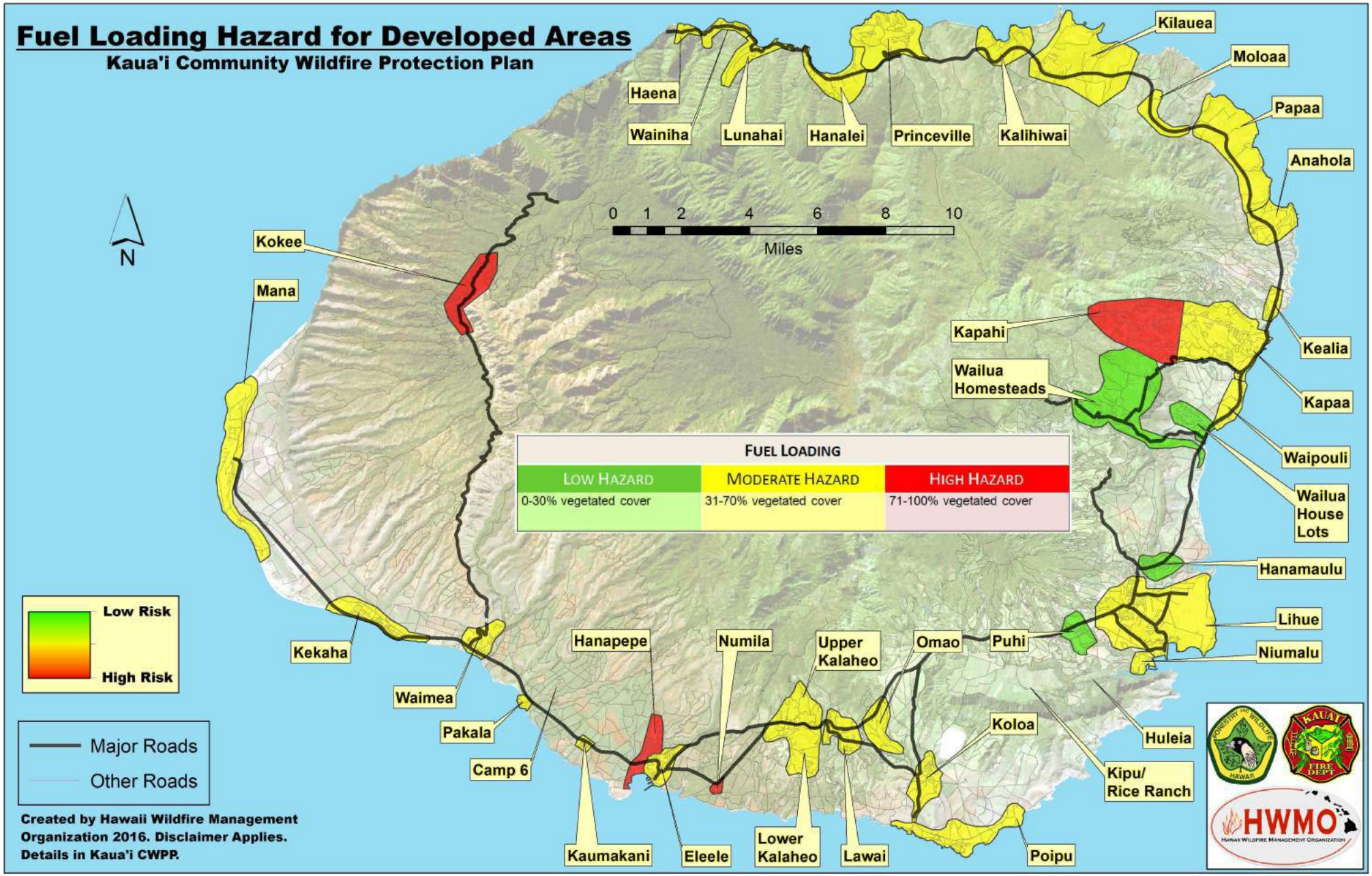
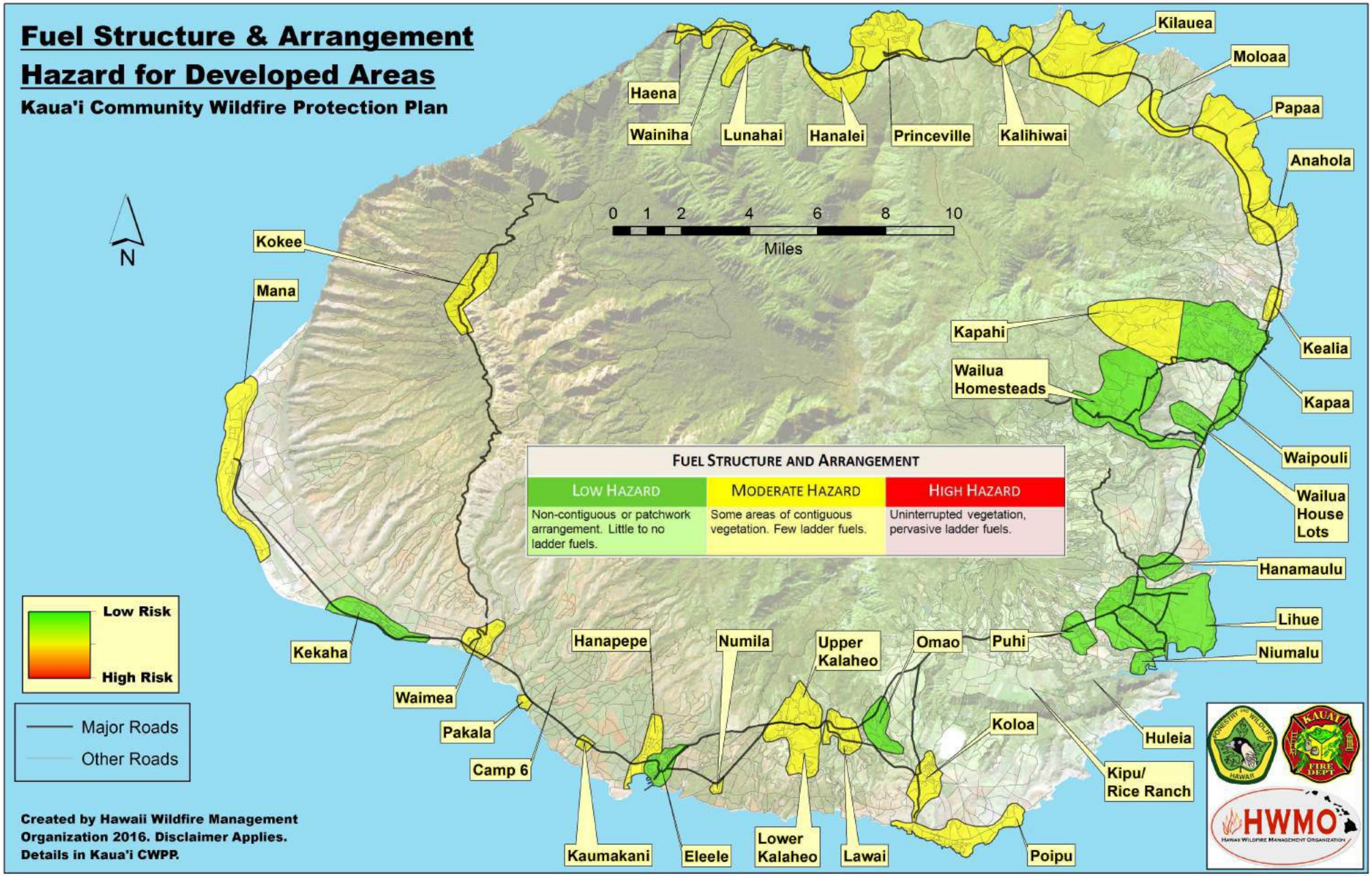
Fuel Loading Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan



Fuel Structure & Arrangement Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan



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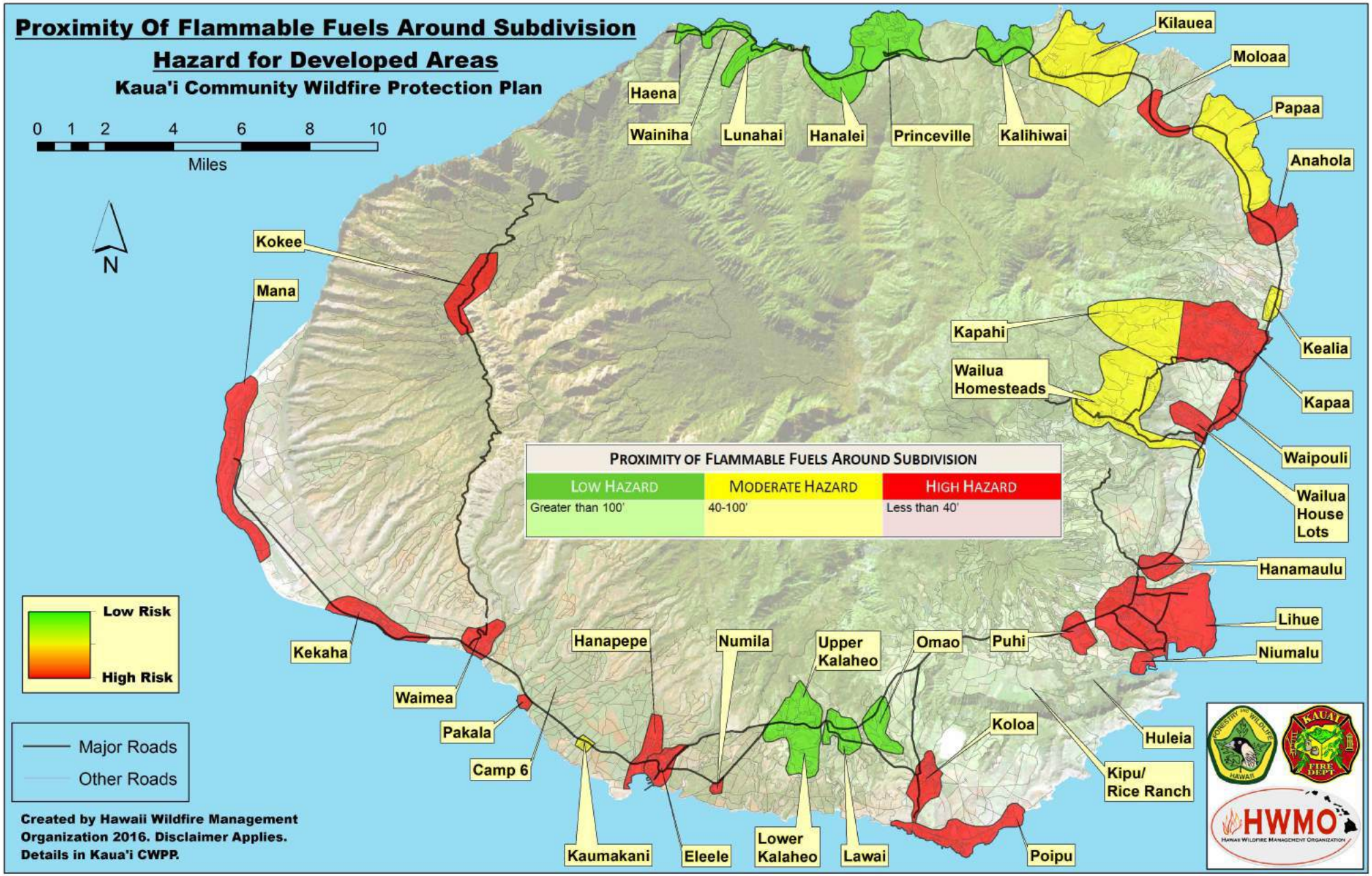
Proximity Of Flammable Fuels Around Subdivision
Hazard for Developed Areas
Kaua'i Community Wildfire Protection Plan
0 1 2 4 6 8 10
Miles
N
Haena
Wainiha
Lunahai
Hanalei
Princeville
Kalihiwai
Kilauea
Moloaa
Papaa
Anahola
Kokee
Mana
Kapahi
Wailua Homesteads
Kealia
Kapaa
Waipouli
Wailua House Lots
Hanamaulu
Lihue
Niumalu
Puhi
Omao
Upper Kalaheo
Hanapepe
Numila
Kekaha
Waimea
Pakala
Camp 6
Koloa
Huleia
Kipu/ Rice Ranch
Kaumakani
Eleele
Lower Kalaheo
Lawai
Poipu
PROXIMITY OF FLAMMABLE FUELS AROUND SUBDIVISION
LOW HAZARD
Greater than 100'
MODERATE HAZARD
40-100'
HIGH HAZARD
Less than 40'
Low Risk
High Risk
Major Roads
Other Roads
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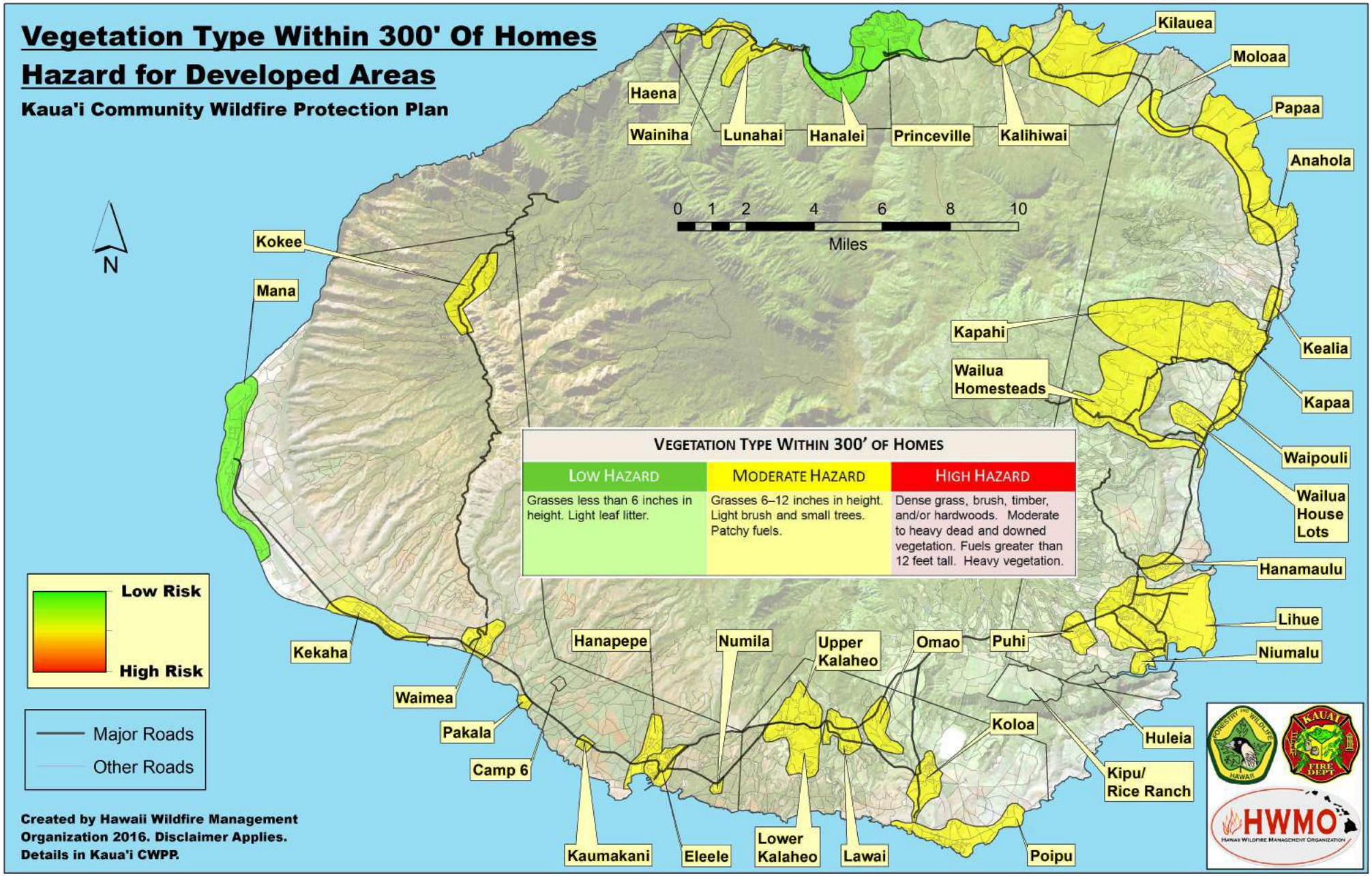
HWMO

Vegetation Type Within 300' Of Homes
Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan



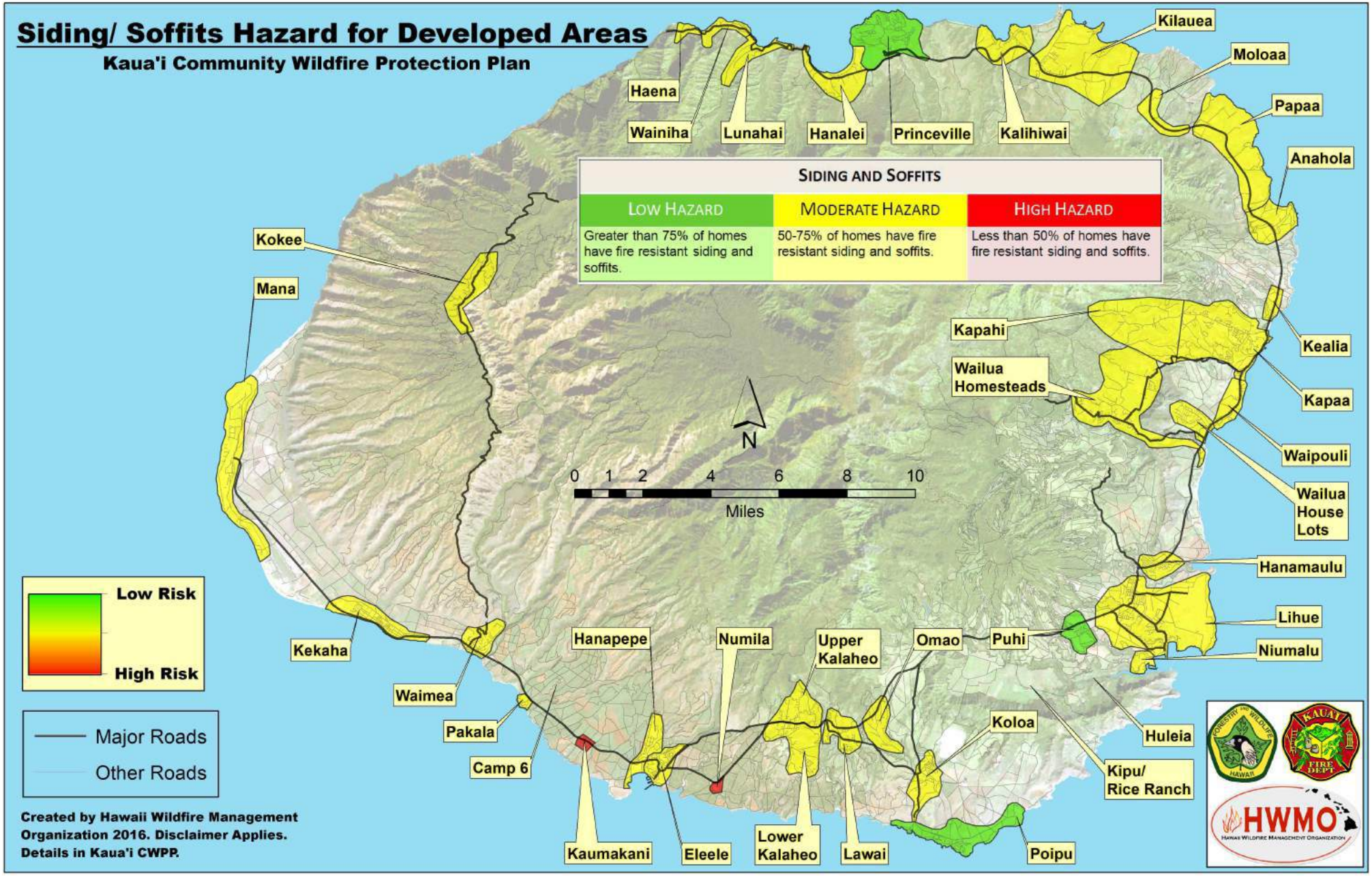
Vegetation Type Within 300' of Homes

Low Hazard	Moderate Hazard	High Hazard
Grasses less than 6 inches in height. Light leaf litter.	Grasses 6–12 inches in height. Light brush and small trees. Patchy fuels.	Dense grass, brush, timber, and/or hardwoods. Moderate to heavy dead and downed vegetation. Fuels greater than 12 feet tall. Heavy vegetation.

BUILDING HAZARD FOR DEVELOPED AREAS

Siding/ Soffits Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan



Siding and Soffits		
Low Hazard	Moderate Hazard	High Hazard
Greater than 75% of homes have fire resistant siding and soffits.	50-75% of homes have fire resistant siding and soffits.	Less than 50% of homes have fire resistant siding and soffits.

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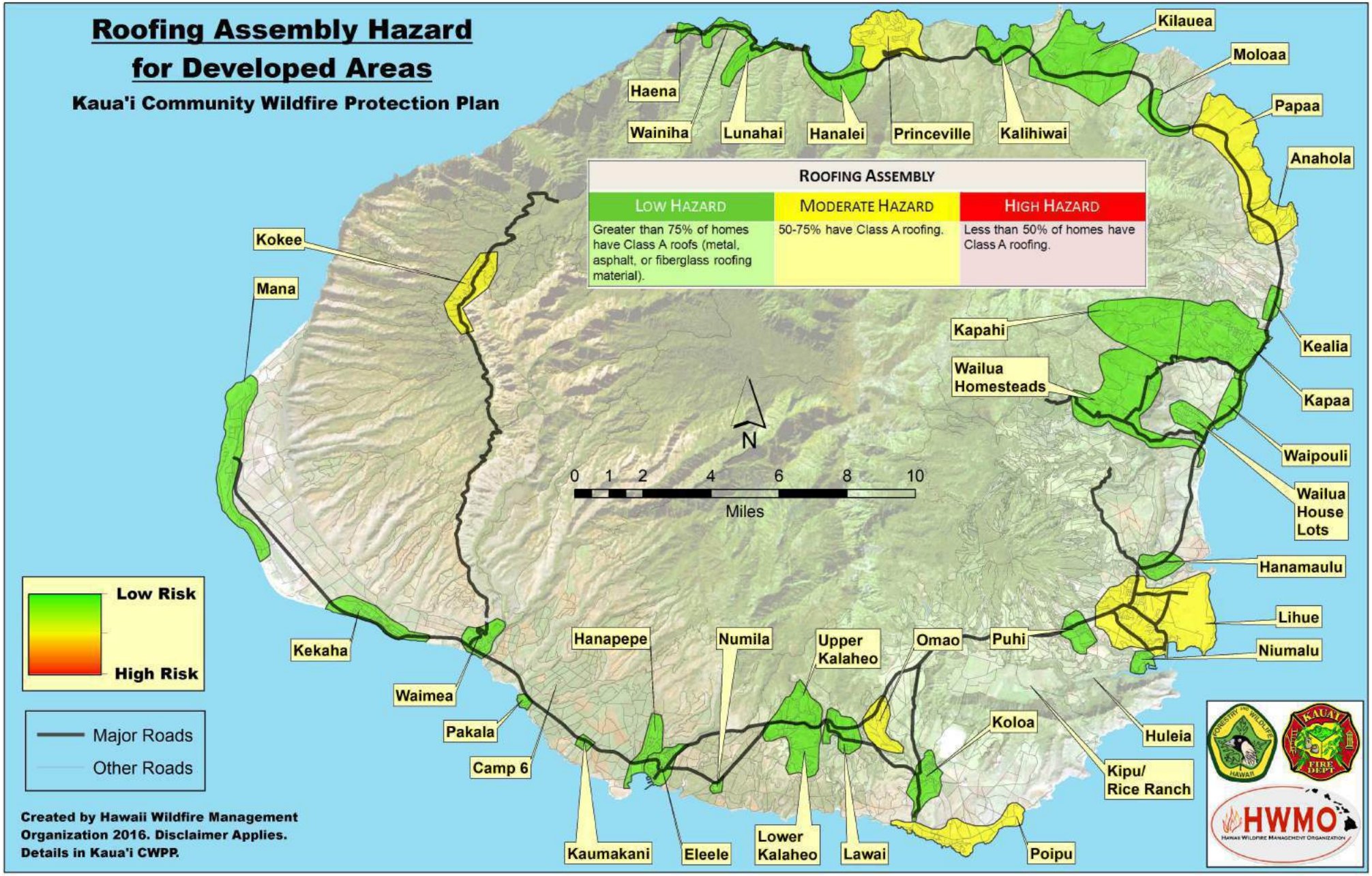
Roofing Assembly Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan



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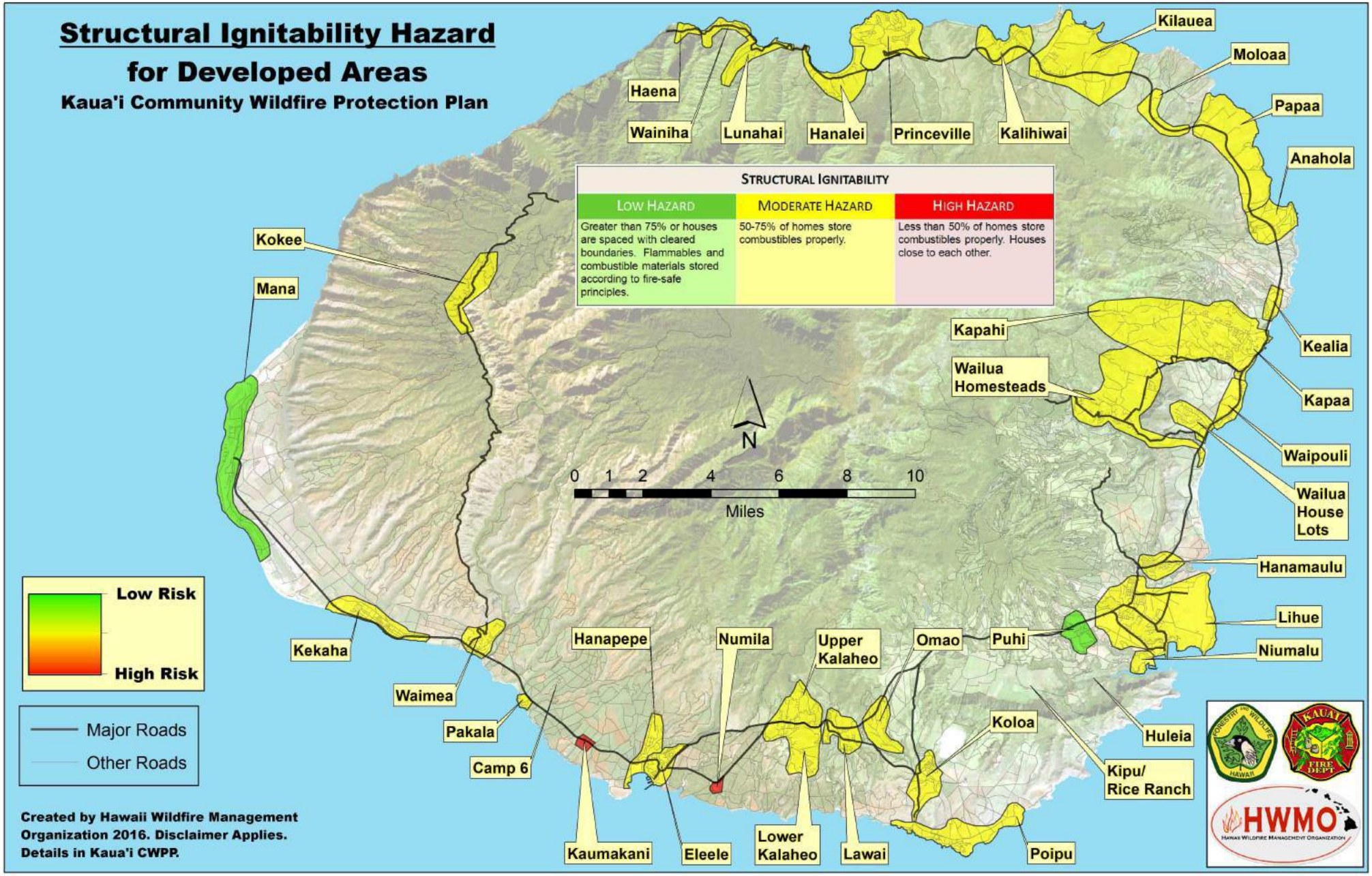
Structural Ignitability Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan



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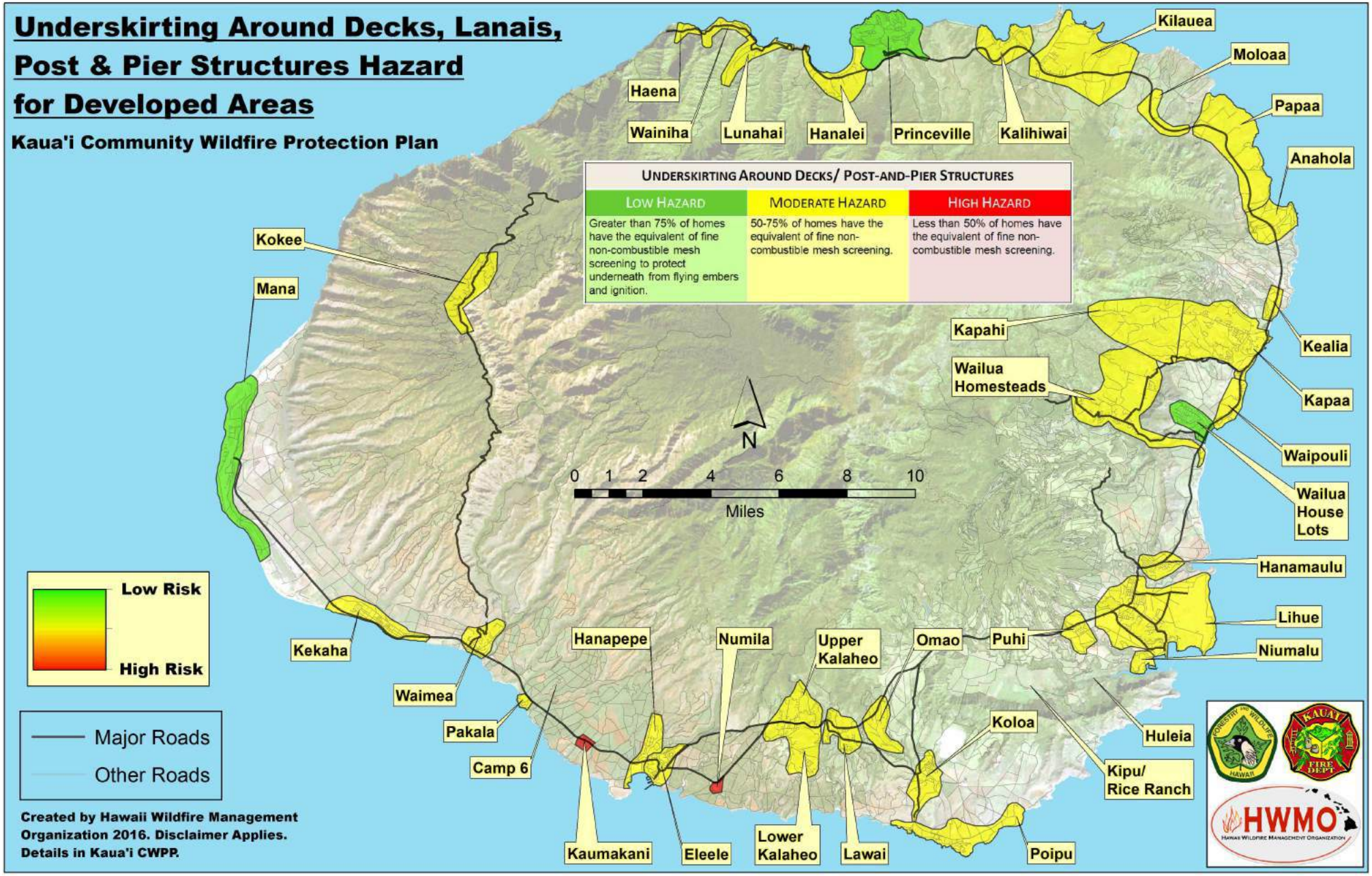
Underskirting Around Decks, Lanais, Post & Pier Structures Hazard for Developed Areas

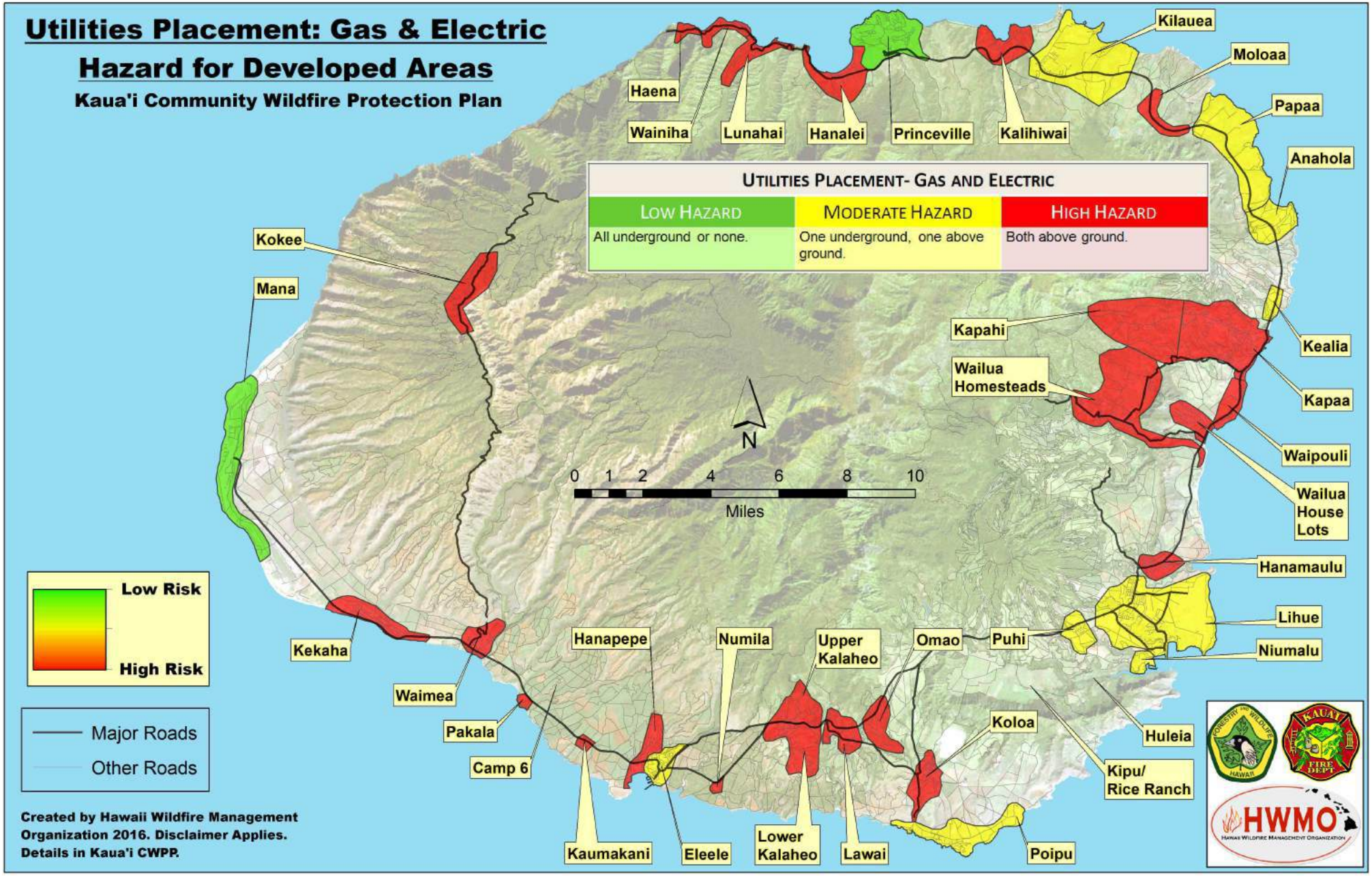
Kaua'i Community Wildfire Protection Plan



Underskirting Around Decks/ Post-and-Pier Structures		
Low Hazard	Moderate Hazard	High Hazard
Greater than 75% of homes have the equivalent of fine non-combustible mesh screening to protect underneath from flying embers and ignition.	50-75% of homes have the equivalent of fine non-combustible mesh screening.	Less than 50% of homes have the equivalent of fine non-combustible mesh screening.

Utilities Placement: Gas & Electric Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan

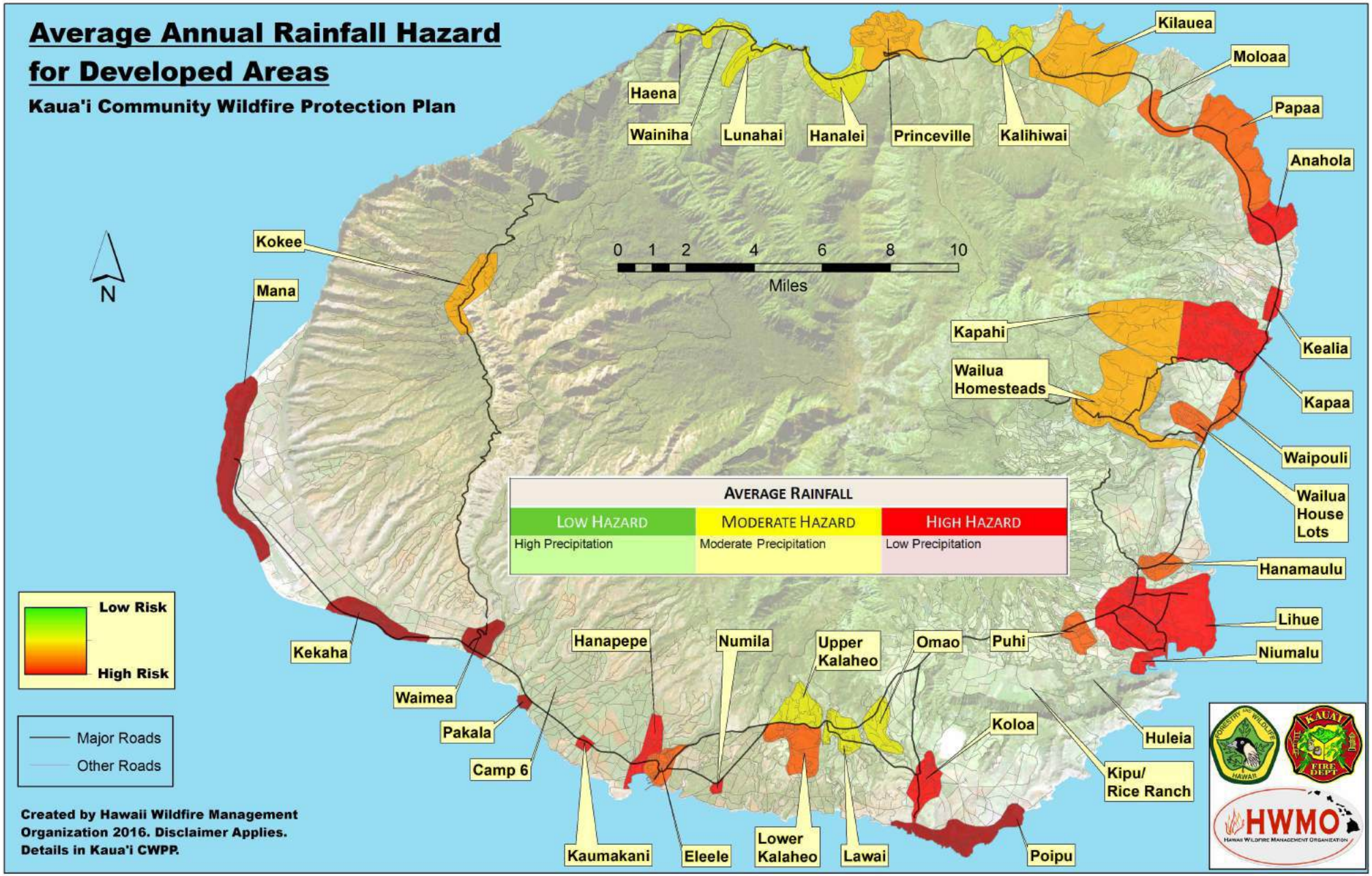


Utilities Placement- Gas and Electric		
Low Hazard	Moderate Hazard	High Hazard
All underground or none.	One underground, one above ground.	Both above ground.

FIRE ENVIRONMENT HAZARD FOR DEVELOPED AREAS

Average Annual Rainfall Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan



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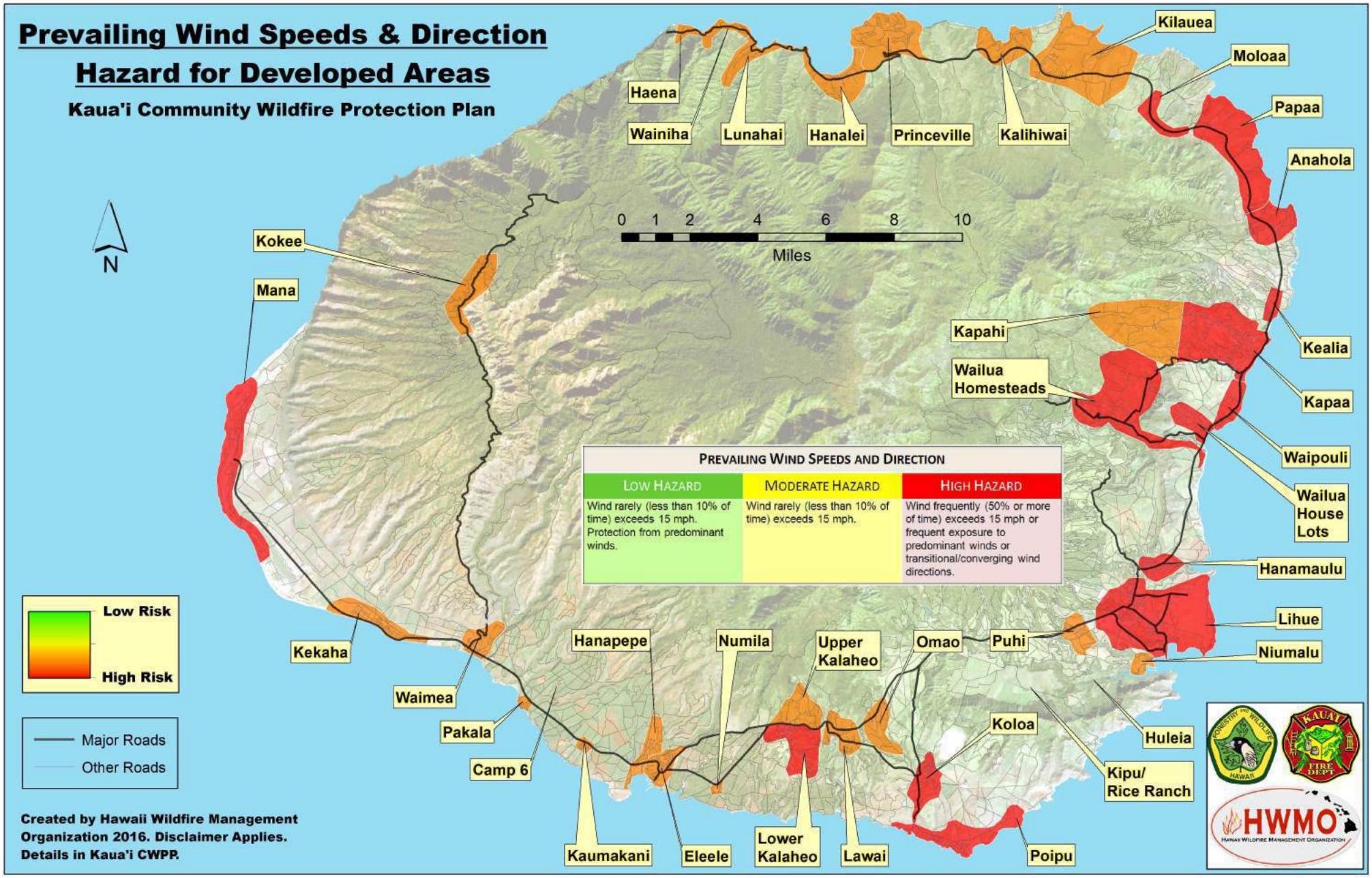
Prevailing Wind Speeds & Direction Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan

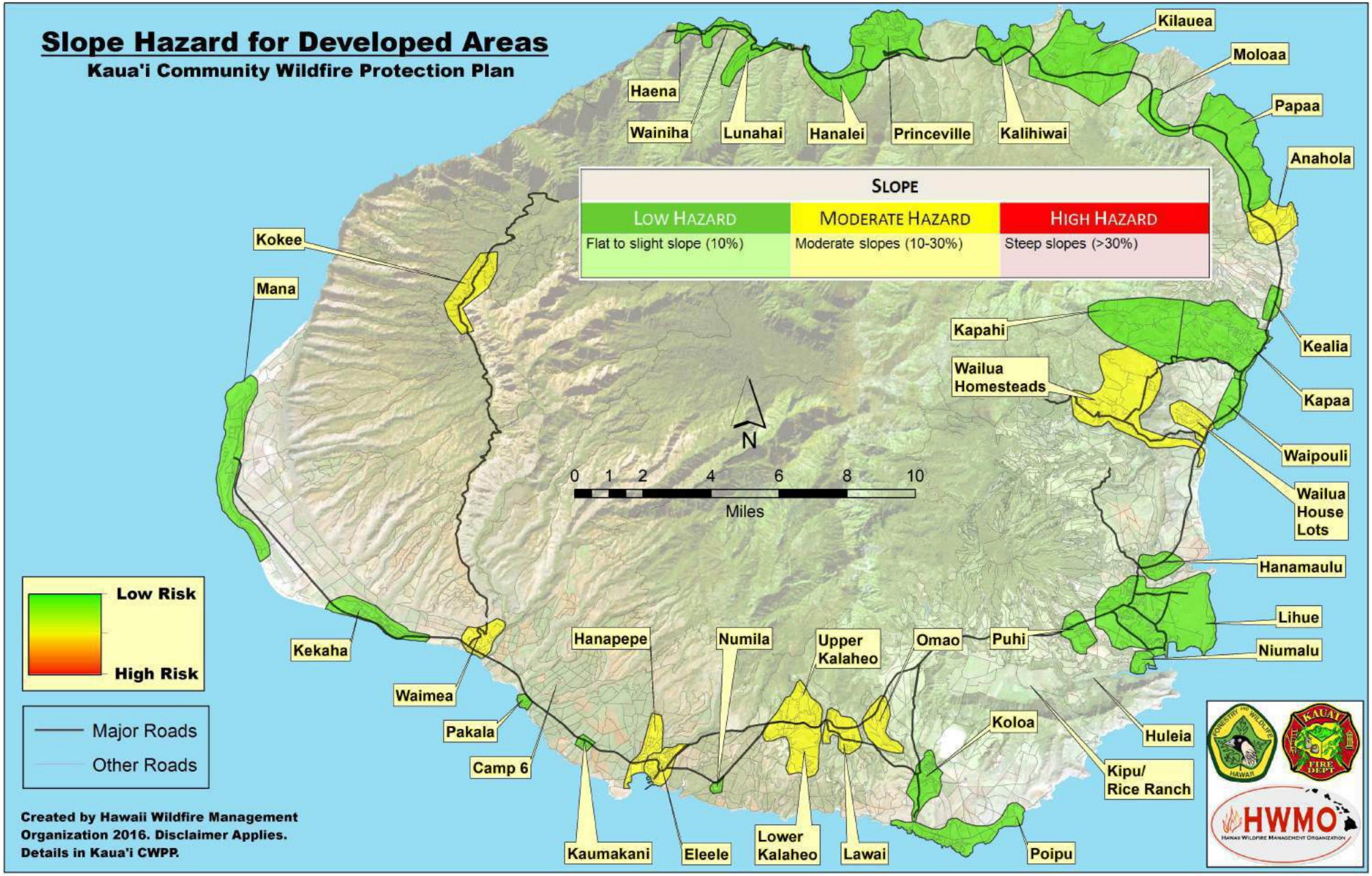


PREVAILING WIND SPEEDS AND DIRECTION

LOW HAZARD	MODERATE HAZARD	HIGH HAZARD
Wind rarely (less than 10% of time) exceeds 15 mph. Protection from predominant winds.	Wind rarely (less than 10% of time) exceeds 15 mph.	Wind frequently (50% or more of time) exceeds 15 mph or frequent exposure to predominant winds or transitional/converging wind directions.

Slope Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan



SLOPE		
LOW HAZARD	MODERATE HAZARD	HIGH HAZARD
Flat to slight slope (10%)	Moderate slopes (10-30%)	Steep slopes (>30%)

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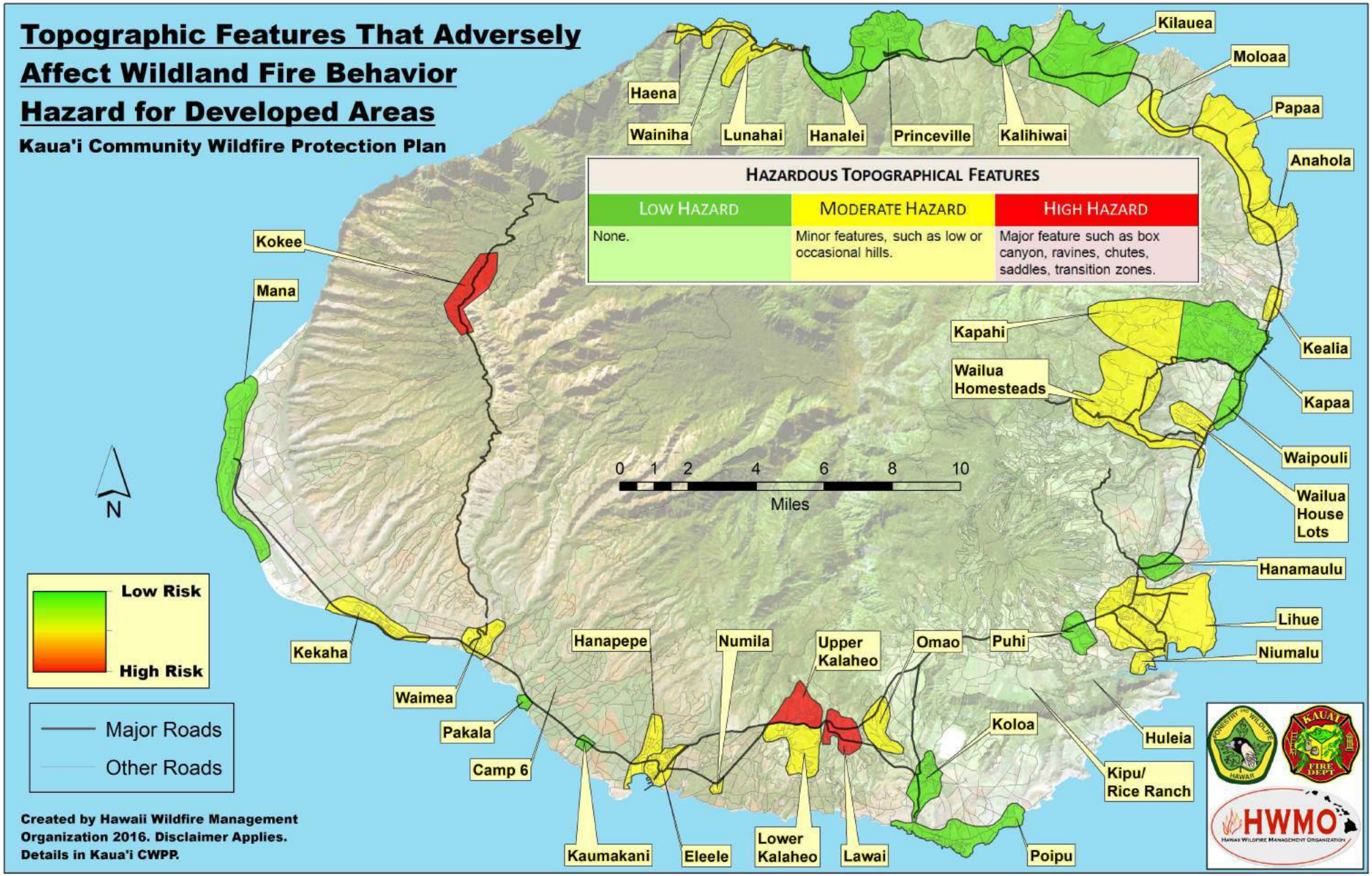
Topographic Features That Adversely Affect Wildland Fire Behavior Hazard for Developed Areas

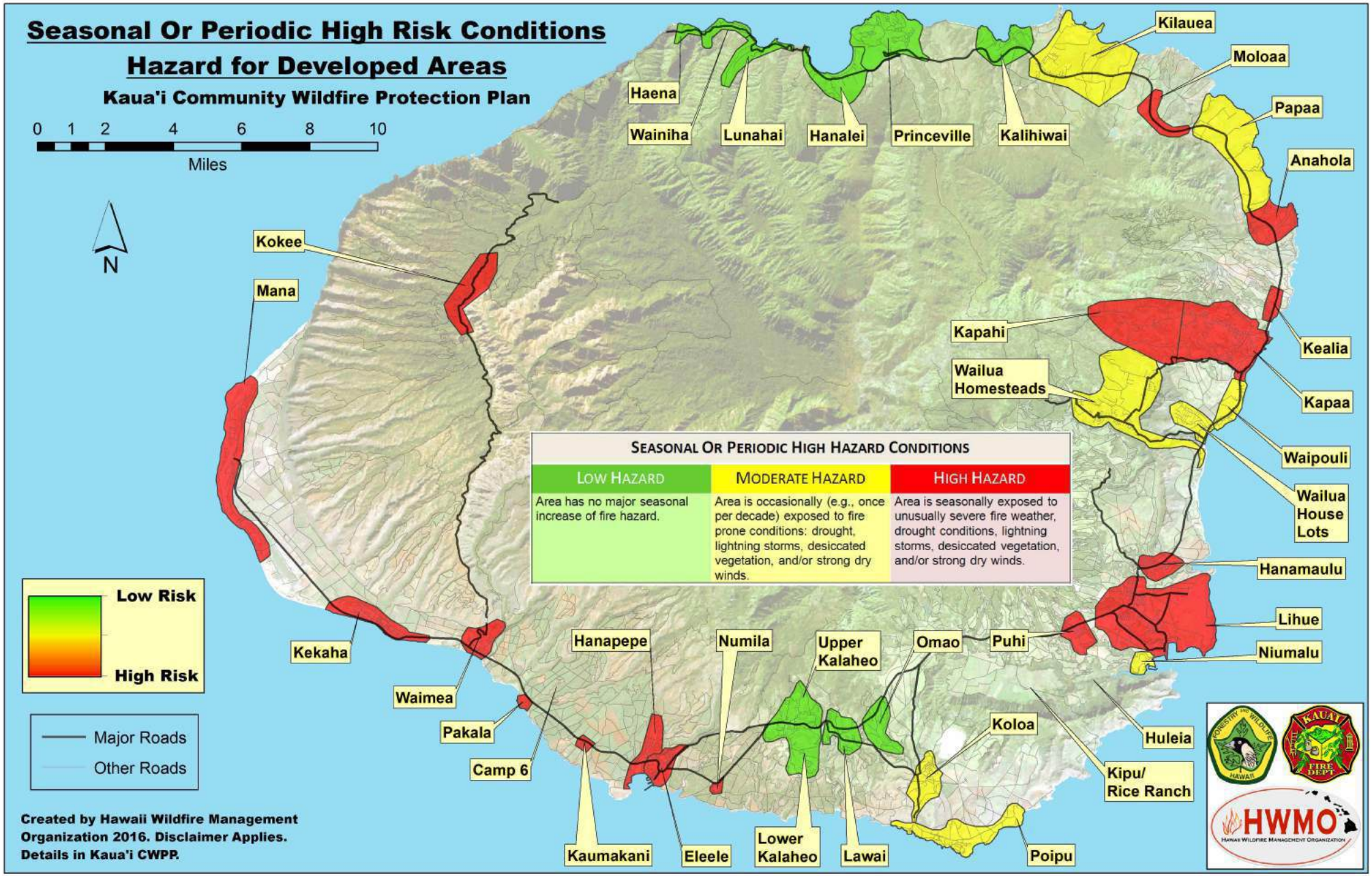
Kaua'i Community Wildfire Protection Plan



Hazardous Topographical Features		
Low Hazard	Moderate Hazard	High Hazard
None.	Minor features, such as low or occasional hills.	Major feature such as box canyon, ravines, chutes, saddles, transition zones.

Seasonal Or Periodic High Risk Conditions Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan

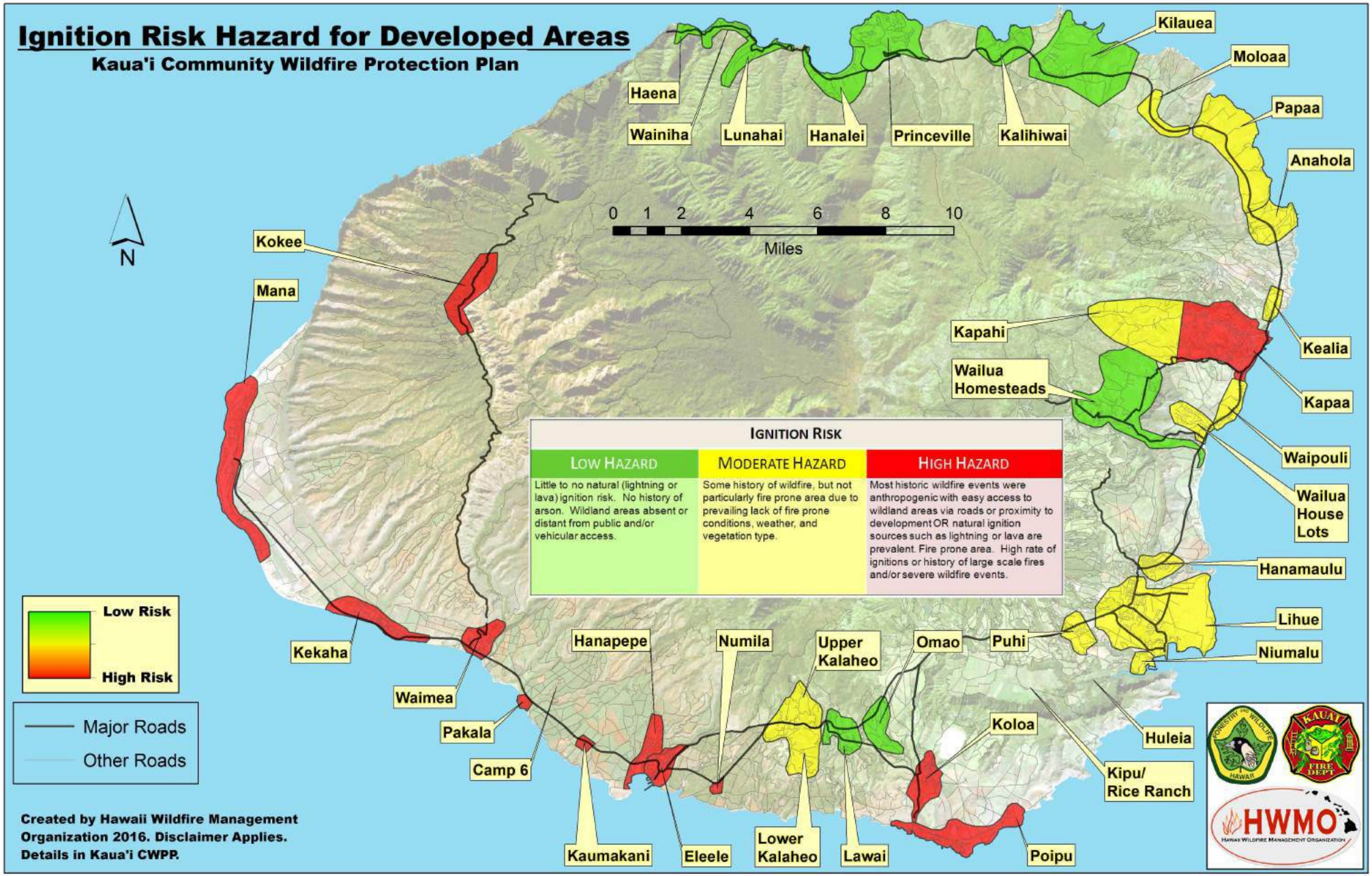


Seasonal Or Periodic High Hazard Conditions

Low Hazard	Moderate Hazard	High Hazard
Area has no major seasonal increase of fire hazard.	Area is occasionally (e.g., once per decade) exposed to fire prone conditions: drought, lightning storms, desiccated vegetation, and/or strong dry winds.	Area is seasonally exposed to unusually severe fire weather, drought conditions, lightning storms, desiccated vegetation, and/or strong dry winds.

Ignition Risk Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan



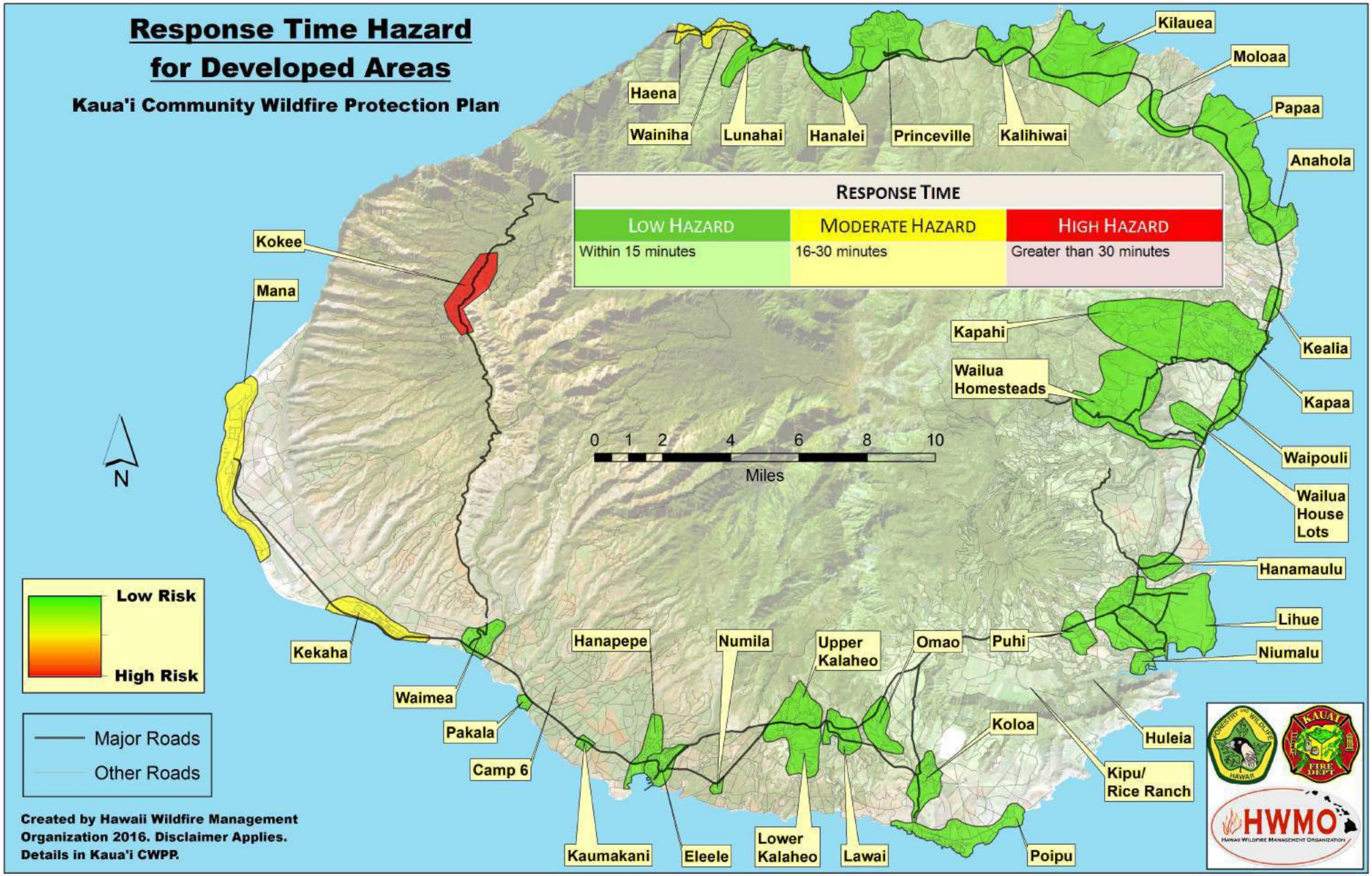
Ignition Risk

Low Hazard	Moderate Hazard	High Hazard
Little to no natural (lightning or lava) ignition risk. No history of arson. Wildland areas absent or distant from public and/or vehicular access.	Some history of wildfire, but not particularly fire prone area due to prevailing lack of fire prone conditions, weather, and vegetation type.	Most historic wildfire events were anthropogenic with easy access to wildland areas via roads or proximity to development OR natural ignition sources such as lightning or lava are prevalent. Fire prone area. High rate of ignitions or history of large scale fires and/or severe wildfire events.

FIRE PROTECTION HAZARD FOR DEVELOPED AREAS

Response Time Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan



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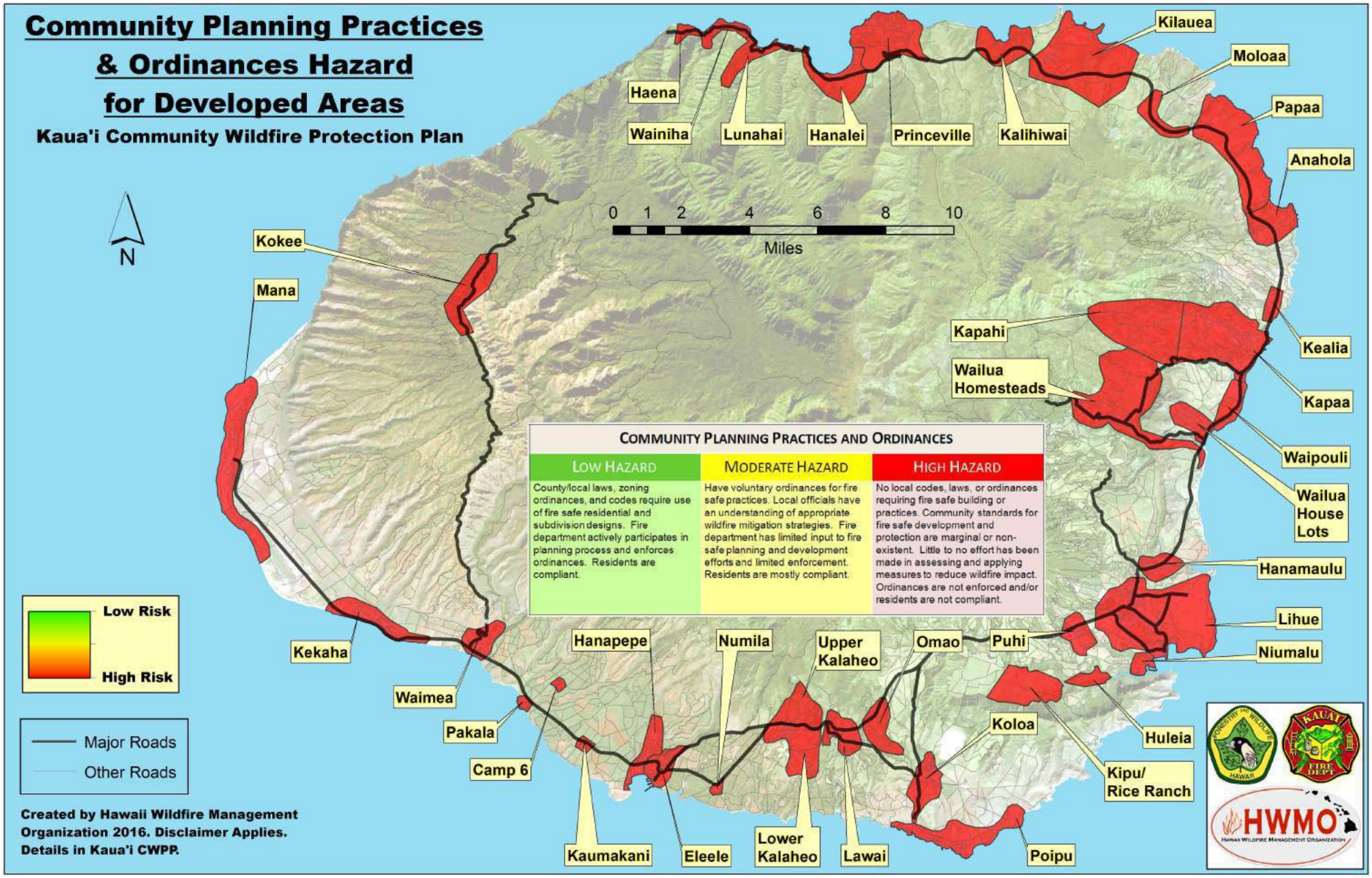
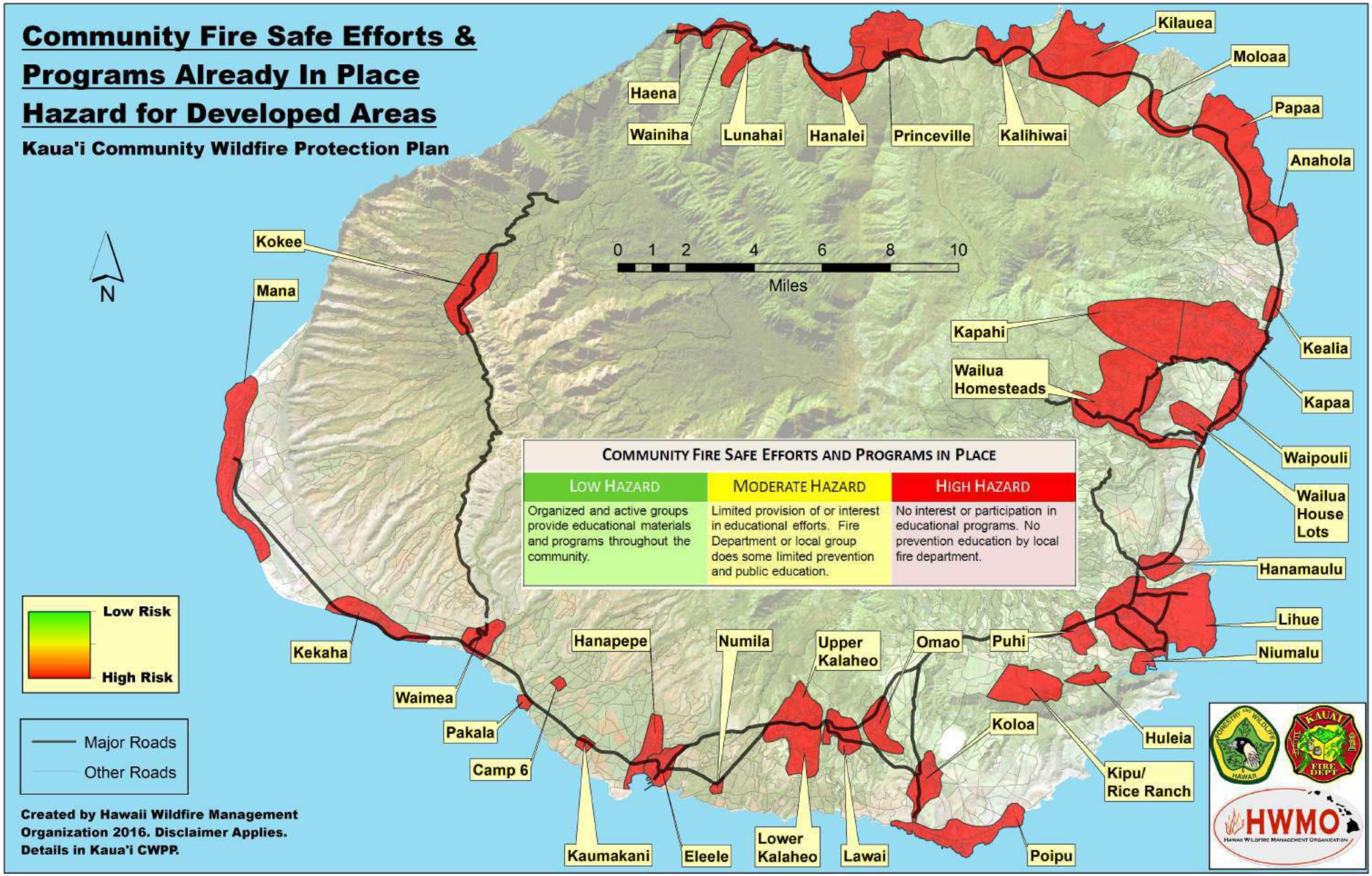
Community Planning Practices & Ordinances Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan



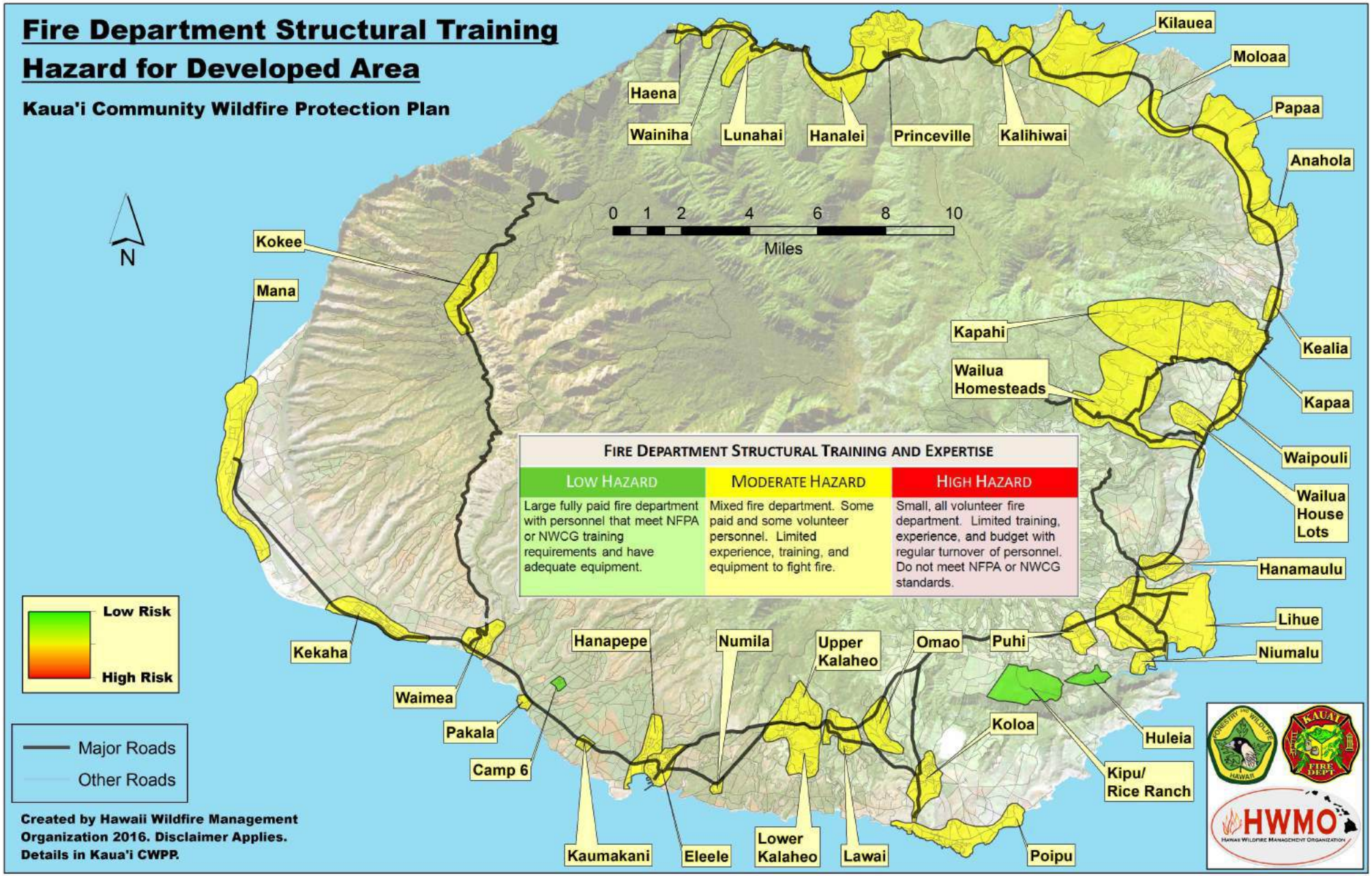
Community Planning Practices and Ordinances

Low Hazard	Moderate Hazard	High Hazard
County/local laws, zoning ordinances, and codes require use of fire safe residential and subdivision designs. Fire department actively participates in planning process and enforces ordinances. Residents are compliant.	Have voluntary ordinances for fire safe practices. Local officials have an understanding of appropriate wildfire mitigation strategies. Fire department has limited input to fire safe planning and development efforts and limited enforcement. Residents are mostly compliant.	No local codes, laws, or ordinances requiring fire safe building or practices. Community standards for fire safe development and protection are marginal or non-existent. Little to no effort has been made in assessing and applying measures to reduce wildfire impact. Ordinances are not enforced and/or residents are not compliant.


Community Fire Safe Efforts & Programs Already In Place Hazard for Developed Areas
Kaua'i Community Wildfire Protection Plan
N
0 1 2 4 6 8 10
Miles
Haena
Wainiha
Lunahai
Hanalei
Princeville
Kalihiwai
Kilauea
Moloaa
Papaa
Anahola
Kokee
Mana
Kapahi
Wailua Homesteads
Kealia
Kapaa
Waipouli
Wailua House Lots
Hanamaulu
Lihue
Niumalu
Puhi
Omao
Upper Kalaheo
Numila
Hanapepe
Kekaha
Waimea
Pakala
Camp 6
Kaumakani
Eleele
Lower Kalaheo
Lawai
Poipu
Koloa
Huleia
Kipu/ Rice Ranch
COMMUNITY FIRE SAFE EFFORTS AND PROGRAMS IN PLACE
LOW HAZARD
Organized and active groups provide educational materials and programs throughout the community.
MODERATE HAZARD
Limited provision of or interest in educational efforts. Fire Department or local group does some limited prevention and public education.
HIGH HAZARD
No interest or participation in educational programs. No prevention education by local fire department.
Low Risk
High Risk
Major Roads
Other Roads
Created by Hawaii Wildfire Management Organization 2016. Disclaimer Applies.
Details in Kaua'i CWPP.
HWMO
Hawaii Wildfire Management Organization

Fire Department Structural Training Hazard for Developed Area

Kaua'i Community Wildfire Protection Plan

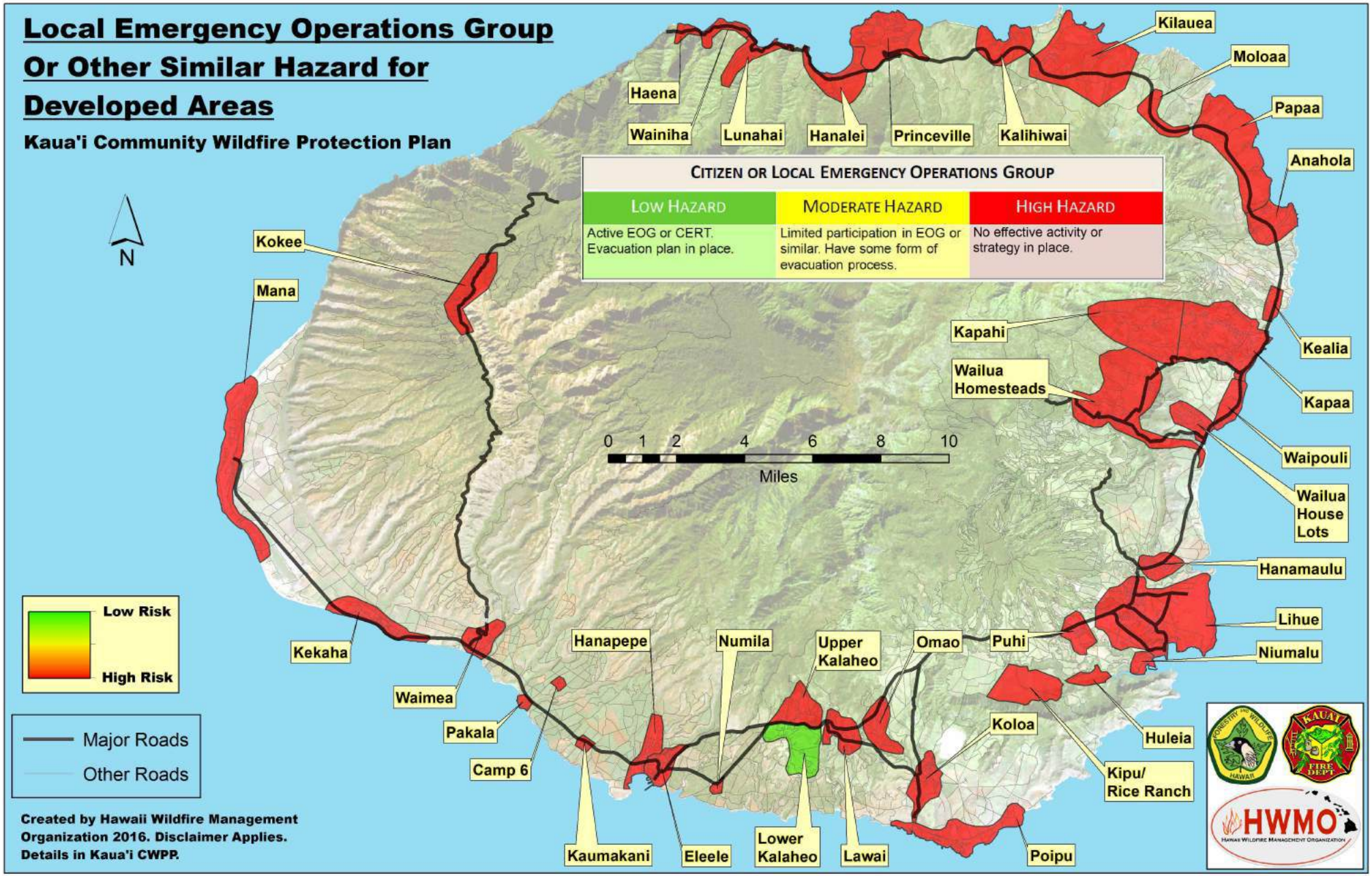


FIRE DEPARTMENT STRUCTURAL TRAINING AND EXPERTISE

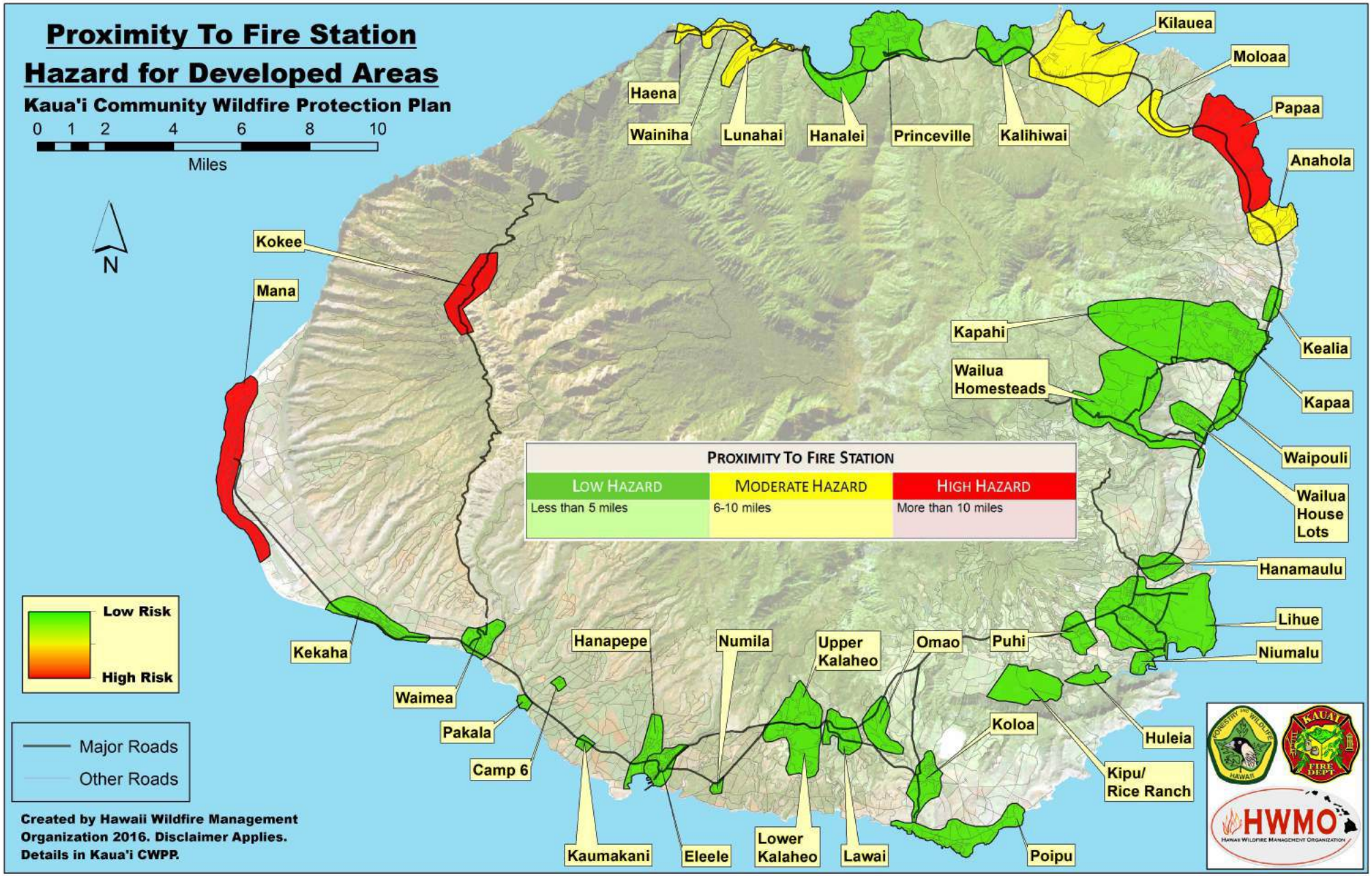
LOW HAZARD	MODERATE HAZARD	HIGH HAZARD
Large fully paid fire department with personnel that meet NFPA or NWCG training requirements and have adequate equipment.	Mixed fire department. Some paid and some volunteer personnel. Limited experience, training, and equipment to fight fire.	Small, all volunteer fire department. Limited training, experience, and budget with regular turnover of personnel. Do not meet NFPA or NWCG standards.

Local Emergency Operations Group Or Other Similar Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan

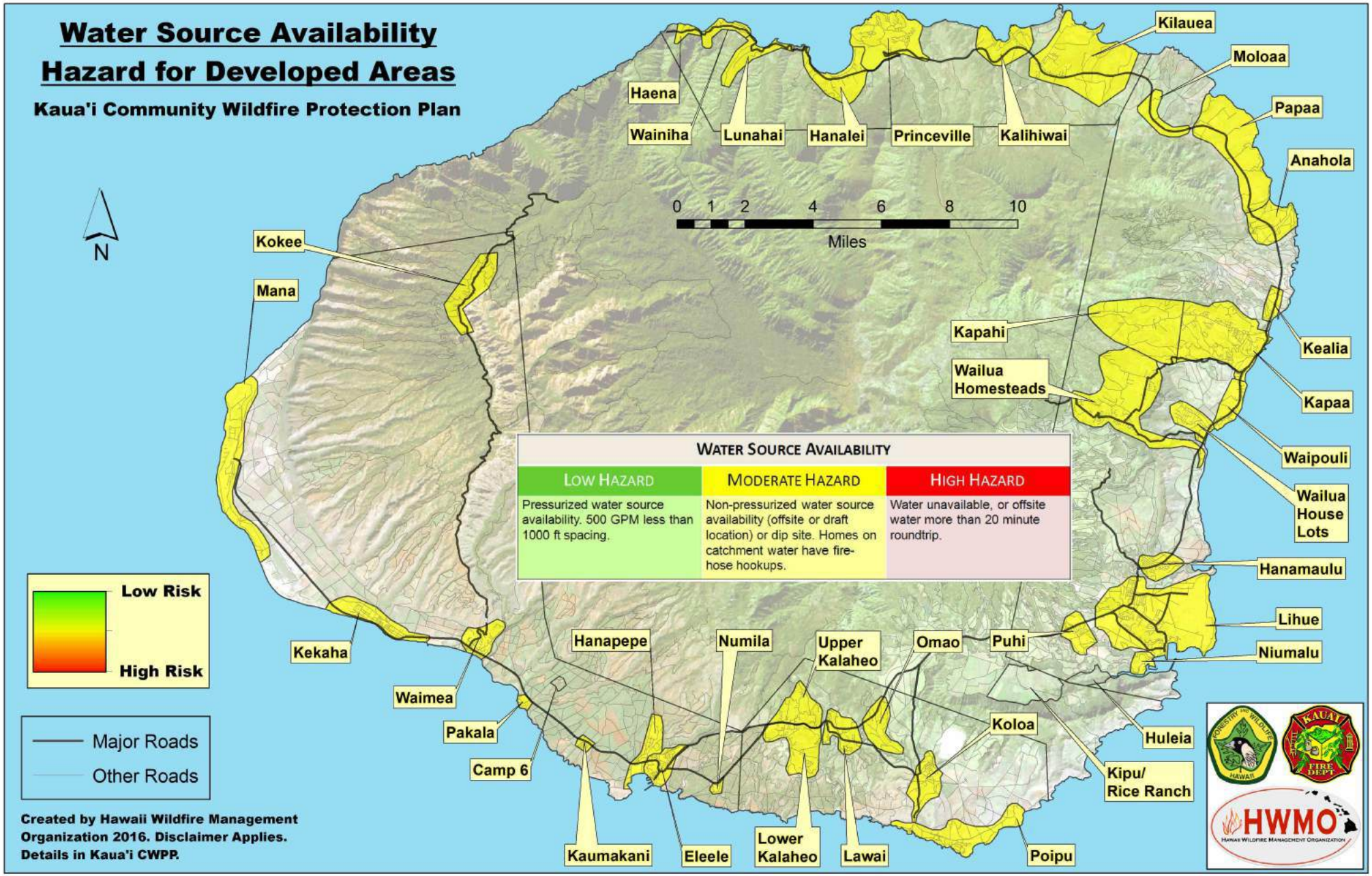


Citizen or Local Emergency Operations Group		
Low Hazard	Moderate Hazard	High Hazard
Active EOG or CERT. Evacuation plan in place.	Limited participation in EOG or similar. Have some form of evacuation process.	No effective activity or strategy in place.


Proximity To Fire Station
Hazard for Developed Areas
Kaua'i Community Wildfire Protection Plan
0 1 2 4 6 8 10
Miles
N
Haena
Wainiha
Lunahai
Hanalei
Princeville
Kalihiwai
Kilauea
Moloaa
Papaa
Anahola
Kokee
Mana
Kapahi
Wailua Homesteads
Kealia
Kapaa
Waipouli
Wailua House Lots
Hanamaulu
Lihue
Niumalu
Huleia
Kipu/ Rice Ranch
Koloa
Poipu
Lawai
Lower Kalaheo
Upper Kalaheo
Omao
Puhi
Numila
Hanapepe
Kaumakani
Eleele
Kekaha
Waimea
Pakala
Camp 6
PROXIMITY TO FIRE STATION
LOW HAZARD
Less than 5 miles
MODERATE HAZARD
6-10 miles
HIGH HAZARD
More than 10 miles
Low Risk
High Risk
Major Roads
Other Roads
Created by Hawaii Wildfire Management Organization 2016. Disclaimer Applies.
Details in Kaua'i CWPP.
HWMO

Water Source Availability Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan

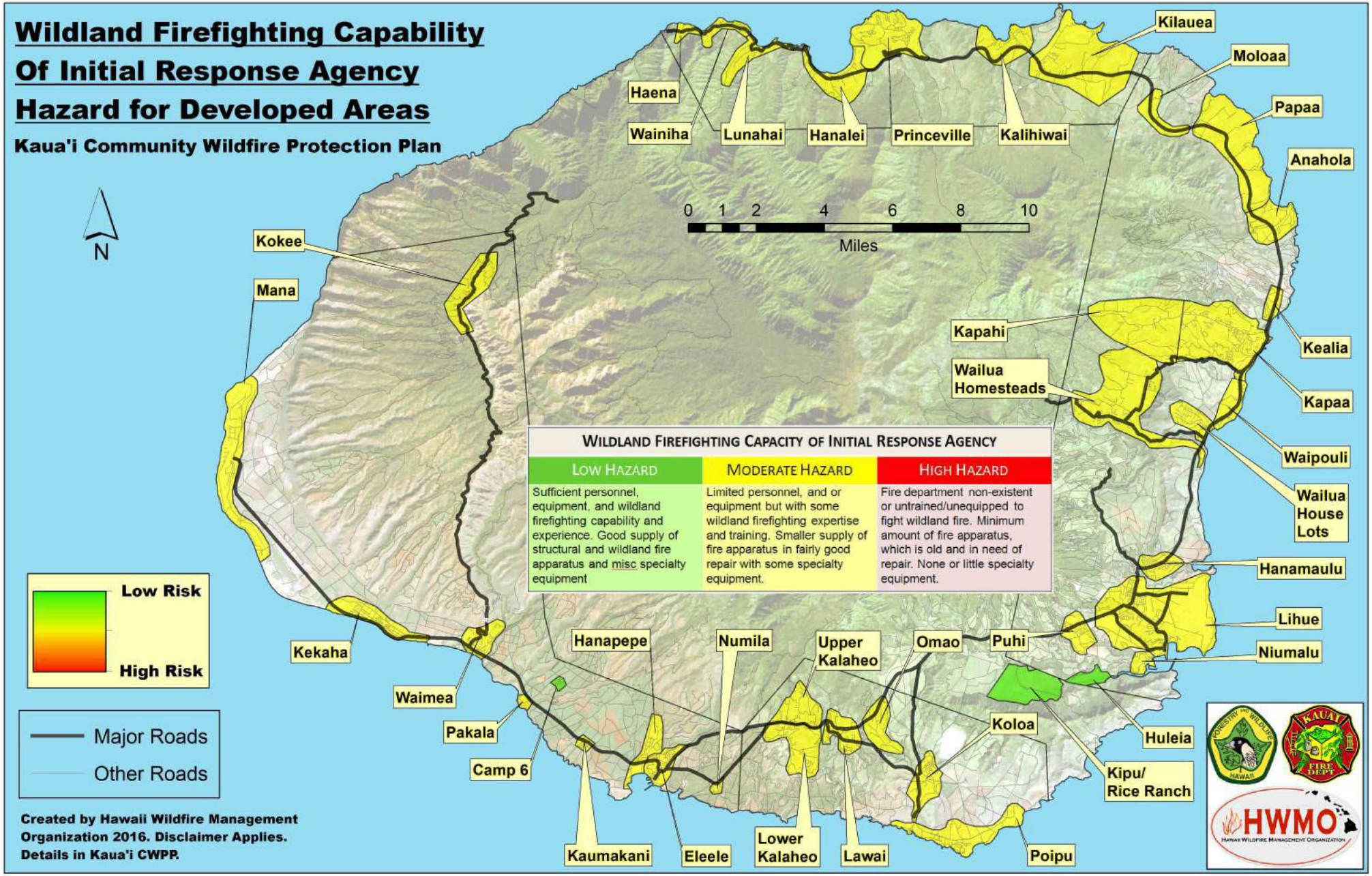


Water Source Availability

Low Hazard	Moderate Hazard	High Hazard
Pressurized water source availability. 500 GPM less than 1000 ft spacing.	Non-pressurized water source availability (offsite or draft location) or dip site. Homes on catchment water have fire-hose hookups.	Water unavailable, or offsite water more than 20 minute roundtrip.

Wildland Firefighting Capability Of Initial Response Agency Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan

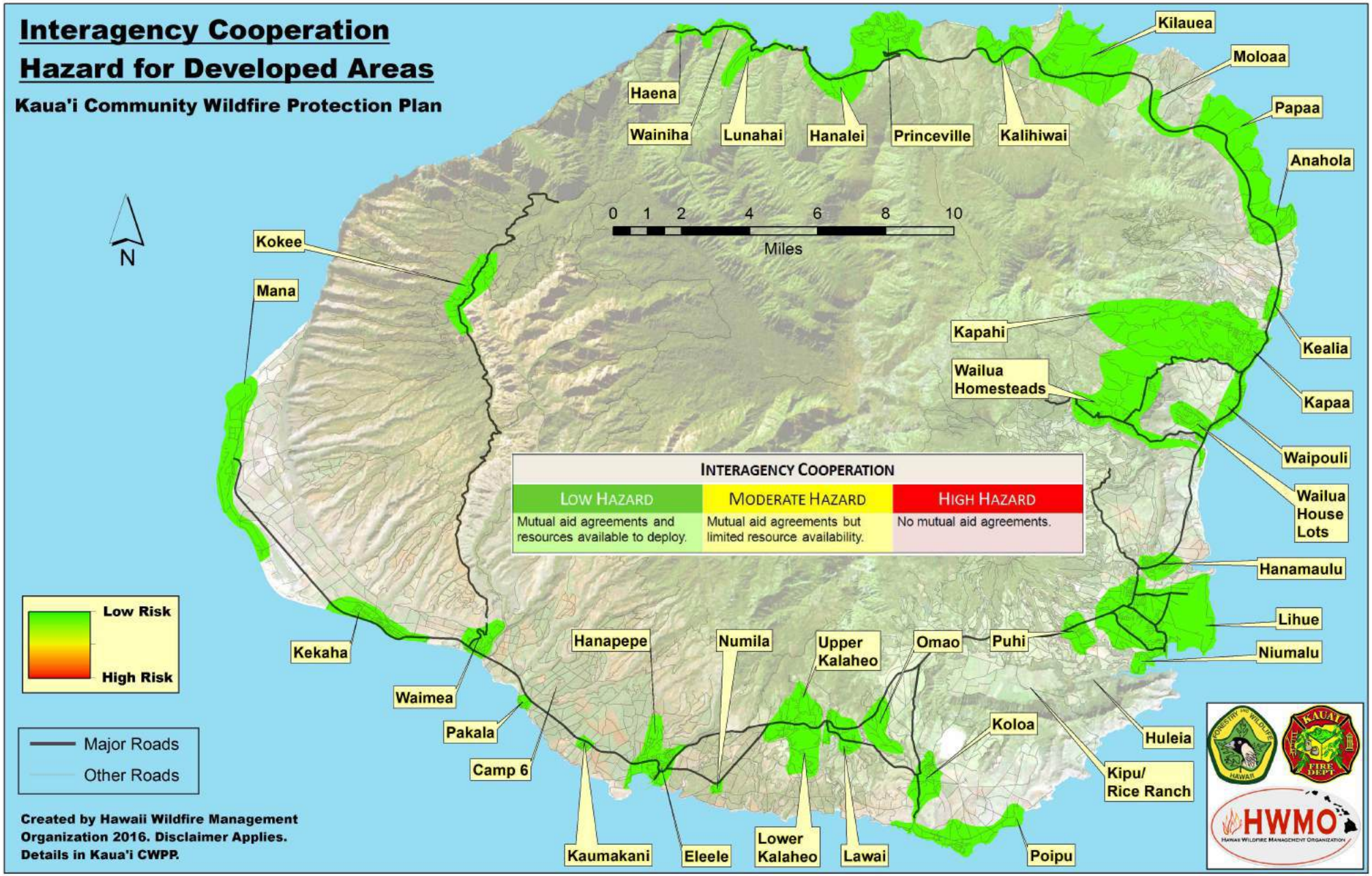


Wildland Firefighting Capacity of Initial Response Agency

Low Hazard	Moderate Hazard	High Hazard
Sufficient personnel, equipment, and wildland firefighting capability and experience. Good supply of structural and wildland fire apparatus and misc specialty equipment	Limited personnel, and or equipment but with some wildland firefighting expertise and training. Smaller supply of fire apparatus in fairly good repair with some specialty equipment.	Fire department non-existent or untrained/unequipped to fight wildland fire. Minimum amount of fire apparatus, which is old and in need of repair. None or little specialty equipment.

Interagency Cooperation Hazard for Developed Areas

Kaua'i Community Wildfire Protection Plan



Created by Hawaii Wildfire Management Organization 2016. Disclaimer Applies. Details in Kaua'i CWPP.

Appendix C
Kauai Community Wildfire Protection Plan Update
2016 Kauai Fire Department Brush Fire Apparatus

Brush Truck
TRUCK 1
TRUCK 2
RESCUE 3
TRUCK 4
TRUCK 5
TRUCK 6
TRUCK 8
TRUCK7

Engine
ENGINE 1
ENGINE 2
ENGINE 3
ENGINE 4
ENGINE 5
ENGINE 6
ENGINE 7
ENGINE 8
SPARE ENGINE 6

Helicopter
AIR1

Support Equipment
ATV 3
ATV 7
ATV MULE
ATV MULE 8
TRAILER 7
TRUCK 3

Tanker or Tender
TENDER 1

Appendix D
Kaua‘i Community Wildfire Protection Plan 2016 Update
Photos of WUI Communities across Kaua‘i

The following pages contain photo examples from communities across Kaua‘i. They depict examples of existing wildfire hazards, community assets and resources at risk, and good examples of defensible space and other protective activities.

‘Ele‘ele

Intersection of Kaumualii Highway and Waialo Road

Example of non-combustible roofs

‘Ele‘ele School

Example of shake roofs

Grassy unmanaged field next to Kaua‘i Medical Clinic

View of main highway and WUI

View of homes along gulch in Hanapepe

Example of home with good defensible space

Fuels next to highway and across from shopping center

Continuous ‘ekoa along fenceline next to home

Home with aloe and plumeria used in landscaping

Port Allen with murky water

Hanapepe

Hanapepe Lookout with high tourist traffic

View of Hanapepe from highway lookout

View of Hanapepe homes along WUI

Tall ‘ekoa forest along edge of businesses in downtown Hanapepe

Hanapepe downtown strip

Hanapepe River

Narrow Awa‘awa Road with no outlet and dense fuels

Homes off of Awa‘awa Road surrounded by tall grasses and kiawe forest

Abandoned cars and sheds with overgrown fuels off of Awa‘awa Road

Green waste and trash dumped along Awa‘awa Road

Example of gravel road with fuels cleared on edges

‘Ele‘ele homes on cliffside

Hanapepe (cont.)

One-way bridge on Awa‘awa Road

Shake roof home next to hardened home

Series of homes with shake roofs

Home with ‘ekoa and grasses surrounding it

Home with good defensible space

Grassland across from homes on Kane and Moi Road

Kaua‘i Vets Cemetery

Hanapepe Bay smothered in debris

Hanapepe Bay with post-fire debris

Kaumakani

Town center

Overgrown fuels next to power generator

Unpaved main road with frequent traffic

Typical street

Charred vegetation under powerline at end of the street

Overgrown vegetation along and over home

Kaumakani Park ballfield

Kaumakani Preschool – Kamehameha School

Kaumakani homes along edge of highway

Common homes in area

Tall grasses and ‘ekoa on roadside next to homes

Private land on makai edge of community with firebreak

Kekaha

Kikiaola Small Boat Harbor

Green waste illegal dumping grounds next to parking lot for Kikiaola Small Boat Harbor

Car parked next to dry grass an ignition risk

Example of home with good defensible space and xeriscaping within fire-free zone

Mauka home with hazardous fuels surrounding and overgrowing it

Horses grazing in open land next to mauka south end homes

Turnout with green waste pile

Green waste piles on open land across from mauka south end homes

Kekaha Sugar Company old mill with ‘ekoa and kiawe

Kekaha Post Office

Agribusinesses Development Corp. land

Contrast between managed and unmanaged roadside fuels on Kokee Road

Kekaha (cont.)

Car next to roadside fuels on Kokee Road

Kekaha Neighborhood Community Park with view of beach

Popular surf spot: Kekaha Beach

Kekaha Beach facing south

Surfing at Kekaha Beach

MacArthur Park

Kekaha Beach condos with naupaka

Beachside homes with unmanaged grasses and shrubs next to homes and apartments

Tall grasses along roadside (Kokee Road)

Koloa

Scenic byway

Koloa Cemetery

Example of well-managed fuels next to unmanaged grassland and albizia

Jeep with flammable vegetation near exhaust

Large green lawn with plants blocking windows

Homes across from grassland on Waialau Street

Driveway with well-maintained shrubs

Homes next to active grazing pasture

Homes with lack of defensible space but green vegetation

Anne Knudsen Park

Welcome to Koloa sign with tall grasses

Downtown Koloa lunch truck area with mulch pile stacked amongst fuels

Koloa (cont.)

Downtown food truck zone next to monument

Koloa downtown strip

Koloa Public School

Lawai

Typical home with good defensible space

Typical street with green lawns

Oma‘o WUI view from Lawai

Lawai Cannery in WUI

Halima Road neighborhood with green front lawns

Lawai General Store

Lower Kalaheo

Kalaheo Fire Station

Kalaheo School homes with high density

Kalaheo School

Turnaround with homes

Kalaheo School homes WUI

Grassy lot right next to homes

Papalina Road turnout with tall grasses and brush

Example of homes with non-combustible roofs and combustible sidings

Kalaheo downtown strip

Kalaheo Post Office

Upper Kalaheo

Upper Kalaheo WUI from Lawai

View of Upper Kalaheo from Lower Kalaheo

Koloa rum entrance along highway

Gulch with tall mixed vegetation along highway

Mana

Polihale State Park with fuels

Kao Road roadside ‘‘ekoa and grasses

Kawaiele Bird Sanctuary

Mana (cont.)

Highway shoulders mowed 15 feet

Experimental corn fields with mowed edges and ‘ekoa forest

Roadside fuels next to car

Kekaha Landfill with dry grasses

Sunkiss Shrimp Co. next to roadside fuels

Stream with heavy erosion and fuel-build-up on road to Polihale

Polihale campgrounds

Polihale restroom facilities surrounded by fuels

Road dip with stream debris makes for difficult access on road to Polihale

Kiawe overhanging road to Polihale

Sandy section on road to Polihale

Dry agricultural fields and roadside fuels along road to Polihale

Numila

Ironwoods a ladder fuel risk along highway shoulder

Kauai Coffee Company row of bougainvillea

Row of coffee fields with cleared areas around it

Highway with limited shoulder space

Kauai Coffee Company unpaved wide rows between crops

Highway intersection with dense roadside fuels

Unpaved road with unmanaged roadside fuels on north side of Numila

Mix of vegetation along unpaved road

Ladder fuels on highway shoulder

ʻŌmaʻo

Omao WUI

Pastureland and long driveway

Home with pastureland and palms for windbreak

Poʻipū

Traffic circle with constant traffic flow

Kukui Ula Center

Grassland from traffic circle leads up to edge of homes

Welcome to Poʻipū
Poʻipū Beach sign

Sheraton Kauai front entrance

Poʻipū
Poʻipū Beach

Koloa Landing driveway with ʻekoa and grasses

Koloa Landing fuels next to parking area with no dumping sign

Typical home in area – good defensible space

Mauka side of Poʻipū
Poʻipū – ʻekoa shrubland along edge of homes with cacti

Mauka side of Poʻipū
Poʻipū with kukui on shoulders

Mauka side of Poʻipū
Poʻipū ranchland
Edged by ʻekoa shrubland

Waimea

Downtown park and strip in Waimea

Waimea Fire Station

Downtown 4 p.m. traffic

Waimea Canyon High School ballgame

Waimea Canyon School fuels at end of road along powerlines

West Kauai Medical Center

Vacant lot with dry grass across from Hale Puna

Hale Puna goat grazing next to structure

Waimea Canyon Drive homes with grassy lots in between

Example of dry grasses next to home along WUI boundary

Waimea Canyon Drive homes with kiawe forest and steep slopes behind them

Homes with good defensible space on WUI boundary

Waimea (cont.)

Dry grasses growing right to edge of home

‘ekoa under powerlines on roadside of Waimea Canyon Drive

Waimea Walking Town sign

Smokey Bear prevention signs along Waimea Canyon Drive

Waimea WUI with coastal runoff from recent storm – El Nino 2015

View of makai side of Waimea Canyon – ag. lands

Runoff in erosion from El Nino rain events in 2015

Waimea Canyon Middle School classroom activities with HWMO in September 2015

Waimea side of Koke‘e with miles of open grasslands

Waimea Canyon Falls with koa

Site of Koke‘e fire – now DOFAW timber operation

Row of koa plantings at site of Koke‘e Fire

Kealia/Kapa‘a

Kealia Beach

Dense fuels along busy intersection off of Kuhio Highway

Area being cleared along busy intersection off of Kuhio Highway

Homes along WUI grassland

Homes with tall palms along WUI edge

Mechanical treatment to remove fuels along WUI

No shoulders along Olohena Road

Vacant home with tall grasses surrounding structure

WUI homes on top of slope with dense fuels

Drying tall grasses along edge of transfer station

Tall grasses and shrubs along edge of parking lot for Kapa‘a Middle School

Dense fuels separate homes and Kapa‘a Middle School parking lot

Anahola

Example of common tall grasses surrounding home

Main highway with constant traffic flow through day and ironwoods on edge

Tall grasses under windows of home

Mauka side property with heavy dead and down fuels

Mauka side road with one of a few abandoned cars

Makai side home in gulch surrounded by tall trees and with debris on roof

Makai side illegal green waste dumping on roadside

Large property with tall grasses

Vegetation weedwhacked between homes in Pi‘i Lani Mai Ke Kai

End of road in Pi‘i Lani Mai Ke Kai where arson fires have been occurring

Green waste and trash dumping along dirt road next to Pi‘i Lani Mai Ke Kai

Green waste and trash dumped on roadside with tall grasses next to Pii Lani Mai Ke Kai

Hanamā‘ulu

Kalepa Village Apartments bordered by ladder fuels

Kalepa Village Apartments long hedge next to unmanaged shrubland

Example of debris piling up along fence line

Kalepa Village Apartments bordered by forest lands

King Kaumuali‘i Elementary School with eroding slope

King Kaumuali‘i Elementary School

Dead trees along Kuhio Highway

Wailua

View of Wailua WUI from Sleeping Giant

Princeville Ranch

Cattle crossing along dirt road

Common grasses and shrubs in area

Dry grasses at top of gully

Dry grasses on hillside

View of homes on WUI

Fuels along steep dirt road

Comparison between unmanaged v. grazed land

Lihue

Brush fire next to Lihue Airport on January 14, 2016. Credit: Seri Niimi-Burch

Island School

Commercial area with groundcovers in medians

Car an ignition risk amongst tall shrubs on roadside

Vidinha Stadium

Car with tall grasses along roadside near Vidinha Stadium

Puuhonua Kaulike Circuit Court

Example of good defensible space and hardened sidings on home

Umi Street neighborhood with well-kept green lawns

Example of poor access into home

Common shingle roofs and wood sidings in Umi Street neighborhood

Traffic circle near Elsie Wilcox Elementary School

Lihue (cont.)

Lihue Public Library

Elsie Wilcox Elementary School

Example of home with wide driveway and defensible space with WUI in backdrop

View from Mokoi Street of WUI within and along gulch

Lihue Fire Station

Rice Street main strip

Kauai Museum

Lihue Post Office with pohinahina in median

Chiefess Kamakahelei Middle School

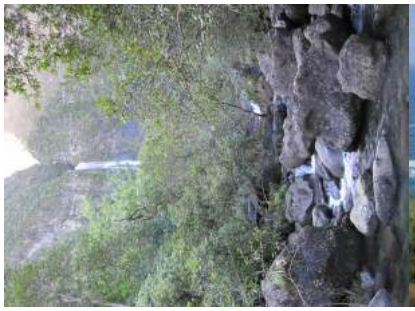
North Shore Kauai

Limahuli hale and loi

Mountain backdrop behind Limahuli

Kalalau Trail

Vegetation on steep cliffs along Kalalau



Hanakapi'ai Falls

Ke'e Beach

Example of erosion at top of Kalalau Valley

Hanalei Bay

Agricultural lands

Kalalau Valley

APPENDIX E: 2009 KAUAI CWPP

Community Wildfire Protection Plan for Kauai, Hawaii

Sponsored by the Kauai Fire Department
June 2009

Written by Denise Laitinen

Table of Contents:

This Community Wildfire Protection Plan was made possible with the assistance of the Kauai Fire Department. The author would like to extend a sincere mahalo nui loa to the following people and agencies for their assistance: Chief Robert Westerman and Captain David Bukoski of the Kauai Fire Department, Roland Licona of the Department of Hawaiian Home Lands, and Kawika Smith of Hawaii State Division of Forestry and Wildlife. A very special mahalo nui loa to Francisco Garcia of Kauai Fire Department for his fire data assistance and Garrett Johnson of Kauai County GIS for researching and creating the GIS maps used in this project. Unless otherwise noted, all photographs courtesy of Denise Laitinen.

Cover photo: View of August 2005 Wailua wildfire. Photo courtesy of Kauai Fire Department.

June 2009

Kauai Community Wildfire Protection Plan
Mutual Agreement Page

The Community Wildfire Protection Plan (CWPP) developed for the Island of Kauai, Hawaii by the Kauai Fire Department:

Was collaboratively developed. Interested parties and federal land management agencies managing land on Kauai Island have been consulted.

This Plan identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment that will protect Kauai.

This Plan recommends measures to reduce the ignitability of structures throughout the area addressed by the Plan.

The following entities mutually agree with the contents of this Community Wildfire Protection Plan:

_____ _____

Paul J. Conry **Date**
Administrator, Division of Forestry and Wildlife

_____ _____

Robert Westerman **Date**
Fire Chief, Kauai Fire Department

_____ _____

Mark Marshall **Date**
Administrator, Kauai County Civil Defense Agency

Executive Summary:

Covering roughly 622 square miles, the Island of Kauai is the smallest of the four main Hawaiian Islands in terms of geographical size, as well as population with more than 63,000 inhabitants. Yet it has the highest concentration of endangered and threatened native Hawaiian plants and animals in the state.

Dominated by the sugar cane industry for more than a century, today on Kauai acre upon acre of once active agricultural land now lies fallow or is subject to residential development. With the exception of small industrial and commercial zones, virtually the entire Island of Kauai is in a wildland urban interface (WUI) environment—that is the line area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuel. These interface areas pose the highest risk of loss of life and property due to wildland fire.

Satellite map of Kauai. The island is 33 miles long and 25 miles wide although the bulk of the island's interior is inaccessible. Image courtesy of Kauai Fire Department.

The risk of wildland fire impacting homes in the WUI is determined by several factors, including the ignitability of fuels, structural ignitability, weather conditions, and topographical features, such as slope. Unlike other parts of the United States, wildfire is not a natural part of Hawaii's ecosystem. In Hawaii, wildfires destroy native plants, which can impact the watershed and the habitat of threatened and endangered native Hawaiian animals. Wildfires in Hawaii can also cause soil erosion, which has the potential to cause runoff that can negatively impact ocean reefs.

The overwhelming majority of wildfires in the state of Hawaii, and Kauai in particular, are caused by human error. Human error includes errant fireworks, rubbish, cooking, and agricultural fires, as well as vehicle-caused wildfires.

Principal stakeholders who have an interest in protecting Kauai from wildfire include the Kauai Fire Department, the State Division of Forestry and Wildlife (DOFAW), Kauai County Civil Defense Agency, Department of Hawaiian Home Lands (DHHL), U.S. Fish & Wildlife Service (USFWS), large landowners and farmers, such as Grove Farm and Kauai Coffee Company, as well as residents themselves. These stakeholders were invited to participate in the development of this Plan.

A wildfire risk hazard assessment determined that the WUI areas around the island have a high risk of wildland fire. Since 2000, roughly 30% of all fires that occur annually on Kauai are wildfires. These wildfires have closed major highways, and threatened homes.

This CWPP encompasses the entire island of Kauai. Community meetings were held in June 2008 in Kapa'a, Waimea, and Lihue. Interagency fire service meetings were held between June 2008 and June 2009. Meetings with community members and fire agency personnel identified 12 priority mitigation measures that can reduce the wildfire risk on Kauai, as well as improve community safety. These include: 1) Installing and maintaining firebreaks along the Wailua Corridor; 2) Reducing fuel load along the Wailua Corridor; 3) Implementing grazing practices in Anahola and increasing grazing around the perimeter of Wailua Homesteads; 4) Maintaining and increasing the use of current reservoirs around the island; 5) Continuing general public fire prevention education, such as the need for defensible space particularly in Kokee, Anahola, Wailua, Hanamaulu, Koloa, Waimea, and Kapa'a;
6) Implementing community chipping days to encourage fuel load mitigation and green waste recycling;
7) Increasing the use of fire-resistant building materials in new residential development; 8)

Implementing Firewise recommendations in the planning process, such as multiple means of ingress/egress and fuel-breaks around all new residential subdivisions; 9) Creating secondary emergency access roads in residential areas where necessary; 10) improving communication between state, federal, and county agencies during wildfires; 11) purchasing a refurbished light-response brush truck to be staged in Kokee; and 12) installation of fire hydrants or stand pipes in Kokee.

Background:

Kauai is a place of extremes. The oldest (and northernmost) of the main Hawaiian Islands, Kauai is home to one of the wettest places on earth—the 5,148-foot Mt. Wai'ale'ale, which receives 460 inches of rain a year. A mere 15 miles away on the leeward coast, Kekaha receives only 20 inches of rain annually and experience strong trade winds.

Because the central interior of Kauai is home to steep inaccessible mountains, including Mt. Wai'ale'ale, Kawaikini, (5,243 feet), and the Na Pali coast (17 miles long with 4,000-foot cliffs), residential, commercial, industrial, and agricultural activities are found along the perimeter of the island. Due to the rugged 17-mile long Na Pali coastline, which encompasses 6,175 acres on northwest side of the island and is inaccessible to vehicles, there are no roads around the entire island. Rather the route around the island is one of a horseshoe shape ending at either end of the Na Pali Coast.

In addition to being shaped by geographic features, Kauai's economic history has also shaped the landscape of the island. Driving around the perimeter of the island on the one main highway (known as Kuhio Highway on the east side and Kaumuali'i Highway on the west), one encounters vast expanses of open land juxtaposed with small towns where the homes are sited in close proximity to each other.

Slope around the island varies by geography, although the overall terrain in the region naturally slopes from the mountains down to the sea. Gulches, as well as hills several hundred feet in elevation, dot the countryside. Because Kauai is the oldest of the main Hawaiian islands, rain has eroded mountains to steep cliffs, especially in the island's center. Some subdivisions, such as Hanapepe Residence Lots in Hanapepe and Wailua Riverview Estates in Wailua, have steep ridges bordering their community. Others, such as Lawai have gulches running through their communities.

Vegetation zones vary between grasslands, mixed forest, high-intensity developed, scrub/shrub, bare land, estuarine shrub/scrub, and low-intensity developed, among others. Communities and subdivisions on Kauai are often separated by vast expanses of open grasslands containing high-intensity burning fire fuels, including grasses and shrubs. Many of the grasses, such as molasses grass (*Melinis minutiflora*) and bear grass (*Schizachyrium condensatum*), are fire-adapted and increase wildfire potential in the areas they invade.

Above left and right: Former sugar cane fields lie fallow across the island. Overgrown with grasses, these area pose a wildfire risk to the communities they surround.

The sugar cane industry, which shaped the residential, agricultural, and economic face of Kauai for 125 years, has died out in the past 20 years. Gay and Robinson Inc., the last sugar producer on the island, announced in September 2008 that it was ceasing sugar cane operations on Kauai after 119 years.

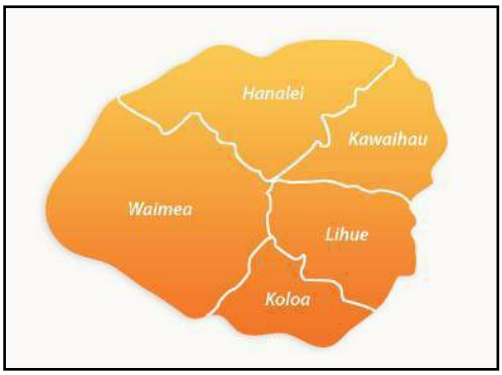
Lands that were once maintained for sugar cane production now lie fallow or have been sold and turned into residential developments. Many of these fallow fields are overgrown with vegetation and surround existing and/or new subdivisions.

Above: Recent residential development in Poipu. More than 4,000 residential units are planned for Poipu, which has a current population of 1,000 permanent residents.

The increase in residential development has led to an interesting juxtaposition: decades-old plantation neighborhoods with modest homes built on small lots are now adjacent to “gentleman farms”–large lots with even larger homes. Many of these newer homes, particularly in areas such as Poipu and Hanalei, are vacation rentals or second homes that are not occupied on a regular basis.

New development combined with year-round balmy weather and spectacular scenery has led to an increase in Kauai’s population. In 2006, the last year for which data is available, an estimated 63,004 people lived on Kauai, an increase of 7 percent from the 2000 Census count of 58,463 residents.

There are five districts on Kauai: Waimea, including the town of Waimea, Hanapepe, Kekaha, and Kokee State Park; Koloa, encompassing Koloa and Poipu; Lihue, including Lihue and Hanamaulu; Kawaihau, encompassing the towns of Kapa’a, Wailua, Kealia, and Anahola; and Hanalei, which includes the towns of Princeville, Kilauea, Ha’ena, and Hanalei.



Map showing the 5 districts of Kauai. Map courtesy of: http://www.hawaiis.com.

Although the town of Lihue (on the southeast coast) is the government seat of the island and home to the island’s main airport and retail centers, it is not the most populous. The largest town population-wise is Kapa’a, six miles to the north of Lihue. About 10,000 people call Kapa’a home. Many of Kapa’a’s residents must drive along Kuhio Highway, known as the Wailua Corridor, to travel between Lihue and Kapa’a for work and shopping. Lihue is the second largest town on Kauai (5,900 residents). Other populated areas include Hanamaulu (3,500 residents) and Wailua Homesteads (4,500 residents). Further up the coast from Kapa’a on the east side, Anahola has roughly 2,250 residents. On the southwest side of the island, Kalaheo has an estimated 4,100 residents. Former plantation towns on the southwest side, such as Hanapepe (2,500 residents), Koloa (1,800 residents), and Waimea (1,800 residents) have smaller populations. Poipu, with its concentration of resorts and vacation rentals, has an estimated year-round population of 1,000.

Figure 1 shows the population density of Kauai. Population densities center around towns such as Kapa'a and Lihue.

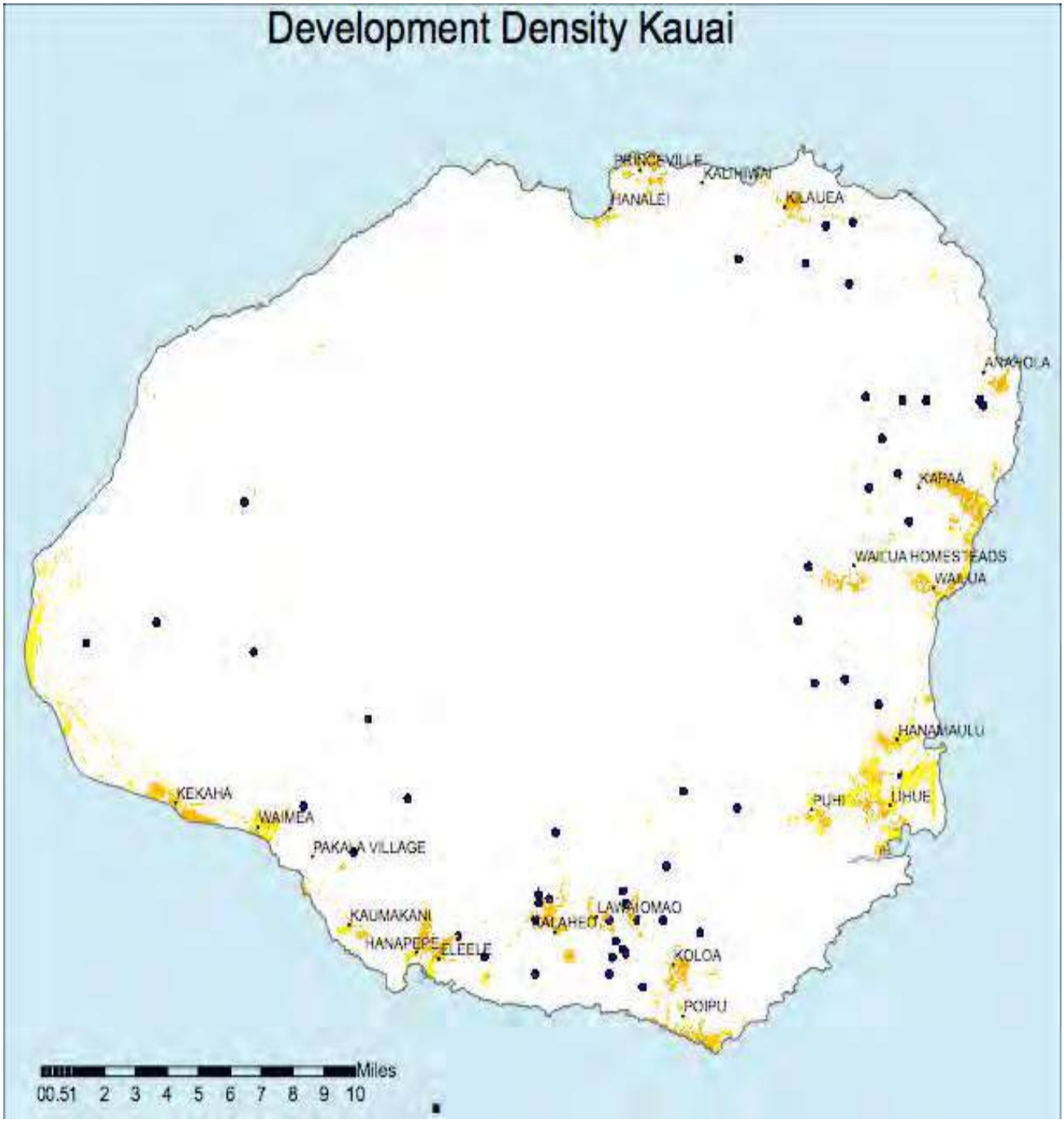


Figure 1: Map illustrating the population density of Kauai. Light yellow represents high-density developed areas while dark yellow represents low-density developed areas. The dots represent dams. Map courtesy of Kauai County GIS.

Figure 2 depicts the largest landowners on Kauai. The State of Hawaii is the largest landholder. Other large landowners include Alexander & Baldwin (including Kauai Coffee Company), Grove Farm, and the Department of Hawaiian Home Lands (DHHL), among others. Although depicted as state land, DHHL owns 20,000 acres on Kauai. Their land holdings include 15,000 acres in the Waimea district, 5,000 in Anahola, and 400 acres in Wailua.

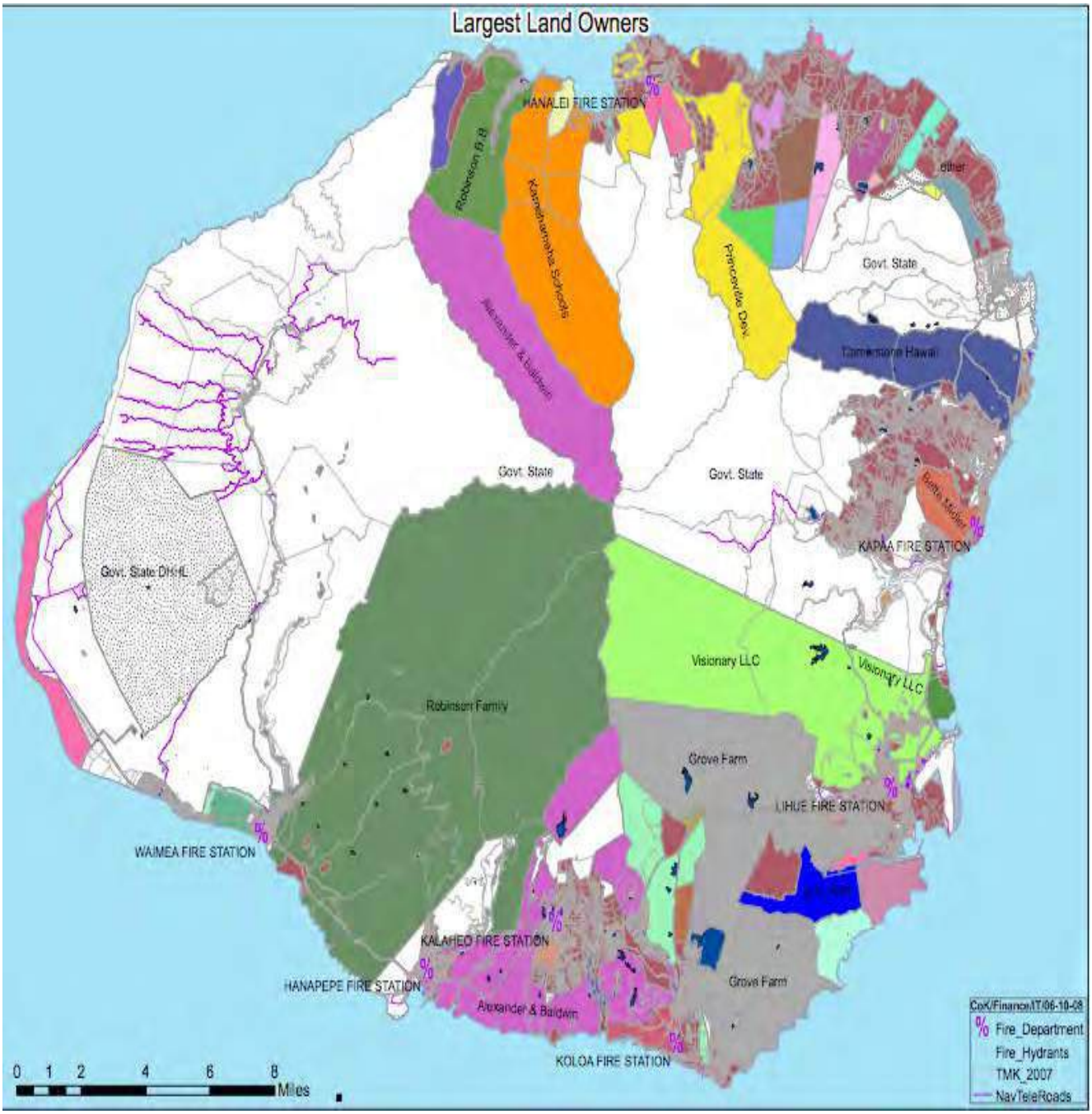


Figure 2: Map showing major landowners on Kauai. White areas represent Hawaii State government lands; grey: Grove Farm; dark green: the Robinson Family; purple: Alexander & Baldwin; light green: Visionary LLC; medium blue: W.H. Rice; orange: Kamehameha schools; dark orange: Bette Midler; yellow: Princeville Development; dark blue: Cornerstone Hawaii. Fire station locations are also shown. Map courtesy of Kauai County GIS.

One of the largest private landowners on island is Grove Farm Kauai with 40,000 acres. Its holdings include the former sugar mill lands of Koloa Mill and Lihue Plantation.

As sugar cane production ceased in the mid-1990s in eastern Kauai, a majority of former Grove Farm sugar lands were leased for cattle ranching, tree farming, and the growing of diversified agricultural

crops such as corn, bananas, and taro. It also built residential developments, including the Puakea subdivision in Lihue, pictured below.

Grove Farm is concerned about the threat of wildfires on its property and stringently requires that all lessees maintain the leased property and the roads therein. According to Mike Tresler, senior vice-president of Grove Farm, the company has evicted lessees who have allowed brush to become overgrown or who have not maintained the roads. In some instances, Grove Farm has brought in cattle ranchers to graze areas when vegetation became overgrown or grew too close to utility poles.

Left: entrance sign to Puako section of the Puakea subdivision in Lihue. Right: typical house in Puako subdivision. Built on former sugar cane lands, Puako was recently developed by Grove Farm Kauai, which has diversified its holdings since the demise of the sugar cane industry.

Despite the demise of the sugar cane industry, agriculture is still a vital part of Kauai's economy. Seed corn, grown primarily in West Kauai and exported to the U.S. mainland, is the island's number one crop in terms of economic value. Other important crops include guava, taro, and coffee. In fact, the largest coffee estate in the U.S. is found on Kauai. Located on the southwest side of the island, Kauai Coffee Company grows 3.5 million pounds of coffee annually (60% of the state's total coffee production) on 3,400 acres. Kauai Coffee Company allows small-scale ranchers to graze in gulches around their property.

Small livestock operations operate around the island raising poultry and hogs for local consumption. Cattle are also raised on Kauai for beef export to the U.S. mainland.

Aside from agriculture, the island's main industry is tourism. Kauai is rich in natural beauty with its steep mountain cliffs, white sand beaches, native forests, and cascading waterfalls. There are numerous state and county parks around the island, including Kokee State Park, Wailua River State Park, and Na Pali Coast State Park. Kokee State Park and Wailua River State Park are situated within the island's wildland urban interface.

While there are no national parks on Kauai, the island is home to the national headquarters of the National Tropical Botanical Gardens (NTBG). The NTBG preserves, conserves, and perpetuates biological resources, such as rare and native Hawaiian plants, as well as cultural and historical resources. Its holding on Kauai include a series of gardens, such as the McBryde Garden and Allerton Garden in Lawai Valley on the south side and the nearly 1,000-acre Limahuli Garden and Preserve on the north shore in Limahuli Valley in Ha'ena. The gardens in Ha'ena and Lawai Valleys contain archeological resources while McBryde Garden is home to the largest ex situ collection of native Hawaiian flora in existence. NTBG also manages the Breadfruit Institute, which with 120 varieties makes it the largest collection of breadfruit in the world.

There are also three national wildlife refuges on Kauai, including Hanalei National Wildlife Refuge, Huleia National Wildlife Refuge, and Kilauea National Wildlife Refuge, all of which are managed by the U.S. Fish and Wildlife Service (USFWS).

Encompassing 917 acres in Hanalei Valley on Kauai's north shore, the Hanalei National Wildlife Refuge was established under the Endangered Species Act to conserve five endangered water birds that rely on the Hanalei Valley for nesting and feeding habitat: the koloa (Hawaiian duck), 'alae ke'oke'o (Hawaiian coot), 'alae'ula (Hawaiian moorhen), ae'o (Hawaiian stilt), and nene (Hawaiian goose). Twenty-seven additional species of native Hawaiian birds and 18 nonnative bird species also use the Refuge.

View of taro fields in Hanalei. While the taro fields are quite lush, the surrounding hillsides are prone to wildfires. Due to the rugged terrain, unattended campfires in this area can spread quickly. Photo credit: tripadvisor.com

Hanalei Valley is surrounded by steep hillsides. Taro farming has been an important crop in Hanalei Valley for 1,000 years. Nearly two-thirds of the state's six million pounds of taro is grown in Hanalei**.** Given the large amounts of water required for taro farming and an annual average rainfall of 62 inches, the risk of wildfire is minimal in the Hanalei Valley area. However, wildfires can and do occur in the surrounding hillsides. Although the area is generally high in moisture, vegetation can dry out in the summer months and during periods of drought, lead to increased wildfire risk.

In August 2008, 50 acres burned in a remote area of Hanakapiai Valley closing the Kalalau Trail, a popular hiking trail. Kauai Fire Department personnel rescued 28 day-hikers via Hanakapiai Beach during the wildfire. The beach is only accessible by the Kalalau Trail or by boat. The blaze may have started by a campfire. Unattended campfires in the Hanakapiai Valley are of concern to officials because of the rugged terrain.

Down the coast from Hanalei Valley, Kilauea Point National Wildlife Refuge juts out into the ocean on Kauai's north shore. The 203-acre refuge encompasses Crater Hill, Makolea Point, as well as the 106-year-old Kilauea Lighthouse, which is on the National Register of Historic Places. The sea cliffs provide nesting areas for native Hawaiian seabirds, including the endangered nene, as well as native Hawaiian plants. Wildfires have occurred in the area in recent years, including one fire started by discarded smoking materials just outside the entrance to the Refuge in 2000.

Above: View of Kilauea Lighthouse. Photo credit: tripadvisor.com

Located on the southwest side of the island by the Menehune Fish Pond, the 241-acre Huleia National Refuge is a flat valley along the Huleia River bordered by a steep wooded hillside. Thirty-one species of birds can be found here. A registered National Historic Landmark, the USFWS purchased the land from Grove Farm in 1973 to provide wetlands for endangered Hawaiian water birds that rely on the Huleia River Valley for nesting and feeding habitat.

Both Hanalei and Huleia Refuges are in river valleys surrounded by steep wooded hillsides. Both Refuges are closed to the public to protect the endangered birds and their habitat. Since the Refuges are private, the threat of human-caused wildfires is reduced. However, it is possible that wildfires that

start beyond the borders of the refuges, can have a debilitating effect. To address this concern, the USFWS has developed fire plans for all three Kauai refuges.

In addition to agriculture and tourism, the military also has a presence on Kauai. The U.S. Navy's Pacific Missile Range Facility (PMRF) at Barking Sands on the western shore past Waimea, is one of the largest employers on the island. Covering nearly 2,385 acres, PMRF is the biggest testing and training missile facility of its kind in the world. PMRF has its own fire department, and there is an established Memorandum of Understanding (MOU) between the County of Kauai and PMRF for assistance in wildland firefighting. PMRF has contract helicopter services which can assist, for a fee, on large wildland and forest fires.

PMRF is surrounded by 6,000 acres of former sugar cane lands. PMRF is undertaking an Agriculture Preservation Initiative working with the State and County to ensure that the lands remain designated for agricultural use.

Infrastructure:

Kauai has well-established infrastructure. The vast majority of roads in subdivisions and municipalities around the island observed during the wildfire hazard assessment are paved. A main highway, Kuhio Highway (Highway 560) on the east side and Kaumuali'i Highway (Highway 50) on the west, runs along the perimeter of the island up to the inaccessible Na Pali coastline.

Above: Roadway in Wailua. Collector roads, such as this one, are required to be at least 56 feet wide in accordance with Kauai County Code.

The County and State maintain the roads. Major roadways on Kauai are greater than 24 feet in width. In fact, Section 9-2.3 of the Kauai County Code, *General Standards for Streets*, mandates that major undivided thoroughfares be at least 80 feet in width while divided thoroughfares be at least 88 feet. Major streets are to be 60 feet wide, collector streets are required to be 56 feet wide, minor streets 44 feet wide, and dead-end streets must be 40 feet wide. Dead end streets longer than 150 feet are required to have room for fire department apparatus to turn around. Private subdivisions must adhere to this code as well.

Property owners on Kauai are required to be connected to the County water system and homes are not allowed to have catchment systems.

All areas of Kauai are on the electric grid. Utilities are above-ground in older neighborhoods and subdivisions. The Kauai Planning Department is responsible for requiring utilities to be placed underground in new residential developments.

Vegetation:

The vast majority of land on Kauai is classified as conservation or agricultural. Figure 3 illustrates state land use zoning on Kauai.

Kauai has more native Hawaiian endangered and threatened plants than any other major Hawaiian island. Ninety-five of the 97 native Hawaiian plant species listed as threatened or endangered as designated under the *U.S. Endangered Species Act* are found on Kauai. [*www.fws.gov/pacificislands/publications/listingplants.pdf*] This is more than three times the number of endangered and threatened plants found on any other Hawaiian island.

In September 2008, the U.S. Secretary of the Interior issued a proposal planning to add 48 additional plants, animal, and insect species found only on Kauai to the federal endangered species list. The proposal also recommended adding 27,674 acres as designated critical habitat for the 48

Kolea is a threatened shrub found only in the forests of Kauai. Photo © M. LeGrande.

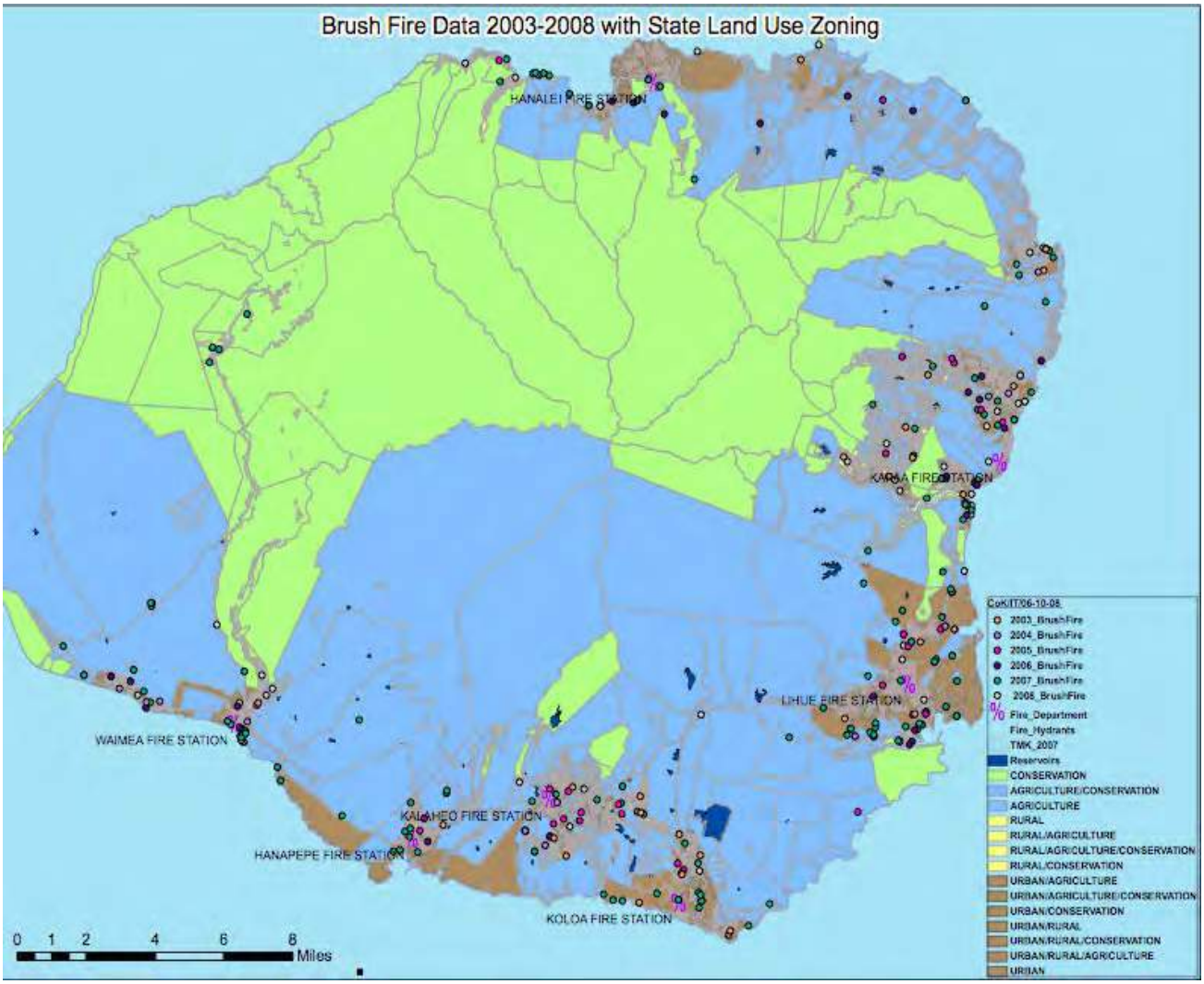


Figure 3: Land use zoning on Kauai The green, blue, and brown areas represent conservation, agriculture, and urban land classifications respectively. Yellow areas are classified as rural. The past five years of wildfire data are also indicated. Map courtesy of Kauai GIS.

species. All but 1,646 of the proposed 27,674 acres are already designated as critical habitat for other species. There is roughly 52,500 acres of critical habitat designated on Kauai. Figure 4 illustrates the location of the critical habitats in relation to recent wildfires.

In 2008, Alexander & Baldwin entered into a 10-year agreement with The Nature Conservancy to manage over 7,000 acres in Wainiha Valley extending into Alakai Swamp and Mt. Wai'ale'ale. This extensive management will help protect the 127 species of rare plants and native forest birds. Some of the endangered plants on Kauai are so rare that there are less than 100 known plants still in existence. Indeed, it is believed that there are only seven mature 'Olulu (*Brighamia insignis*) plants

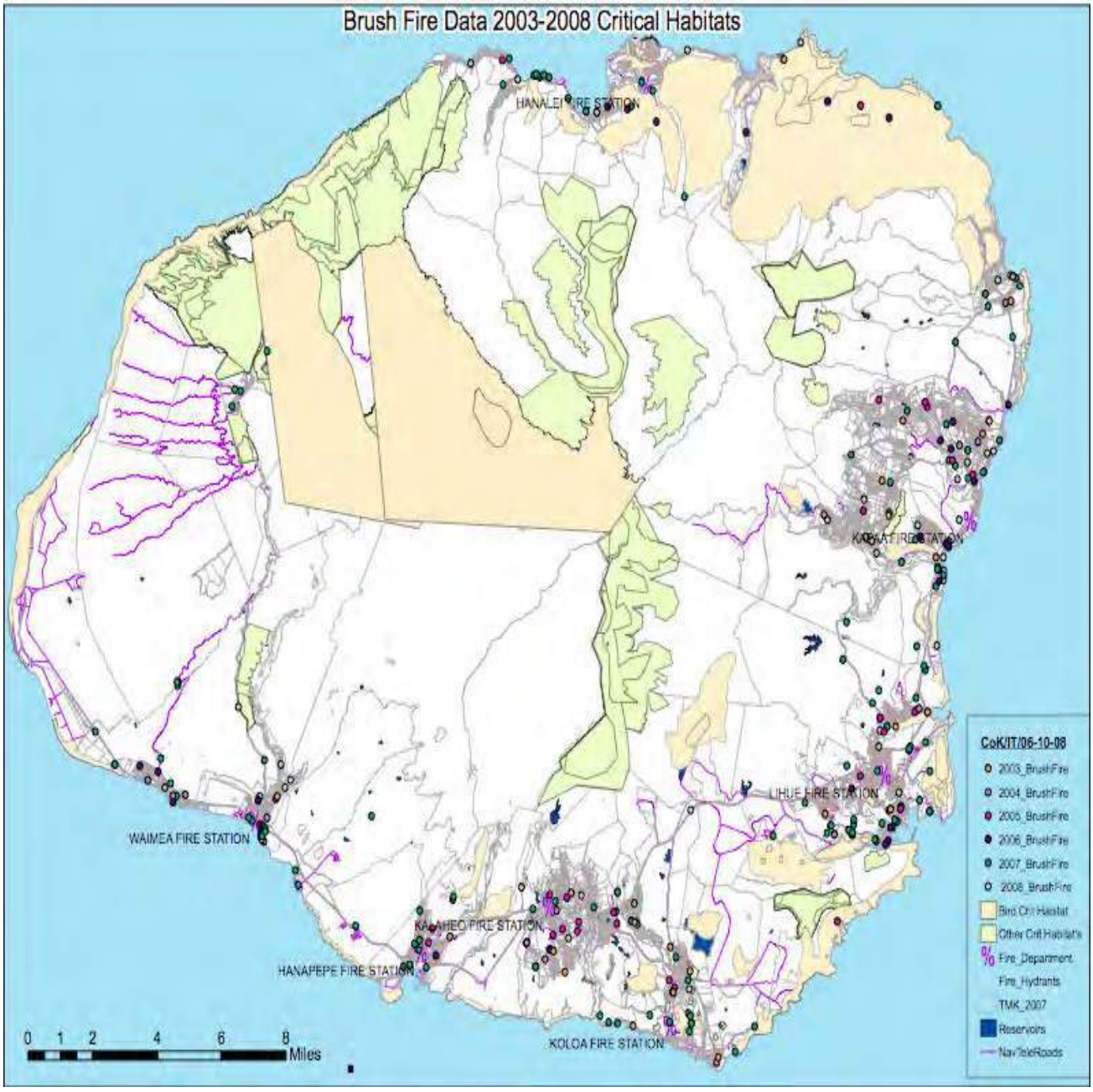


Figure 4: Map depicts areas designated as critical habitats for plants and animals on Kauai, as well as the location of wildfires in recent years. Areas highlighted in peach are bird habitats and those cream in color are other critical habitats. Map courtesy of Kauai County GIS.

remaining in the wild–all found in two locations on Kauai.

Kuawawaenohu (*Alsinidendron lychnoides*) a small flowering plant is found in only three valleys on Kauai with each population having about 10-20 plants.

'Olulu plant. Once found on all four major Hawaiian islands, today it's estimated there are only 7 plants in the wild – all found on Kauai. Photo courtesy of Arkive: © Bill Coster.

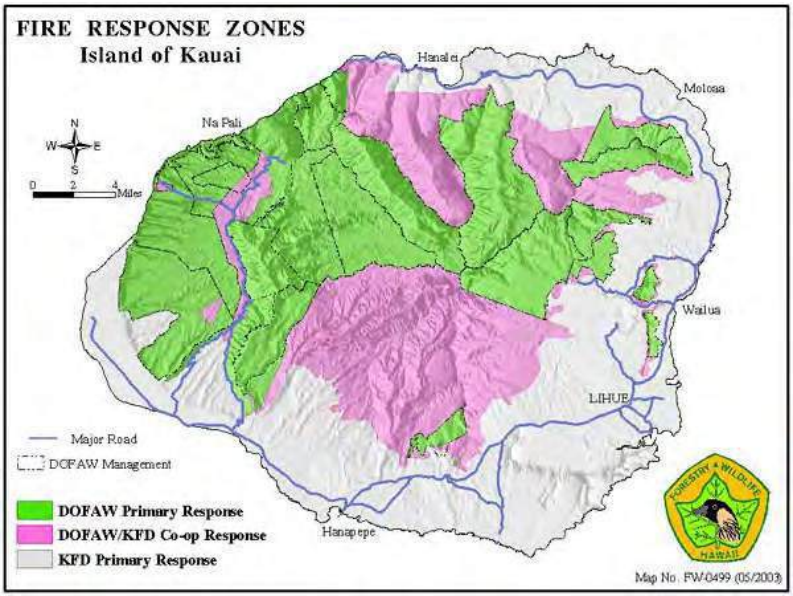
More prevalent than the previous two mentioned plants, Kolea (*Myrsine linearifolia*) is a perennial shrub that can reach 26 feet in height. It can be found in eight locations around Kauai, with the largest number of shrubs found in Kalalau Valley.

Kokee alone contains 57 rare or endangered plant species. Many plants and animals depend on this unique ecosystem for subsistence. State forestry officials maintain 15 plant exclosures. In addition, they maintain the Kokee Rare Plant Facility, where they propagate more than two dozen rare and endangered plant species. Given Kokee's remote location, wildfires have the potential to cause tremendous harm to the native forest ecosystem.

Above left: The Kauai Cave Wolf Spider, an endangered native Hawaiian animal, relies on the endangered Kauai Cave Amphipod for food. Above right: The Hawaiian Hoary Bat is considered Hawaii's only native land mammal. Photo credit: www.earthsendangered.com.

There are also several species of native Hawaiian animals that can be negatively impacted by wildfire. The akepa (*Loxops coccineus*), a small honeycreeper found in forests above 3,000 feet, eats primarily spiders and insects. The Kauai Cave Wolf Spider (*Adelocosa anops*) or Pe'e Pe'e Maka 'Ole is an endangered animal whose main food source is another endangered animal, the Kauai Cave Amphipod (*Spelaeorchestia koloana*). The Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) is considered to be Hawaii's only native land mammal. The hoary bat roosts in trees in forests and open pastures making it susceptible to wildfires.

Marine life found in coastal waters can also be impacted by wildfires. Soil erosion caused by wildfires can lead to runoff, which can eventually end up in the ocean. The resulting sedimentation in the ocean and on coral can negatively impact reefs and local traditional practices for gathering food from the ocean.



Fire Department Resources:

The Kauai Fire Department (KFD) is the primary responder to all wildfires. Existing mutual aid agreements between KFD and other fire agencies

Wildfires on Kauai can lead to soil erosion and r
impacting the reefs and marine mammals. Left p
photo: Jeffrey L. Cooper © 2007.

allow for cooperative responses on fires of mutual concern.

KFD has mutual aid agreements with PMRF, Lihue Airport Crash Fire/Rescue Department and DOFAW. KFD receives grant funding from DOFAW of which the funds can be utilized to organize, train, and equip KFD fire personnel.

A total of 125 personnel staff 7 fire stations around Kauai, with 32-37 firefighters on duty across the island at any given time. An eighth fire station planned for Kealia is scheduled to be built in 2011. Figure 6 shows station wildfire response data per fire station. Between 2003 and 2008 Station #2 (Kapa'a) responded to the most wildfires—170, while station #3 (Lihue) responded to 127 wildfires.

Figure 5: Fire response map for the island of Kauai shows the areas of responsibility for the different fire fighting agencies on island. KFD is the primary responder to all fires. Fire Resource Map courtesy of DOFAW.

Above: Various apparatus of the Kauai Fire Department. Photo credit: left and right pictures DHHL Ronald Licona, center picture KFD.

Left: Poipu fire station. Photo credit: Denise Laitinen. Right: PMRF helicopter providing water drops during an Anahola wildfire. Photo credit: DHHL Ronald Licona.

KFD has 21 apparatus and 14 light trucks, including 11 engines, 7 with slip-on 300-gallon units, 4 tankers, 3 mini-pumpers, 2 Hummers, 2 rescue trucks, and 2 hazardous material vehicles, including an incident command vehicle.

DOFAW has 23 personnel trained for wildland firefighting on Kauai. Their wildland firefighting equipment includes 3 water tenders, a 400-gallon slip-on unit for initial response, two 100-gallon slip-on units for ATVs for initial response, two water pumps, one backhoe, two dozers, one grader, and two portable 1,500-gallon dip tanks. The heavy equipment, (i.e. both dozers, grader, and backhoe) is based in Kokee with the remainder kept at the Lihue base yard.

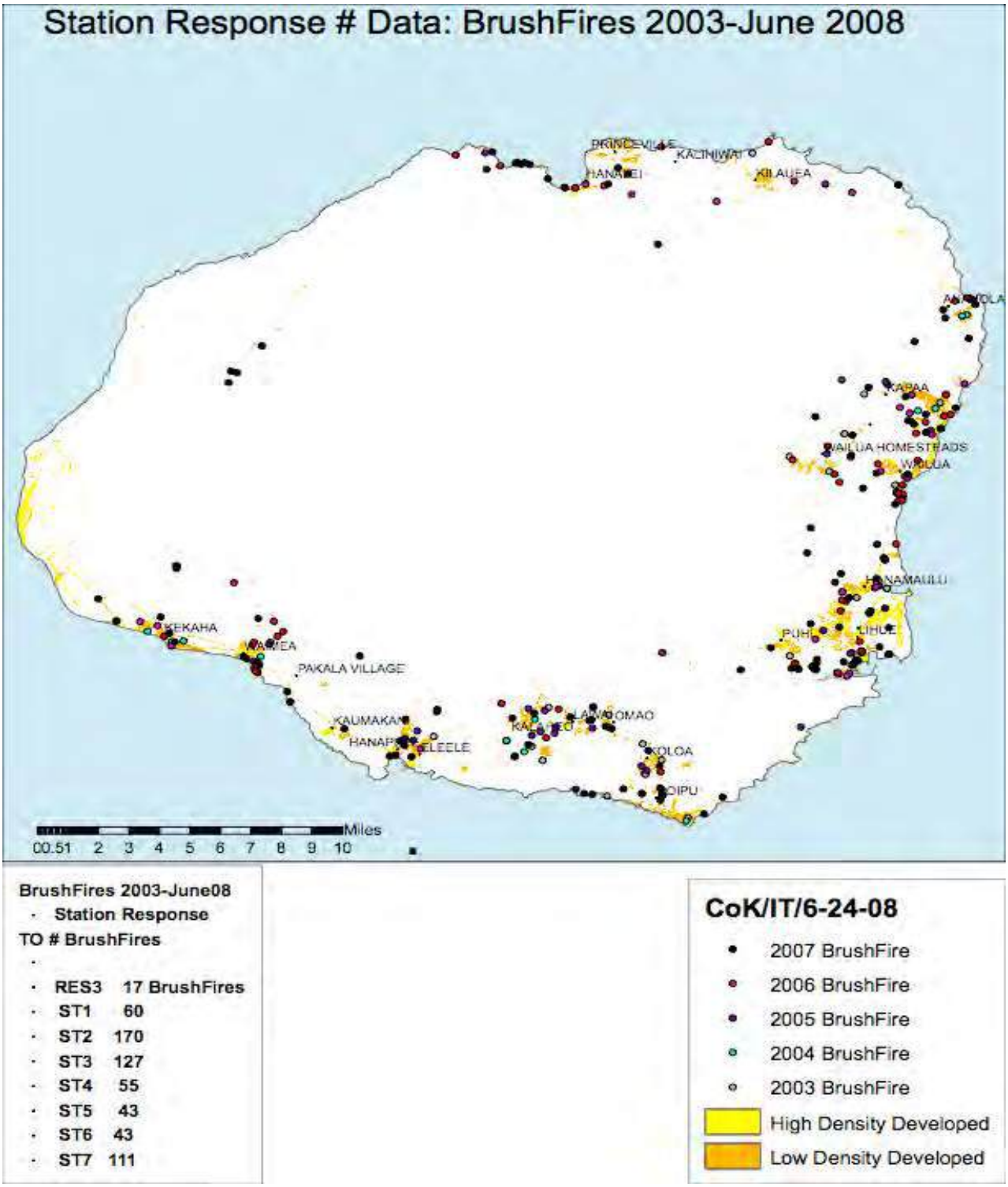


Figure 6: Map illustrating wildfires on Kauai between 2003-2008 and the number of responses per station. Map courtesy of Kauai County GIS.

The most common injury complaints by firefighters in the course of suppressing wildfires on Kauai are dehydration and exhaustion. While not a serious injury on its own, exhaustion can lead to motor skills impairment and slower response to changing conditions. Heart related problems and vehicle accidents

are the two leading causes of line of duty deaths for firefighters nationwide. The more wildfires a community experiences, the higher the probability of one of these situations occurring.

Wildfires on Kauai have been responsible for one death. Since Kauai Fire Department does not have its own rescue helicopter, it contracts with an outside company, Inter-Island Helicopters, for assistance to suppress wildfires. On Christmas Day 2005, a helicopter pilot was killed when his aircraft crashed while conducting water drops on a Hanamaulu wildfire.

Fire History:

Between January 2000 and September 2008 there were 837 wildfires on Kauai[1]. Annual wildfire totals range from a low of 61 wildfires in 2004 to a high of 134 wildfires in 2007, see Table 1.

Wildland, brush, and grass fires tend to spike from May through September with the highest numbers in the summer months of July and August.

[1] [wildfire totals include three categories of fire data collected by KFD: brush or grass fires; forest or wildland fires; and grass fires.]

Table 1: Kauai Fires 2000-2008 per KFD

Year	Number of wildfires [Brush, grass, forest, and wildland fires]	Total # of fires	Percentage of wildfires to total # of fires
2000	101	264	38%
2001	102	262	39%
2002	80	256	31%
2003	103	282	36%
2004	61	207	29%
2005	98	283	35%
2006	76	281	27%
2007	134	336	40%
2008	82	237	34%
Totals:	**837**	**2,408**	**34 percent**

Of note is the large number of wildfires, as well as overall increase of the total number of fires, during 2007. One possible reason for the higher than normal number of wildfires is the higher than normal rain levels the preceding winter, which in turn led to increased levels of fuel load in the wildland urban interface.

Of the 837 wildfires, 45 were larger than 10 acres in size listed in Table 2. Four of the five largest wildfires since 2000 have all occurred in the Kawaihau district. The largest wildfire was a 640-acre blaze in 2003 in Kealia. The second and third largest wildfires both occurred in Wailua: a 2005 fire burned 500 acres and a 2007 blaze burned 300 acres. 2005 also saw the fourth largest wildfire break out in Anahola and burn 270 acres. The fifth largest wildfire burned 200 acres in Hanamaulu in 2006.

A review of the frequency of wildfires shows that Kawaihau and Lihue districts also have the most number of wildfires. Figure 7 shows wildfires per town for the last eight years. Lihue town has the highest number of wildfires—91 since 2000. Anahola came in second with 89 wildfires while nearby Wailua had 83 fires. The remaining top 5 towns, Waimea and Kapa'a, are closely matched: Waimea had 69 wildfires while Kapa'a had 68 fires. Koloa had a surprisingly large number of wildfires: 56. The most frequent cause of the largest wildfires is "other cause" or "undetermined".

Lihue, Anahola, Wailua, Waimea, Kapa'a, and Koloa are all towns surrounded by large tracts of open lands. Maps depicting the ignition component of fuels and the spread component of these fuels can be found in Appendix A.

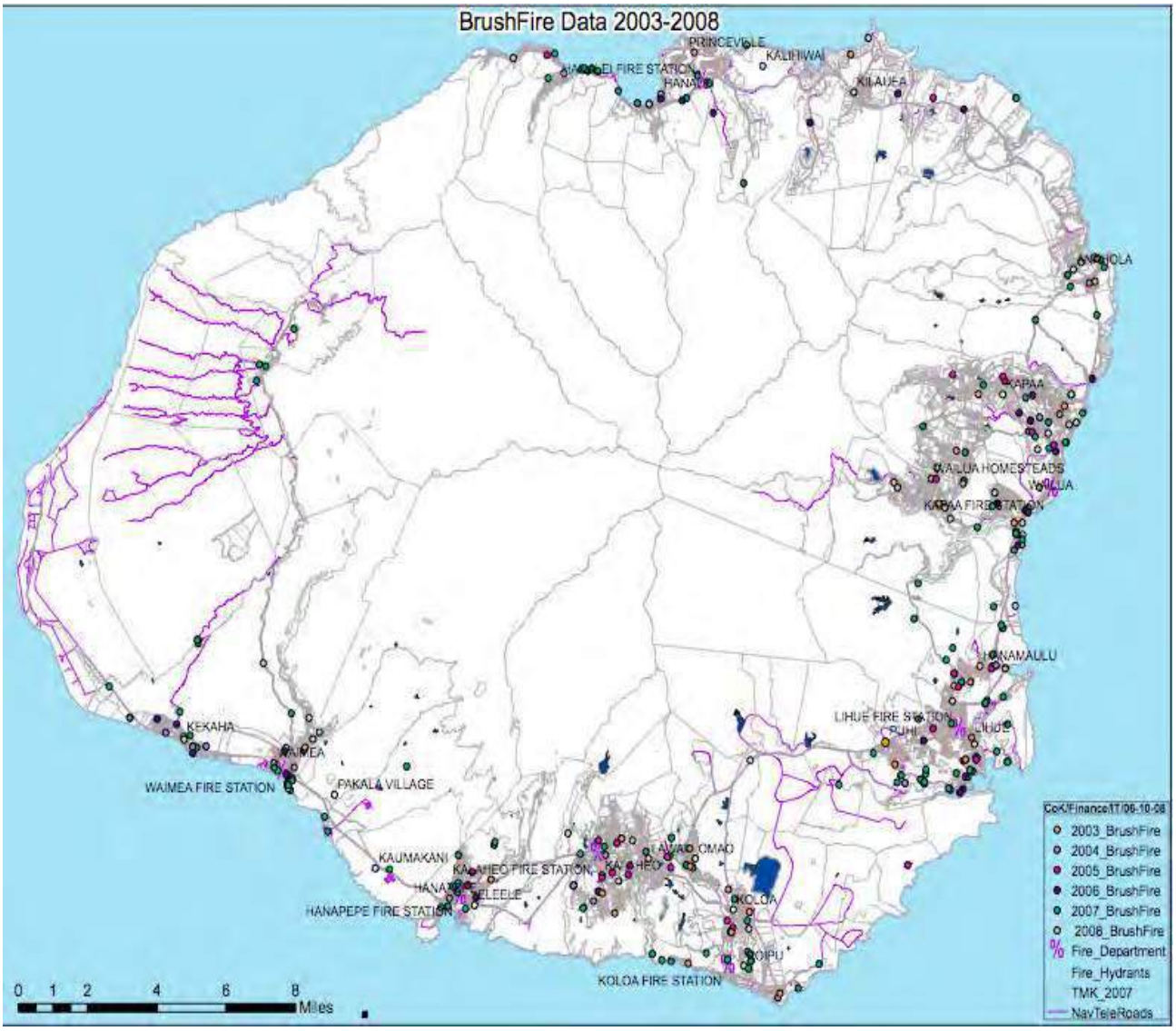


Figure 7: Map illustrating wildfires on Kauai from 2003 to 2008 and fire station locations. Map courtesy of Kauai County GIS.

Table 2: Wildfires Larger than 10 acres on Kauai 2000-2008

(Items in bold represent wildfires larger than 200 acres in size.)

	Date	City	Fire Cause	Acreage burned
1.	3/19/00	Kokee	Undetermined	10

2.	5/7/00	Kealia	Incendiary	12
3.	6/10/00	Kilauea	Other Cause	10
4.	8/6/00	Koloa	Undetermined	40
5.	8/8/00	Puhi	Debris, vegetation burning	10
6.	9/3/00	Puhi	Undetermined	10
7.	9/26/00	Kealia	Equipment	60
8.	5/11/01	Koloa	Smoking	12
9.	5/14/01	Moloaa	Undetermined	10
10.	6/23/01	Anahola	Other Cause	40
11.	9/3/01	Kealia	Other Cause	100
12.	11/25/01	Kealia	Other Cause	105
13.	10/14/02	Koloa	Debris, vegetation burning	20
14.	1/17/03	Lihue	Debris, vegetation burning	10
15.	3/5/03	Waimea	Open/outdoor fire	10
16.	5/26/03	Poipu	Undetermined	12
17.	**7/19/03**	**Kealia**	**Other Cause**	**640**
18.	8/19/03	Lihue	Incendiary	10
19.	9/9/03	Mana	Equipment	40
20.	2/14/04	Anahola	Incendiary	10
21.	7/2/04	Kokee	Incendiary	20
22.	7/6/04	Anahola	Other Cause	20
23.	7/20/04	Anahola	Undetermined	10
24.	7/25/04	Anahola	Undetermined	30
25.	6/3/05	Niumalu	Undetermined	50
26.	6/15/05	Waimea	Undetermined	80
27.	**6/15/05**	**Anahola**	**Misuse of fire**	**270**
28.	7/7/05	Princeville	Undetermined	10
29.	**8/21/05**	**Wailua**	**Undetermined**	**500**
30.	**1/3/06**	**Hanamaulu**	**Undetermined**	**200**
31.	1/5/06	Lihue	Undetermined	50
32.	7/18/06	Poipu	Undetermined	15
33.	3/31/07	Wainiha	Other Cause	30
34.	6/20/07	Wailua	Undetermined	40
35.	**6/30/07**	**Wailua**	**Undetermined**	**300**
36.	7/5/07	Hanamaulu	Undetermined	80
37.	7/5/07	Kapa'a	Undetermined	30
38.	7/8/07	Puhi	Undetermined	30
39.	7/9/07	Lihue	Undetermined	10
40.	7/17/07	Pakala	Debris, vegetation burning	30
41.	7/26/07	Niumalu	Undetermined	75
42.	9/5/07	Hanapepe	Open/outdoor fire	10
43.	9/12/07	Hanamaulu	Other Cause	10
44.	9/12/07	Lihue	Undetermined	10
45.	**10/15/07**	**Poipu**	**Undetermined**	**200**

Table 3: Wildfires per town 2000-2008

Town	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Anahola	**4**	**16**	**6**	**7**	**19**	**8**	**14**	**8**	**7**	**89**
Anini	0	0		1	0	0	0	1	1	**3**
Ele'ele	2	1	3	5	0	1	2	2	1	**17**

Haena	1	1	3	1	0	2	3	1	2	**14**
Hanalei	1	1	3	1	1	0	3	5	1	**16**
Hanamaulu	3	4	2	6	2	3	4	5	5	**34**
Hanapepe	4	3	3	3	1	6	6	7	4	**37**
Hanapepe Heights	2	0	0	0	0	0	0	2	0	**4**
Huleia Valley	0	0	1	0	0	0	2	0	0	**3**
Kalaheo	7	8	6	3	7	11	3	5	3	**53**
Kalihiwai	1	0	0	0	0	0	1	0	0	**2**
Kapaa	3	8	6	6	8	11	8	9	9	**68**
Kapahi	1	3	0	0	0	3	1	0	0	**8**
Kapaia	1	1	1	1	0	2	2	5	0	**13**
Kauai County	0	0	0	0	0	0	0	0	1	**1**
Kaumakani	1	1	1	1	0	1	0	1	2	**8**
Kawelo	0	0	0	0	0	0	0	0	0	**0**
Kealia	8	4	1	2	1	2	1	2	3	**24**
Kekaha	0	3	3	6	5	4	8	6	1	**36**
Kilauea	7	4	3	4	1	2	3	0	3	**27**
Kipu	4	0	0	1	0	0	0	0	0	**5**
Kokee	2	1	1	3	1	2	1	5	5	**21**
Koloa	19	7	6	4	1	7	1	7	4	**56**
Koolau	0	0	0	1	0	0	0	0	0	**1**
Lawai	1	2	4	0	0	1	0	4	0	**12**
Lihue	14	10	6	11	4	10	10	21	5	**91**
Lumahai	2	0	5	2	1	0	1	6	0	**17**
Makaweli & Makaweli Valley	0	2	0	1	0	0	0	0	0	**3**
Mana	0	0	0	4	0	1	1	1	1	**8**
Moloaa	1	1	1	2	0	1	3	1	2	**12**
Na Pali Coast	0	0	0	0	0	1	0	0	0	**1**
Nawiliwili	2	1	1	0	2	3	1	4	3	**17**
Niumalu	0	0	0	3	3	3	3	4	2	**18**
Numila	2	0	0	1	0	1	0	0	0	**4**
Omao	5	4	3	2	0	1	0	2	1	**18**
Pakala	0	0	0	1	0	0	0	3	0	**4**
Poipu	4	3	4	10	2	0	4	10	1	**38**
Polihale	0	0	0	0	0	1	0	0	0	**1**
Port Allen	0	0	1	0	1	0	0	0	0	**2**
Princeville	2	1	2	1	1	1	0	1	0	**9**
Puhi	7	1	5	4	2	2	0	7	1	**29**
Wailua	5	11	9	13	2	10	8	12	13	**83**
Waimea	5	7	3	5	7	12	5	8	17	**69**
Wainiha	0	0	1	1	0	0	1	1	1	**5**
Waipouli	0	0	1	0	0	0	0	0	1	**2**
TOTALS:	**121**	**109**	**96**	**116**	**72**	**113**	**100**	**156**	**100**	**983**

DOFAW maintains separate wildfire data and their wildfire totals vary from those kept by KFD because they only respond to wildfires on state land. Wildfires responded to by both agencies may be counted in each agency's respective statistics.

According to DOFAW data, their personnel have responded to 19 wildfires since 2000. Of those, 11 wildfires were larger than a half-acre in size and 8 fires were smaller than a quarter-acre. The two largest wildfires were both in Kalepa: a 310-acre blaze in 2005 and a 220-acre fire in 2007. A 2003

wildfire burned 50 acres in Kekaha. Table 4 lists wildfires reported by DOFAW since 2000 with the three largest fires in bold. Table 4 also shows the response zone (refer to Figure 5).

Nine fires occurred in Kokee State Park. Puu Ka Pele Forest Reserve had 5 fires, 3 occurred in Kalepa, and one each in the Na Pali Forest Reserve and Kekaha.

Although fire cause is not included in DOFAW fire reports, they do record the type of fuel burned. The most commonly burned fuels are: koa, eucalyptus, and haole koa. Guinea and molasses grass, java plum, silk oak, pine trees, and waiawi were other vegetation types that burned during fires. Figure 8 illustrates the locations of wildfires responded to by DOFAW staff.

Table 4: Kauai wildfires from 2000-2008 per DOFAW

	Date	**Location**	**Acreage burned**	**Response zone (green, pink or white)**
1.	8/1-3/07	Kalalau Valley, Na Pali Forest Reserve	1	green
2.	7/24-26/07	Puu Ka Pele Forest Reserve	1	pink
3.	**6/30-7/3/07**	**Kalepa**	**220**	N/A
4.	5/4-06/07	Kalepa	12	N/A
5.	2007	Kokee State Park – Makai Hunter Check Station	.1	pink
6.	2007	Kokee State Park, Polihale Ridge Rd.	.1	pink
7.	2007	Kokee State Park – Halemanu Rd.	.25	pink
8.	6/10-11/06	Puu Ka Pele Forest Reserve – Pua Lua Reservoir	.2	pink
9.	**8/21-26/05**	**Kalepa Forest Reserve**	**310**	white/green
10.	9/15-16/05	Kokee State Park – Kukui Trail	.1	pink
11.	3/8-9/04	Kokee State Park – Faye Rd.	.1	pink
12.	**9/9-10/03**	**Niu Ridge, Kekaha Game Management Area**	**50**	white
13.	6/30-7/1/03	Kokee State Park	.50 ace	green
14.	6/25/03	Kokee State Park	.20 acre	green
15.	3/21-23/03	Makaha Ridge Puu Ka Pele Forest Reserve	2	green
16.	6/17-19/02	Kokee State Park	.5	green
17.	10/21-23/01	Puu Ka Pele Forest Reserve	<.1	green
18.	3/19-4/4/00	Makaha, Puu Ka Pele Forest reserve	5	green
19.	3/13/00	Kokee State Park	.1	pink

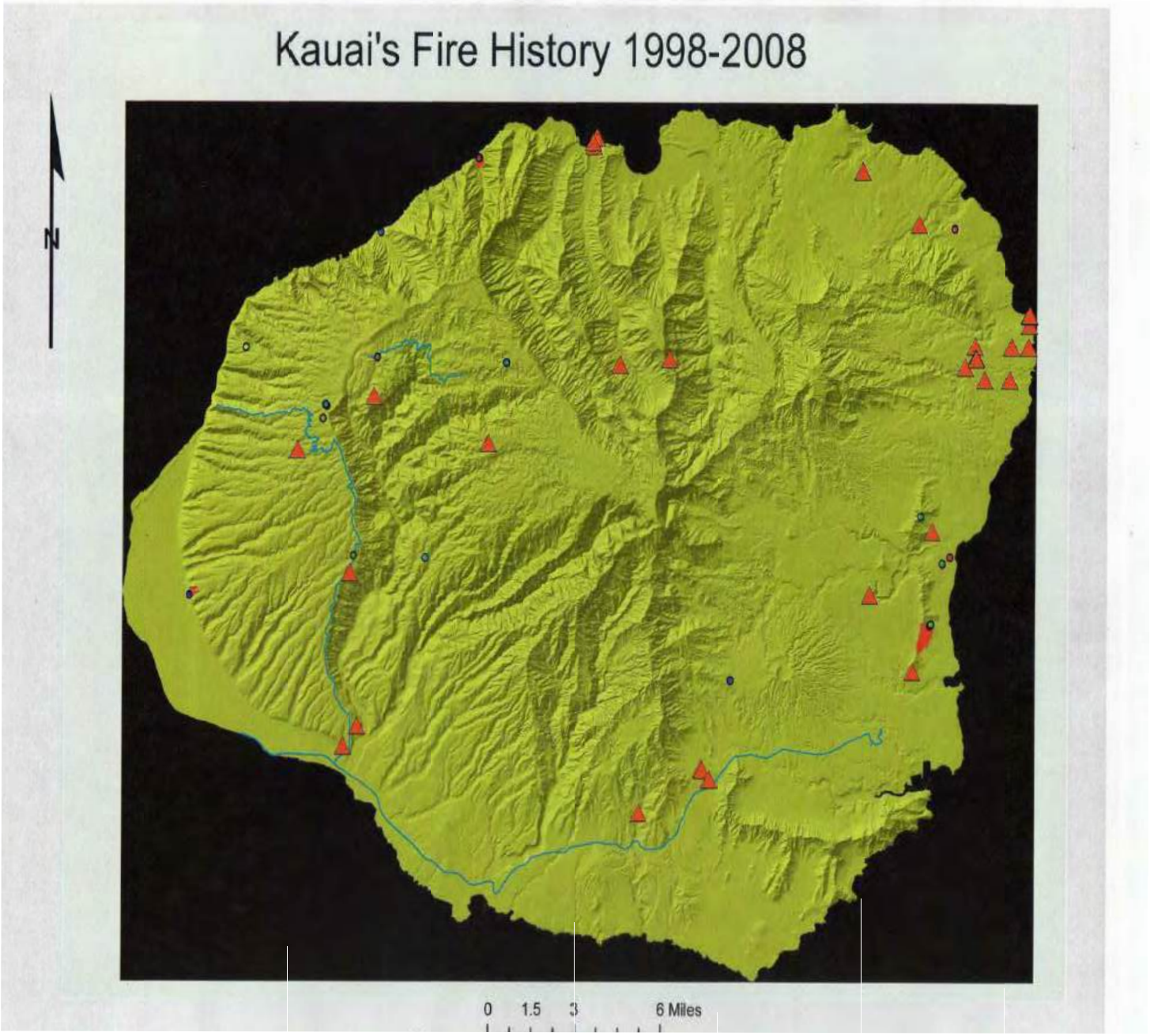


Figure 8: Map illustrating the location of wildfires responded to by DOFAW staff. Map courtesy of DOFAW.

As the charts above illustrated, Lihue, Anahola, Kapa'a/Wailua, Waimea, and Koloa have the highest wildfire occurrences on Kauai. These wildfires have threatened homes and residents, closed major highways to traffic, and strained fire response agencies resources. Although the official cause of the majority of wildfires is undetermined, anecdotal evidence suggest that the majority of wildfires are human-caused.

Human-caused fires are particularly troublesome because they can be prevented. Kauai fire officials described an event in the late 1990s during which witnesses on a boat at sea saw a suspect set fires in Kokee at night. The witnesses saw headlights coming down the mountain, saw the vehicle stop and

shortly thereafter, a fire was observed. The car travelled down the mountain stopping periodically, and at every stop flames erupted. They quickly contacted the authorities, however the suspect reached the main highway and fled before he could be apprehended.

Because the wildfires were spotted quickly, they were extinguished before they could grow out of control. Given the late hour and remote location, these remote area fires could have spread quickly with serious consequences.

In 2008 a lost hiker set a signal fire along the fence line of a native plant enclosure. The hiker was rescued by helicopter, but not before several species of plants were burned. The fire burned five acres.

Arson and human-caused wildfires are also a concern in Anahola, because on several occasions they have come dangerously close to homes. In 2001 there were three wildfires in Anahola greater than 40 acres in size, all juvenile arson related. The juveniles responsible for setting the wildfires were eventually apprehended by the police.

A September 2001 fire in Anahola, which started in an abandoned vehicle on Kealia Road, burned 100 acres. Soon after, in November 2001, another wildfire scorched 105 acres in Anahola, threatening several homes.

Above left and right: A June 15, 2005 wildfire burned 270 acres and came dangerously close to homes in Anahola. Photo credit: Kauai Fire Department.

Large wildfires are an issue because they take fire department resources away from other parts of the island. According to fire officials, at one point during the suppression of the November 2001 Anahola fire, there were no firefighters at Kapa'a, Koloa, Kalaheo, and Waimea fire stations.

"When several engine companies are taken out of their home districts to suppress fires in Anahola, large areas of the island are left without adequate or timely fire, rescue, and emergency medical protection," Battalion Chief Bob Kaden said in media reports on the fire. (*The Garden Island Newspaper*, November 27, 2001.)

Fire resources and personnel were strained yet again on June 15, 2005 when wildfires erupted at opposite ends of the island within hours of each other.

A blaze broke out around noon on June 15, 2005 off of Waimea Canyon Road, burning 80 acres. A few hours later another wildfire started in Anahola. The Anahola fire, which burned 270 acres, came close to several homes. Media reports described tall guinea grass in close proximity to many homes in the Anahola area.

On January 5, 2006, three wildfires were intentionally set by youth within a two-hour period in the early morning hours in Anahola and burned approximately 3 acres. According to press reports, the blaze came within 100 feet of several homes.

On the same day a 50-acre wildfire off Ahukini Road near the Lihue airport threatened 300 rental cars in an inventory overflow lot. Fortunately, fire department personnel were able to knock down the blaze before it reached the rental cars and the gasoline stored in the gas tanks. Tall guinea grass reportedly surrounded the parking area.

Above left: An August 2005 wildfire in Wailua burned 500 acres. The cause of the blaze, the second largest on the island in the past 10 years, was undetermined. Fires of this magnitude strain resources and personnel across the island. Photo credit: Kauai Fire Department.
Above right: Helicopter suppression of an Anahola wildfire. Photo credit: Roland Licona, DHHL.

While fire crews were dealing with the Anahola and Ahukini Road wildfires, another blaze broke out in Hanamaulu under the Kapule Highway Bridge. Although this fire was small in size—fire report data list it under an acre in size—the additional strain on fire department resources and personnel was a burden.

On June 30, 2007, four fires occurred in one day in Hanapepe, Hanalei, Lihue, and Wailua. While the wildfires in Hanapepe, Lihue, and Hanalei were small (an acre or smaller), the Wailua fire burned 300 acres in just a few hours. According to press reports, this fire was less than a mile from a wildfire that had burned 40 acres the preceding week.

Wildfires in the Wailua area are of special concern because they can shut down Kuhio Highway, known as the Wailua Corridor, the main roadway connecting the west and east sides of the island. Kapa'a is the largest residential town on the island with commercial and residential traffic dependent on traveling between Lihue and Kapa'a.

When the Wailua Corridor is closed to traffic due to wildfire, as has happened several times in the past, it has a tremendous impact on residents and tourists alike. When wildfires cause the closure of Kuhio Highway it disrupts the transportation of goods and services around the island, prevents residents from traveling to and from work, and prevents visitors from reaching their departing flights at the airport. Perhaps most importantly, Kuhio Highway closures can prevent people from reaching the emergency room of the island's largest medical facility, Wilcox Memorial Hospital in Lihue.

Another wildfire concern on Kauai is the illegal dumping of trash and cars, particularly in Anahola.

Abandoned vehicles can still contain gasoline and flammable liquids, and compounds in the vehicle frame, upholstery, and tires can become toxic when burned. During a 2004 wildfire hazard assessment of Anahola, Kauai Fire Department personnel estimated there may be over 100 abandoned vehicles in the open fields surrounding Anahola. When driving the perimeter of the open fields these vehicles are hard to see in the dense overgrown brush, thus posing a hidden danger. Removing the cars is problematic because they are considered hazardous materials and require Environmental Protection Agency (EPA) oversight. According to DHHL personnel, during a July 2004 wildfire in Anahola, several abandoned cars caught fire and explosions could be heard when the car tires exploded.

Above left and right: abandoned cars discovered after a wildfire in Anahola. The vehicles pose a serious threat to fire crews battling blazes. Photo credit: Roland Licona, DHHL.

Dumped trash can also pose problems when wildfires break out. The trash itself can contain a host of unknown hazards, including chemical and/or biological matter that can impact the health of responding fire crews and area residents. The sheer physical size and/or location of the trash is also a concern as it has hindered firefighters from responding to at least one fire.

During an April 2005 wildfire near the Anahola Kahala Point Coast Guard light beacon responding fire crews needed to move household appliances from the access road in order for apparatus to reach the fire. One apparatus suffered a flat tire responding to the fire. The combination of large quantities of abandoned vehicles and illegally dumped trash plus large amounts of overgrown brush and a high rate of fire occurrence, make Anahola especially vulnerable when wildfires erupt.

Above left: Discarded rubbish is an issue in Anahola where it has hindered firefighters' ability to reach wildfires. Above right: Discarded rubbish and appliances litter a fire scene at a June 20, 2001 fire. Photo credit: Roland Licona, DHHL.

Stakeholders:

Stakeholders are individuals or groups who have a high level of interest in the protection of their assets from wildfire. In addition to community members and federal, state, and county fire response agencies, major landowners have an interest in reducing the wildfire risk on Kauai. Contact information for principal stakeholders is listed below.

Federal:

U.S. Fish & Wildlife Service
Shannon Smith, Refuge Manager
Kaua'i National Wildlife Refuge Complex
P.O. Box 1128, Kilauea, HI 96754
(808) 828-1413
Shannon_smith@fws.gov

U.S. Navy Pacific Missile Range Facility (PMRF)
Barking Sands Fire Department
Robert Cecconi, Fire Chief
P.O. Box 399, Kekaha, HI 96752
(808) 335-4867
robert.cecconi@navy.mil

State:

Department of Land and Natural Resources: Division of Forestry and Wildlife
Wayne Ching, State Protection Forester
1151 Punchbowl St., Rm. #325, Honolulu, HI 96813
(808) 587-4173
Wayne.F.Ching@hawaii.gov

Department of Hawaiian Home Lands
Roland Licona, Kauai District Supervisor
3060 Eiwa St., Rm. #203, Lihue, HI 96766
(808) 274-3132
Roland.e.licona@hawaii.gov

County:

Kauai County Fire Department
Robert Westerman, Fire Chief
3083 Akahi St., Lihue, HI 96766
(808) 241-4982
rwesterman@kauai.gov

Kauai County Civil Defense Agency
Mark Marshall, Administrator
3990 Kaana St., #100, Lihue, HI 96766
(808) 241-1800
mmarshall@kauai.gov

Kauai Planning Department
Bryan Mamaclay, Planner
4444 Rice St., Rm. #473, Lihue, HI 96766

(808) 241-6677
bmamaclay@kauai.gov

Community:

Grove Farm Kauai
Mike Tresler, Senior Vice President
3-1850 Kaumualii Highway, Lihue, HI 96766-7069
(808) 245-3678
mtresler@grovefarm.com

Kauai Coffee
Greg Williams
P.O. Box 530, Kalaheo, HI 96741
(808) 335-0052
gwilliams@kauaicoffee.com

Garden Isle RC&D
Laurie Ho, Coordinator
Garden Isle Resource Conservation and Development Council (RC&D)
3083 Akahi St., #204, Lihue, HI 96766
(808) 246-0091
Laurie.Ho@hi.usda.gov

Forestry Management Consultants-Hawaii
Stephen E. Smith
P.O. Box 351, Lawai, HI 96765-0351
(808) 332-5200
forestry@hawaiiantel.net

Hui O Laka, Kokee Natural History Museum
Marsha Erickson / Michelle Hoohano
P.O. Box 100, Kekaha, HI 96752
(808) 335-9975
Kokeemuseum@earthlink.net

Kokee State Park Advisory Council
Canen Ho`okano, Chair
ku_nahau@msn.com
kokeeadvisory@gmail.com
www.kokeeadvisory.org

Bill Cowern
P.O. Box 649, Lawai, HI 96765
treefarm@halekua.com

Base Map of Kauai:

Figure 9 shows a base map for the island of Kauai. Towns, major highways, and major tourist destination areas, such as the Poipu resort area and the Coconut Coast near Kapa'a are shown. State parks and forest reserves are illustrated in shades of pink and red.

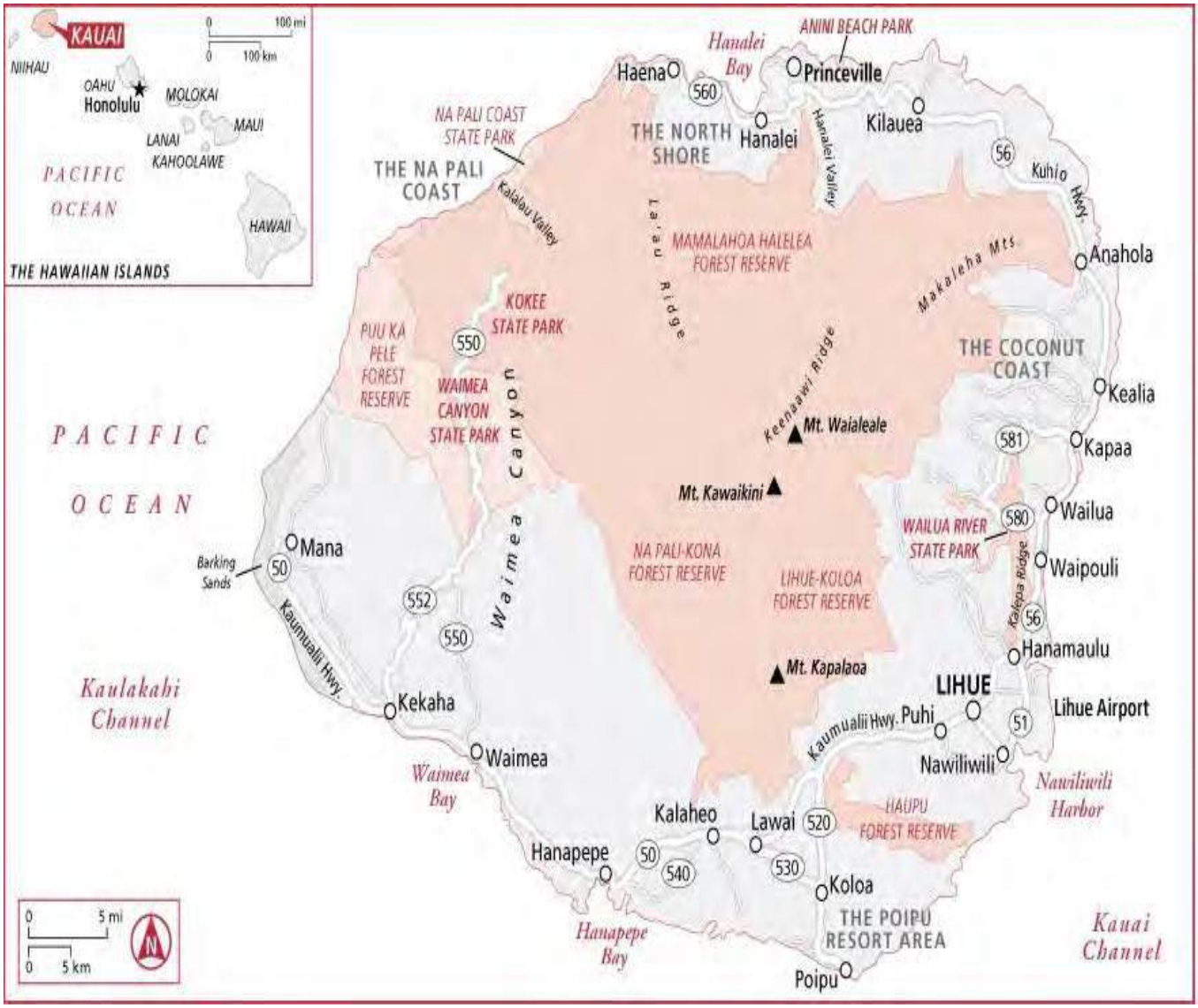


Figure 9: Base map of Kauai, showing the locations of towns, forest reserves, and highways. Map credit: frommers.com

Fire Risk Assessment for Kauai:

A wildfire hazard assessment was conducted to identify the level of wildfire risk for communities on Kauai. The Hawaii Wildland Fire Risk and Hazard Severity Assessment was used for this CWPP, which is based on the Assessment in Appendix A of NFPA 1144, *Standard for Protection of Life and Property from Wildland Fire*.

Using a pre-established point system, the Hawaii Wildland Fire Risk and Hazard Severity Assessment is a tool used to determine the level of wildfire risk to a home or community. Points are given regarding overall terrain and location, road width, local area fire history, prevailing winds and seasonal weather, geographical contours, native vegetation, water availability, location of fire suppression resources, as well as the combustibility of building materials, including the roof, siding, and attached items, such as decks, fencing, or an unit. The combined points in all these categories are added together and the overall risk is determined by whether the score falls in the low-, medium-, high-, or extreme-risk point range. Given the ignitability of individual structures, preponderance of open tracts of land full of overgrown fire fuels in close proximity to structures and communities, lack of water in reservoirs, and high rate of human-caused fires, the communities on Kauai scored in the high-hazard range in the wildfire hazard assessment.

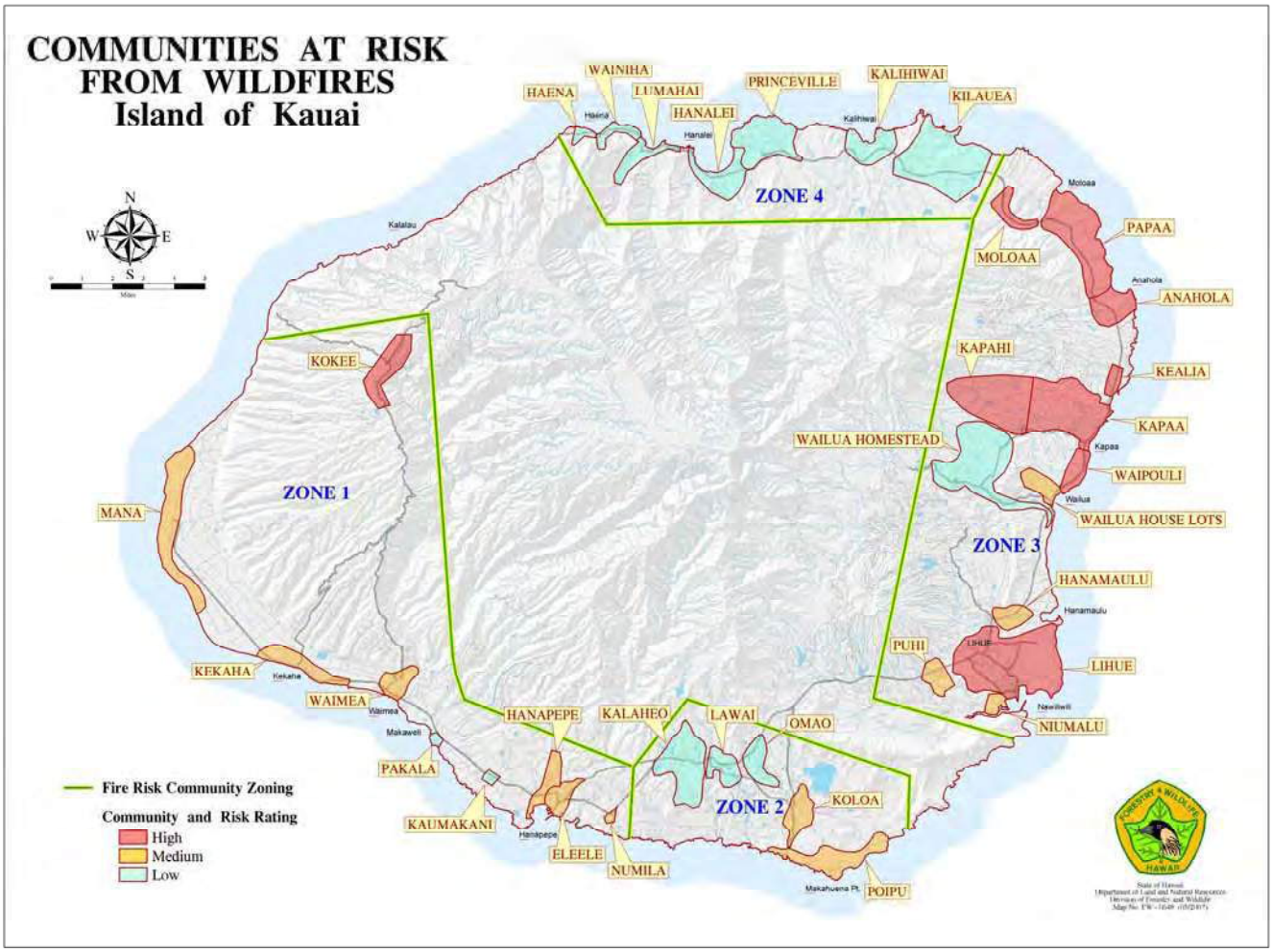


Figure 10: Kauai DOFAW staff created the above map illustrating communities at risk from wildfires based on the 2001 Federal Register: "*Urban Wildland Interface Communities Within the Vicinity of Federal Lands That Are at High Risk From Wildfire,"* (Volume 66, Number 160). Map courtesy of DOFAW.

While the island as a whole shares certain common characteristics, the communities within it vary tremendously and deseve separate description in terms of slope, size, and water availablity. Figure 10 illustrates the communities at risk from wildfires around Kauai. The island is broken down by district with descriptions provided below.

Common characteristics around the island:

With the exception of the higher elevations, such as Kokee which are cooler, most of Kauai experiences year round warm weather with temperatures ranging from the mid-60s to high-80s. Relative humidity is usually above 50 percent year round. Rainfall tends to be evenly spread out throughout the year with the least amount of rainfall occurring in the summer months.

In 2008, Kauai experienced lower than normal rainfall. Mt. Wai'ale'ale received only 352 inches of rain, 83% of its normal level. Reduced rainfalls result in a higher-than-normal risk of wildfires, especially in the dry summer months.

Streets are paved and more than 20 feet wide (see Infrastructure). With the exception of extremely rural and remote areas, such as Kokee, roads are well marked with metal reflectorized signs.

Four percent of the island's land classified as urban has been developed although there is growth in non-urban lands. Kauai's Comprehensive Zoning Ordinance stipulates that no building can be taller than 55 feet (4 stories). Minimum setbacks to property lines are generally allowed for residential construction. The Comprehensive Zoning Ordinance requires a setback of 10 feet from the front of a property, 5 feet or one-half the wall height from the side, and 10 feet from the rear.

While there is no one housing standard for the entire island, the older plantation towns around Kauai (Kalaheo, Koloa, Kekaha, Kapa'a, Hanamaulu, Lawai, and Waimea to name a few) tend to share similar characteristics. The neighborhoods have homes on small lots (10,000-12,000 square feet.) Houses tend to be single story, with metal or other Class A type roofing and combustible siding, have small louvered windows, and are of post and pier or concrete construction. Driveways are short (less than 100 feet) and paved with little or no turn around space for fire apparatus. Driveways are usually 10-12 feet wide with 15 feet vertical clearance. Ornamental vegetation around yards is well established and the maintenance of such vegetation varies greatly depending on the homeowner. Utilities are above ground.

In older neighborhoods fire hydrants tend to be 1,000 feet apart or have a standpipe connected to a 3-inch pipeline. Agriculturally zoned subdivisions are also allowed to have stand pipes. However, new subdivisions are required to have one fire hydrant every 300 feet with an 8-inch line per Kauai Department of Water Supply standards.

It is important to note that in recent years the reservoirs around Kauai have been allowed to run dry. In March 2006 the Kaloko Dam (an earthen dam) near Kilauea breached and the resulting mudflow destroyed homes, closed the highway, and severely impacted the island as a whole. Seven fatalities also occurred. State and federal agencies conducted assessments of all dams and reservoirs on Kauai after the Kaloko dam break. Some reservoir owners voluntarily drained their reservoirs while others were allowed to run dry. While dam safety is an important issue, officials would be wise to address the consequences of allowing these dams to remain dry.

Hanalei District

Hanalei district on Kauai's north shore encompasses the towns of Hanalei, Princeville, Wainiha, Kilauea, Moloa'a, and Ha'ena, and

small neighborhoods in between.

Cultural, natural, and historical resources in this district include the Kilauea Point National Wildlife Refuge and Lighthouse, Na Pali Coast, Kalalau Trail, Makana Peak, Manininiholo Dry Cave, Waikanaaloa and Waikapalae Wet Caves, and the Waioli Mission House.

The district is home to Kula High and Intermediate school, three elementary schools, one middle school, and smaller private schools.

View of Hanalei Bay. Photo credit: tripadvisor.com

The Robinson Family, Kamehameha Schools, Alexander & Baldwin, Department of Hawaiian Home Lands, and Princeville Corporation are some of the larger landholders in the district.

There is one fire station in the district, adjacent to the Princeville Shopping Center. Nearby is Princeville airport that serves as a hub for helicopter tour companies. There is a steep drop in elevation between Princeville and Hanalei town. A one-lane bridge across Hanalei River at the bottom of this ridge is the only means of access to Hanalei and Ha'ena.

There are gently rolling hills in the area surrounded by steep mountain ridges. The land slopes from the mountains to the ocean. Normal trade winds blow from the east-northeast averaging 5 – 15 mph.

Kuhio Highway, a two-lane paved major highway maintained by the State Department of Transportation, is the only major road connecting Kauai's north / northeast shore with the rest of the island. Kuhio Highway dead-ends at Ke'e Beach at the base of the Na Pali coastline. Residential and commercial development tends to be on the makai (ocean) side of the highway, with smaller amounts of residential and agricultural development on the mauka (mountain) side of the highway.

Along the coastal areas of Hanalei, Princeville, and Anini lot sizes are small (usually less than an acre). Residential areas mauka of the highway tend to be larger in size. There are several horse ranches and public riding stables in the district and some property owners have livestock, including horses, sheep, and/or goats. There are several active commercial agricultural operations in the district, which are well irrigated. However, a great deal of former agricultural lands are being developed with large up-scale homes that do not practice any agriculture.

Hanalei church. Photo credit: www.tripadvisor.com

High-end residential development around the luxury resorts in Princeville is in sharp contrast to the more modest homes found in surrounding towns. As of June 2009, real estate listings for single family homes in the Hanalei district range from $400,000 - $20,000,000+. Vacation home rentals are prevalent in the area, especially in Hanalei, Princeville, and Anini.

Although there is a strong anti-development sentiment in the Hanalei district, in recent years several subdivisions have been built on former agricultural land. These newer subdivisions tend to have house lots larger than an acre (often 5 – 10 acres) with well-maintained landscaping. Driveways are typically paved, at least 12 feet wide with15 feet vertical clearance, are often more than 300 feet long, and are usually gated. The majority of homes have Class A (non-combustible) roofing and wood siding.

Roads are paved and greater than 20 feet in width. There are several subdivisions in the district (Princeville Ag lots, Seawind Farms in Moloa'a, Kilauea Ag subdivision, and others) that has only one

means of egress and ingress. Utilities are aboveground in older neighborhoods and underground in newer ones. Side streets in the district are paved and marked with metal reflectorized signs.

Additional development is planned for Hanalei district. Princeville Corporation's master plan calls for conservation and residential development for the hundreds of acres of undeveloped land it owns on the north shore. However, this residential development is low-density and requires residents to utilize cattle grazing as a means of fuel reduction. In Hanalei, they plan to expand the taro field. There is also a plan to dedicate 8 - 12 acres as a wetland preserve.

The main plan also calls for an agricultural subdivision east of the highway between the existing gates of Princeville and Anini Vista, past the Prince Clubhouse and Spa. This latest subdivision will have 17 lots ranging from 10-30 acres each. Lot owners will be required to devote one-half to one-third of their land to cattle grazing.

Kawaihau District

The Kawaihau district comprises the towns of Kealia, Waiopouli, Wailua, Anahola, and Kapa'a. Natural and cultural resources include Nounou Mountain ridge commonly called Sleeping Giant, Opaekaa Falls, Keahua Forestry Arboretum, the Fern Grotto, and Wailua Falls. As the only navigable river in Hawaii, Wailua River is a popular kayaking location for tourists and locals alike. And as one of the first areas on Kauai inhabited by migrating Polynesians thousands of years ago, the Wailua River Valley is rich in archeological sites as well.

View of coastline in Kapa'a, which is often referred to as the Coconut Coast.

Schools in the Kawaihau district include Kapa'a Educational Complex; Kapa'a High, Intermediate, and Elementary Schools; Kamehameha School campus; and private schools.

There is one fire station in the district, in Kapa'a.

The largest landowner by far in this area is the State of Hawaii. Cornerstone Hawaii, Grove Farm, Bette Midler, and the Department of Hawaiian Home Lands are also large landowners.

There are gently rolling hills in the area surrounded by steep mountain ridges. The land slopes from the mountains to the ocean.

Downtown Kapa'a. Shops on the makai side of the street are a few hundred feet of the ocean. Behind the businesses on the mauka side of the street are large empty fields filled with overgrown brush.

There are large open fields of overgrown brush in Wailua and Kapa'a. In several areas, this brush continues up hillsides to homes. The brush also comes close to the roadsides. Normal trade winds blow from the east-northeast averaging 5 – 15 mph.

Kuhio Highway, a two-lane paved major highway maintained by the State Department of Transportation, is the only major road connecting Kauai's east shore with the rest of the island. A section of the highway is three lanes wide in front of the prison and golf course. Commercial development tends to be along the highway, with residential and agricultural development on the mauka (mountain) side and inland of the highway.

Overgrown grass and kiawe along the mauka side of the Wailua Corridor between Wailua and Lihue.

On the makai side of the Wailua Corridor there are hotels and a golf course while the mauka side is vast open fields of overgrown brush. The island's only prison is directly across from the golf course on the mauka side of the highway. Surrounded by fields of brush, the prison has come close to evacuating inmates during previous wildfires.

DHHL manages 5,000 acres of land in Anahola, 3,000 of which are used for grazing. They also manage the 71-acre Pi'ilani Mai Ke Kai subdivision, which contains 172 houses with lots averaging 10,000 square feet. Houses within Pi'ilani Mai Ke Kai are typically single story with Class A roofing and combustible siding. Driveways are short – less than 100 feet and unpaved. Several homes are within 30 feet of overgrown brush. Slope in Anahola averages 0 – 20 percent and the average annual rainfall is 45 inches. During the summer the community receives about 2 inches of rain a month.

According to DHHL officials, a 500,000-gallon water tank was built in Anahola in 1999. There is also a 150,000-gallon tank, which is interconnected to a second 500,000-gallon gravity-fed water tank in the farm area that can be used only in the event of an emergency.

Smoke from a backyard fire can be seen from the Wailua Bypass Road.

DHHL is acutely aware of the wildfire risk in Anahola and the threat it poses to homestead lot owners. In 2001, Anahola experienced 16 wildfires, far more than another other town on Kauai that year. As a result, DHHL and Kauai Fire Department staff met and discussed fire prevention efforts in light of the fires affecting Anahola. In March 2002, the Fire Chief sent a letter to the Hawaiian Homes Commission regarding the department's concerns about wildfires in Anahola. The letter also contained mitigation suggestions, including the need to provide access to gated lands; maintaining access roads; clearing roadsides; preventing the dumping of trash and green waste; as clearing defensible space around structures. Some progress was made, however, a great deal more work needs to be done.

In 2004, Anahola once again experienced more wildfires when 19 fires occurred. As a result, KFD staff called DHHL regarding the levels of thick brush surrounding the community. In response, DHHL applied for and received a $50,000 FEMA grant to mow and maintain fuel breaks around the community. DHHL is currently in the process of implementing that grant.

DHHL also owns 400 acres in Wailua on the mauka side of the highway, which is slated for development. Plans call for 700 homestead lots for native Hawaiians, a school, community center, parks, and infrastructure improvements. DHHL plans for commercial development on the makai side of

the highway are currently on hold.

There are several small-scale farming and livestock operations in the district.

While homes in this district are generally built on flat land, the communties themselves are built in and atop river valleys and foothills with steep ridges. Homes in subdivisions at the top of valleys, such as Wailua Riverview Estates and Kapa'a Heights tend to be entirely owner-occupied. Roads are paved, with metal road signs. While the occasional wood shake roof is seen, the majority of houses have Class A roofing with wood siding. Several homes are made of concrete block. Almost all driveways are paved and less than 100 feet long with no turn around space for fire apparatus. As of June 2009, real estate listings for single family homes in the Kawaihau district range from $375,000 to $2,500,000.



Left: View of homes on Kawaihau Road in Kawaihau, adjacent to Kapa'a. Open field of overgrown brush lay mauka of downtown Kapa'a. The brush grows up the hillsides to the homes. Center and right: View of Wailua Valley homes. Some homes have large amounts of vegetation around them, while other lot owners conduct small-scale grazing.

Houses vary in level of defensible space. However, those homes closest to undeveloped areas have kiawe and overgrown grasses growing in close proximity.

There are several resorts and hotels in Kapa'a. This side of the island is often called the Coconut Coast. Condominiums and vacation rentals are prevalent along the coast. In recent years development has focused on catering to the tourism industry with the building of time-shares, condominiums, and vacation homes.

Another proposed development for the district is the 2,021-acre Kealanani Project north of the Kealia River and mauka of the highway. Plans call for 190 agricultural lots ranging from 3 – 100 acres. One hundred low-income house and lot packages will be developed at a later date. Lots will have separate domestic and agricultural water systems with domestic water coming from onsite wells and agricultural water coming from old sugar irrigation system. Unlike other recent upscale development on agricultural land, Kealanani developers are mandating that property owners use their land for agricultural purposes. Tea and cacao are the main crops to be grown in these lots although property owners can choose alternate crops if they wish.

Lihue District

Encompassing the towns of Lihue, Hanamaulu, Puhi, and Nawiliwili, Lihue District is home to the island's governmental and commercial seat. Lihue district is also home to several natural and cultural resources, including the Grove Farm Homestead Museum, Huleia National Wildlife Refuge, the Menehune Fishpond, Nawiliwili Harbor, and Lydgate State Park.

Schools in the area include the main campus of Kauai Community College in Puhi, Kauai High School and Intermediate School, a middle school, two elementary schools, and several private schools.

Kauai's only hospital, main shipping port, and airport are all in Lihue. There is one fire station for the district, in central Lihue.

Major landowners include Grove Farm, Visionary LLC, and W.H. Rice.

There are gently rolling hills in the area surrounded by steep mountain ridges and river valleys. The land slopes from the mountains to the ocean. There are large open fields of overgrown brush in Hanamaulu and Kapaia. In several areas, this brush continues up hillsides to homes. The brush also comes close to the roadsides. Normal trade winds blow from the east-northeast averaging 5 – 15 mph. Average annual rainfall in district varies from 49 inches in Hanamaulu to 58 inches in Puhi.

In Lihue, Kuhio Highway connects with Kapule Highway and Kaumuali'I Highway. In Hanamaulu, Kuhio Highway veers mauka and runs inland to upper Lihue while Kapule Highway runs parallel with the coast closer to shore and airport. Kalpule Highways runs a little over four miles and changes to Nawiliwili Road in Nawiliwili. Kuhio Highway is the main road through downtown Lihue and changes to Kaumuali'i Highway at Rice Street.



Left: A ball field in a Hanamaulu neighborhood. The ballpark is surrounded by dense overgrown kiawe. The tall trees are the vegetation separating the ball field from neighborhood houses. Center: the house next to the ball field. Although the lot is small, there is a great deal of overgrown vegetation between the house and the ballpark. Right: dead end street on Wailua side of Hanamaulu. Overgrown grasses and kiawe borders the neighborhood.

Commercial development tends to be along the highways, with residential and agricultural development on the mauka (mountain) side and inland of the highway.

Unlike the resort towns of Poipu, Princeville, and Kapa'a the majority of homes are owner-occupied although some in Nawiliwili are used as vacation rentals. As of June 2009, real estate listings for single family homes in the Lihue district range from $343,000 - $768,000.

Subdivisions are built on or next to former agricultural lands. Homes in Lihue Town Tract Camp, Lihue and Hanamaulu Homes, Hanamaulu are typical district subdivisions in that houses are single or double story built on 10,000-12,000 square-foot lots. It's common for house lots to be separated by concrete or metal fences. Driveways are short, usually less than 50 feet, and paved with 15-foot vertical clearance. In Hanamaulu the side streets tend to be narrow with cars parking along both sides of the street. On the Wailua side of Hanamaulu Homes, the side streets dead end with no turn around space for fire apparatus. These dead end streets have dense overgrown brush within 30 feet of homes at the end of the street. Similarly, Lihue Town Tract Camp has vast open fallow fields around the subdivision.

Homes vary between post and pier and concrete slab construction. Some homes have wood siding while others are made of concrete block. Almost all the homes have Class A roofing. Homes vary in levels of defensible space.

Homes in Puhi, such as Hokulei Estates are similar to those described above, while homes on rural streets, such as those near the Menehune Fishpond and in Niumalu are larger in size with larger lots.

Puakea Golf Course surrounds most of the Puakea subdivision in Lihue developed by Grove Farm, although there are some parts where overgrown grasses and brush come within 100 feet of homes. Beyond the golf course is acres of open fields. Because Puakea is a new subdivision, the vegetation on individual lots is not yet fully grown in.

Roads are paved and greater than 20 feet in width. Utilities are aboveground in older neighborhoods and underground in newer ones. Side streets in the district are paved and marked with metal reflectorized signs.

Koloa

Koloa District on Kauai's south shore includes the towns of Omao, Kalaheo, Lawai, Koloa and Poipu. Koloa is the oldest sugar plantation town in the state, while nearby Poipu's beaches and resorts make it one of the top tourist destinations on Kauai. The Spouting Horn in nearby Lawai, as well as the renowned National Tropical Botanical Gardens are just some of the natural and cultural resources in the area.

Typical plantation-style house found on Kauai. This house is in Koloa.

The area includes Kalaheo School and two private schools. The district is served by fire stations in Poipu and Kalaheo.

Spouting Horn in Lawai is a popular tourist destination on Kauai.

Alexander & Baldwin and Grove Farm are two of the largest landowners in the district.

The area surrounding Koloa and Poipu is mostly flat with slope ranging from 0-10 percent, while Kalaheo and Lawai tend to be steeper with slope ranging upwards of 20 percent. Koloa averages about 65 inches of rain annually while Poipu receives an average of 44 inches. Normal trade winds blow from the east-northeast averaging 5 – 15 mph.

Poipu and Koloa are accessible by two roads off of Kaumuali'i Highway: Maluhia Road and Koloa Road. The tree tunnel, a well-known landmark on Kauai, runs along the first mile of Maluhia Road from the Highway. Both Maluhia Road and Koloa Road are two-lane paved major streets. There are a couple ranches and vast fallow cane fields along Maluhia Road. Some of the former cane lands are slated for development, such as the proposed Poipu Aina Estates that are planned within sight of the Poipu sugar mill.

There is ranching and residential development along Koloa Road. Some lots along Koloa Road are 10-12,000 square feet, while others are much larger.

Commercial development is centralized in downtown Koloa and a few shopping centers in Poipu.

Because Koloa is one of the oldest towns on the island, (it dates back to 1835) houses tend to be small, single-story, and close together. Like other plantation towns, it is common for houses to be separated by concrete or metal fences. Driveways are short, usually less than 50 feet, and paved with 15-foot vertical clearance. Homes vary between post and pier and concrete slab construction. Some homes have wood siding while others are made of concrete block. Almost all the homes have Class A roofing. Homes vary in levels of defensible space, although many homes seen during the wildfire hazard assessment had vegetation growing next to or actually up on the house. As of June 2009, real estate listings for single family homes in the Koloa district range from $685,000 - $1,700,000 with the higher end homes found in Poipu.

Above: Fallow cane fields are being developed into upscale housing developments in Koloa and Poipu. From Maluhia Road a realtor's flag can be seen waving in the foreground to promote sales in Poipu Aina Estates with the defunct sugar mill in the background.

Homes in Koloa, Lawai, and Kalaheo have above ground utilities, hydrants and setbacks. Newer homes in Poipu have underground utilities. Road signage is metal and reflectorized, however house

Above left and center: Built in 1835, old Koloa town contains retail shops, a post office, churches, and a community center. Right: A new subdivision Koloa Creekside Estates, is being built a few hundred feet down the street from the red wood building featured in the left and center pictures.

numbers vary in size and color.

More recently homes have been built further away from historic Koloa center. These homes are on slightly larger lots and tend to be larger in size and often two stories in height. The immediate area around the home may be cleared but they often have overgrown fields filled with kiawe and brush within 50-100 feet of the house.

Above left: Homes on the outskirts of historic Koloa center. These newer homes have defensible space within 30 feet of the house but are surrounded by open fields of overgrown brush. Center and right: The same house as seen from the front and side. The front entrance ad sides have 30 feet of defensible space but beyond that there is thick overgrown grasses and kiawe trees.

Condominiums, time-shares, and vacation rental homes are the predominant housing in Poipu. Lot sizes become smaller as you get closer to the ocean. Since most properties are vacation rentals, they tend to be maintained by landscaping services so vegetation rarely becomes overgrown.

Above left: Former sugar cane fields around Poipu are slated for development and ground breaking has already occurred in several subdivisions. Above right: subdivision in Kalaheo built mauka of the highway.

Neighborhoods in Lawai and Kalaheo along Koloa Road and the highway more closely resemble the plantation towns of Hanamaulu and Wailua than the resort area of Poipu. However, homes along the coastline in Poipu and parts of Lawai tend to be upscale vacation rentals. It was observed during the wildland hazard assessment that the majority of these vacation rentals homes have wood shake roofs. Although directly on the ocean, these homes are across the street from open fields of overgrown grasses. While these wood shake roofs pose a threat due to the overgrown grasses, this area, Kukuiula is slated for development and groundbreaking is evident. It is anticipated that when Kukuiula is developed the lack of fuel load will reduce the fire risk of the wood shake roofs.

A substantial amount of development is planned for the Koloa district, primarily in Poipu. Although the current year round population of Poipu is 1,000 people, more than 4,000 residential units are proposed for former agricultural lands. Plans call for resorts, time-shares, condominiums, and single-family residences.

Waimea District

The Waimea District covers the west side of Kauai, including the towns of Kekaha, Port Allen, Waimea, Kokee, Hanapepe, and Ele'ele. These communities are primarily agricultural although tourism also contributes to the local economy.

One of Kauai's most well known and most-visited sites – Waimea Canyon (also known as the Grand Canyon of the Pacific) is on the west side. Additional cultural, historical, and natural resources include Kokee State Park and the breathtaking Kalalau Lookout, Russian Fort Elizabeth, Hanapepe Valley Lookout, the Salt Pond, and the 17-mile-long Polihale beach, the longest beach in Hawaii.

Hanapepe averages about 30 inches of rain annually. Further up the coast, Kekaha and Waimea average 20 and 21 inches of rainfall a year respectively. During the summer months Kekaha and Waimea may see only a half-inch of rain a month.

Frequently referred to as the "Grand Canyon of the West", Waimea Canyon is one of Kauai's most well known scenic vistas. A mile wide, 10 miles long, and more than 3,500 feet deep Waimea Canyon offers spectacular views of its canyons and waterfalls.

Above left: View of Hanapepe town and surrounding agricultural land from the scenic overlook on Kaumuali'i Highway. The canyon in the forefront is Hanapepe River. Above right: View of Waimea town from Waimea Canyon Drive.

The district experiences typical 10-15 mph trade winds from the east/northeast, although winds can gust much higher in Kekaha.

Kauai Coffee Company, Pioneer Seed Company, the U.S. Navy's Pacific Missile Range Facility at Barking Sands, and Syngenta are all major employers in Waimea District. Kekaha Sugar Mill, which for generations influenced all aspects of life in West Kauai, including development, banking, transportation, housing and utilities closed in 2000. The town is still struggling since the mill's closing.

The State of Hawaii, DHHL, and the Robinson Family are the largest landowners in the district. DHHL owns 15,000 acres in this district almost all of which is agricultural or conservation land. However, a 49-lot subdivision was recently developed on 20 acres in Kekaha. In 2005, DHHL awarded 40 homestead leases with most lessees native Hawaiians from the nearby island of Niihau.

Kaumuali'i Highway, a paved two-lane highway maintained by the State Department of Transportation, is the one and only major thoroughfare connecting west side towns with the rest of the island. The highway ends in Mana but a smaller road continues to Polihale State Park where the road ends at the base of the Na Pali coastline. Residential developments have been built on the mauka and makai side of the highway.

The district is home to Waimea High School, Ele'ele Elementary, Island School, Kekaha School, St. Teresa's School, and Waimea Canyon School. Kauai Community College and the University of Hawaii also have satellite offices in the Waimea district. Waimea is also home to a Veteran's Hospital, West Kauai Medical Center, and the West Kauai Technology and Visitor Center. There are commercial areas in Waimea, Ele'ele, and Port Allen.

In recent years Hanapepe town, established along the banks of the Koula River, has marketed itself as an artistic center, although many of the storefronts along Hanapepe Road have remained vacant since the demise of the sugar cane industry.



Above left: plantation home in Makaweli. Note the wood shake roof and vegetation within 10 feet of the home. Above center and right: View of houses above Hanapepe town. Note the dense dried vegetation on the hillside.

Waimea district has two fire stations: one in Waimea and another in Hanapepe.

As former sugar plantations towns, neighborhoods in Kekaha, Waimea, Hanapepe, and Ele'ele, all tend to be in densely developed areas, composed of 8,000 – 12,000 square-foot lots with modest homes. House types vary between post and pier construction and concrete slab. Homes tend to be single-story with small louvered windows, Class A roofing and wood siding, although some homes are made of concrete block. There were several homes in Hanapepe Residence Lots and Hanapepe Heights that had wood shake roofs. A smattering of newer homes are two-stories high.

Driveways are 10-12 feet wide with 15-foot vertical clearance. Driveways in these neighborhoods are also paved and less than 100 feet in length with no turnaround space for fire apparatus. House numbers are displayed on mailboxes or the sides of houses. The communities have above ground utilities, paved roads, hydrants, and setbacks.

These neighborhoods are surrounded by open areas, either agricultural or former sugar cane lands.

Although there are several vacation rentals in Waimea ad Kekaha, the majority of homes in the Waimea district are owner-occupied. As of June 2009, real estate listings for single family homes in the Waimea district range from $495,000-$1,900,000.

For the most part, homes have defensible space because the lots are small. However, a visual inspection of neighborhoods throughout the district found homes with vegetation growing within 10 feet of the structure, sometimes abutting the house.



Above left: typical home in Kekaha. On the other side of the street is overgrown brush that extends for several acres (Center photo). Above right: View of Hanapepe Residence Lots in Hanapepe.

Waimea and Kekaha neighborhoods tend to have at least two means of ingress and egress except for the homes along the bottom of Waimea Canyon Drive. Hanapepe Residence Lots in Hanapepe only have one means of ingress/egress (Moi Road). There are gulleys on either side of Moi Road with kiawe and grasses coming up to the roadside.

At the 3,600-foot-elevation above Waimea, Kokee is home to Kokee State Park, Kokee Museum, Waimea State Park, NASA Tracking Station, Kokee Air Force Station, Kalalau Lookout, YWCA Camp Slogett, Kokee Methodist Camp, a Boy Scout Camp, Kokee Hongwanji, and Camp Hale Koa. Kokee State Park is 15 miles from Waimea and it takes the fire department about 30-45 minutes to respond due to the windy steep roads in the area.


From sea level, two roads can access Kokee, Kokee Road in Kekaha, and Waimea Canyon Drive in Waimea. However the two roads merge just before the 7 mile-marker, about halfway up the mountain, with the two-lane windy and narrow Waimea Canyon Drive as the only means of ingress/egress for Kokee. Side roads are unpaved, steep, have no signage, and many require four-wheel drive to navigate.

Above left: cabin in Kokee. The majority of cabins are owned by the State of Hawaii and leased to those who submit an application. Some cabins are inhabited year round, while others are used as vacation homes. Above right: cabin in Kokee. The cabin has wood shingles and the wood shake roof is covered in dried pine needles.

Above left: cabin in Kokee. The cabin is built on a slope with dried vegetation gathering under the wooden lanai. Overgrown grass and unpruned trees dot the property. Above right: The remains of a Kokee cabin destroyed in an April 2005 fire. Because the nearest fire station is at the bottom of Waimea Canyon (a 30+ minute drive), the cabin was completely involved by the time fire personnel arrived on scene. Fortunately, the fire did not spread to the nearby woods.

In addition to being home to the largest concentration of rare and endangered native Hawaiian plants on Kauai. Kokee is also home to more than 90 cabins on state land that are leased. Some of these leases have been in the same family for generations.

The cabins in Kokee tend to be on flat land, with some built into the hillsides. While some cabins have metal roofs, several have wood shake roofs, wood siding, and dense vegetation close to the structure. Most driveways are unpaved and vary in length (some are less than 50 feet while a few are longer than 300 feet) with limited turnaround space for fire apparatus. House numbers are nonexistent, although some have signs with the cabin name. Utilities are above ground.

Unattended campfires pose a fire threat in Kokee. Response time from Waimea fire station is at least 45 minutes. This is problematic for a response that is needed to keep the fire from rapidly spreading. Dead and down trees and branches from the 1992 Hurricane Iniki have contributed to the concentrated fuel load.

Lack of water resources is also an issue. Aerial water drops is one of the most effective tools in fire suppression given the rough terrain. Water resources are limited in the Waimea district.

Community Assets at Risk:

Assets at risk are valued resources that can be damaged or destroyed by wildfire. In addition to ensuring firefighter safety and protecting residents and visitors, the following assets warrant consideration in pre-incident planning: watersheds; forest reserves; wildlife; scenic, cultural, and archeological sites; ranchlands; and structures.

The following were identified as valued resources within Kauai that would be adversely affected by wildfire.

Commercial / community resources:

Resorts, shopping centers, schools, community centers, churches, restaurants, industrial parks, and retail establishments.

Natural / Cultural Resources:

National Tropical Botanical Gardens, Kilauea Lighthouse and National Wildlife Refuge, Huleia National Wildlife Refuge, Bell Stone, Alakai Swamp, Tree Tunnel (Koloa), Waikanaloa Wet Cave, Russian Fort Elizabeth, Waimea Canyon, county parks and beaches including Polihale Beach State Park, Kokee State Park, Lydgate State Park, and Wailua River Valley, as well as rare and endangered plants and animals, and cultural and archeological features.

These resources are critical for a number of reasons. Not only are the natural resources home to rare and endangered native Hawaiian plants and animals, they are also attracting thousands of tourists a year to Kauai.

In 2006, the Kauai Open Space Commission catalogued places of importance to the people of Kauai. This list was developed during the public-input process of the Public Access, Open Space, and Natural Resources Management Fund Commission (Open Space Commission).

While this list identifies many places around Kauai dear to its residents for cultural, historic, religious, natural, and other reasons it is by no means definitive – it simply reflects the data collected at that time. Some areas are listed more than once for specific areas within that locale.

Above: View from Kalalau lookout, one of the places listed as important to the people of Kauai.

Not all areas on the list are in the wildland urban interface. However, it is of interest to note that the first 32 places on the list are in Kapa'a, Kauai's largest residential town situated in the heart of the wildland urban interface. Nearly one third of the list, are in Anahola, a town with the second highest rate of wildfire incidents on the island. Below is a list of the top ten places on the list; the full list can be found in Appendix B.

Places of Importance to the People of Kauai

Number	Quad Map	Site Name
1	Kapaa	Nukolii
2	Kapaa	Kalepa Point
3	Kapaa	Kalepa Forest Reserve
4	Kapaa	Wailua River Valley
5	Kapaa	Opaekaa Falls
6	Kapaa	Wailua River Valley
7	Kapaa	Wailua River Valley
8	Kapaa	Wailua River Valley
9	Kapaa	Wailua River Valley
10	Kapaa	Wailua River Valley

Community Concerns for Kauai:

Community meetings specifically on the CWPP process held in June 2008 through June 2009 with community members and fire agencies identified the most pressing fire concerns on Kauai. They include, in order of priority:

1. Fuel load reduction along Wailua Corridor;
2. Fuel load reduction surrounding communities, such as Anahola and Wailua Homesteads;
3. Fuel load reduction along roadsides, in community open areas, and individual homes;
4. Complete lack and/or low level of water in reservoirs around Kauai;
5. Lack of public awareness of the wildfire threat on Kauai. Need to educate current and future residents about wildfire risks in the community;
6. Green waste recycling to prevent illegal dumping;
   6a. Reduce amount of illegally dumped trash in Anahola;
7. Develop regional and local planning and development standards that require communities' and subdivision designs to consider and/or mitigate fire risk;
8. Structures' design, materials, placement, and landscaping that promotes or does not mitigate fire risk;
9. Additional evacuation routes from communities that only have one means of ingress/egress; and.
10. Increase/integrate communication equipment between state, federal, and county agencies.
11. Additional fire apparatus staged in Kokee for quick response.
12. Additional water resources in Kokee, such as fire hydrants or stand pipes.

CWPP Recommendations:

Feedback from community members and fire service agencies during the CWPP process led to 12 recommendations listed below.

1. Installing and maintaining firebreaks along the Wailua Corridor.

2. Fuel load reduction along the Wailua Corridor.

3. Implementing grazing practices in Anahola and increasing grazing around the perimeter of Wailua Homesteads.

4. Maintaining and increasing the use of current reservoirs around the island.

5. Continued public education on fire prevention issues, such as creating defensible space particularly in Kokee, Anahola, Wailua, Hanamaulu, Koloa, Waimea, and Kapa'a.

6. Implement community chipping days to encourage fuel load mitigation and green waste recycling.

7. Increased use of fire-resistant building materials in new residential development.

8. Implementation of Firewise recommendations in the planning process, such as fuel-breaks around all new residential subdivisions and multiple means on ingress/egress.

9. Creation of secondary emergency access roads in residential areas where necessary.

10. Integrate and increase radio communications between federal, state, and county fire response agencies. May require purchasing additional radios for Public Works and other county departments to use during wildfire suppression.

11. Purchase of refurbished light-response brush truck to be staged in Kokee.

12. Installation of fire hydrants or stand pipes in Kokee.

Recommended Action for Kauai:

Given its importance as a vital transportation link between two of the most populated areas on the island, the Wailua Corridor is an area that is extremely vulnerable to wildfires. The closure of the road during wildfires has a tremendous negative impact on the Kapa'a community and the island as a whole. Constructing and maintaining fuel breaks along the Corridor can possibly slow the spread of wildfires when they occur.

Reducing the fuel load along the Wailua corridor will also help reduce the potential spread of wildfires in the area. The vast majority of land around the Wailua Corridor is former agricultural land primarily owned by the State of Hawaii and other large landowners. Large landowners will need to address community concerns when implementing fire breaks near communities

With its high rate of wildfires, vast tracts of open lands, and large piles of dumped trash and abandoned vehicles, the Anahola area is a concern to fire officials. During interagency meetings as part of the CWPP process, DHHL officials indicated they were amenable to grazing around Hawaiian homesteads in Anahola. Issues facing ranchers wanting to graze in the Anahola include insurance, lack of water resources, and length of stay for animals in fields (need to make it effective to pay for fencing.)

Limited grazing has been done around Wailua Homesteads in the past. Grant funding would help expand the size of the area being grazed, as well as the frequency of the grazing. This will go a long way toward reducing the fuel load around the Wailua Homesteads community.

Kauai Fire Chief Westerman would like to see current reservoirs maintained and used rather than installing dip tanks around the island. Many reservoirs are being allowed to go dry because land is no longer being farmed.

Continued public education about wildfire prevention is crucial. During the development of this CWPP, the author frequently asked Kauai residents how many wildfires they thought occurred annually on the island. No one ever answered more than 12 wildfires a year even though there were 82 wildfires on Kauai in 2008 and 134 fires in 2007.

Given the steady influx of residents from other parts of the U.S. who are unfamiliar with the fire regime of Hawaii, it is important to constantly remind people of the wildfire threats in their community. Chief Westerman noted that the increase in "gentlemen's farms" come with their own wildfire hazards, pointing out that gentleman farmers in Kilauea own 8-10 acres with wooden structures on their farms.

Public education on wildfire safety education could also include an awareness campaign about the hazards of illegal trash dumping. Abandoned cars and trash piles are an issue in Anahola. However, it was noted during the CWPP process that trash (boxes, cars, etc.) are left behind by tenant farmers on A&B land.

Communities around Kauai could benefit from communal chipping programs and green waste recycling.

An island-wide chipping program was suggested by members of the Kauai Planning Commission during the development of the CWPP. It was suggested that such a program be implemented by the

Kauai Fire Department and other County agencies (Environmental Management) to benefit those communities wanting to reduce their fuel load.

Another recommendation of this CWPP is to increase the use of fire-resistant building materials in new residential development. The Kauai Planning Department is responsible for regulations regarding residential development on Kauai. The County as a whole can mandate that fire-resistant building materials be used in all new residential construction. Homeowner associations in individual communities can also require the use of fire-resistant building materials through their CC&Rs (Codes, Covenants and Restrictions). At least four homeowner associations in communities on the west side of Hawaii Island have adopted Firewise construction recommendations as part of their CC&Rs.

Given the rapid rate of development Kauai has recently experienced, the Kauai Planning Department may want to explore the possibility of implementing Firewise recommendations in the planning process, such as fuel breaks around all new residential subdivisions. The creation of secondary emergency access roads in existing residential areas and/or planning multiple means on ingress/egress in new residential subdivisions is also recommended.

When large-scale wildfires occur on Kauai, multiple state and county agencies respond. However, not all the agencies may be able to communicate with each other. Kauai Department of Public Works are frequently called in to assist with heavy equipment during wildfires but their staff have little or no wildland fire training and are often do not have radios. During a June 2009 wildland interagency meeting, the lack of standardized radio communications (all responding agencies being able to communicate via radios on the same frequency) was cited as a concern. Ensuring that all responding agencies have the proper radio equipment and are versed in using it properly will help minimize the potential risk inherent in lack of communication during a fire.

Given Kokee's remote location and high preponderance of threatened and endangered plants and animals, quick response to wildfires is vital. However, the nearest fire station is more than 15 miles away in Waimea and with the windy uphill roads it takes nearly 45 minutes for fire crews to respond. There are no fire hydrants in Kokee. The Kokee Advisory Council would like to explore the possibility of purchasing a light-response brush truck and install fire hydrants or stand pipes in the area to facilitate faster fire response.

Based on the results of the community risk assessment, priority ratings have been selected for Kauai and areas of community importance. The community recommendations for the type and method of treatment for the surrounding vegetation are listed in the following table.

Community, structure or area at risk	**Type of Treatment**	**Method of Treatment**	**Overall Priority**
Wailua	Mechanical / Chemical	Installing and maintaining fuel breaks along Wailua Corridor	Very High
Wailua	Mechanical / Chemical	Fuel load reduction	Very High

	/ Hand Labor	along Wailua Corridor	
Island-wide	Mechanical/Chemical/ Hand Labor	Reduction of fuel load along roadsides, community open areas, and individual homes	High
Anahola, Wailua, Koloa, Princeville	Animal	Grazing	High
Island-wide	Mechanical / Political	Maintaining and increasing use of current reservoirs	High
Island-wide	Public Education and Outreach	Continued fire prevention education and outreach, including arson prevention education	High
Island-wide	Mechanical	Implement community chipping days to encourage fuel load reduction	High
Island-wide	Planning / Political	Increase use of fire-resistant building materials in new residential development. Incorporation of fuel breaks and multiple means of ingress/egress in all new residential development.	Medium
Island-wide	Mechanical	Creation of secondary emergency ingress/ egress roads in existing neighborhoods where necessary.	Medium
Island-wide	Mechanical / Political	Increase effective integrated radio communication between state and county fire suppression agencies.	Medium
Kokee	Mechanical	Purchase a brush truck to be staged in Kokee for fast response to wildfires.	Medium
Kokee	Mechanical	Install fire hydrants/stand pipes in Kokee.	Medium

Community organizations, federal agencies, and private landowners around Kauai were invited to submit projects that provide protection and reduce wildfire risk. The following table displays a list of projects based on recommendations from community and/or fire-related organizations.

Community, structure, or area at risk	**Project**	**Agency**	**Funding Needs**	**Timetable**	**Community Recommen-dation**
Wailua	Installing and maintaining fuel	Multiple agencies:	Cooperative Funding	2009 - 2014	Yes

	breaks along Wailua Corridor	state and county	$500,000		
Wailua	Fuel load reduction along Wailua Corridor	Multiple Agencies: county	Cooperative Funding $500,000	2009 - 20014	Yes
Island-wide	Reduction of fuel load along roadsides, community open areas, and individual homes	Multiple Agencies: state, county, and private	Cooperative Funding $850,000	2009 - 2014	Yes
Anahola, Wailua Homesteads, Koloa, Princeville	Grazing around subdivision perimeters to reduce fuel load	Multiple Agencies: state, county, and private	Cooperative Funding $200,000	2009 - 2014	Yes
Island-wide	Maintain and increase use of current reservoirs	Multiple Agencies: county and state	Cooperative Funding $	2009 - 2014	Yes
Island-wide	Continued fire prevention education and outreach, including arson prevention education	Multiple agencies: federal, state, county, and private	Cooperative Funding $45,000	2009 - 2014	Yes
Island-wide	Implement community chipping days to encourage fuel load reduction	Multiple agencies: state, county, and private	Cooperative Funding $175,000	2009 - 2014	Yes
Island-wide	Creation of development standards and community planning that requires the mitigation of wildfire risks	Multiple Agencies: county and state	Cooperative Funding $150,000 for outreach, any needed impact studies and education	2009 - 2014	Yes
Island-wide	Creation of secondary emergency ingress/egress roads	Multiple Agencies: state, county, and private	Cooperative Funding $750,000 if environment-al assess-ments required	2009 - 2014	Yes
Island-wide	Increased effective integrated radio communication between state and county fire suppression agencies	Multiple agencies	Cooperative Funding $80,000	2009 - 20013	Yes
Kokee	Purchase a brush truck to be staged in Kokee for fast	Multiple agencies	Cooperative Funding $75,000	2009-2013	Yes

	response to wildfires.				
Kokee	Install fire hydrants/stand pipes in Kokee.	Multiple agencies	Cooperative Funding $250,000	2009-2014	Yes

Reduce Structural Ignitability:

As part of its fire prevention education efforts, Firewise Communities Hawaii provides recommendations to reduce structural ignitability. Individuals and community groups around Kauai can reduce structural ignitability throughout the county by taking the following measures.

• Create a buffer zone of defensible space around a property of at least 30 feet or to the property line if the house has less than 30 feet of yard. Remove flammable vegetation and combustible growth within 30 feet of the house.

• Prune tree limbs 6 – 10 feet above the ground.

• Space trees and shrubs ten feet apart in the yard.

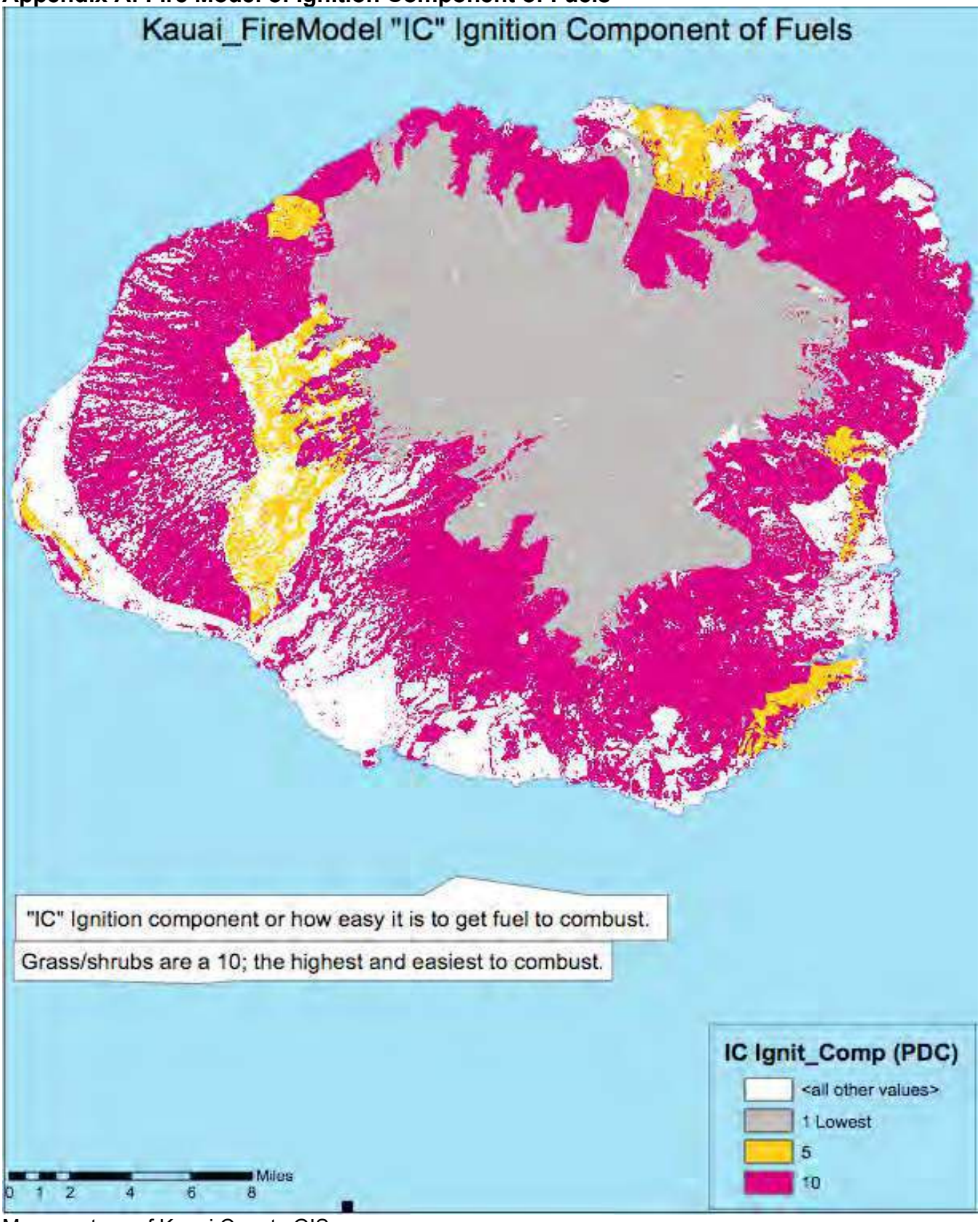
• Make sure that plants closest to the house are low-lying. Wherever possible use native Hawaiian or succulent plants.

• Routinely remove dead leaves and other organic matter from the yard.

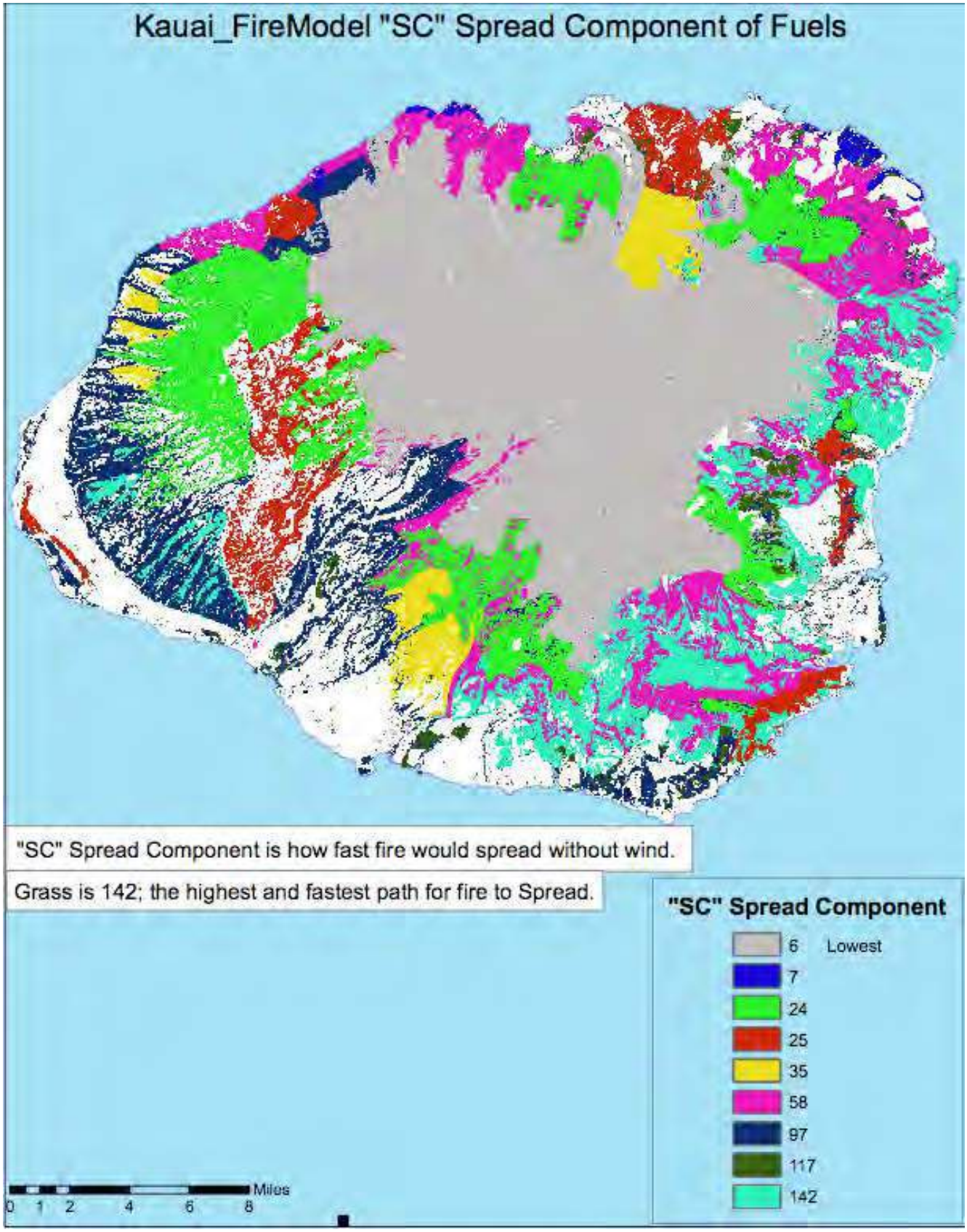
• Sweep and/or clean gutters, eaves, and roofs regularly to prevent the build-up of leaves and other matter.

• Use fire-resistant building materials for the roof, siding, and decks, such as metal, stucco, tile, brick, and cement.

Appendix A: Fire Model of Ignition Component of Fuels



Map courtesy of Kauai County GIS.



Map courtesy of Kauai County GIS.

Appendix B:

Places of Importance to the People of Kauai

Number	Quad Map	Site Name
1	Kapaa	Nukolii
2	Kapaa	Kalepa Point
3	Kapaa	Kalepa Forest Reserve
4	Kapaa	Wailua River Valley
5	Kapaa	Opaekaa Falls
6	Kapaa	Wailua River Valley
7	Kapaa	Wailua River Valley
8	Kapaa	Wailua River Valley
9	Kapaa	Wailua River Valley
10	Kapaa	Wailua River Valley
11	Kapaa	Wailua River Valley
12	Kapaa	Opaekaa Falls
13	Kapaa	Opaekaa Falls
14	Kapaa	Wailua River Valley
15	Kapaa	Wailua River Valley
16	Kapaa	Wailua River Valley
17	Kapaa	Nounou/Sleeping Giant
18	Kapaa	Nounou/Sleeping Giant
19	Kapaa	Waipouli Beach
20	Kapaa	Waipouli Beach
21	Kapaa	Waipouli Beach
22	Kapaa	Waipouli Beach
23	Kapaa	Waipouli Mauka
24	Kapaa	Kapaa Beach Park
25	Kapaa	Kapaa Cemetary
26	Kapaa	Kapaa Homesteads
27	Kapaa	Upper Kapahi Reservoir
28	Kapaa	Kahuna Road
29	Kapaa	Hoopii Falls
30	Kapaa	Hoopii Falls
31	Kapaa	Kealia Coast
32	Kapaa	Waipouli Mauka
33	Hanapepe	Numila Makai
34	Hanapepe	Puolo Point
35	Hanapepe	Puolo Point
36	Hanapepe	Puolo Point
37	Hanapepe	Puolo Point
38	Hanapepe	Puolo Point
39	Hanapepe	Paakahi Point
40	Hanapepe	Salt Pond Beach Park
41	Hanapepe	Salt Pond Beach Park
42	Hanapepe	Hanapepe River Valley
43	Hanapepe	Hanapepe River Valley
44	Hanapepe	Makaweli Mauka
45	Hanapepe	Kaumakani Makai

46	Hanapepe	Makaweli Landing
47	Hanapepe	Makaweli Landing
48	Hanapepe	Makaweli Landing
49	Hanapepe	Waimea River Valley
50	Koloa	Mahaulepu
51	Koloa	Mahaulepu
52	Koloa	Makawehi
53	Koloa	Koloa Mill
54	Koloa	Kaneiolouma
55	Koloa	Kaneiolouma
56	Koloa	Poipu Beach Park
57	Koloa	Waiohai Beach
58	Koloa	Kipu
59	Koloa	Haupu
60	Koloa	Haupu
61	Koloa	Haupu
62	Koloa	Waita Reservoir
63	Koloa	Waita Reservoir
64	Koloa	Waita Reservoir
65	Koloa	Waita Reservoir
66	Koloa	Kukuiula
67	Koloa	Kahili
68	Koloa	Kahili
69	Koloa	Kahili
70	Koloa	Haupu
71	Koloa	Haupu
72	Koloa	Kahili
73	Koloa	Lawai Mauka
74	Koloa	Lawai Mauka
75	Koloa	Lawai Mauka
76	Koloa	Lawai Mauka
77	Koloa	Lawai Mauka
78	Koloa	Lawai Homestead
79	Koloa	Lawai Homestead
80	Koloa	Lawai Homestead
81	Koloa	Lawai Kai
82	Koloa	Na Pali
83	Koloa	Wahiawa Bog
84	Koloa	Alexander Reservoir
85	Koloa	Alexander Reservoir
86	Koloa	Alexander Reservoir
87	Koloa	Alexander Reservoir
88	Koloa	Kalaheo Mauka
89	Koloa	Kalaheo Mauka
90	Lihue	Ahukini
91	Lihue	Nawiliwili
92	Lihue	Menehune Fishpond
93	Lihue	Menehune Fishpond
94	Lihue	Menehune Fishpond

95	Lihue	Kipu Falls
96	Lihue	Kipu Falls
97	Lihue	Haupu
98	Lihue	Haupu
99	Lihue	Kipu Kai
100	Lihue	Kipu Kai
101	Lihue	Kipu Kai
102	Lihue	Mahaulepu
103	Lihue	Mahaulepu
104	Lihue	Mahaulepu
105	Haena	Kokee
106	Haena	Na Pali State Park
107	Haena	Hanakapiai
108	Haena	Wainiha Mauka
109	Haena	Wainiha Mauka
110	Haena	Haena State Park
111	Haena	Haena State Park
112	Haena	Haena State Park
113	Haena	Haena State Park
114	Haena	Haena Park
115	Haena	Haena Mauka
116	Haena	Haena Point
117	Haena	Haena Point
118	Haena	Haena Point
119	Haena	Haena Point
120	Haena	Kepuhi Point
121	Haena	Kepuhi Point
122	Haena	Kepuhi Point
123	Haena	Wainiha
124	Kekaha	Niu Ridge
125	Kekaha	Niu Ridge
126	Kekaha	PMRF
127	Kekaha	PMRF
128	Kekaha	PMRF
129	Kekaha	PMRF
130	Kekaha	PMRF
131	Kekaha	PMRF
132	Kekaha	PMRF
133	Kekaha	PMRF
134	Kekaha	PMRF
135	Kekaha	PMRF
136	Kekaha	PMRF
137	Makaha Point	PMRF
138	Makaha Point	PMRF
139	Makaha Point	PMRF
140	Makaha Point	Makaha Ridge
141	Makaha Point	Milolii
142	Makaha Point	Milolii
143	Makaha Point	Milolii

144	Makaha Point	Milolii
145	Makaha Point	PMRF
146	Makaha Point	Kokee
147	Waimea Canyon	Kokee
148	Waimea Canyon	Kokee
149	Waimea Canyon	Kokee
150	Waimea Canyon	Kokee
151	Waialeale	Waialeale
152	Waialeale	Waialeale
153	Waialeale	Waialeale
154	Waialeale	Waialeale
155	Waialeale	Waialeale
156	Waialeale	Waialeale
157	Waialeale	Waialeale
158	Waialeale	Waialeale
159	Waialeale	Waialeale
160	Waialeale	Waialeale
161	Waialeale	Kilohana Crater
162	Eastern Kauai	Kealia Spaulding Monument
163	Eastern Kauai	Kalihiwai River Basin
164	Anahola	Kauapea
165	Anahola	Kilauea Stream
166	Anahola	Waiakalua Makai
167	Hanalei	Wainiha
168	Hanalei	Lumahai
169	Hanalei	Princeville Makai
170	Hanalei	Pinceville Makai
171	Hanalei	Black Pot
172	Hanalei	Black Pot
173	Hanalei	Hanalei River
174	Hanalei	Hanalei River
175	Hanalei	Waioli Stream
176	Hanalei	Waioli Stream
177	Hanalei	Princeville Makai
178	Hanalei	Princeville Makai
179	Hanalei	Princeville Makai
180	Hanalei	Princeville Makai
181	Hanalei	Princeville Makai
182	Hanalei	Anini Beach
183	Hanalei	Princeville Makai
184	Hanalei	Anini Beach
185	Hanalei	Hanalei River
186	Hanalei	Kilauea Point
187	Hanalei	Hanalei Homestead
188	Hanalei	Hanalei River
189	Hanalei	Princeville Mauka
190	Hanalei	Kalihiwai River Basin
191	Hanalei	Kalihiwai River Basin
192	Hanalei	Kalihikai Mauka

193	Hanalei	Kalihikai Mauka
194	Hanalei	Anini Beach
195	Hanalei	Kalihiwai Bay
196	Hanalei	Kalihiwai Bay
197	Hanalei	Kauapea
198	Hanalei	Puukumu Stream
199	Hanalei	Puukumu Stream
200	Hanalei	Puukumu Stream
201	Hanalei	Kalihiwai Reservoir
202	Hanalei	Kalihiwai River Basin
203	Hanalei	Kalihiwai River Basin
204	Hanalei	Kalihiwai River Basin
205	Hanalei	Kalihiwai River Basin
206	Hanalei	Moloaa Forest Reseve
207	Anahola	Anahola Bay
208	Anahola	Anahola Mauka
209	Anahola	Anahola Mauka
210	Anahola	Anahola Mauka
211	Anahola	Anahola Mauka
212	Anahola	Kamalomaloo
213	Anahola	Kealia Spaulding Monument
214	Anahola	Kealia Mauka
215	Anahola	Kealia Mauka
216	Anahola	Kealia Mauka
217	Anahola	Kealia Mauka
218	Anahola	Papaa Bay
219	Anahola	Papaa Bay
220	Anahola	Papaa Bay
221	Anahola	Papaa Bay
222	Anahola	Papaa Bay
223	Anahola	Papaa Bay
224	Anahola	Papaa Bay
225	Anahola	Papaa Mauka
226	Anahola	Papaa Mauka
227	Anahola	Papaa Mauka
228	Anahola	Aliomanu Mauka
229	Anahola	Aliomanu Mauka
230	Anahola	Anahola Mauka
231	Anahola	Aliomanu Mauka
232	Anahola	Moloaa Bay
233	Anahola	Moloaa Bay
234	Anahola	Moloaa Bay
235	Anahola	Moloaa Bay
236	Anahola	Moloaa Bay
237	Anahola	Moloaa Bay
238	Anahola	Moloaa Bay
239	Anahola	Moloaa Bay
240	Anahola	Moloaa Bay
241	Anahola	Waiakalua Mauka

242	Anahola	Pilaa Beach
243	Anahola	Pilaa Beach
244	Anahola	Pilaa Beach
245	Anahola	Pilaa Beach
246	Anahola	Waipake
247	Anahola	Waiakalua Reservoir
248	Anahola	Waiakalua Reservoir
249	Anahola	Waiakalua Reservoir
250	Anahola	Waiakalua Reservoir
251	Anahola	Pilaa Mauka
252	Anahola	Pilaa Mauka
253	Anahola	Pilaa Mauka
254	Anahola	Kaloko Reservoir
255	Anahola	Pilaa Mauka
256	Anahola	Pilaa Mauka
257	Anahola	Pilaa Mauka
258	Anahola	Pilaa Mauka
259	Anahola	Kaloko Reservoir
260	Anahola	Puukaele Reservoir
261	Anahola	Puukaele Reservoir
262	Anahola	Kaloko Reservoir
263	Anahola	Kaloko Reservoir
264	Anahola	Kaloko Reservoir
265	Anahola	Kilauea Bay
266	Anahola	Kilauea Bay
267	Anahola	Kilauea Bay
268	Anahola	Kilauea Falls
269	Anahola	Kilauea Falls
270	Anahola	Kilauea Falls
271	Anahola	Kilauea Falls
272	Anahola	Kilauea Falls
273	Anahola	Kilauea Falls
274	Anahola	Kilauea Makai
275	Anahola	Kilauea Mauka
276	Anahola	Kilauea Mauka
277	Anahola	Kilauea Mauka
278	Anahola	Kilauea Mauka
279	Anahola	Kilauea Mauka
280	Anahola	Kilauea Mauka
281	Anahola	Kilauea Mauka
282	Anahola	Kauapea
283	Anahola	Kauapea
284	Anahola	Kauapea
285	Anahola	Mokuaeae Isle
286	Anahola	Kauapea
287	Anahola	Kauapea
288	Anahola	Kauapea
289	Anahola	Kilauea Point
290	Anahola	Kauapea

291	Anahola	Kauapea
292	Anahola	Kauapea
293	Anahola	Kauapea
294	Anahola	Kauapea
295	Anahola	Kauapea
295	Anahola	Kauapea
297	Anahola	Kauapea
298	Anahola	Kauapea
299	Anahola	Kilauea Makai
300	Anahola	Kauapea
301	Anahola	Kauapea

Appendix C:

List of Potential Grant Resources

Below is a list of potential grant sources to help fund mitigation projects described within this CWPP. The list below is by no means exhaustive and potential community groups should also research grant-funding sources available to them.

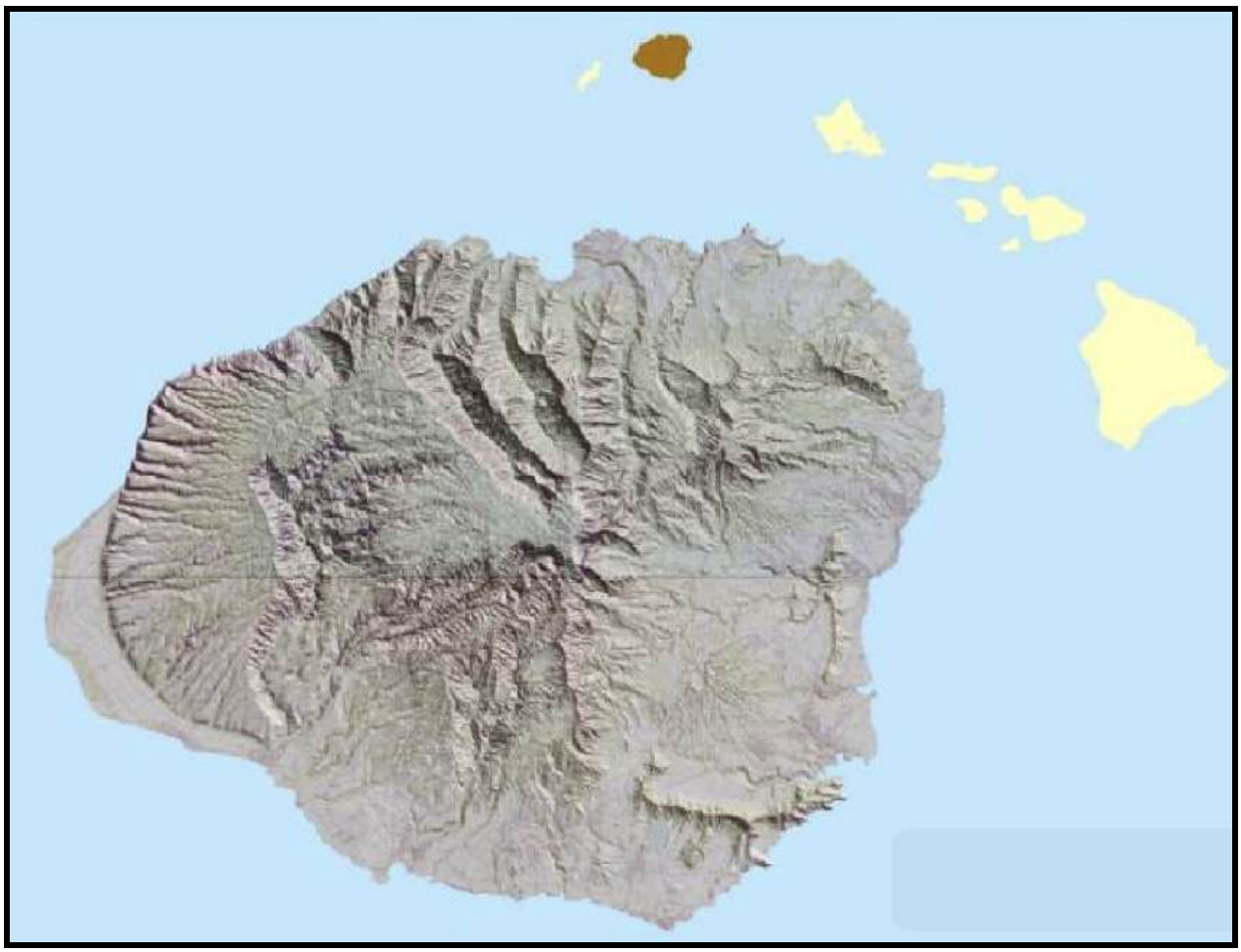
Grant Program	Deadline	Contact Information	Matching Funds Required?
State Fire Assistance Grants. Funds target hazard mitigation in the Wildland Urban Interface for mitigating risks of hazardous fire conditions through hazardous fuels reduction, information and education, and homeowner and community defensible space treatments.	August 28, 2009 for 2010-2011 competitive funding	Division of Forestry and Wildlife Attn: Wayne Ching, 1151 Punchbowl St., Rm. # 325 Honolulu, HI 96813 (808) 587-4173 Fax: (808) 587-0160 www.dofaw.net	Yes: 50/50 match
FM Global Prevention Grants Through their new Fire Prevention Grant Program, fire departments, national, state, regional, local and community organizations can apply for funding to support a wide array of fire prevention, preparedness and control efforts, including: • Pre-fire planning for commercial, industrial and institutional facilities • Fire and arson prevention and investigation • Fire prevention education and training programs	Awarded quarterly	www.fmglobal.com or email: firepreventiongrants@fmglobal.com	No
Department of Homeland Security (DHS) • Citizen Corps is the Department of Homeland Security's grassroots initiative that encourages citizens to play a role in hometown security through personal preparedness. Grant funding supports Citizen Corps Councils in efforts to engage citizens in personal preparedness, exercises, ongoing volunteer programs, and surge capacity response, in order to better prepare citizens to be fully aware, trained, and practiced on how to prevent, protect/mitigate, prepare for, and respond to all threats and hazards. This program provides funding on a formula basis to all 56 states and territories. Other Homeland Security Grant Programs include: • Infrastructure Protection Program • Regional Catastrophic Preparedness		www.dhs.gov/xgovt/grants/index.shtm MG Robert Lee Adjutant General 3949 Diamond Head Rd. Honolulu, HI 96816-4495 808-733-4246 www.scd.state.hi.us	

Grant Program			
Hawaii Tourism Authority (HTA) Natural Resources Program In 2002, HTA established the Natural Resources Advisory Group to develop the Natural Resources Program. A Natural Resources Assessment was conducted including an inventory and assessment of natural resource areas around the state. Since 2005 HTA has awarded funds to those projects identified as priorities in the Assessment and to community-based natural resource projects.		Hawaii Tourism Authority 1801 Kalakaua Avenue Honolulu, HI 96815 (808) 973-2255	
Rural Fire Assistance Grants (RFA) The Dept. of the Interior receives an appropriated budget each year for a rural fire assistance (RFA) grant program. This funding enhances the fire protection capabilities of rural and volunteer fire departments through training, equipment purchases, and fire prevention work on a cost-shared basis. This program is primarily for rural departments serving populations under 10,000 that have responsibilities to provide mutual aid to Dept. of Interior lands (e.g., Tribal, National Parks etc.) The DOI assistance program targets rural and volunteer fire departments that routinely help fight fire on or near DOI lands. One of these four agencies administers those lands: Bureau of Land Management (BLM), Bureau of Indian Affairs (BIA), U.S. Fish and Wildlife Service (FWS) and the National Park Service (NPS).	Varies by state	Hawaii Volcanoes National Park Joe Molhoek Pacific Island Fire Mgmt. Officer PO Box 52, HNP, HI 96718 (808) 985-6042 Joe_Molhoek@nps.gov	The maximum award is $20,000. RFA grants may require 90/10 cost-share.

APPENDIX F:

2024 LIST OF PRIORITY PROJECTS AND ACTIONS KAUAI, STATE OF HAWAII

2024 LIST OF PRIORITY PROJECTS AND ACTIONS



Kauai, State of Hawaii

Drafted by Hawaii Wildfire Management Organization, in cooperation with the Department of Land and Natural Resources - Division of Forestry and Wildlife, Kauai Fire Department, and Kauai Emergency Management Agency

Table of Contents

I. INTRODUCTION

Community Wildfire Protection Plans (CWPP) are a great community planning tool and have become a prerequisite for receiving federal funding for wildfire protection projects. A CWPP assists a community in identifying and prioritizing areas for hazardous fuel reduction treatments and supports communities in taking action. The plans assess values at risk, such as safety, natural resource protection, recreation, scenic values, and economic assets. Through a collaborative process involving input from community members, resource management and firefighting agencies, and various other interested parties, CWPPs help bring wildfire hazard information and planning and action opportunities to all parties. These plans are increasingly important in Hawaii, which faces unique wildfire threats that are becoming more challenging due to increasing ignitions, drought episodes, and land use changes.

In order to keep the CWPPs current and relevant, this Appendix to the CWPP serves as a repository for annual updates to the list of priority projects and actions. These project and action updates are designed to keep the CWPP actionable and aligned with the community's current needs and opportunities for wildfire mitigation. In this appendix, you will find a list of projects and actions that help at-risk communities to protect their citizens, homes, and resources from the destruction of catastrophic wildfires in the wildland-urban interface (WUI).

This approach was mutually agreed upon and affirmed through the signatures at the front of this document, ensuring collective commitment to maintaining the CWPP as a living and evolving tool. By focusing on shovel-ready priority projects, we enable more effective planning, resource allocation, and funding efforts. Each update reflects the collaborative efforts of stakeholders and represents the best available information for advancing wildfire risk reduction.

Readers are encouraged to refer to these updates in conjunction with the foundational elements of the CWPP. Together, they provide a comprehensive framework for understanding wildfire risks and implementing effective mitigation strategies.

II. TABLE OF PROJECTS AND ACTIONS

Project Name: Fire Adapted Kauai County	
Communities and Neighborhoods that will benefit from this project: Kekaha, Waimea, Kapaa, Hanapepe, Kalaheo, Kilauea, Lihue, Poipu, Anahola, Hanalei	
Affiliation: Hawaii Wildfire Management Organization (HWMO)	**Project Lead:** HWMO **Partners:** DLNR-DOFAW, Kauai Fire Department
CWPP Area: Kauai	**Cost:** $1,395,297

Project Description:
The proposed project is for HWMO to lead the following two programs for Kauai County, in close communication and partnership with Kauai Fire Department, Kauai Emergency Management Agency, and Hawaii Dept. of Land and Natural Resources, State Division of Forestry and Wildlife (DLNR-DOFAW):

1. The Firewise Communities (FC) program, which leads resident education, aids communities through the Firewise hazard assessment and recognition process. It also supports defensible space and risk-reduction efforts for at-risk, underserved communities via vegetation removal/transport assistance; and

2. The Wildfire Resilient Landscapes (WRL) program, which provides education and technical support for land managers, policymakers, emergency responders, and others. The WRL program provides education via in-person and virtual workshops,
facilitates collaboration by facilitating ongoing working groups toward sustained multi-partner planning and cross-boundary mitigation, and provides area-specific and onsite technical mitigation and planning guidance.

This work will be implemented in close partnership with fire and forestry agencies.

The August 2023 fires across Hawaii were spread by heavy winds and through unmanaged lands heavily invaded by fire-prone grasses that entered the built environment, causing substantial damage to life and property. These wildfires were the most devastating and publicized fires in Hawaii's history in terms of the number of lives (approx. 100) and structures (2,200+) lost. However, wildfire size and frequency has been growing over the past few decades with broad and long-lasting impacts, including on Kauai. Kauai County's infrastructure is not designed or built with wildfire safety in mind, nor are its ecosystems adapted to fire.

The Kauai CWPP (which covers the entire island/county of Kauai) has prioritized community, land manager, and decision maker education, and vegetation management in and around at-risk communities and WUI boundaries. This project supports both.

Specifically, 60% of all community-focused input in the Kauai CWPP was related to increasing community awareness and action. There was an urgency and emphasis of participant

concerns regarding the general lack of awareness of the threats and impacts of wildfire among all community members from residents to decision makers (page 34). The Firewise Communities program will address this priority.

Kauai CWPP participant input related to improved planning included the need for fire management plans, the need for an established process for residents to address wildfire related concerns and fuels management assistance needs, and the participation of the community members, planners, and policy makers in wildfire protection regulations and building/development requirements (page 34). The Wildfire Resilient Landscapes program addresses these priorities. The proposed program also explicitly pursues several action items of the Kauai CWPP, as follows:

Near-Term Action Items (Page 45): Assist interested communities in completing Firewise Communities certification process; Aid communities in applying for fuels management grants; Host wildfire preparedness information and materials for residents and decision makers.

Longer-Term Action Plan Items (Page 46): Increase outreach to community associations; Provide wildfire education for decision makers; Work with large landowners to encourage fuels management.

The project also supports the updated goals of the Cohesive Wildland Fire Management Strategy (CWFMS, 2023). By providing the opportunity for people to work together to reduce fire risk the project will support the goal of creating fire-adapted communities. By engaging practitioners to inform, learn and work toward climate-smart land and fire management, the project will support the goal of creating resilient landscapes by prioritizing management actions to safeguard and restore landscapes.

The project also supports the new wildland fire critical emphasis areas of: (1) community resilience, and (2) diversity, equity, inclusion and environmental justice in creating fire-adapted communities.

This need for community risk reduction education and fuels management is also highlighted in the Hawaii Forest Action Plan (https://dlnr.hawaii.gov/forestry/files/2013/09/Hawaii-Forest-Action-Plan-2016-FINAL.pdf) as Issue # 3: Wildfires: Priority 1.a. Prevention education: Reduce the threat from wildfires to native ecosystems, forests, watersheds, and threatened and endangered species as well as communities within WUI areas through established fire prevention programs; and Priority 2.c Pre-suppression fuels management: Mitigate the impacts of wildfires on natural and built environments.

By bringing together a diverse group of agencies, organizations, and the public, the two proposed programs also support the State of Hawaii Forest Action Plan (FAP) by providing an opportunity to address wildfire issues in Hawaii by strengthening collaborative partnerships through the partner-heavy implementation of the FC program, and by facilitating collaborative learning and project planning across jurisdictional and land ownership boundaries through the WRL program.

The full set of programs will operate throughout Kauai County, focusing on the communities with the highest fire threat, all of which are identified as Communities at Risk by the State Division of Forestry and Wildlife and Hawaii Wildfire Management

Organization. Wildfire in Kauai County poses threats to many communities on the island, however many of our communities at highest risk of wildfire are also socioeconomically vulnerable, underserved, and/or low-income, particularly Hawaiian Homestead Lands, which are designated as underserved Tribal areas in the CWDG tool.

Importance:
These two programs have been key to Hawaii's progress toward wildfire preparedness and risk reduction thus far, but support is needed to carry forward the programs at the county level. The request for participation in these two programs has increased 1,500% since our recent devastating fires. People across Kauai County have become both scared and motivated. This proposal will meet those emotions and motivations with meaningful programming, sound information, and sustained technical support and risk reduction project assistance, carried out at the county level instead of at the existing, albeit limited, statewide level. Supporting county-level implementation of the two programs will provide higher quality education and technical support for individuals and communities (via FC program) and for others who influence fire outcomes (land stewards, large landowners, policymakers, and more, via the WRL program) in this new era when capacity, not complacency, has become our biggest obstacle.

Project Name: Dedicated Risk-Reduction Support for Native Hawaiians

Communities and Neighborhoods that will benefit from this project:
All DHHL Homestead Communities

Affiliation: Department of Hawaiian Home Lands (DHHL)	**Project Lead:** Richard Hoke
CWPP Area: Kauai	**Cost:** $150,000 annually per firewise coordinator, plus annual mitigation funds

Project Description: DHHL homesteaders are Native Hawaiians who receive land leases from DHHL to build homes and establish sustainable communities. Many face socioeconomic challenges, including lower income levels and limited access to essential resources. While DHHL will provide financial assistance for community mitigation efforts, grant funds will directly support the hiring of a dedicated Firewise Coordinator for these vulnerable communities, enabling unified efforts in wildfire preparedness and mitigation.

As a central point of contact, the Coordinator will support three groups: those interested in wildfire preparedness (Firewise-interested sites), those needing assistance to meet Firewise requirements (emerging sites), and those already in the Firewise program seeking advanced guidance (existing sites).

Firewise-interested sites will receive resources and participate in workshops aimed at increasing knowledge around wildfire risks and mitigation best practices. Emerging sites will benefit from social and technical support to meet Firewise criteria, including forming a team, completing a hazard assessment, developing an action plan, and executing a risk-reduction

project. Emerging and existing sites will receive technical assistance for mitigation planning and implementation, as well as access to the broader community of Firewise sites across the state (HI-Firewise Network).

Mitigation projects to be designated by this Firewise assessment process.

Importance: We are committed to investing millions in fuel breaks & land management activities to enhance the health/safety of the lands & communities we steward. However, achieving this vision requires the cooperation & active participation of our beneficiaries/homesteaders. Our primary aim is to target the enabling factors that will empower them to take proactive risk-reduction actions, while DHHL simultaneously mitigates risks on surrounding lands. This initiative will assess the impact of coordination support for our homestead communities and the availability of funds for their risk-reduction projects. Targeting both residential areas and DHHL-owned lands fosters a cohesive approach to wildfire management. This strategy encourages collaboration among neighboring communities and with DHHL, effectively reducing overall risk across the landscape. Additionally, this initiative aligns with broader wildfire management strategies, contributing to a unified regional response. As communities implement their mitigation plans and achieve Firewise recognition, we will establish a network of prepared landscapes and neighborhoods. This collaborative effort will collectively reduce wildfire hazards and promote sustainable, long-term risk reduction strategies.

Project Name: Heavy Impact - Developing Careers for Climate Change

Communities and Neighborhoods that will benefit from this project:
Anahola

Affiliation: Aina Alliance	**Project Lead:** Jeremie Makepa Partners: DHHL, OHA, KFD, DOE, Kamehameha Schools
CWPP Area: Kauai	**Cost:** $1,200,000 over two years.

Project Description: Aina Alliance has partnered with DHHL to steward 400 acres of land for hazard mitigation including Wildfires. We have expanded educational activities with support from OHA and Kamehameha Schools to run our first pilot program with DOE high school students. Project “Heavy Impact” allows students to participate in wildfire fuel reduction with training in heavy equipment. Students from all Kaua’i communities engaged with professional Operators using excavators, skid steers, loaders and tow trucks to haul 30 abandoned vehicles and tons of trash in one day. Operators also demonstrated use of mastication equipment to reduce flammable vegetation and enhance the fire break roads in the community. With CWDG funding we would develop training programs with schools and businesses to increase workforce development in related careers while simultaneously reducing Wildfire hazards.

Link to the article about the project: https://www.hawaiinewsnow.com/2024/09/27/high-schoolers-volunteers-remove-dozens-abandoned-vehicles-kauai/#m1lesdssg00cucxawtg
Importance: Actively engaging with the next generation to share the importance of stewardship in a fun and impactful way deepens the connection between student and community. Using our area as a training facility actively builds relationships to recruit potential careers in Natural Resource Management, Firefighting, Construction and other sectors for climate resilience. It also provides a continuous supply of new trainees and future managers to sustain the project for years to come. As the project grows we can continue to expand into other areas that are a high risk for Wildfires and conduct fuel management activities there.

Project Name: Anahola Resilient Landscapes	
Communities and Neighborhoods that will benefit from this project: Anahola	
Affiliation: Aina Alliance	**Project Lead:** Aina Alliance **Partners:** Department of Hawaiian Homelands, County of Kauai, Kauai Fire Department, DLNR Forestry, HWMO, Hoakeolapono Trades Academy, Kanuikapono Charter School, Kukulu Kumuhana o Anahola, Surfrider Foundation, Mochary Foundation, Piilani Mai ke Kai Homestead Association, and others.
CWPP Area: Kauai	**Cost:** $4,684,097
Project Description: Anahola Resilient Landscapes is a fuels mitigation project intent on creating a landscape that is resilient to fire and therefore is at the core of the National Cohesive Wildland Fire Management Strategy. This project expands upon previous fire hazard mitigation efforts towards Fire Adapted Communities started by the Kauai Fire Department, County of Kauai, Hawaii State Department of Forestry and Wildlife, and the Department of Hawaiian Homelands. With 501c3 nonprofit, Aina Alliance, coordinating the community engagement and activities, we connect all three goals of the NCWFMS by engaging with residents and industry allowing all stakeholders to participate in a Safe, Effective, Risk-based Wildfire Response. Aina Alliance will be executing recommended fire mitigation projects as specified in the Kauai Community Wildfire Protection Plan updated 2016. All recommended projects are shown on page 177 of the pdf. These projects also align with the Hawaii Forest Action Plan, Issue 3: Wildfire starting on page 113 of the pdf. The HFAP	

generally describes Anahola's current wildland condition since the decline of the sugar industry with this line: the WUI comprise vast tracts of land that were once used and maintained for agricultural purposes, but are now fallow and dominated by highly fire-prone invasive grasses. The HFAP maps Anahola as a High-risk community from Wildfire on page 114. The CWPP and HFAP can be accessed at this link: (https://drive.google.com/drive/folders/1qLTJJqzeLuPVikbM7Lt_z7Z8JFKHVQ8e?usp=sharing) .

The four projects from the Kauai CWPP we will execute for the Anahola Resilient Landscapes project are: 1) Reduction of fuel load along roadsides, community open areas, and individual homes, 2) Grazing around subdivision perimeters to reduce fuel load, 3) Maintain and increase use of current reservoirs, 4) Implement community chipping days to encourage fuel load reduction.

In project #1, Aina Alliance will lay out and implement, in close cooperation with partnering agencies and stakeholders, fuels reduction work along approximately 20 miles of evacuation routes, fire breaks, and pre-planned potential control lines. Our objective is to treat a minimum of 100 feet on each side of evacuation routes and 50 feet along each side of access roads.

Majority of the areas that need treatment are owned by the Department of Hawaiian Homelands. DHHL is a partner for this project. We have pre-authorized permission to conduct this work, and have obtained a Letter of Support from the Chairman of DHHL which can be viewed at this link: (https://drive.google.com/drive/folders/1qLTJJqzeLuPVikbM7Lt_z7Z8JFKHVQ8e?usp=sharing).

Aina Alliance will use contracted services to conduct mechanical treatments with heavy equipment and hand crews as needed for the terrain with consideration for the integrity of surrounding biodiversity of vegetation. If possible, we intend to retain and hire from the underserved populations of this area to further support the New Wildland Fire Critical Emphasis of workforce capacity in the NCWFMS. We intend to engage with Hoakeolapono Trades Academy to supply interns from their workforce training program based in Anahola to enhance their construction based curriculum with our activities. HTA has workforce training programs for women, high school students, and internships with local contractors to build the skills needed in the trades industry. See more on their programs at this link: (https://hoakeolapono.org/)

In project #2, we will add approximately 39,000 feet of ungulate fencing to implement targeted grazing for continuous vegetation management by contracted services. This is a long term investment that is both an economically and environmentally responsible way to maintain the condition of the fuel breaks. We intend to engage with Kaivin Educational Farms to supply goats and sheep. Their program teaches students responsibility and has been implemented on DHHL lands in 2022 for targeted grazing in Kokee. This grazing program is also a healthy step into the workforce for historically marginalized, impoverished, and excluded populations in Anahola to

further support the New Wildland Fire Critical Emphasis of diversity, equity, inclusion and environmental justice in the NCWFMS. Management of the program has seen improved mental health results in participants who interact effectively with the animals. In this project we gain a trifecta of benefits for the community wildfire fuel reduction by supporting indigenous health for native population, workforce education, and economic opportunity for low-income populations.

In project #3, we will maintain and increase use of current reservoirs as well as the ditch lines that once served the sugar plantations in this agricultural area. Since there are no fire hydrants in the AAHH, the intent of this project is to supply firefighters with available water sources for drafting or helicopter dipping areas during a wildfire. Anahola once had 5 reservoirs with connecting ditch lines and control zones. Since the sugar industry shut down in the 1990s, these waterways have been left in disrepair. Two of the reservoirs have been decommissioned. While others are in the planning phases to be removed if we aren't able to assist. We will add shaded fuel breaks of 200 feet in the area directly around the reservoirs and near access roads for clear helicopter and fire vehicle approach. We estimate 36 acres of shaded breaks near the reservoirs and 12 acres of treatment along access roads to the reservoirs. Once safe access is made, we intend to engage with the Field Studies programs at the University of Hawaii and Oregon State University. UH's program - Institute for Research and Engaged Scholarship (IRES), works collaboratively with community partners to support faculty innovation teaching community-engaged research that leads to community transformation. OSU's Indigenous Health program aims to help prepare students to work collaboratively with Indigenous communities and engage in experiential and service-learning opportunities related to the land and the ocean. These partners connect the three National Goals of the NCWFMS by using the best available science, traditional ecological knowledge, and data analysis to support future planning and decision-making for Anahola's watershed.

In project #4, we plan to implement community chipping days to encourage fuel load reduction.Anahola is an under-served community. Anahola's average income is $28,571 lower than Hawaii's 80% median household income according to the CWDG scoring tool. Many of the homes are older dilapidated structures with overgrown vegetation.

The population has limited access to equipment for vegetation removal or trucks/ trailers that can haul material to a green waste facility. We would like to open a 10 acre area near one of the community farms to use as a central collection area for chipping days. We will engage with Kukulu Kumuhana o Anahola, as our partner in this venture. KKOA has been approved by DHHL for long term educational community farm activities. We believe they will need lots of mulch to create rich composted soil. Mulch from the chipper days can be recycled sustainably into the farm ecosystem further enhancing our community health and resiliency. This project directly helps protect and improve the quality of life for the historically underserved residents of Anahola and also benefits all of Kauai County by managing waste sustainably. More info on KKOA can be found at this link: http://www.kkoa.org/

Our proposal also considers planning objectives in the Kauai County General Plan, Kauai Emergency Management Agency (KEMA) Multi Hazard Mitigation and Resilience Plan, DHHL Anahola Regional Plan, and the Kauai Fire Department Operational Utilization Plan. We will also be working closely with the Hawaii Wildfire Mitigation Organization (HWMO) for additional consulting as needed. Copies of these plans can be found at this link to our shared folder: (https://drive.google.com/drive/folders/1qLTJJqzeLuPVikbM7Lt_z7Z8JFKHVQ8e?usp=sharing).

As we've described, Aina Alliance has planned a holistic community approach to wildfire management that sustainably and effectively implements the projects listed in the Kauai CWPP to provide long term solutions by partnering with active organizations with similar but diverse capabilities to synergistically complement the National Cohesive Wildland Fire Management Strategy and Hawaii Forest Action Plan.

Importance: This project may serve as an example to other communities at risk for the impacts of wildfire. This project may be a model other communities can emulate and introduce wildfire mitigation practices that will make these places more resilient. To address sustainability of treatments while facing climate change, we plan to partner with the University of Hawaii and Oregon State University to conduct Field School workshops that monitor data as we continue the process.

Project Name: Kokee Fuels Reduction Project	
Communities and Neighborhoods that will benefit from this project: Kokee, Makaha PMRF, Kekaha, Waimea	
Affiliation: DLNR-DOFAW	**Project Lead:** DLNR-DOFAW **Partners:** Kauai Emergency Management, HWMO, and others
CWPP Area: Kauai	**Cost:** $1,057,425

Project Description: The Puu Ka Pele Fuels Reduction project aims to protect critical habitat, the identified Kokee and Makaha PMRF communities, as well as adjacent the Waimea community, Na Pali and Kokee State Parks, Kekaha Game Management Area under Kekaha Hawaiian Homes and the Na Pali Kona Forest Reserve. The communities lack the resources to mitigate the wildland fire risk in the upland mauka areas. In the recent years, several contracts have occurred and slowly the forest reserves are becoming more wildland fire ready. The installation of these roads occurred over 50 years ago and through time they have gone through phases of immaculate maintenance to overgrown and unmaintained. Currently, half of the forest roads are being maintained on a regular basis, and the other half are not maintained.

FUELS REDUCTION
The Puu Ka Pele Fuels Reduction project proposes to reduce fuels (20' buffer) along both sides (40' total buffer plus road footprint) of 18 miles (approximately 108 acres) along five roads that run through state forest reserve land (Puu Ka Pele Forest Reserve) by mastication of non-native hazardous vegetation.

Fuels reduction along the existing roads will help to create a safe access route for fire and emergency vehicles and equipment. The current condition of these roads would not allow for safe access. Previous fuels reduction project have shown that this is a successful method to provide safe emergency access, as well as suppress the regrowth of these non-native plants.

SAMPLE CONTRACT
Mulch all non-native vegetation smaller than 12 diameter 20 on both sides of identified roads. Vegetation larger than 12 diameter can remain standing but undamaged to ensure the tree remains healthy and standing. If too much damage occurs to nearby standing trees they may die slowly and become hazardous in the near future.

FUELS MITIGATION
Through the purchase of a skid steer with a mulching attachment, and the hiring of an Assistant Fire Protection Forester, additional ladder fuels can be removed from below the hazardous timber plantations within the fuels reduction project areas.

The forester will also help to maintain all the existing and new fire break areas, as well as monitor the success of this project.

This proposal aligns with Kauai Community Wildfire Protection Plan 2016, and the Hawaii Forest Action Plan (FAP). The Hawaii FAP issue 3: Wildfires identifies the threat of wildfires to destroy native plants, ecosystems, and forests and deprive animals of their habitat (National Themes 1.1, 1.2, 2.2). Although majority of the immediate work within this proposal lies within non-native habitat, just adjacent to this area is home to some of the most diverse ecosystems in the world. Two valleys to the north contain over 261 single island endemic species, of which 15 are extremely rare with less than 50 individuals in the wild (PEPP plant: Plant Extinction Prevention Programs plants).

This project ties into Kauai County CWPP (updated 2016) by reducing fuels in the forest reserves and is identified as a high or extreme fuel hazard rating. The CWPP also has this project in its ASAP category in the Near-Term Action Plan.

Importance: The Puu Ka Pele Fuels reduction project plays an integral role in linking together parts of our CWPP, and will provide landscape level benefits to the community of Kauai. The project area is located adjacent to the west flank of a community of cabins. The Kokee cabin community is surrounded by non-native trees and vegetation and typically can access the cabins through one main road. The ability to create these roads as a safer egress will be extremely beneficial to all involved.

The project area was also reforested by the US Forest Service with a variety of different trees, mostly Eucalyptus and Pine. The landscape of these upland mauka forested lands was pasture and used for grazing in the early 1920s. When people began to notice that the grazing activities were creating massive erosion and severe vegetation loss, they stopped the grazing leases and underwent a massive reforestation effort with the creation of the Civilian Conservation Core (CCC) projects.

With DOFAW, USFS and CCC combined, hundreds of thousands of trees were planted across the island, including these mauka pasture lands. These trees have become a highly flammable fuel that exhibit high vertical and horizontal continuity. The proposed project would help reduce fire risk and increase fire fighter safety ingress/egress within the area. With the additional person and piece of equipment, slowly DOFAW can start picking away at the ladder fuels and other firebreak roads. This method will help to reduce the amount of herbicide going onto the landscape just to maintain these breaks.

Project Name: Cross-boundary fuels management technical assistance and education to reduce wildfire risk in Hawaii's underserved communities	
Communities and Neighborhoods that will benefit from this project: Waianae, Makaha, Anahola, Waimea, Kailapa, Kohala, Kula, Waiohuli, Haliimalie	
Affiliation: University of Hawaii at Manoa	**Project Lead:** University of Hawaii at Manoa **Partners:** HWMO and others
CWPP Area: Kauai	**Cost:** $6,744,187

Project Description:
This project will establish Fireshed Partnerships in each CWPP region to bring together landowners and agencies within and adjacent to underserved and vulnerable communities to specify areas for contiguous, cross-boundary fuels mitigation and shared resources and establish agreements whereby partners implement and/or build capacity to implement these actions. The Fireshed Partnerships will target highly fire-prone, largely unmanaged lands that lie between Hawaii's communities and watershed forests and comprise the vast majority of area burned in the islands. This will fill gaps in fuels management by bridging existing community level Firewise projects and programs coordinated by HWMO and the upper elevation terrestrial management by the Hawaii Division of Forestry and Wildlife (DOFAW) and Hawaii Watershed Partnerships. The Fireshed Partnerships will work on three objectives: 1) map available fire-related suppression resources, hazardous fuels, vulnerable assets, resource needs, and potential mitigation strategies; 2) develop cross-boundary agreements/MOUs by determining costs and resource sharing

opportunities for long-term, spatially contiguous fuels mitigation projects at landscape scales; and 3) expand and develop multi-use, multi-partner fuels management demonstrations, including grazing, conventional fuel breaks and reforestation/restoration green strips, that will reduce risk and be used to educate local leadership and other communities. In terms of geographic scope, the project will aim to accomplish Objectives 1, 2 and 3 for to establish one Fireshed Partnership per county in Years 1-3 and initiate Objectives 1 and 2 for an expansion of or establishment of new Fireshed Partnerships in each county in Years 4 and 5.

This project's goals support two of the Cohesive Strategy's challenges: Managing vegetation and fuels, and Protecting homes, communities, and other values at risk. The Fireshed Partnership addresses the most fire-prone and least fire-resilient landscapes in Hawaii which pose the greatest threats to communities, watershed forests, and near-shore areas, namely former agricultural lands dominated by nonnative grasses and shrubs. This project will identify and integrate proven and locally relevant strategies (conventional fuel and green breaks, grazing, fuels conversion/restoration) into planning and implementation efforts to deal with the unique fuel types of Hawaii. By mapping resources and fuels projects, the project will also create opportunities for safer fire response, addressing the third Cohesive Strategy challenge. This project addresses objectives of the 2016 Hawaii Forest Action Plan. Chapter 3 (pages 109-110) points to the need for fuel assessment, modeling, reduction, and management and improved fire data management systems to support fire management projects. Pages 121 and 122 also include Address wildland fire landowner management plans, and develop maps that identify the resources and incorporate risk assessment.

Long-term strategies for wildland fire (Page 125) call to improve cross-sector collaboration among agencies with responsibilities in the areas of planning, wildfire mitigation, and public safety.

This effort will leverage existing partnerships among the Hawaii Department of Land and Natural Resources, the Hawaii Association of Watershed Partnerships and HWMO to expand landowner participation and fill fuels mitigation gaps across the landscape. Within Year 1 for each Partnership area, the Project Lead and Project Manager will work with the GIS Analyst and County-level Extension Agents to review existing projects, fire risk and fuels maps developed by UH Fire, and conduct site assessments. We will identify key allies among our state and/or private landowner partners with whom we will develop a variety of engagement strategies (from one-on-one meetings to working groups). Within Year 1 the GIS Analyst will also contract University of Hawaii Information and Technology Services to develop and maintain a database for storing and sharing spatial information. Over Years 1 and 2, the Agents will develop and implement engagement strategies to establish Partnership MOUs.

This process will involve collaborative mapping of resources and site specific planning spatial extents, timelines, and material needs (labor, supplies, equipment) for new

fuels reduction actions. In Years 1-2, the Economic Analyst will project costs for the purposes of fundraising by partners beginning in Years 2 and 3. Large-scale (e.g.,10-50 acre), cross-boundary demonstration projects (Objective 3) will be established over Years 2 to 3 and Agents will document best practices and project costs with the Economic Analyst for dissemination (Years 4 and 5) via the Pacific Fire Exchange. Demonstrations will provide models for future actions elsewhere, and build from prior successes of small-scale (1-3 acre) fuels reduction/conversion demonstrations of green breaks, grazed fuel breaks, and agroforestry restoration. In Years 4 and 5, the Project Lead and Project Manager will assess the outcomes of the initial Fireshed Partnerships and develop proposals for continued funding. In Years 4-5, the Agents will work with the GIS and Economic Analysts to expand or develop new Fireshed Partnerships and conduct mapping and MOU development (Objectives 1 and 2) with an additional community in each County.

Planning for diverse types of fuels mitigation in lands surrounding communities was identified in each of the CWPPs referenced by this project. For the West Oahu CWPP, fuels management was the highest ranked with Improved Planning ranked third as priorities (Figure 3, page 48). Table 9 (page 55) of the West Oahu CWPP states the need for grazing corridors, reforestation and restoration, and fuel breaks for fuels reduction. Proposed projects (Table 11; Page 63) include working with large land owners to encourage fuels management, the need to consult with land use planners, and to re-establish agriculture as a form of fuels conversion. Table 11 also explicitly pointed to the need for fencing and water troughs to facilitate grazing around the community.

In the Upcountry Maui CWPP general fuels management and using agricultural and/or grazing methods to reduce fuels were the most frequently recommended strategies for fire risk reduction (page 53). Fuels management planning was second alongside ecosystem protection and improved access (page 53). Planning for large landowners and pre-fire actions, was the second most recommended action for increasing firefighter safety (Page 55). Fuels reduction recommendations included grazing, mowing and herbicide, and fuels conversion through reforestation/restoration and shaded fuel breaks (Table 9, page 56). Table 9 also pointed to converting fuels to drought-tolerant, fire-resistant plants (preferably native) as well as re-establishing agriculture. Longer-term plans (Table 11, page 64) identify fencing and water storage to increase grazing feasibility, multi-use water storage, and working with large landowners to encourage access for fire management. Finally, page 65 of the CWPP recommends forming action teams, funding fire risk reduction projects and documenting successes from those projects.

The Kauai CWPP (2016) ranks vegetative fuels management the highest need, followed by planning (page 35). The top four fuels management priorities (Page 36) included using agriculture and grazing, increasing capacity among landowners for fuels mitigation, reducing fuels on vacant, fallow lands, and planning. Among the CWPP priorities were coordinated fuels management and improved planning (Page 37). Table 7 (page 38) further specified grazing, mowing and herbicide, and

reforestation/restoration in shaded fuelbreaks as well as converting fuels to less fire-prone, preferably native plants. Longer-term actions (Table 9, page 46) identified working with large landowners to encourage fuels management, multi-use water storage and installing water and fencing for grazing.

Recommended actions in the NW Hawaii Island CWPP (Updated in 2016) identifies the need to reduce and/or convert fuels to less fire-prone vegetation, especially native plants, community planning at the regional and community/subdivision scale(Page 28). Reduction of fuel load and invasive species were ranked as high priorities across multiple communities in the CWPP (page 29) and also specified that wherever possible incorporate native plants as well as the use of vegetated fuel break corridors with an emphasis on native plants (page 32). Additional input from the 2016 CWPP update included an Action Plan for increased fencing and water for grazing corridors, resource maps, and developing community-specific plans.

Importance: In working towards these place-based objectives, the project will achieve outcomes that have region-wide impacts. Through the process of onboarding and orienting project funded, county-level Extension Agents, the Project Lead will offer training in fire mitigation and best practices to the entire University of Hawaii's Cooperative Extension Program (29 employees statewide), whos relationships with stakeholders will increase program impact and create future opportunities for community engagement and on-the-ground projects. Specific to the objectives described above, the development of infrastructure for data management, visualization, and access will be useable by future and concurrent projects and available to fire response agencies through their dispatch systems (i.e. CODES) meeting a need identified in the State Forest Action Plan. Developing Fireshed Partnerships and MOUs with long-term plans will not only provide a template for future and concurrent statewide action, it will facilitate additional partnerships since many of the agencies, utilities, and large landowners involved in this project manage lands and resources around other communities in the state. For example, the coordinators for Hawaiian Association of Watershed Partnerships have established agreements with both the state and many private landowners, but focus on higher elevation, intact ecosystem conservation. The project will therefore leverage these relationships to forge new agreements through the Fireshed Partnerships to expand land management efforts into lower elevation, high fire risk areas. Finally, using Extension Agents to implement and document place-based fuels reduction projects as demonstrations will create opportunities for dissemination of best practices for multiple strategies and multiple audiences by coordinating with the Pacific Fire Exchange project (www.PacificFireExchange.org) and concurrent outreach efforts by HWMO via FireWise and others such as the Watershed Partnerships.