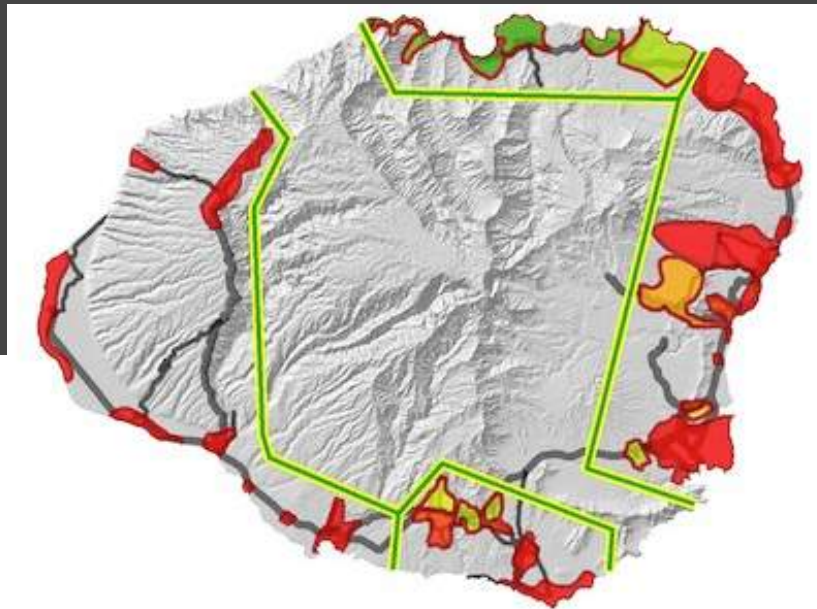


# Kauai WILDFIRE HAZARD

An Assessment of 36 Factors

That Contribute to Wildfire Hazard

Completed June 2013



## Coordinated and Developed By:

Hawaii Wildfire Management Organization, a 501(c)(3) nonprofit organization dedicated to protecting Hawaii's communities and natural resources from wildfire.



## In Collaboration with:

Kauai Fire Department and State of Hawaii Department of Land and Natural Resources Division of Forestry and Wildlife



Hawaii Wildfire Management Organization

65-1279 Kawaihae Rd., Ste. 211

Kamuela, HI 96743

Phone: (808) 885-0900

E-mail: [admin@hawaiiwildfire.org](mailto:admin@hawaiiwildfire.org)

[hawaiiwildfire.org](http://hawaiiwildfire.org)

## Table of Contents

### I. Background

A. Communities at Risk (CAR) from Wildfire in Hawaii	4
B. Hazard Assessment Maps - How They Were Made	5
C. Hazard Assessment Maps - Disclaimer	6
D. Hazard Assessment Maps - Citation Request & Acknowledgements	7

### II. Subdivision Hazard Maps

A. Rating Key	8-9
B. Total Map	10
C. Ingress/Egress Map	11
D. Road Maintenance Map	11
E. Road Width Map	12
F. All-Season Road Condition Map	12
G. Fire Service Access Map	13
H. Street Signs Map	13
I. Structure Density Map	14
J. Home Setbacks Map	14
K. Unmanaged, Untended, Undeveloped Lands Map	15
L. Private Landowner Actions Map	15
M. Proximity of Subdivision to Wildland Areas Map	16

### III. Vegetation Hazard Maps

A. Rating Key	17
B. Total Map	18
C. Proximity of Flammable Fuels Around Subdivision Map	19
D. Type of Predominant Vegetation Within 300' of Homes Map	19
E. Fuel Loading Map	20
F. Fuel Structure and Arrangement Map	20
G. Defensible Space/Fuels Reduction Around Homes & Structure Map	21

## Table of Contents (cont.)

### IV. Building Hazard Maps

A.	Rating Key	22
B.	Total Map	23
C.	Roofing Assembly Map	24
D.	Siding/Soffits Map	24
E.	Under-skirting Around Decks, Lanais, Post-and-Pier Structures Map	25
F.	Utilities Placement - Gas and Electric Map	25
G.	Structural Ignitability Map	26

### V. Fire Environment Hazard Maps

A.	Rating Key	27
B.	Total Map	28
C.	Slope Map	29
D.	Average Rainfall Map	29
E.	Prevailing Wind Speeds and Direction Map	30
F.	Seasonal or Period High Hazard Conditions Map	30
G.	Ignition Risk Map	31
H.	Topographical Features Map	31

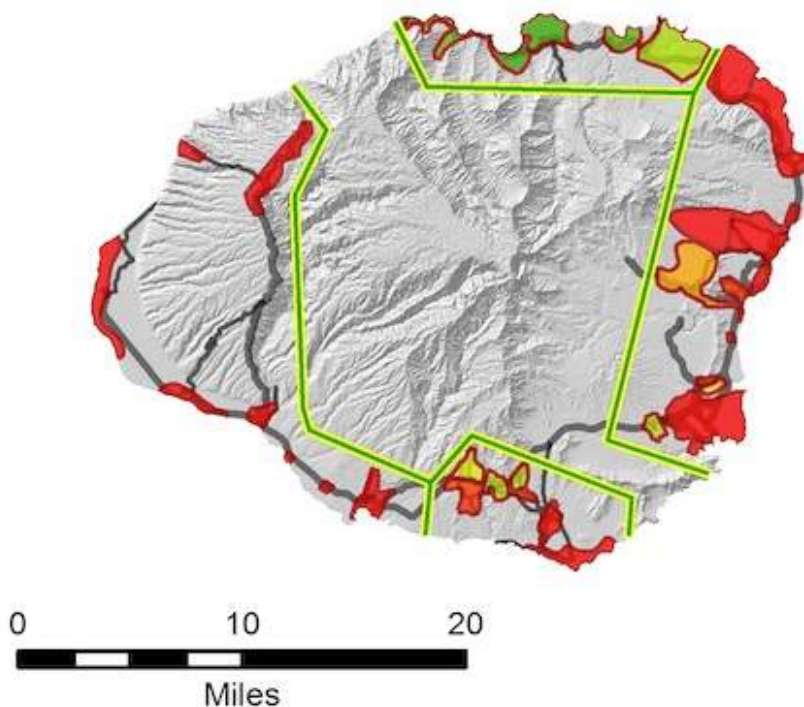
### VI. Fire Protection Hazard Maps

A.	Rating Key	32
B.	Total Map	33
C.	Water Source Availability Map	34
D.	Response Time Map	34
E.	Proximity to Fire Station Map	N/A
F.	Fire Department Structural Training and Expertise Map	35
G.	Wildland Firefighting Capability of Initial Response Agency Map	35
H.	Interagency Cooperation Map	N/A
I.	Local Emergency Operations Group Map	36
J.	Community Planning Practices and Ordinances Map	36
K.	Community Fire-Safe Efforts and Programs Already in Place Map	37

## Communities At Risk (CAR) from Wildfire in Hawaii

Many communities in Hawaii are at high risk of wildfire due to unmitigated fuels, limited community engagement, insufficient water and firefighting resources, and under addressed pre- and post-fire planning and preparedness. In line with its mission to protect communities and natural resources from wildfire through planning, mitigation, and education, the 501 (c)(3) nonprofit organization Hawaii Wildfire Management Organization (HWMO) has conducted hazard assessments for every community in the state. These assessments, coupled with the overall Communities At Risk From Wildfire Map update, will enable a more thorough understanding of wildfire hazards that can be addressed by communities, decision makers, fire responders, and natural resource managers. This report provides specific details and results for the County of Kauai.

### KAUAI



### COMMUNITIES AT RISK FROM WILDFIRES State of Hawaii



Map created by M. Wason, UTM 18N, NAD 83 UTM Zone 47N  
 This publication made possible through a grant from the USDA Forest Service.  
 HWMO is an equal opportunity employer.



## Hazard Assessment Maps - How They Were Made

Communities in Hawaii were assessed for 36 hazard components and rated by personnel from County Fire Departments, DLNR Division of Forestry and Wildlife Fire, and Hawaii Wildfire Management Organization. The following tables provide details on how the rating scores were determined. The Subdivision, Vegetation, and Building hazard categories were rated by site inspections in each community. The Fire Environment and Protection categories were rated by fire responders with expert understanding of their agencies and local environments.

Each community area on each island was assessed per hazard component. The results have been mapped for each region and are provided within the following pages of this document. Tables providing details on how the rating scores were determined are listed before each category's (Subdivision, Vegetation, etc.) set of maps. These maps can also be accessed through the HWMO website: [hawaiiwildfire.org](http://hawaiiwildfire.org). An important note to remember when viewing the maps is that only developed community, residential, and commercial areas were assessed for wildfire hazards. Uninhabited wildland or protected areas were not assessed for hazard using this format, as it is designed specifically to inform the Communities at Risk mapping project.

## Hazard Assessment Maps - Disclaimer

The HWMO Hawaii Hazard Assessment Maps have been prepared to increase awareness on potential wildfire threats to communities across the Hawaiian islands. However, HWMO does not guarantee a house will survive a wildfire event and having a low hazard rating does not “fire proof” an individual house or a given area or subdivision; instead, reducing the hazard rating lowers wildfire threats and improves the potential for wildfire suppression to be successful.

It is important to recognize that the HWMO hazard assessment process is a qualitative ranking system that ranks different factors perceived to contribute to the threat of wildfires at the wildland-urban interface (WUI). The assessment does not include the full range of realistic fire and ember exposures at the WUI and offers no actual quantification of the potential exposure of homes to the ignition, spread, and intensity of wildfires or embers produced by wildfires. Furthermore, the HWMO Wildfire Hazard Assessment is a community-level assessment that produces a rating based on a select number of houses in a given area or subdivision. While such an approach gives an indication of the general wildfire risk for a given area, the actual risk of individual homes can deviate from this assessment based on the characteristics of the site around an individual home.

## **Hazard Assessment Maps - Citation Request**

Please use the following language when using these maps:

“Wildfire hazard data collected, compiled, and mapped by Hawaii Wildfire Management Organization, a 501(c)(3) nonprofit ([hawaiiwildfire.org](http://hawaiiwildfire.org)) with assistance and information from Kauai Fire Department and Hawaii DLNR- Division of Forestry and Wildlife and funded by USFS Cooperative Forestry Assistance- Competitive Wildland/Urban Interface Grant Program.' Or cite as Kauai Wildfire Hazard Assessment. Hawaii Wildfire Management Organization. 2013.”

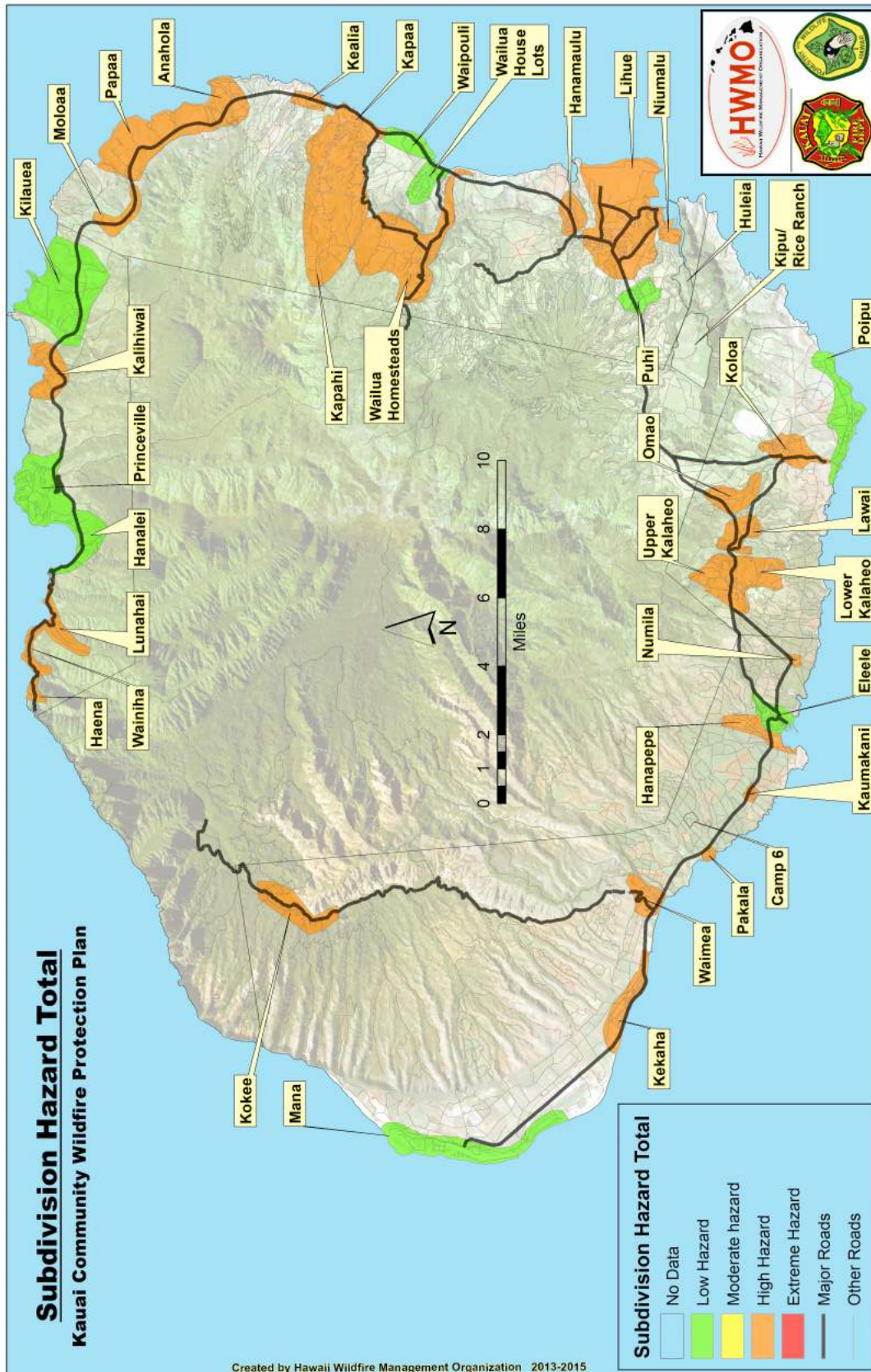
## **Hazard Assessment Maps - Acknowledgements**

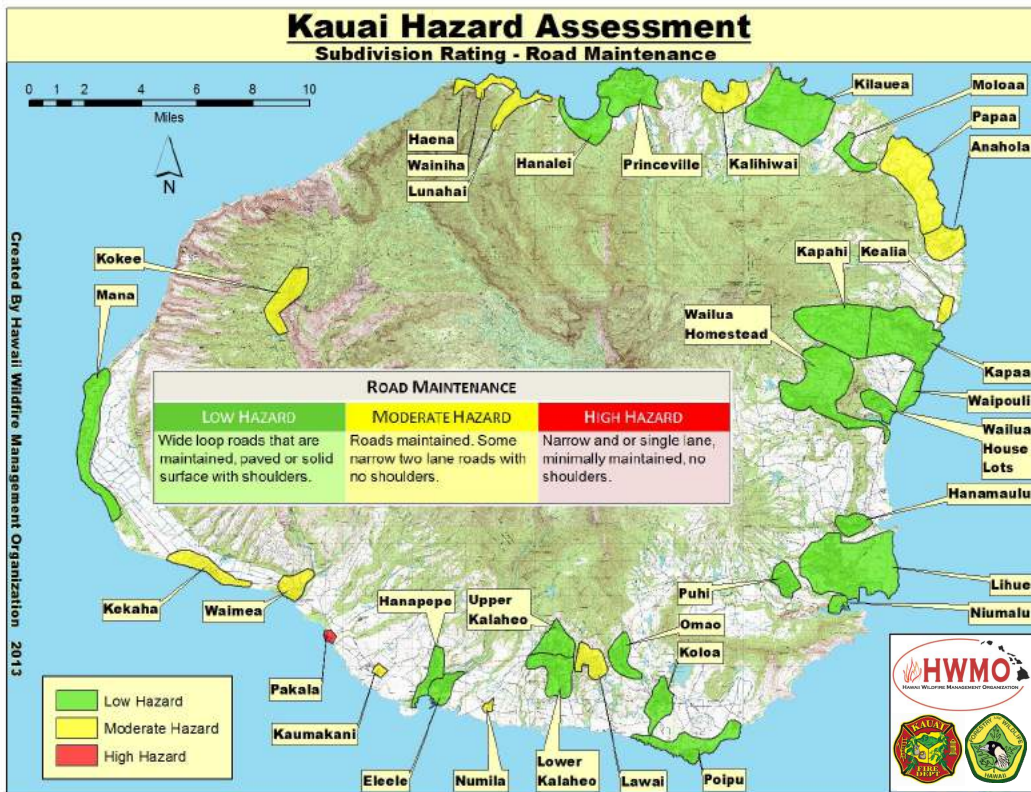
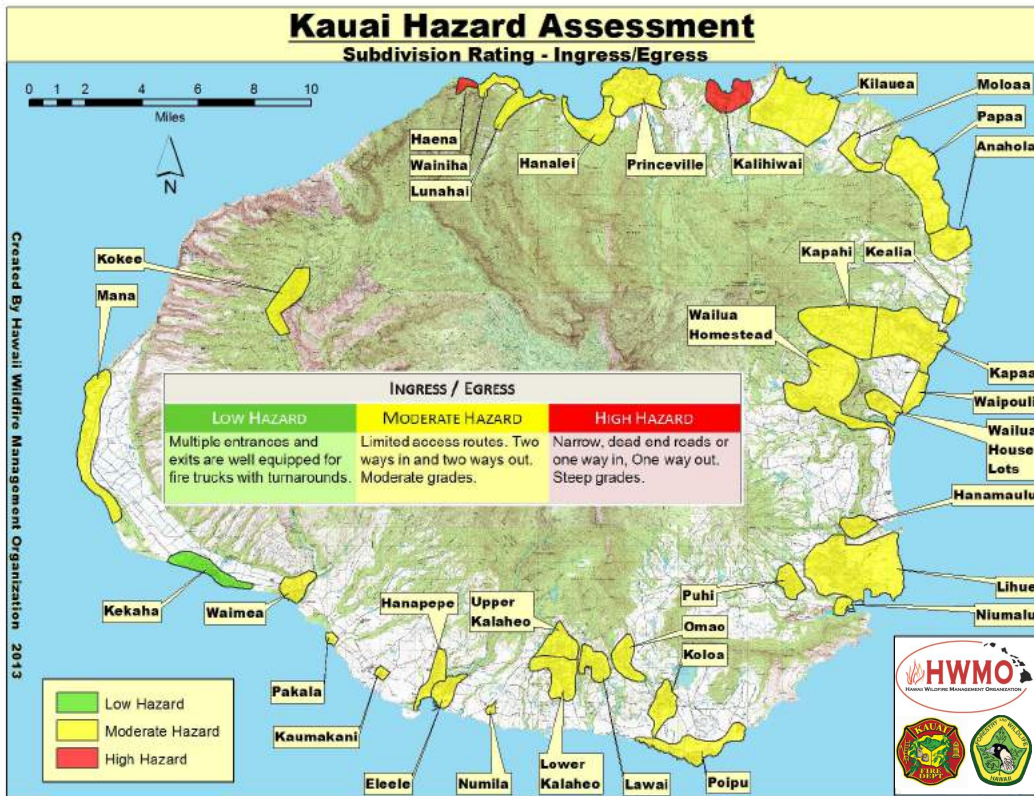
This project was made possible through support provided by the U.S. Forest Service, Pacific Southwest Region, under the terms of Grant No. 11-DG-1105-2012-040. The opinions expressed in this publication, video, or other information/media product are those of the author(s) and do not necessarily reflect the views of the U.S. Forest Service. HWMO is an equal opportunity provider.

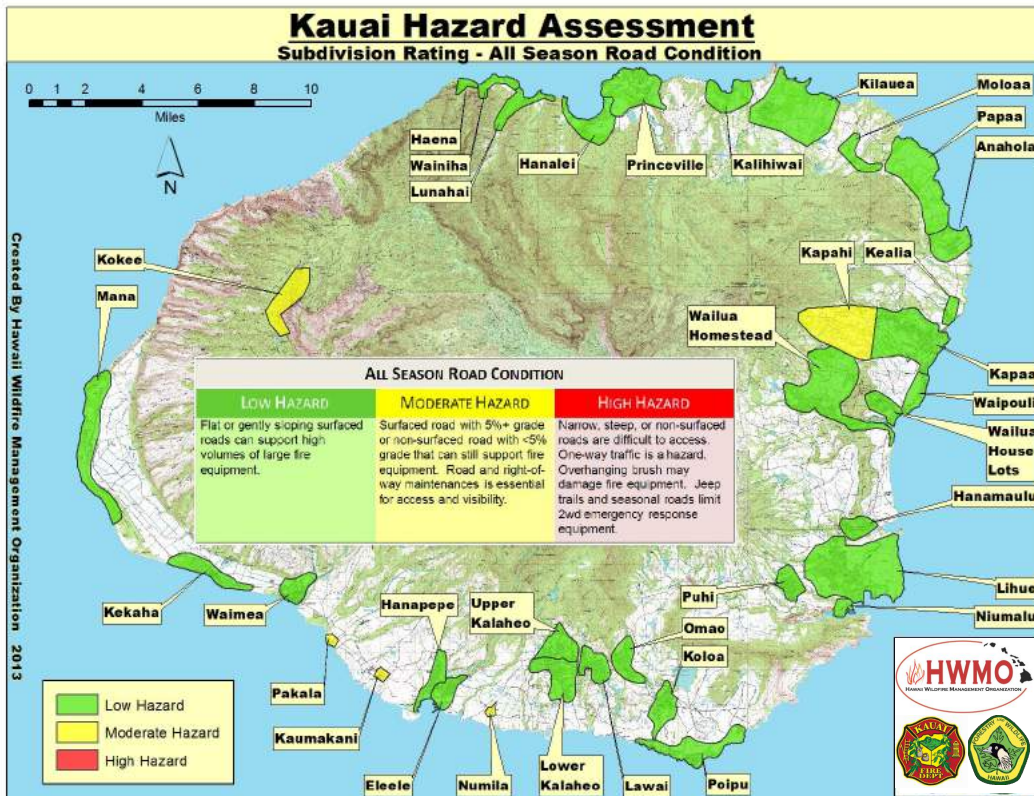
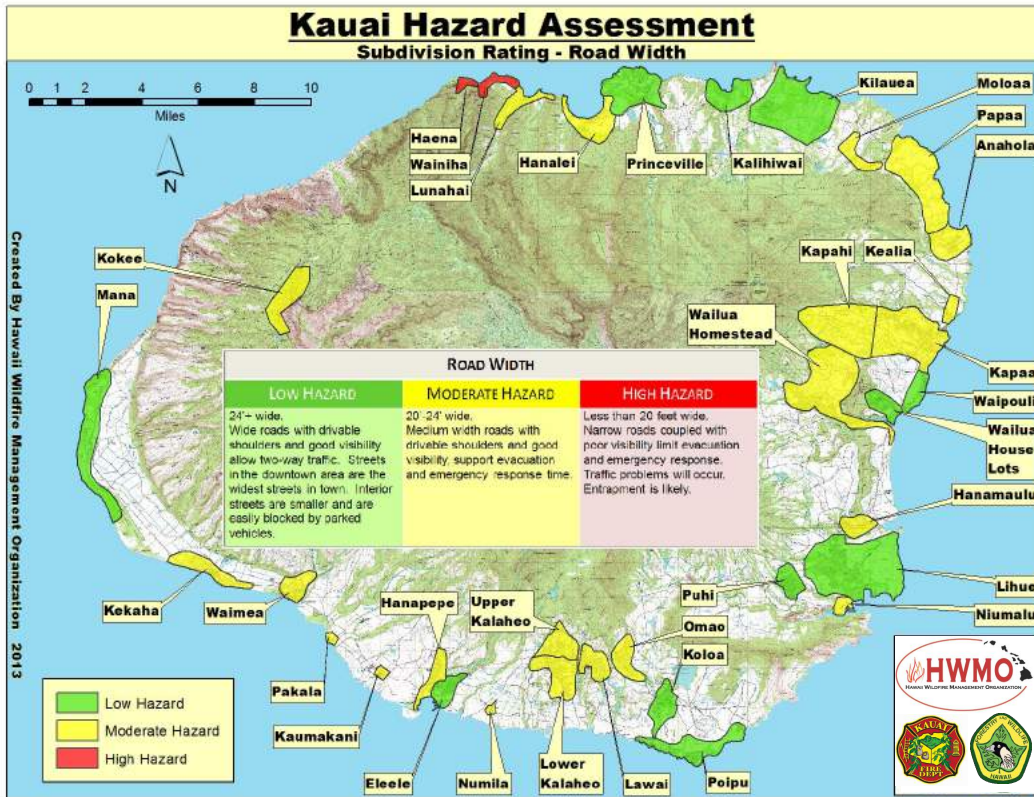
<b>Subdivision Hazard Rating</b>			
<b>Rating Element</b>	<b>Low (Score =1)</b>	<b>Moderate (Score=2)</b>	<b>High (Score=3)</b>
<b>Ingress/ Egress</b>	Multiple entrances and exits are well equipped for fire trucks with turnarounds.	Limited access routes. 2 ways in and 2 ways out. Moderate grades.	Narrow, dead end roads or 1 way in, 1 way out. Steep grades
<b>Road Maintenance</b>	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.
<b>Road Width</b>	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.
<b>All-season Road Condition</b>	Flat or gently sloping surfaced roads can support high volumes of large fire equipment.	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.	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.
<b>Fire Service Access</b>	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.
<b>Street signs</b>	Present. Most are at least 4' in size and are reflectorized.	Present and reflectorized with some exceptions.	Not present.
<b>Structure Density</b>	Low structure density and low ignition probability.	Density and ignition probability are both moderate, or one is high but is balanced by the other being low.	Dense structures with high ignition probability.
<b>Home Setbacks</b>	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.

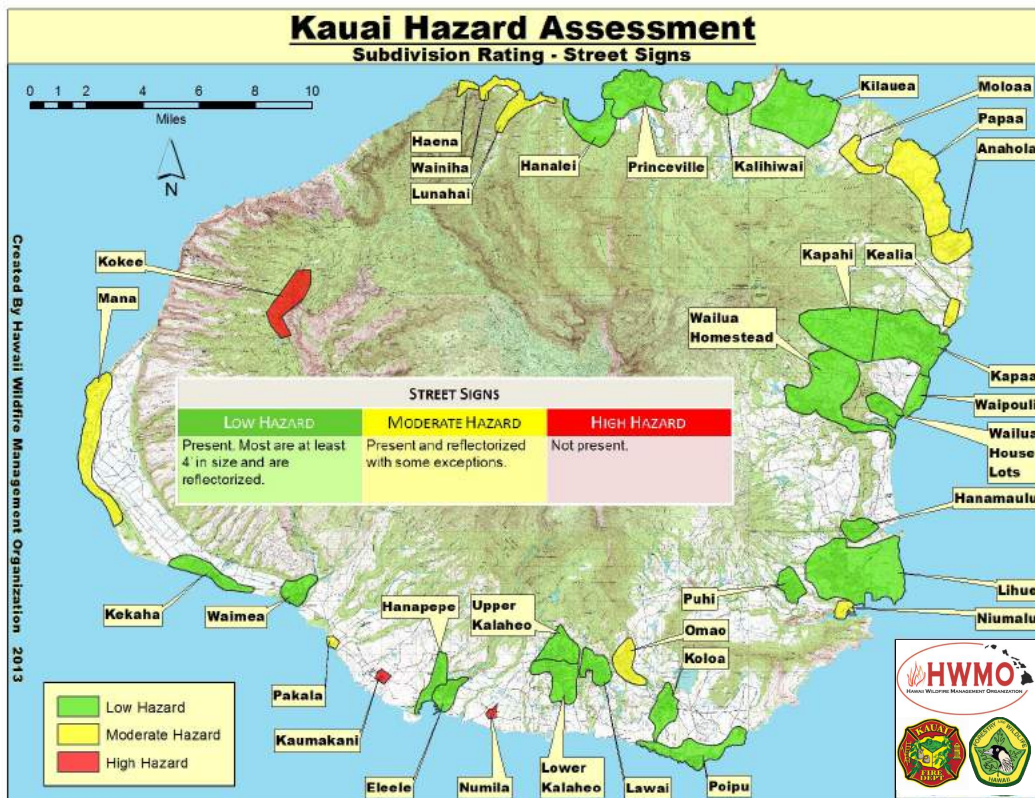
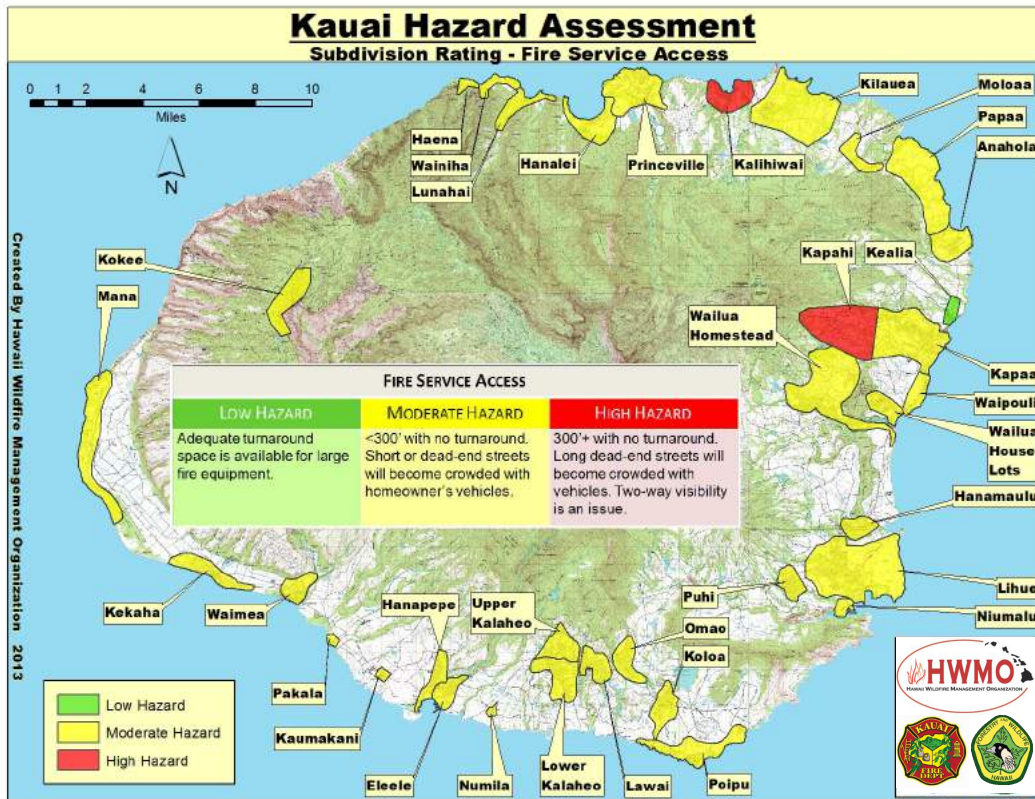


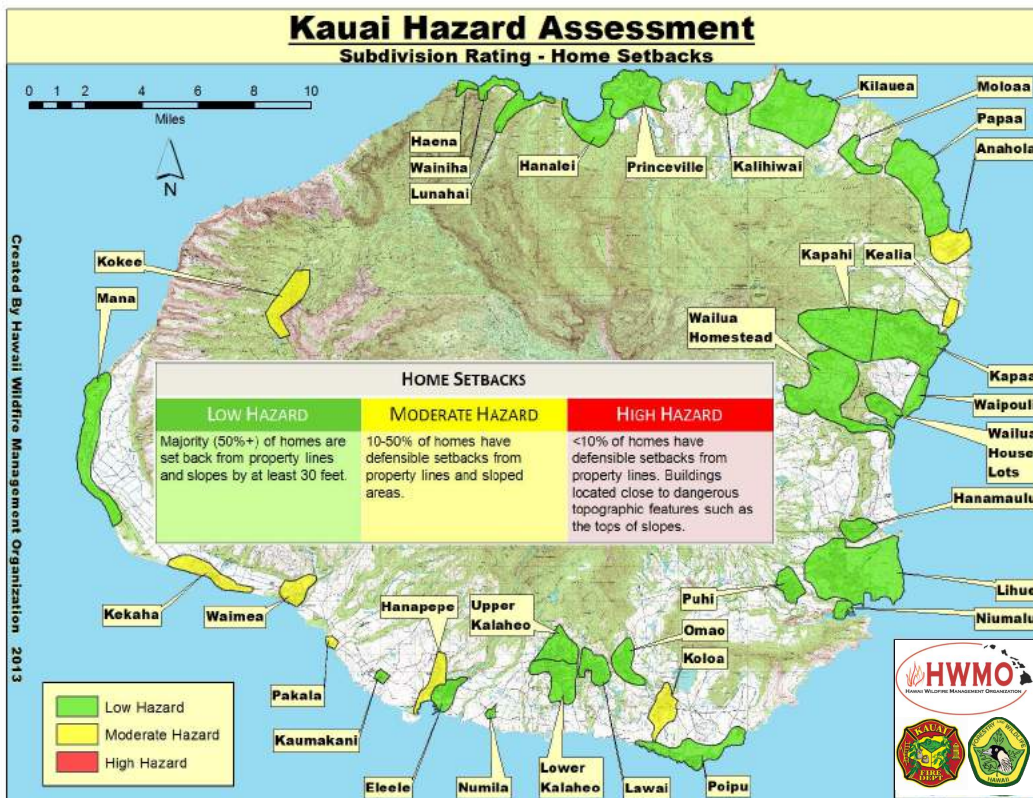
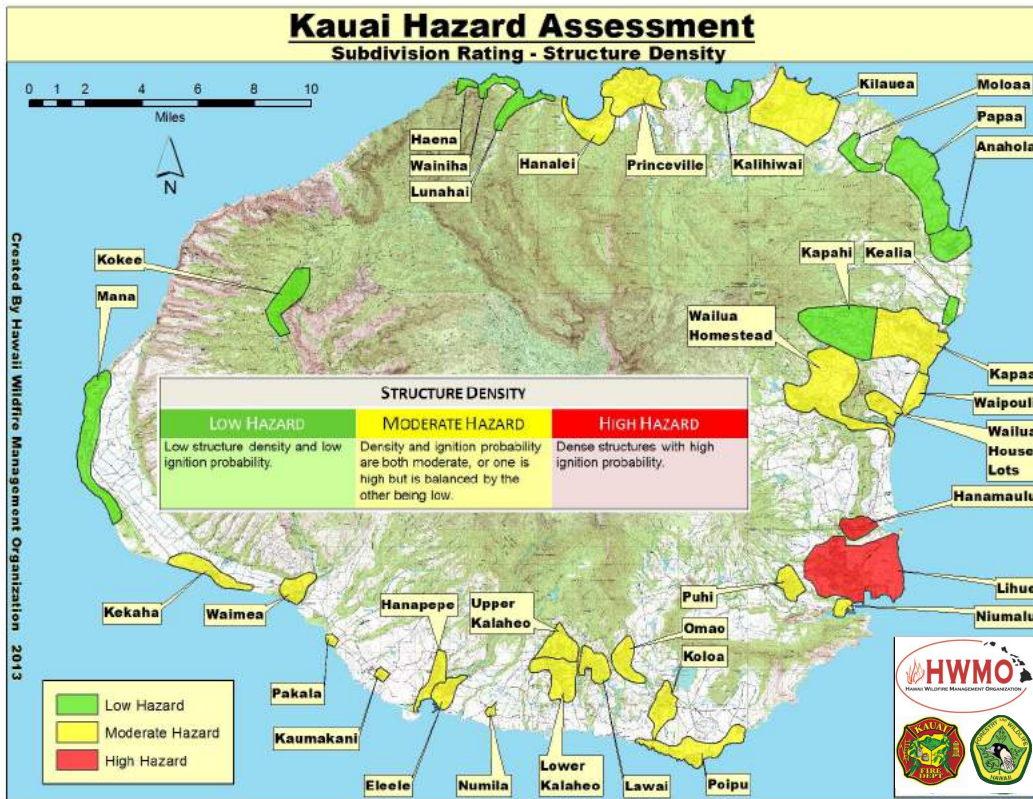
<b>Subdivision Hazard Rating</b>			
<b>Rating Element</b>	<b>Low (Score =1)</b>	<b>Moderate (Score=2)</b>	<b>High (Score=3)</b>
<b>Unmanaged, untended, undeveloped lands</b>	Few to no weedy vacant lots. Few to no undeveloped unmaintained vegetated areas or corridors between homes. Less than 10% of lots 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
<b>Private landowner actions / Firewise landscaping and defensible space</b>	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
<b>Proximity of subdivision to wildland areas</b>	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.

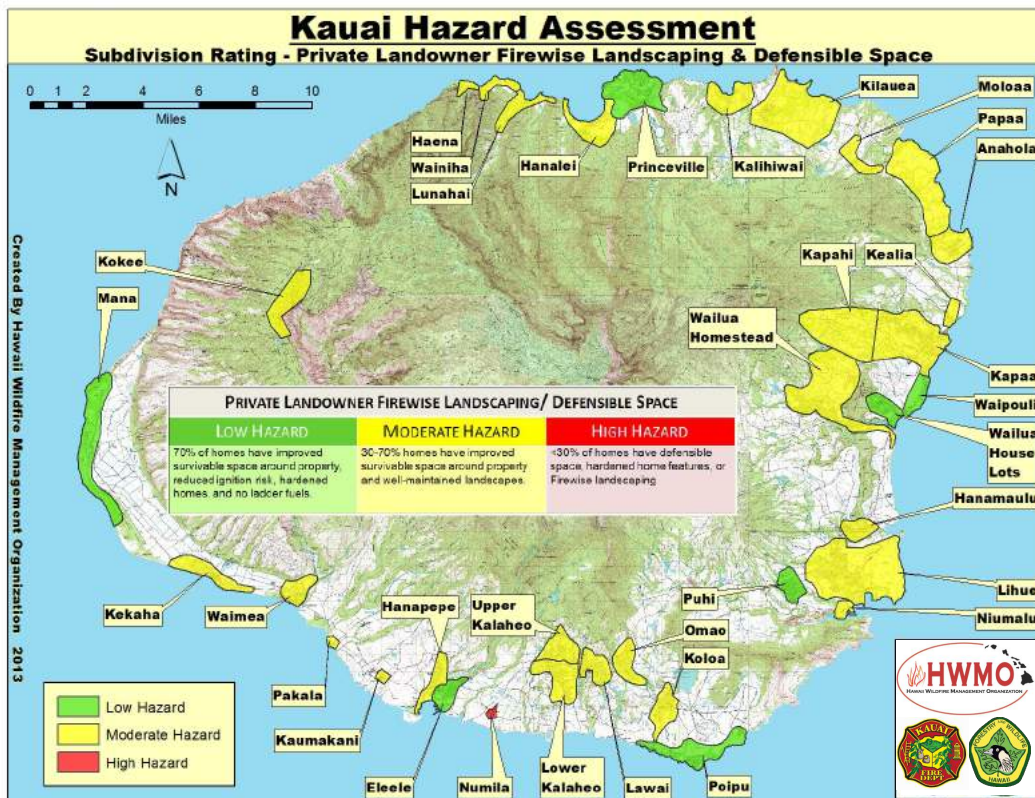
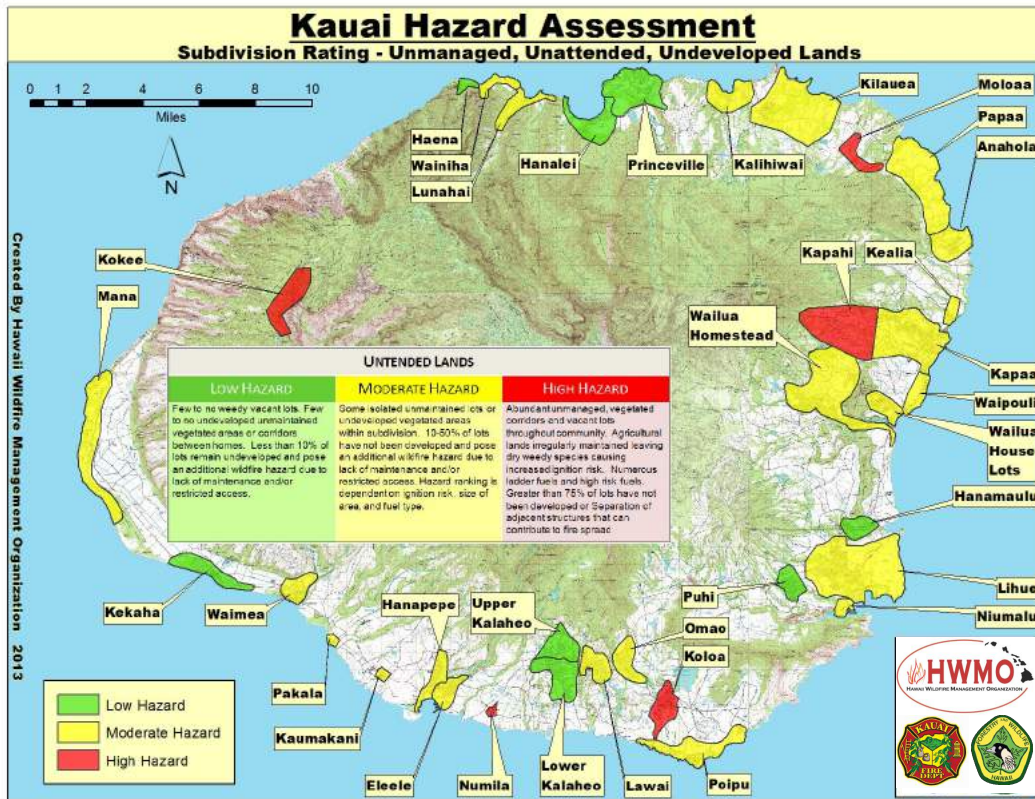


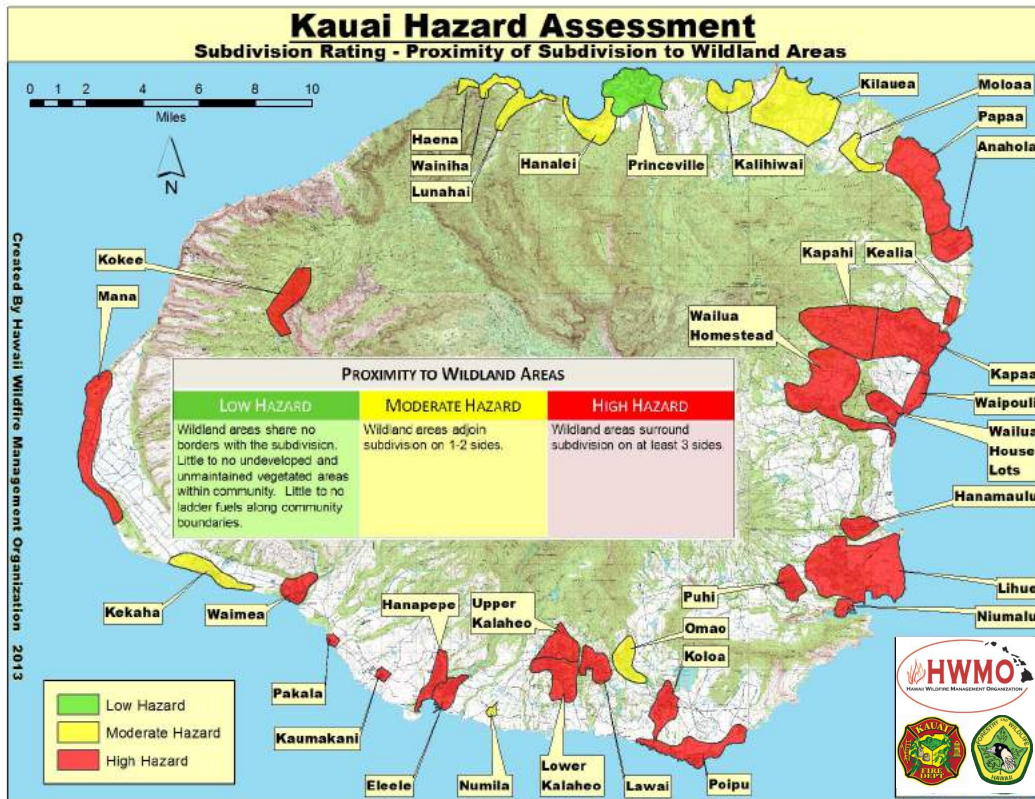








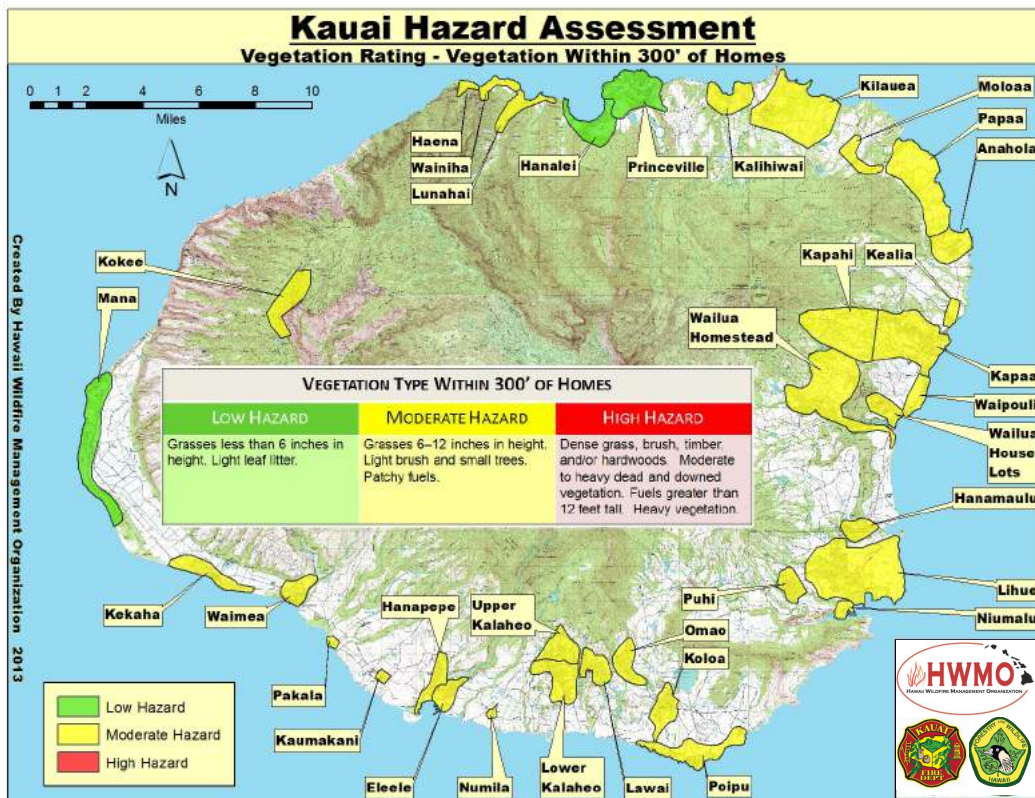
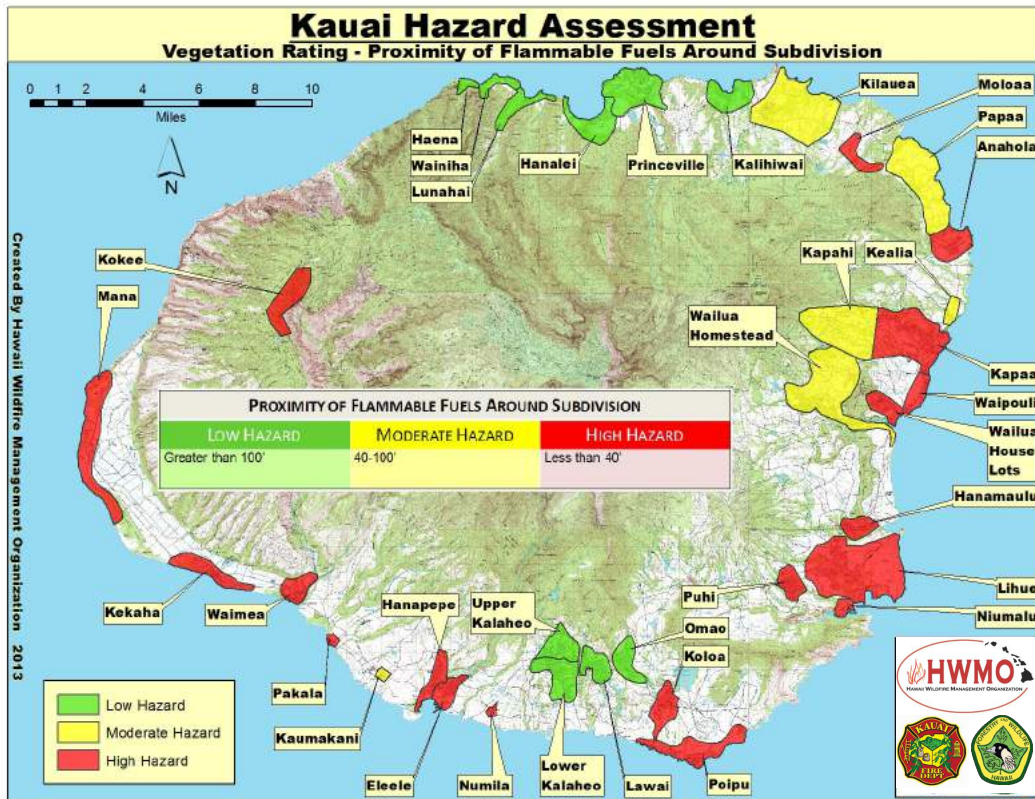


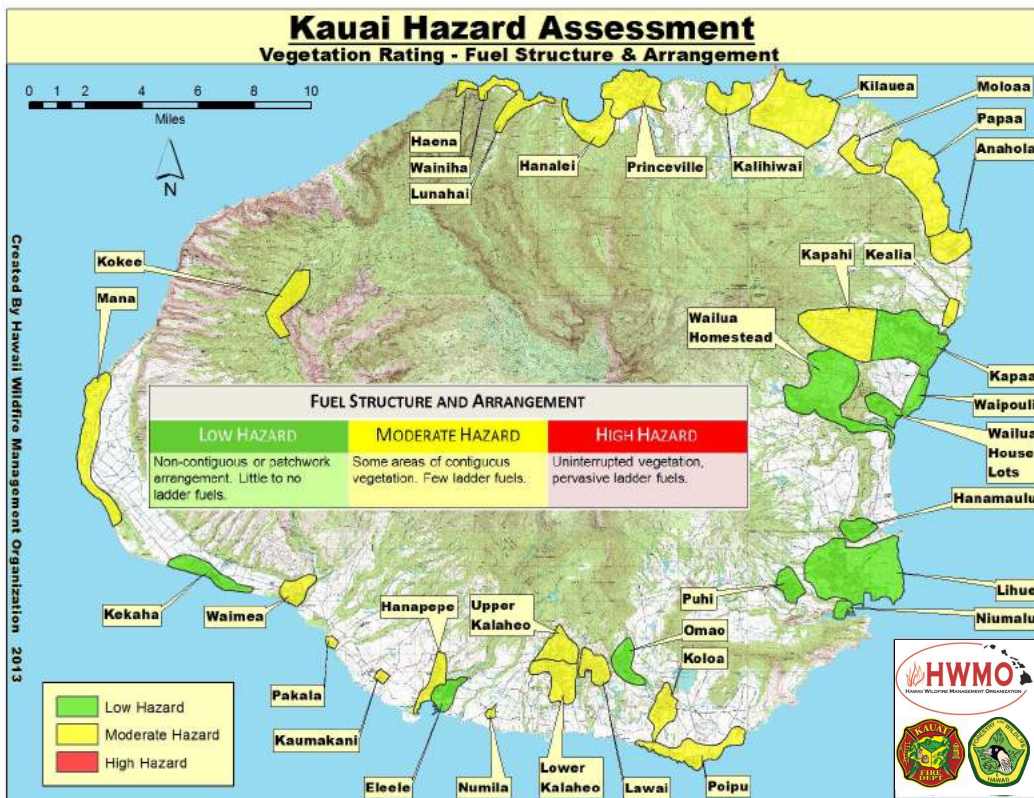
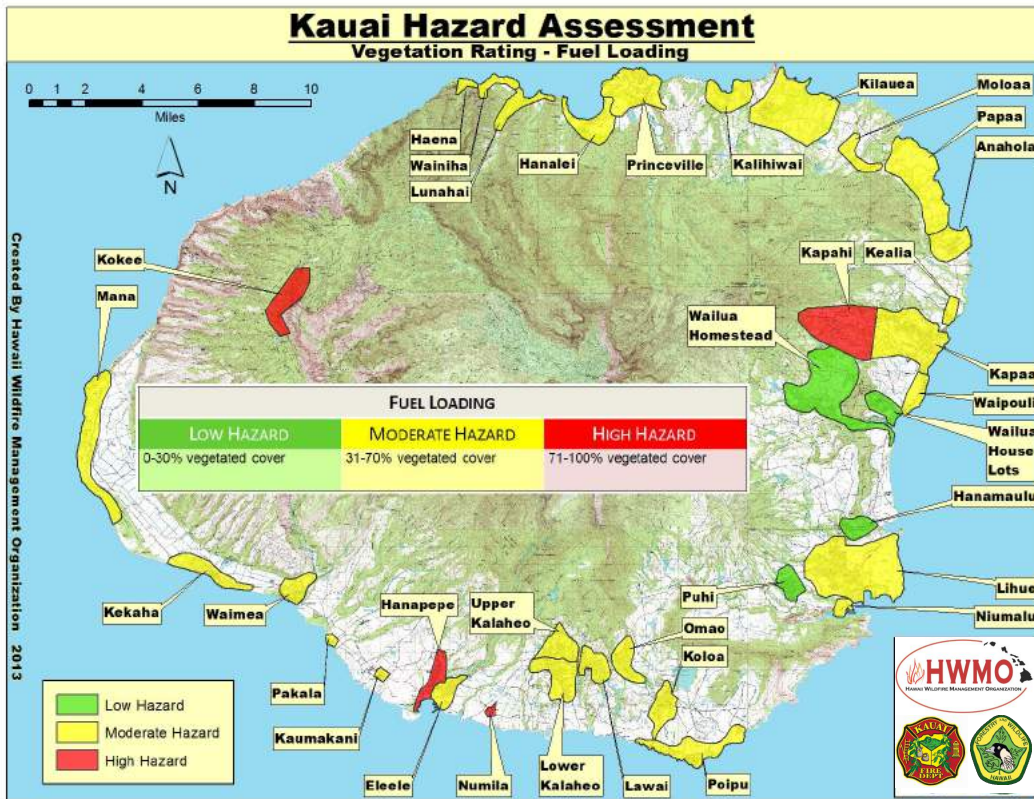


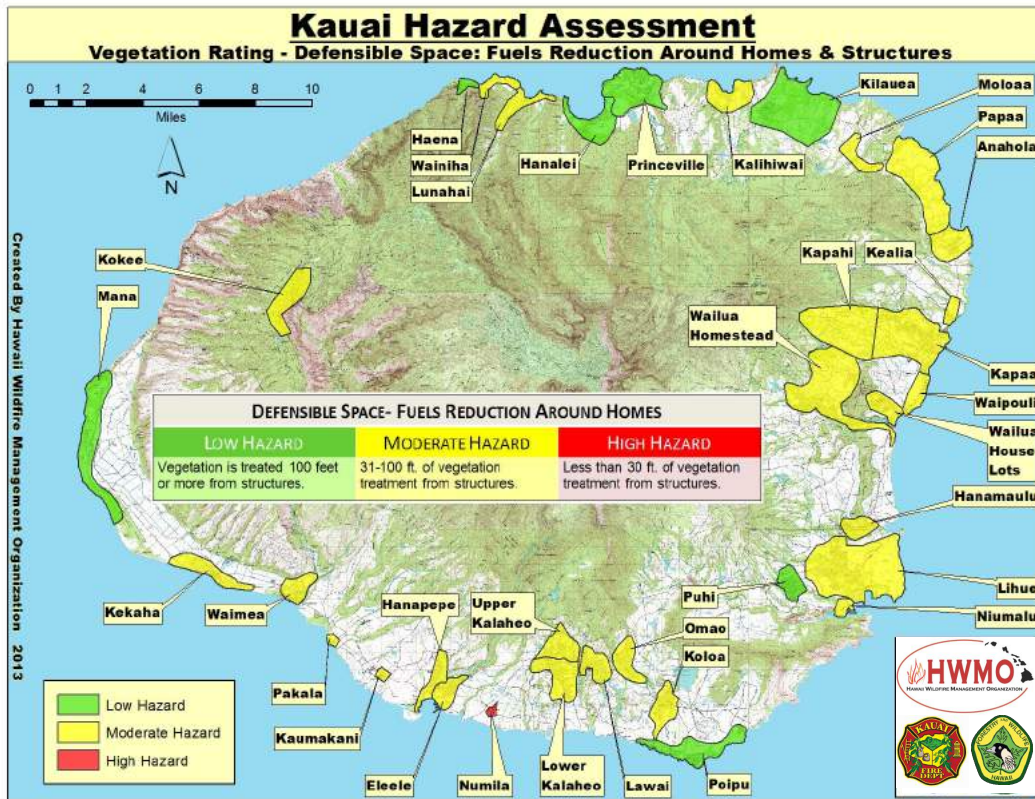


<b>Vegetation Hazard Rating</b>			
<b>Rating Element</b>	<b>Low (1)</b>	<b>Moderate (2)</b>	<b>High (3)</b>
<b>Proximity of flammable fuels around subdivision</b>	Greater than 100'	40-100'	Less than 40'
<b>Type of predominant vegetation within 300' of homes</b>	Grasses less than 6 inches in height. Light leaf litter.	Grasses 6–12 inches in height. Grasses 6-12" tall. 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.
<b>Fuel loading</b>	0-30% cover	31-70% cover	71-100% cover
<b>Fuel structure and arrangement</b>	Non-contiguous or patchwork arrangement. Little to no ladder fuels.		Uninterrupted vegetation, pervasive ladder fuels.
<b>Defensible Space/ Fuels reduction around homes &amp; structures</b>	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.



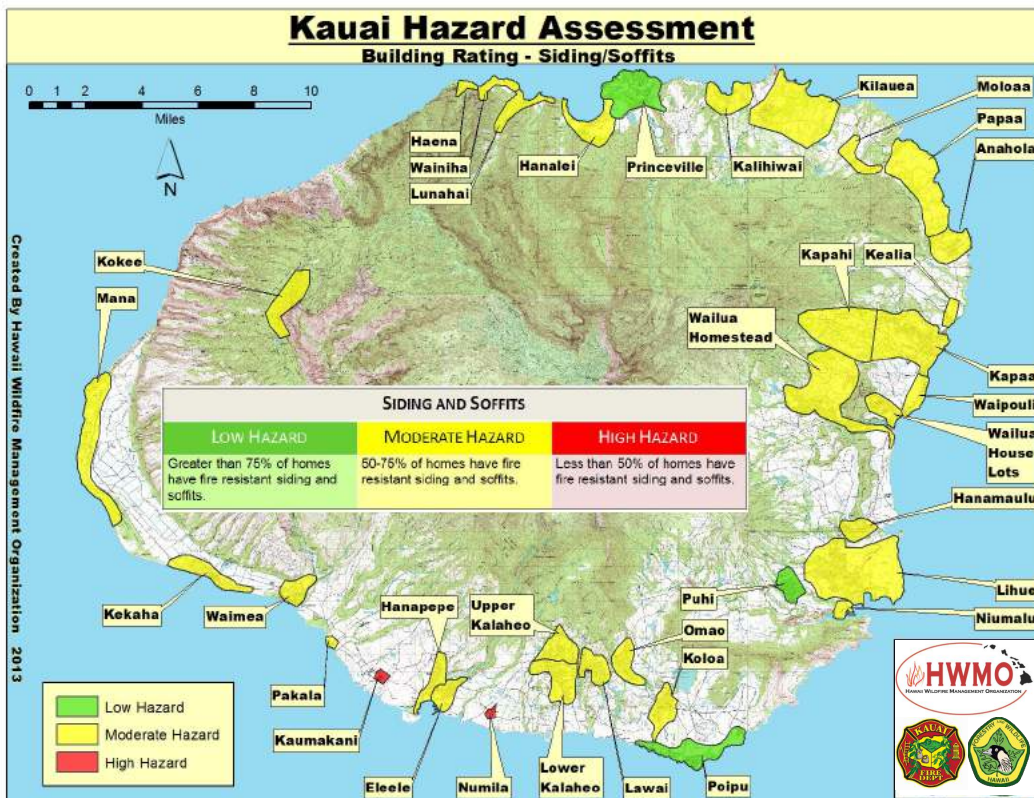
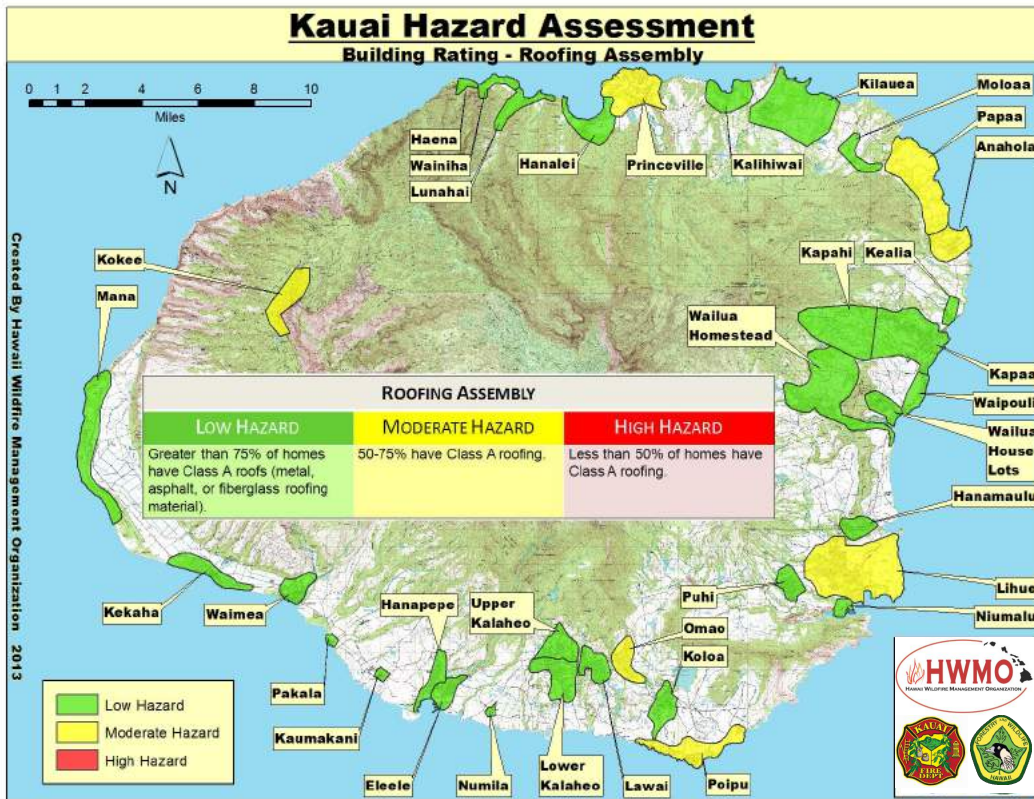




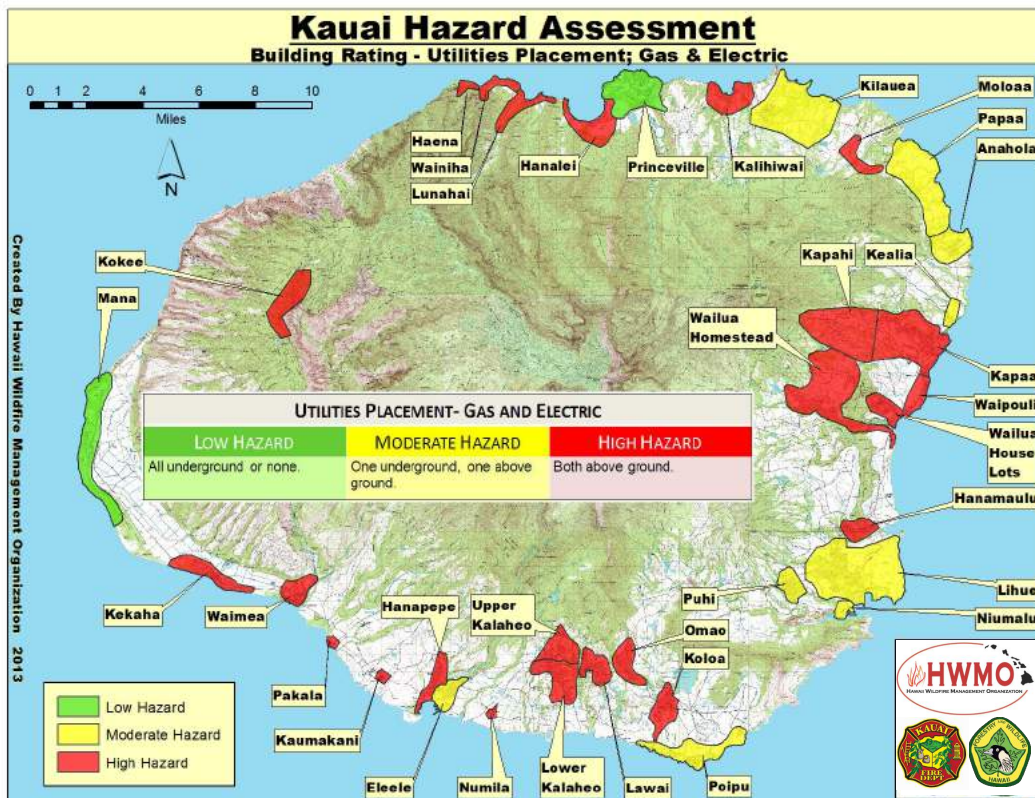
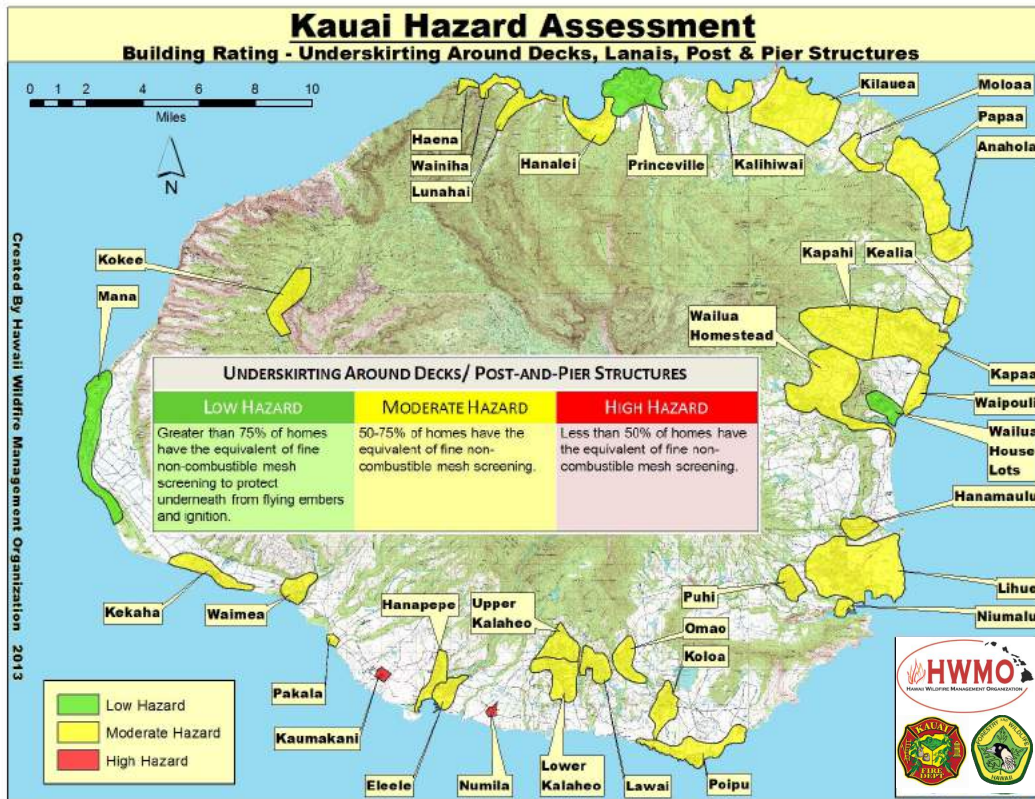


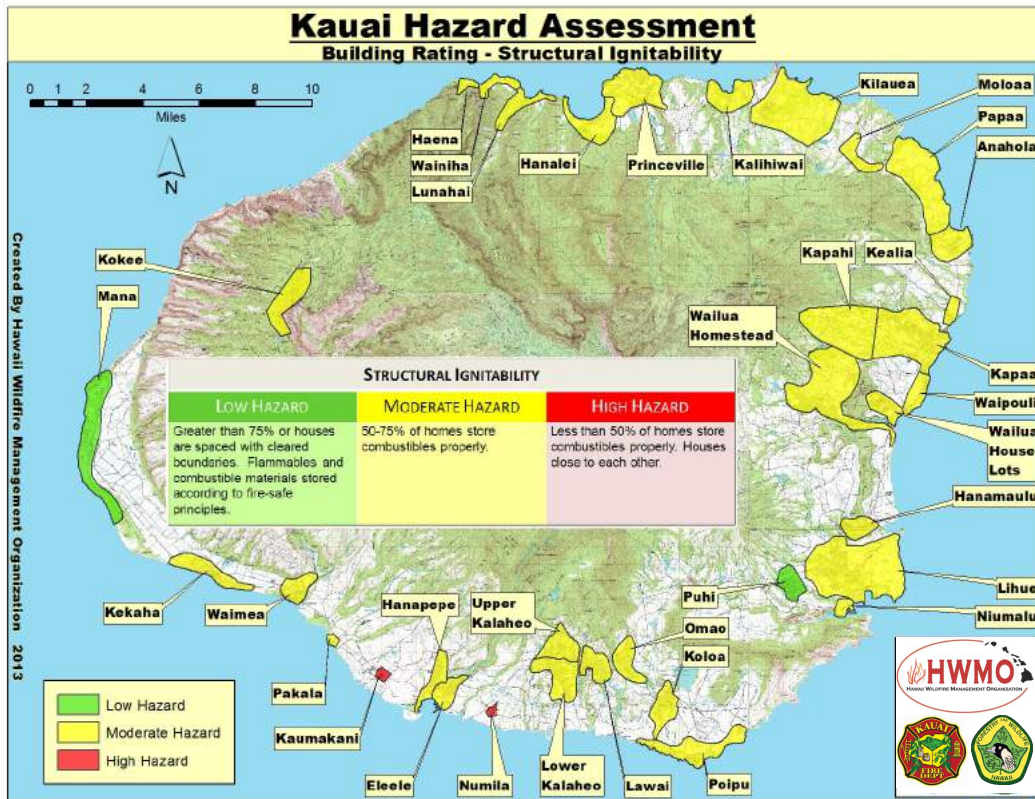
<b>Building Hazard Rating</b>			
<b>Rating Element</b>	<b>Low (1)</b>	<b>Moderate (2)</b>	<b>High (3)</b>
<b>Roofing Assembly</b>	Greater than 75% of homes have Class A roofs (metal, asphalt, or fiberglass roofing material).	50-75% have Class A roofing.	Less than 50% of homes have Class A roofing.
<b>Siding/ Soffits</b>	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.
<b>Under-skirting around decks, lanais, post-and-pier structures.</b>	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
<b>Utilities Placement- Gas and Electric</b>	All underground or none.	One underground, one above ground.	Both above ground.
<b>Structural Ignitability</b>	Greater than 75% of houses are spaced with cleared boundaries. Flammables and combustible materials stored according to fire-safe principles.	50-75% of homes store combustibles properly.	Less than 50% of homes store combustibles properly. Houses close to each other.





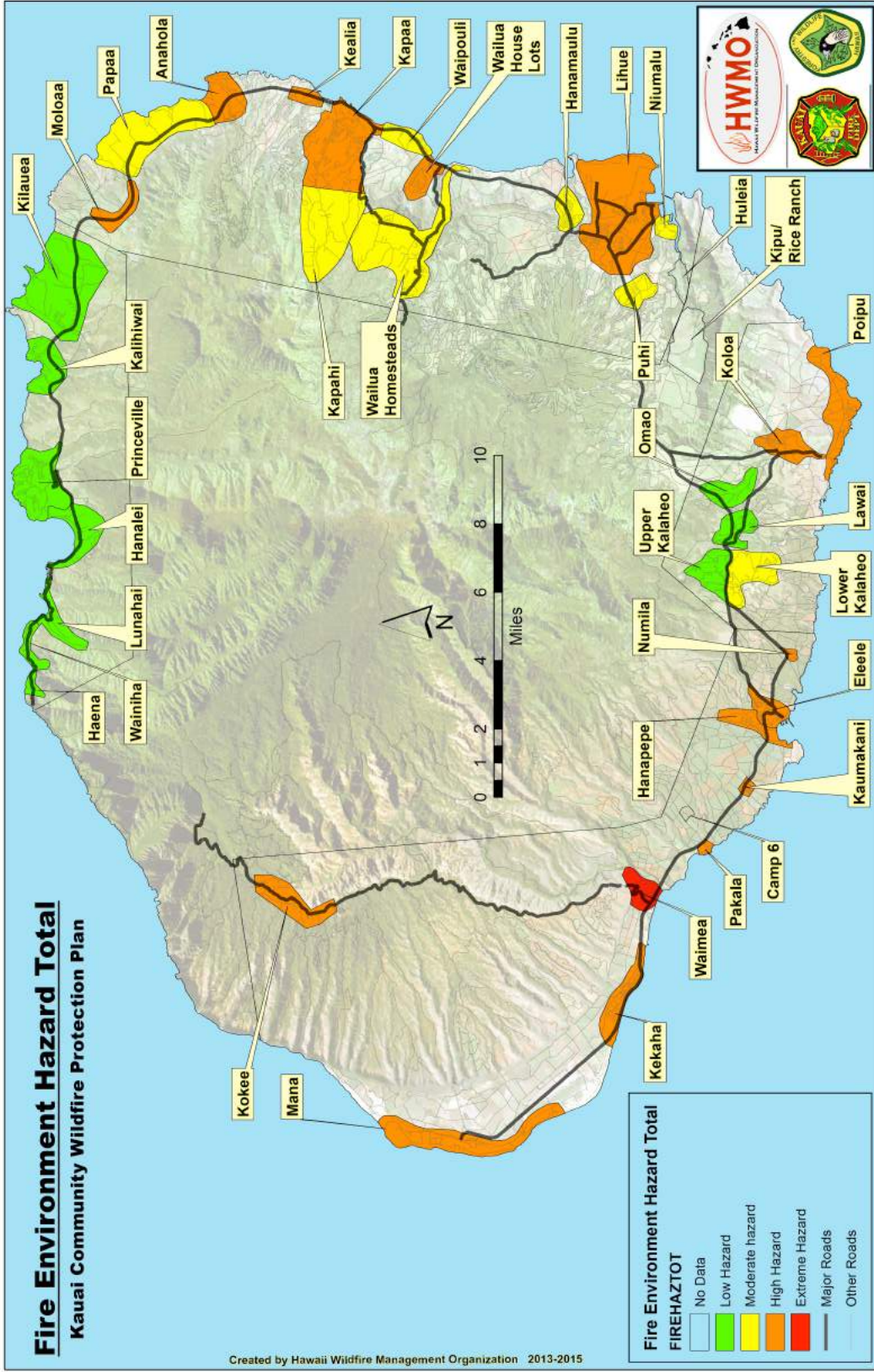




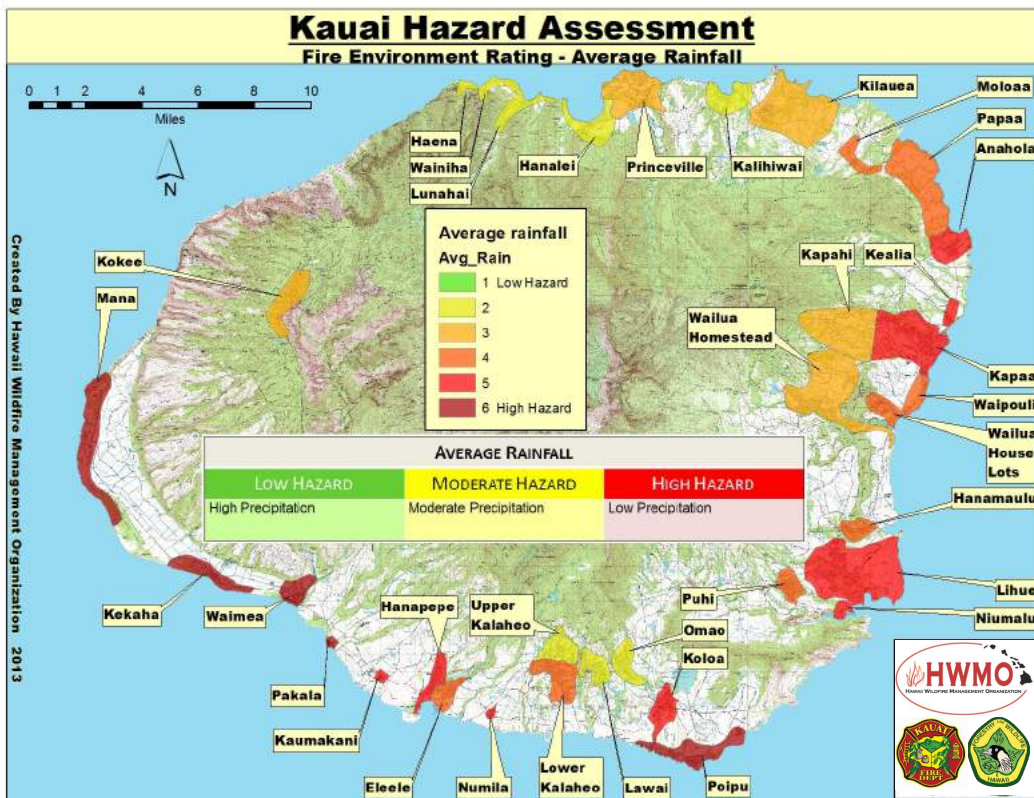
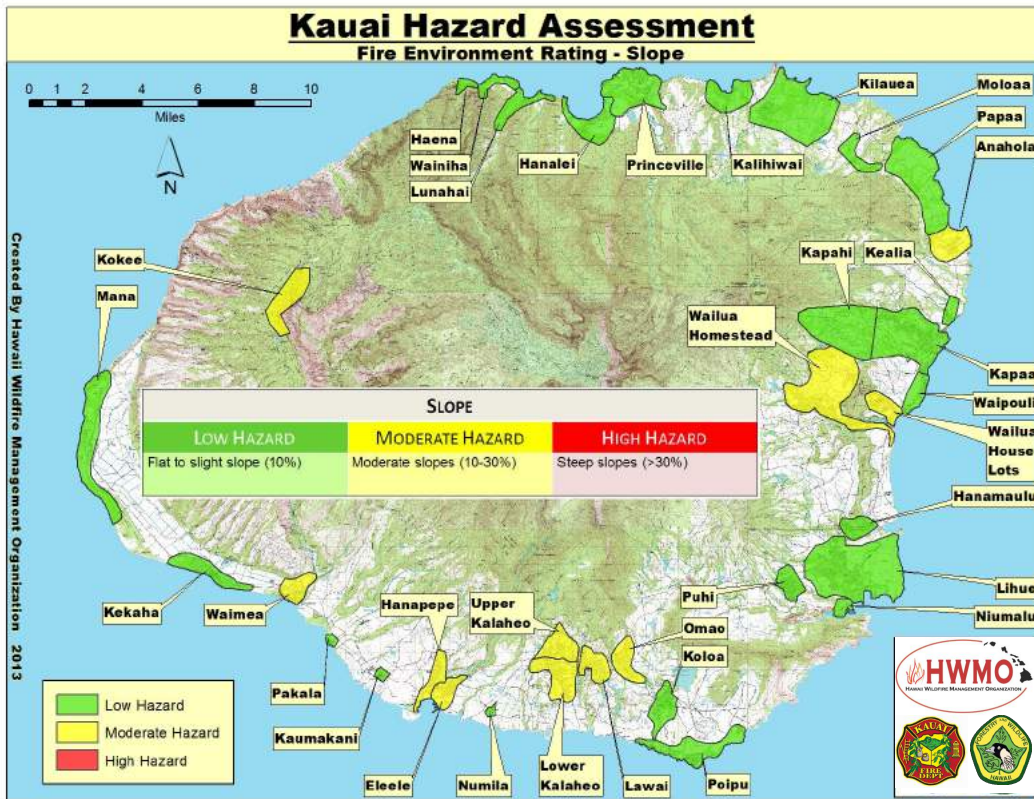


<b>Fire Environment Hazard Rating</b>						
* Note: two elements have unique scoring for better assessment accuracy						
Rating Element	Low (1)		Moderate (2)		High (3)	
<b>Slope</b>	Flat to slight slope (10%)		Moderate slopes (10-30%)		Steep slopes (>30%)	
<b>Average rainfall</b> <b>*Score 1-6 instead</b>	High precipitation (Score=1)	(Score=2)	(Score=3)	(Score=4)	(Score=5)	Low precipitation (Score=6)
<b>Prevailing wind speeds and direction</b> <b>*Score 1-4 instead</b>	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.	
<b>Seasonal or periodic high hazard conditions</b>	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	
<b>Ignition risk</b>	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.	
<b>Topographical features that adversely wildland fire behavior</b>	None.				Major feature such as box canyon, ravines, chutes, saddles, transition zones.	

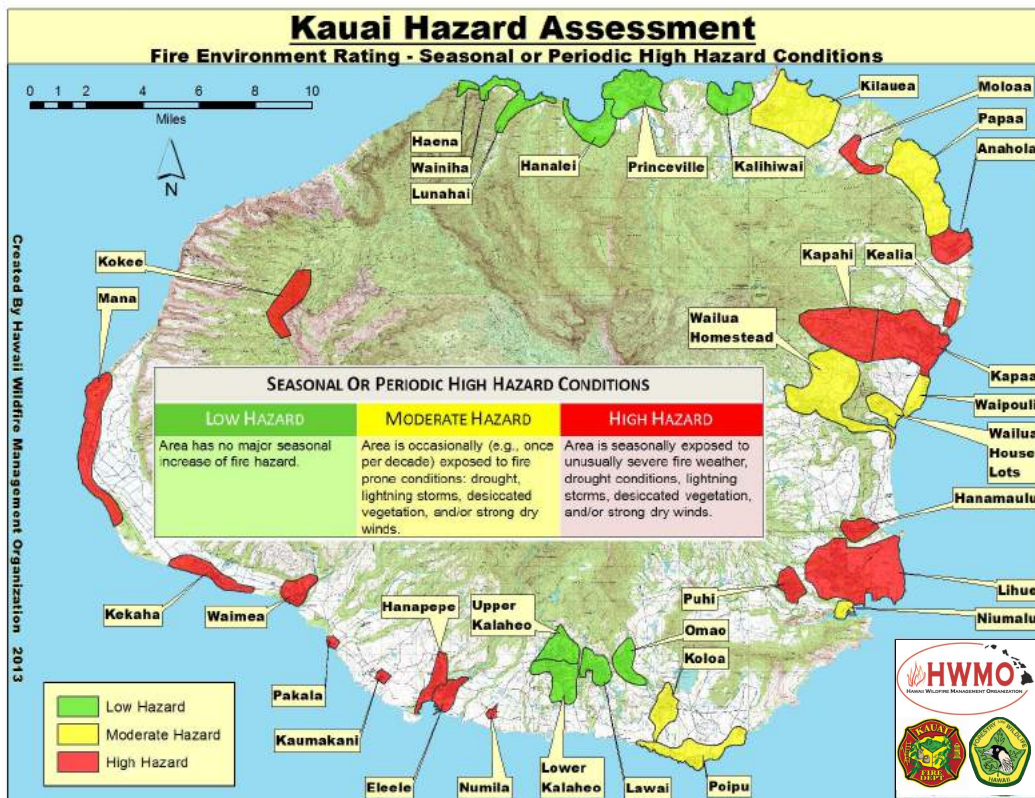
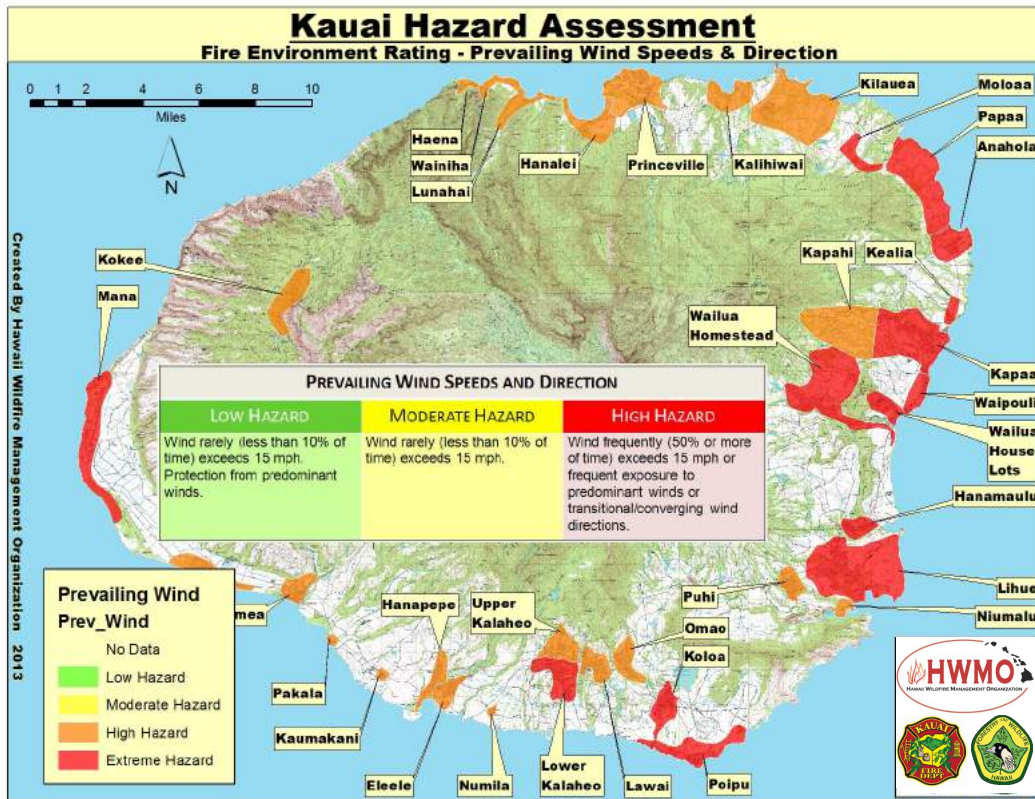
# Kauai WILDFIRE HAZARD Fire Environment Hazard



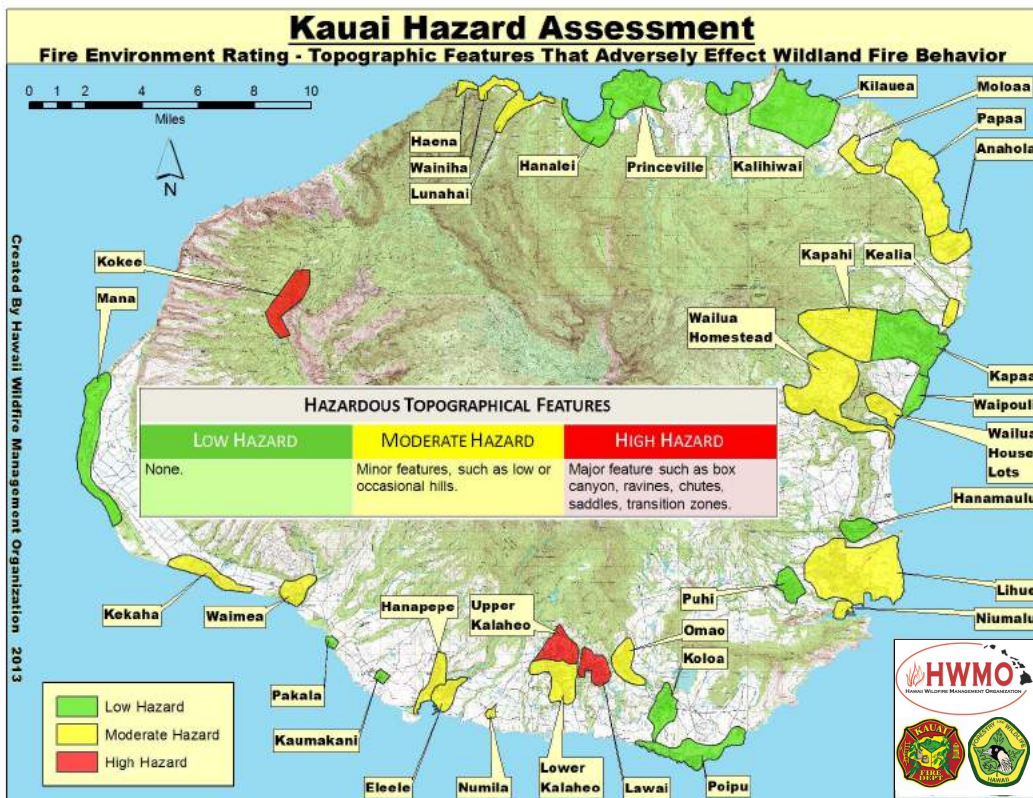
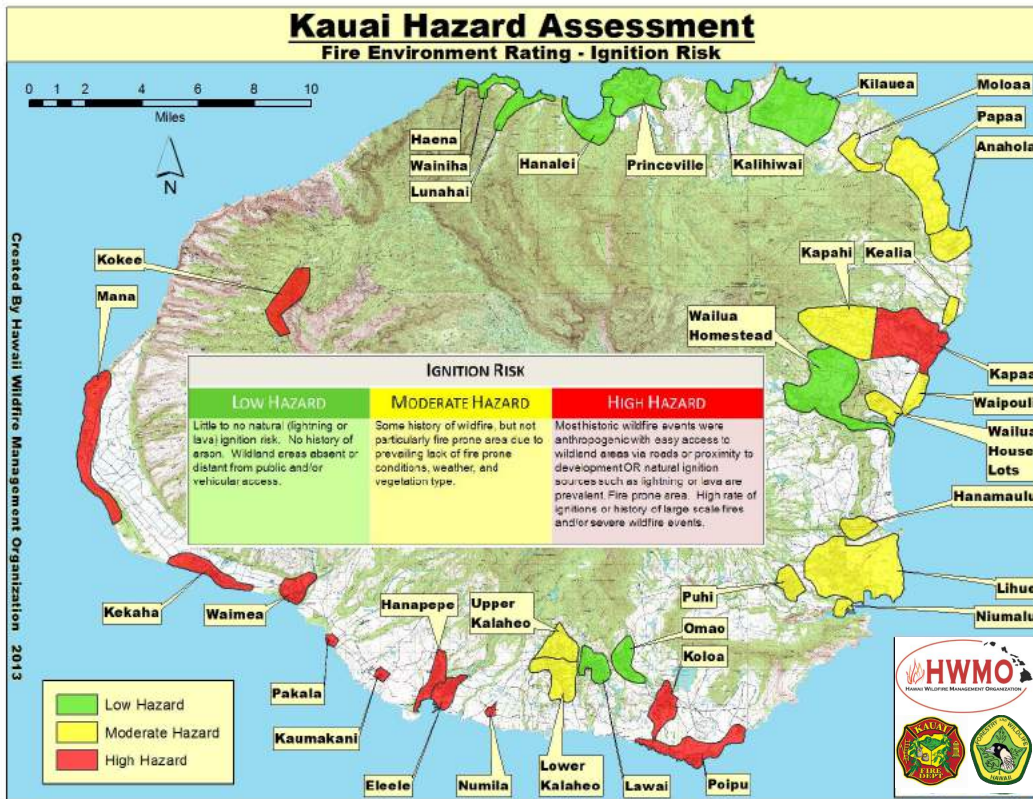
# Kauai WILDFIRE HAZARD Fire Environment Hazard



# Kauai WILDFIRE HAZARD Fire Environment Hazard

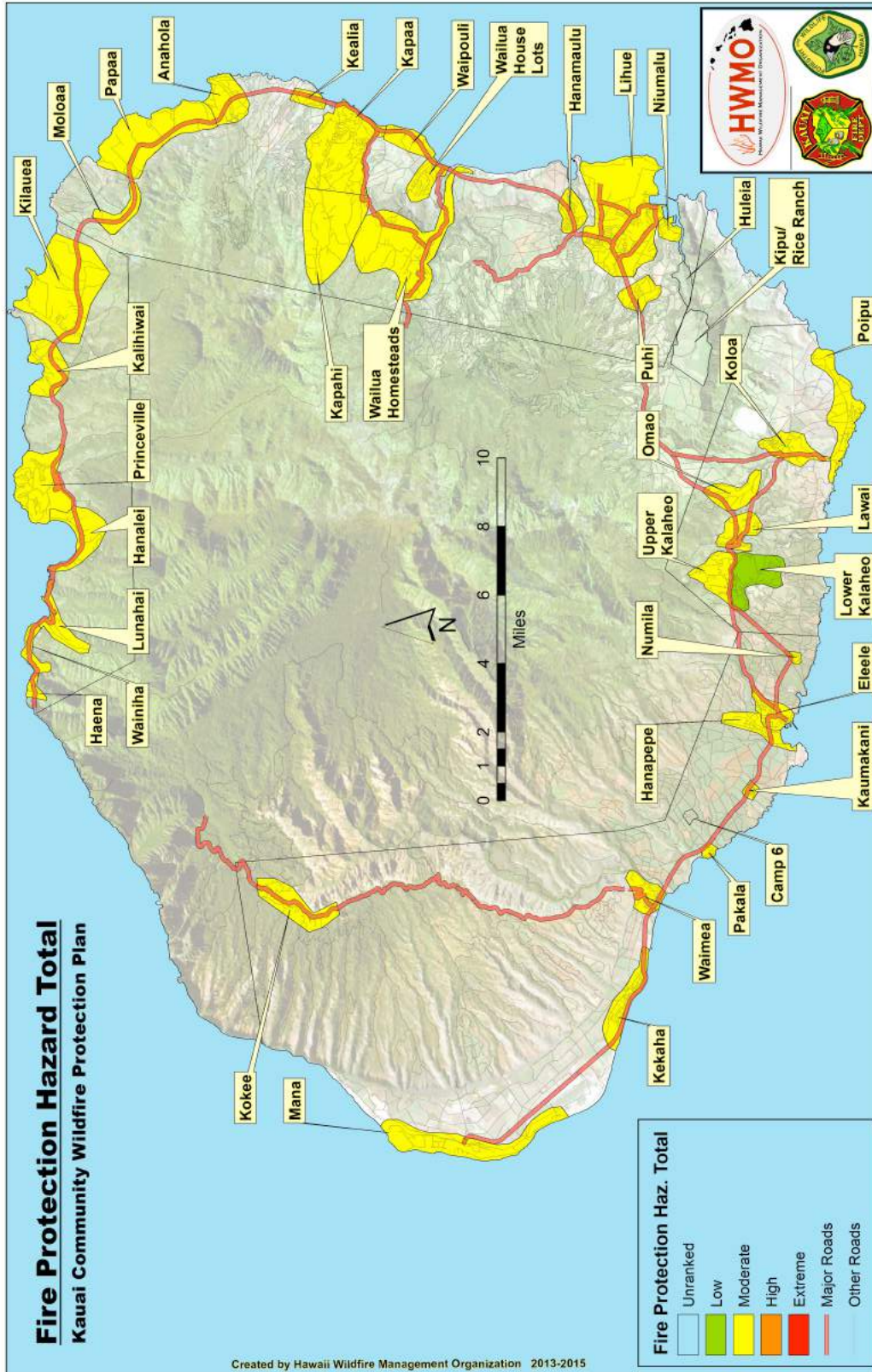


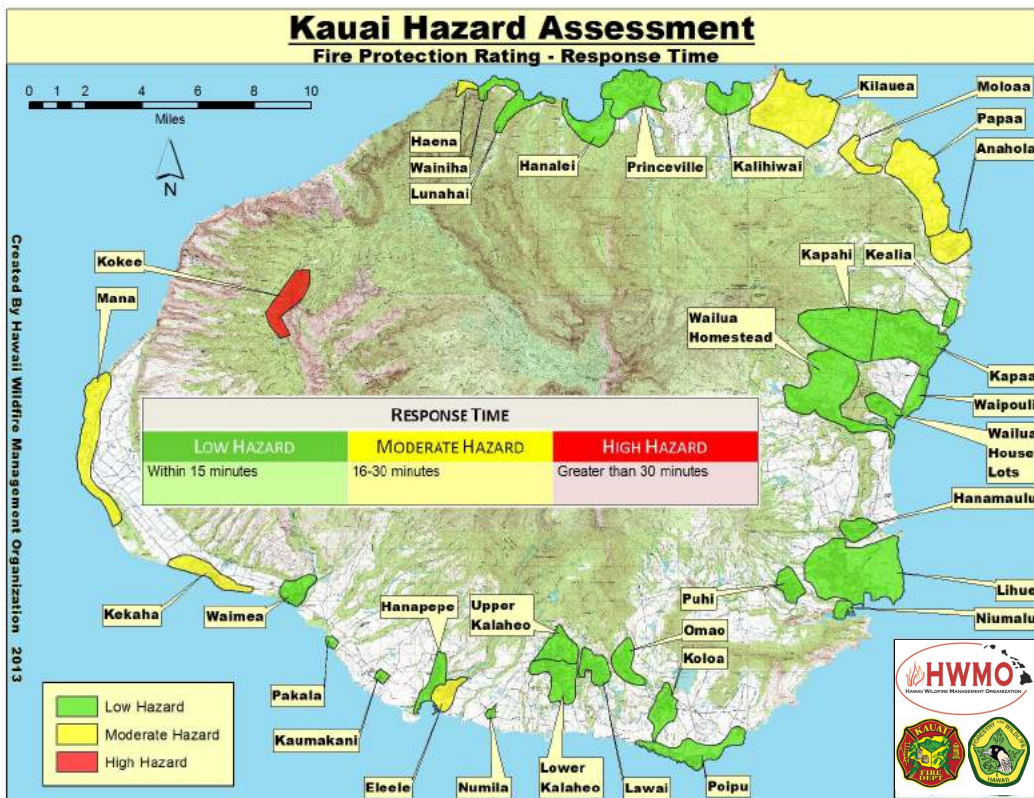
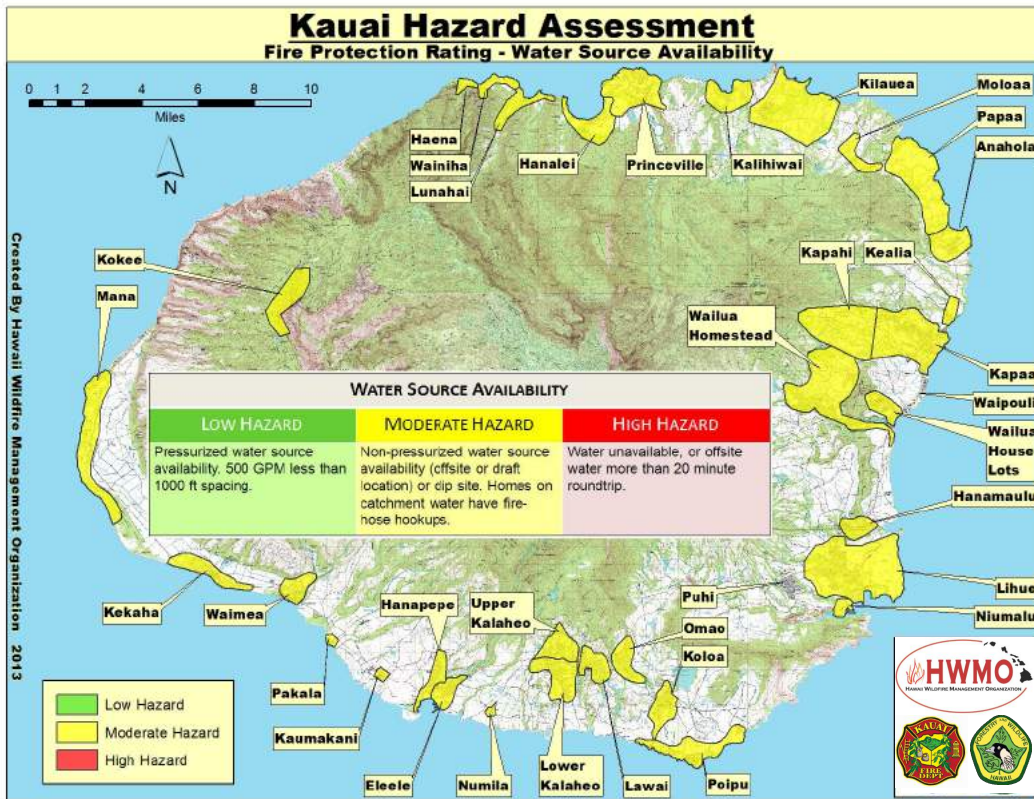
# Kauai WILDFIRE HAZARD Fire Environment Hazard

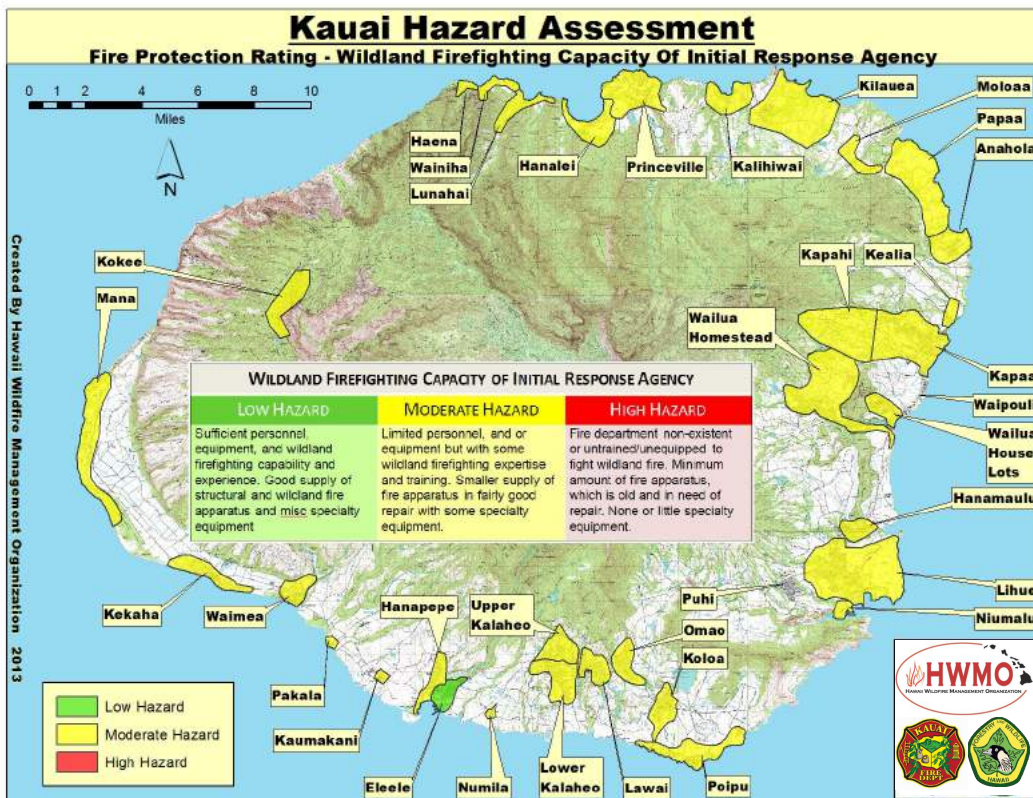
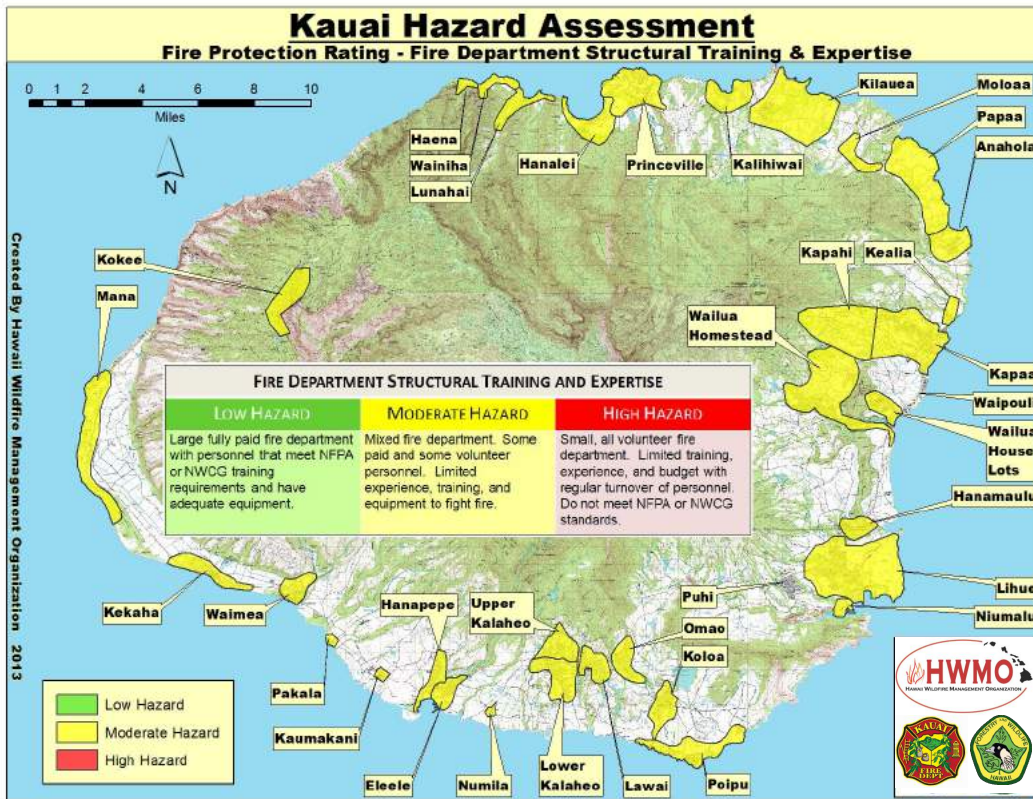


<b>Fire Protection Hazard</b>			
<b>Rating Element</b>	<b>Low (1)</b>	<b>Moderate (2)</b>	<b>High (3)</b>
<b>Water source availability</b>	Pressurized water source availability. 500 GPM less than 1000 ft spacing.	Non-pressurized water source availability (offsite or draft location) or dipsite. Homes on catchment water have fire-hose hookups.	Water unavailable, or offsite water more than 20 minute roundtrip
<b>Response time</b>	Within 15 minutes	16-30 minutes	Greater than 30 minutes
<b>Proximity to fire station</b>	Less than 5 miles	6-10 miles	More than 10 miles
<b>Fire department structural training and expertise</b>	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.
<b>Wildland firefighting capability of initial response agency</b>	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.
<b>Interagency Cooperation</b>	Mutual aid agreements and resources available to deploy.	Mutual aid agreements but limited resource availability.	No mutual aid agreements.
<b>Local emergency operations group or other similar</b>	Active EOG or CERT. Evacuation plan in place.	Limited participation in EOG or similar. Have some form of evacuation process.	EOG or CERT team, etc. organized and active, prepared for evacuation processes
<b>Community planning practices and ordinances</b>	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.
<b>Community fire-safe efforts and programs already in place</b>	Organized and active groups provide educational materials and programs throughout the community.	Limited provision of or interest in educational efforts. Fire Department or local group does some limited prevention and public education.	No interest or participation in educational programs. No prevention education by local fire department.

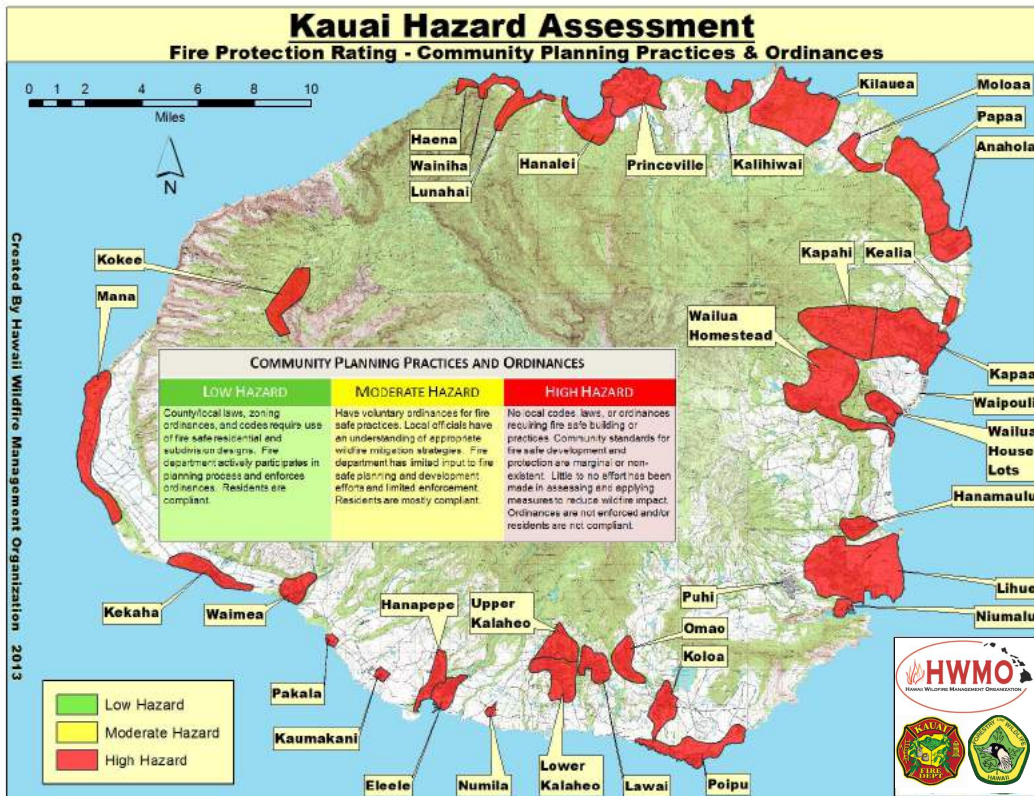
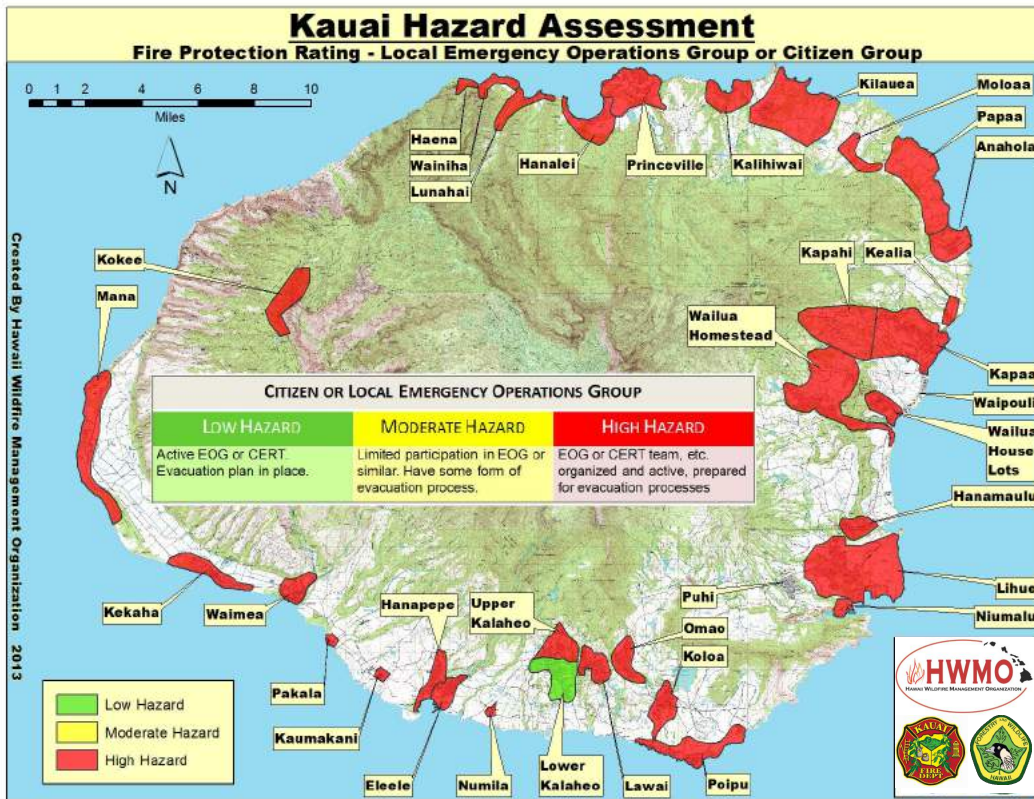


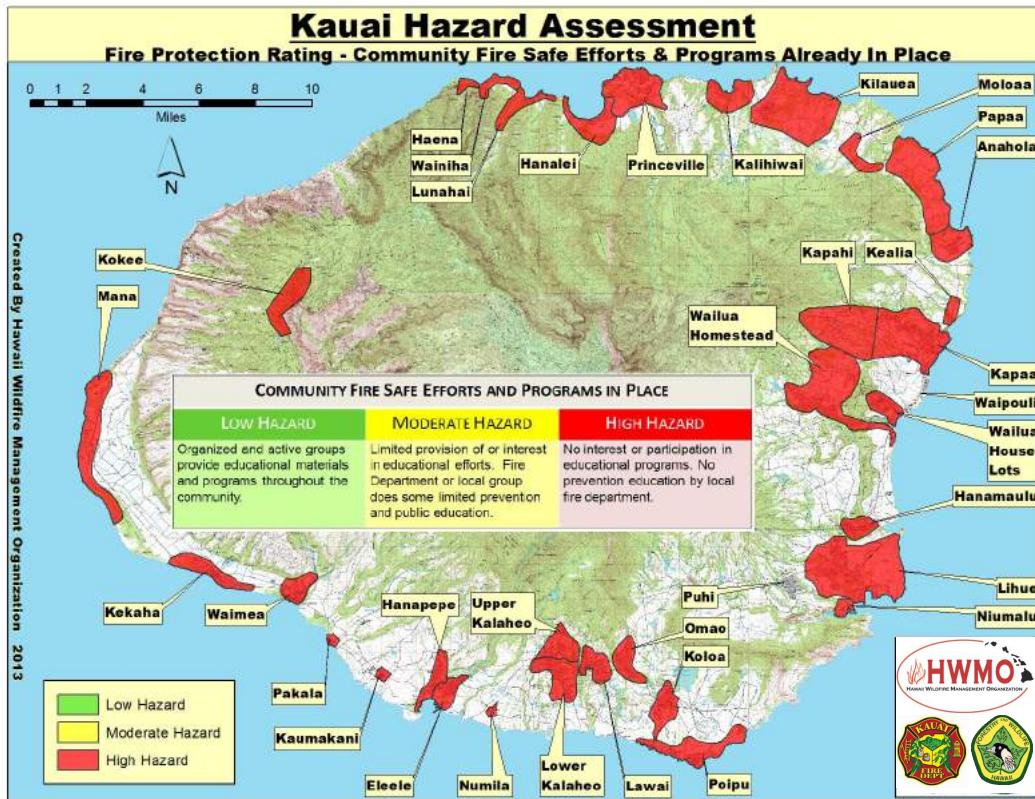






# Kauai WILDFIRE HAZARD Fire Environment Hazard





# Hawaii Wildfire Management Organization

65-1279 Kawaihae Rd., Ste. 211

Kamuela, HI 96743

Phone: (808) 885-0900

E-mail: [admin@hawaiiwildfire.org](mailto:admin@hawaiiwildfire.org)



[hawaiiwildfire.org](http://hawaiiwildfire.org)