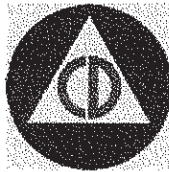


SEP 29 2009

Community Wildfire Protection Plan for Kauai, Hawaii

Sponsored by the Kauai Fire Department
June 2009



Written by Denise Laitinen
©2009

Table of Contents:

Signature Page.....	03
Executive Summary.....	04
Background.....	05
Infrastructure.....	11
Vegetation.....	12
Fire Department Resources.....	15
Fire History.....	17
Stakeholders.....	26
Community Base Map for Kauai	28
Fire Risk Assessment for Kauai	29
Community Assets at Risk.....	42
Community Concerns for Kauai	44
Recommended Action for Kauai	44
Reduce Structure Ignitability.....	48

Appendix A: Fire Model of Ignition Component of Fuels and Fire Model Spread Component of Fuels

Appendix B: Places of Importance to the People of Kauai

Appendix C: List of Grant Resources

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.

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.

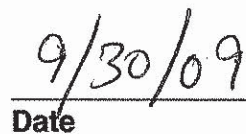
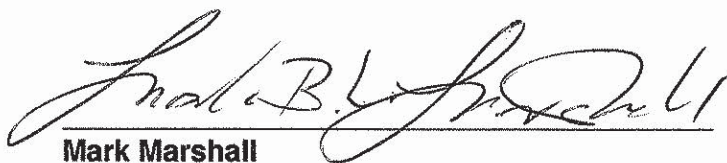
The following entities mutually agree with the contents of this Community Wildfire Protection Plan:



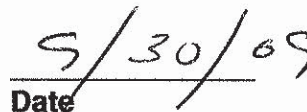
Paul J. Conry
Administrator, Division of Forestry and Wildlife


Date

Robert Westerman
Fire Chief, Kauai Fire Department


Date

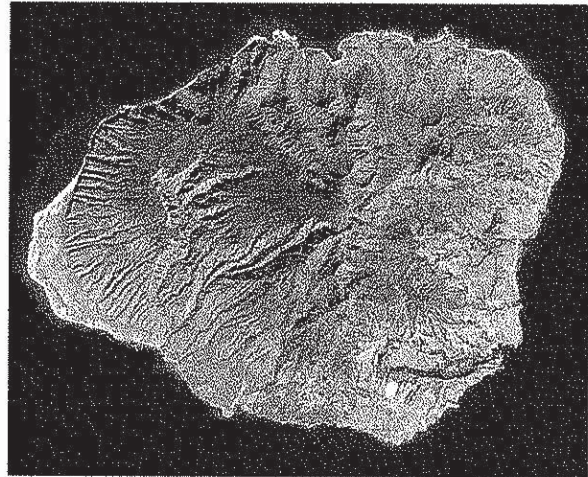
Mark Marshall
Administrator, Kauai County Civil Defense Agency


Date

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.

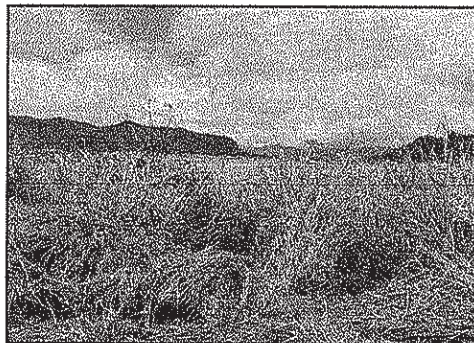
In addition to being shaped by geographic features, Kauai's economic history has also shaped the landscape of the island. Driving around the perimeter of the island on the one main highway (known as Kuhio Highway on the east side and Kaumuali'i Highway on the west), one encounters vast expanses of open 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*

→ grass (*Schizachyrium condensatum*), are fire-adapted and increase wildfire potential in the areas they invade.

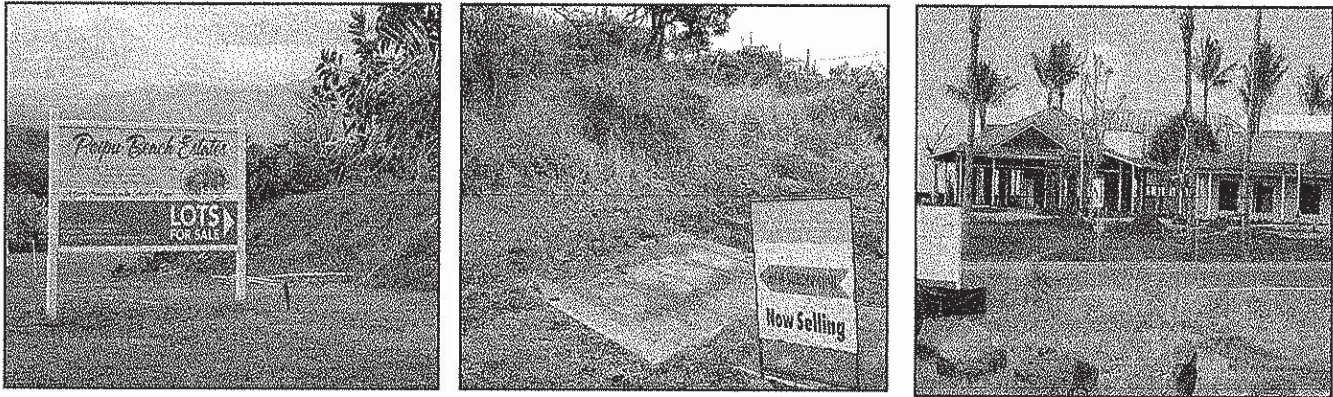
The sugar cane industry, which shaped the



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

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.

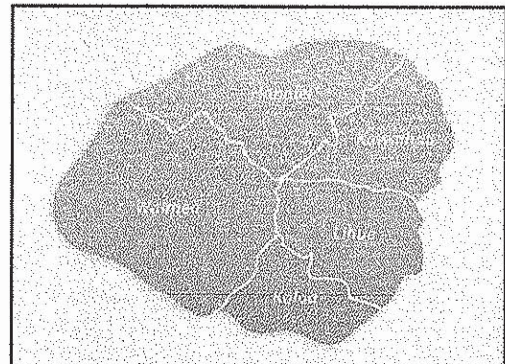


Above: Recent residential development in Poipu. More than 4,000 residential units are planned for Poipu, which has a current population of 1,000 permanent residents.

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.hawaiiis.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.

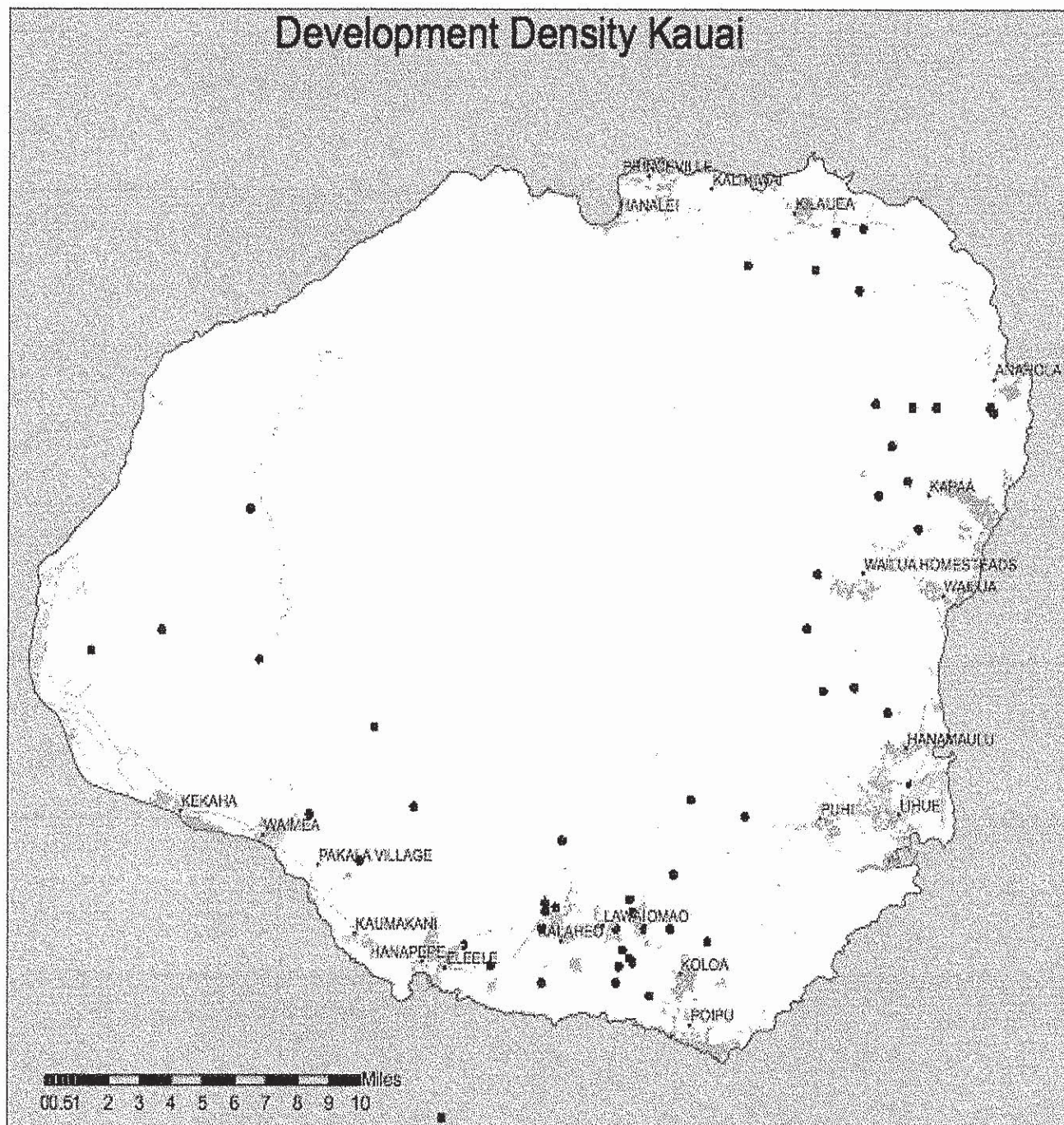


Figure 1: Map illustrating the population density of Kauai. Light yellow represents high-density developed areas while dark yellow represents low-density developed areas. The dots represent dams. Map courtesy of Kauai County GIS.

Kauai Community Wildfire Protection Plan
June 2009

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.

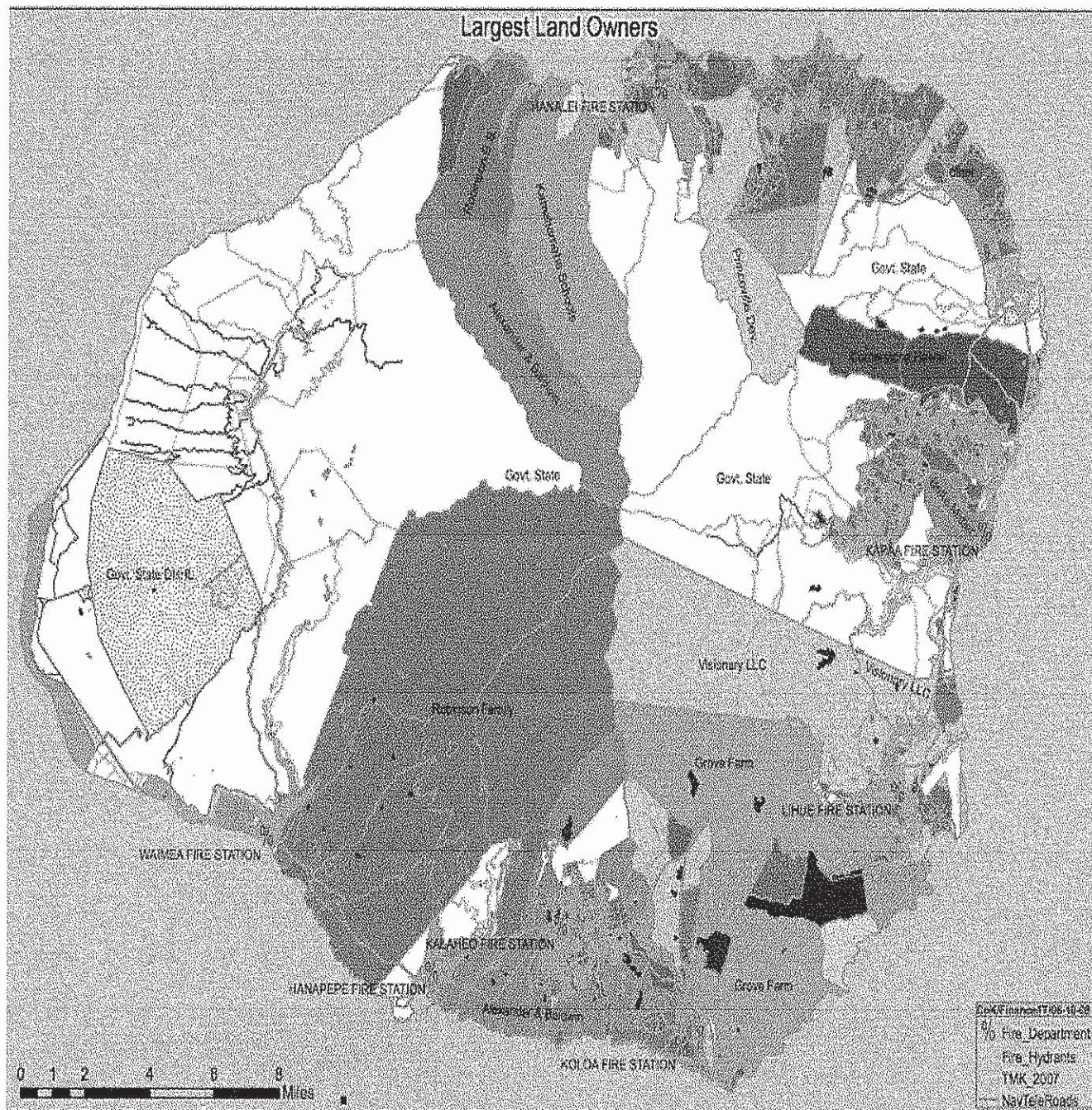
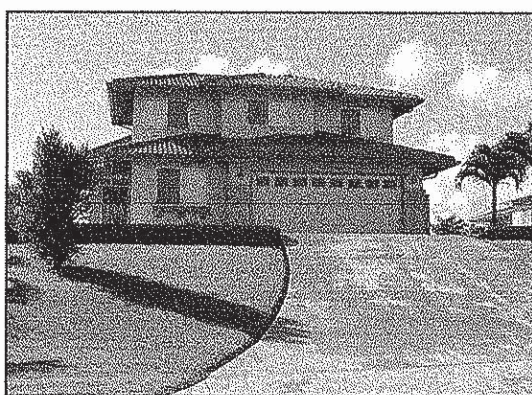


Figure 2: Map showing major landowners on Kauai. White areas represent Hawaii State government lands; grey: Grove Farm; dark green: the Robinson Family; purple: Alexander & Baldwin; light green: Visionary LLC; medium blue: W.H. Rice; orange: Kamehameha schools; dark orange: Bette Midler; yellow: Princeville 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.

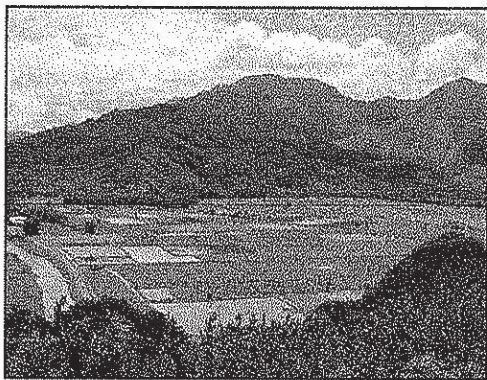
Aside from agriculture, the island's main industry is tourism. Kauai is rich in natural beauty with its steep mountain cliffs, white sand beaches, native forests, and cascading waterfalls. There are numerous state and county parks around the island, including Kokee State Park, Wailua River State Park,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



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

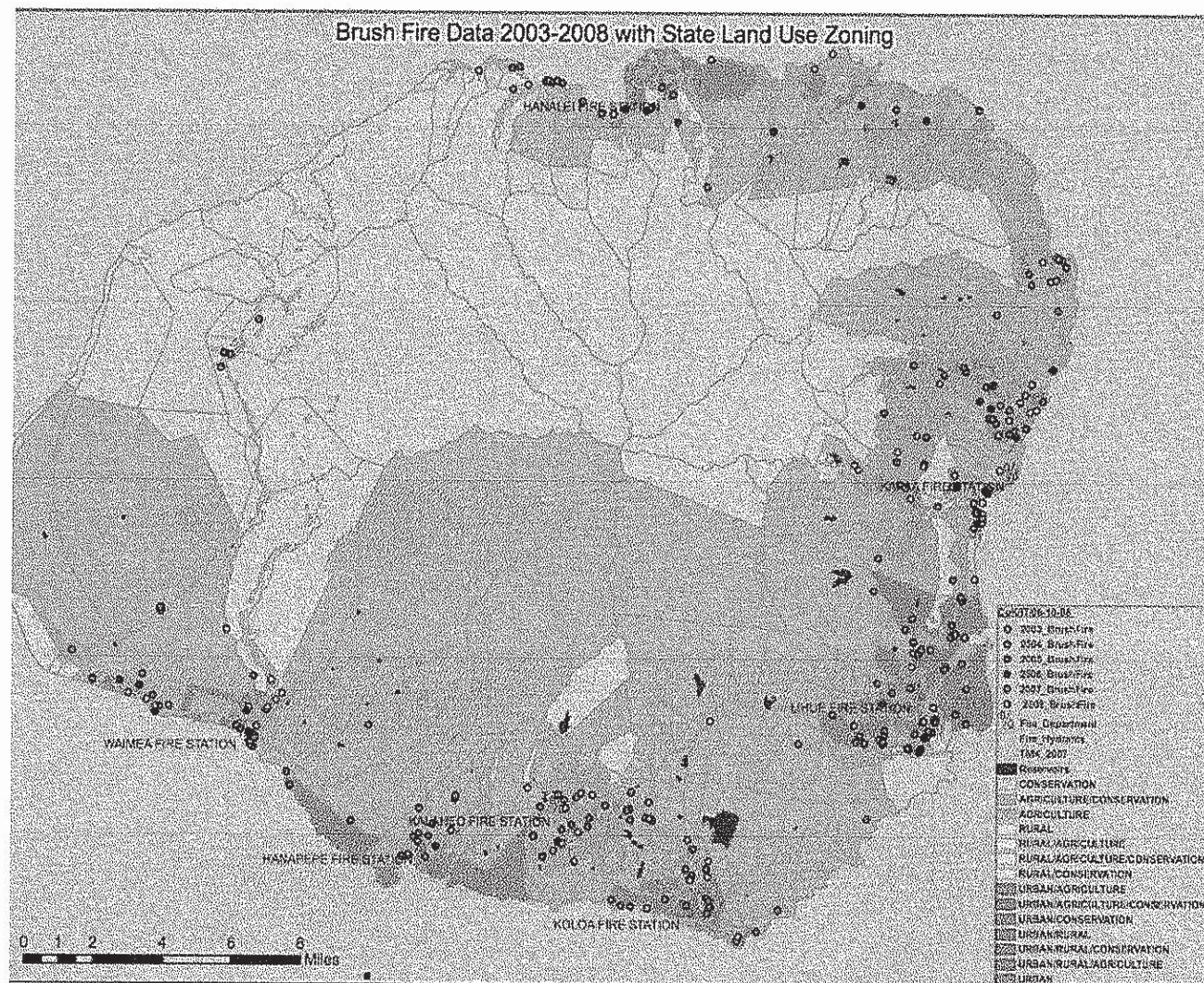


Figure 3: Land use zoning on Kauai The green, blue, and brown areas represent conservation, agriculture, and urban land classifications respectively. Yellow areas are classified as rural. The past five years of wildfire data are also indicated. Map courtesy of Kauai GIS.

Kauai Community Wildfire Protection Plan
June 2009

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

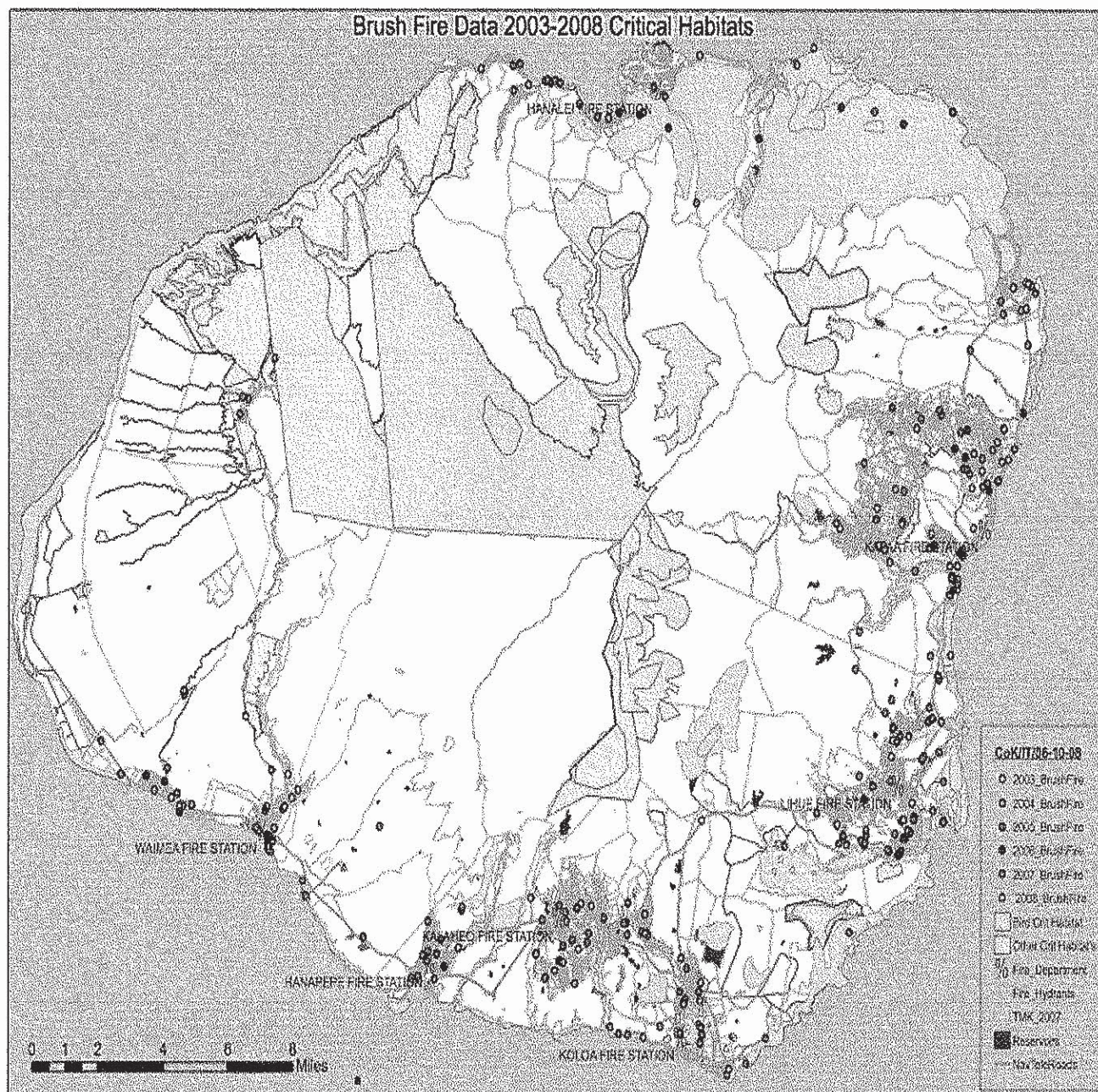


Figure 4: Map depicts areas designated as critical habitats for plants and animals on Kauai, as well as the location of wildfires in recent years. Areas highlighted in peach are bird habitats and those cream in color are other critical habitats. Map courtesy of Kauai County GIS.

existence. Indeed, it is believed that there are only seven mature 'Olulu (*Brighamia insignis*) plants remaining in the wild—all found in two locations on Kauai.

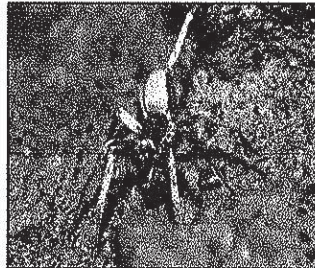
Kuawawaenohu (*Alsinidendron lychnoides*) a small flowering plant is found in only three valleys on Kauai with each population having about 10-20 plants.



'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.

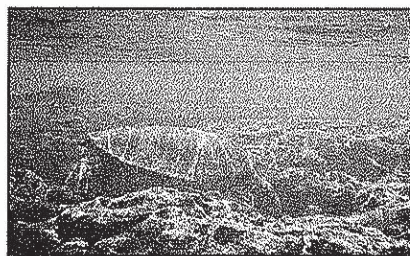
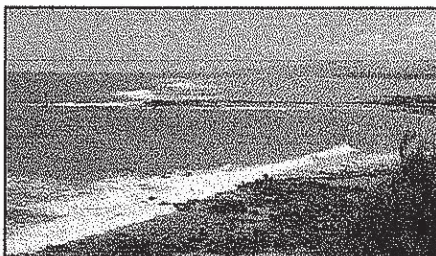
More prevalent than the previous two mentioned plants, Kolea (*Myrsine linearifolia*) is a perennial shrub that can reach 26 feet in height. It can be found in eight locations around Kauai, with the largest number of shrubs found in Kalalau Valley.

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.



Wildfires on Kauai can lead to soil erosion and runoff into the ocean, impacting the reefs and marine mammals. Left photo: Denise Laitinen; Right photo: Jeffrey L. Cooper © 2007.

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.

Kauai Community Wildfire Protection Plan
June 2009

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 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.

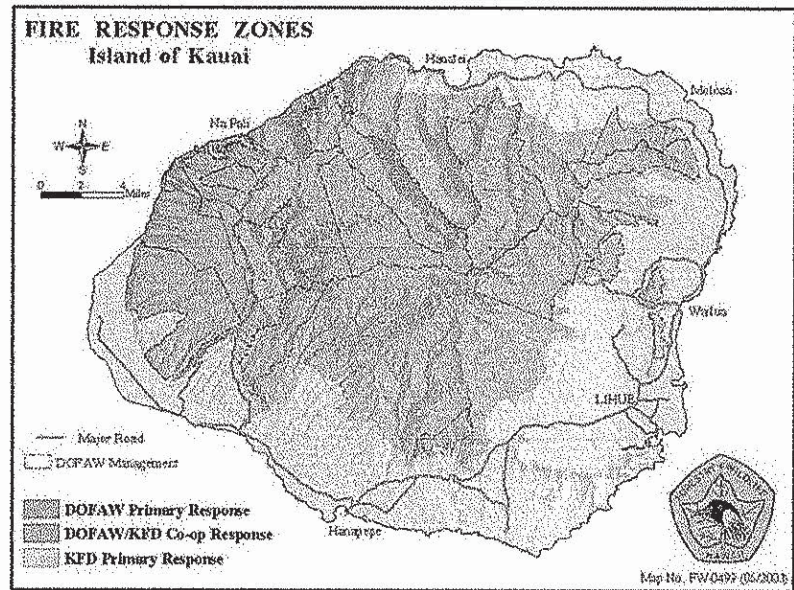
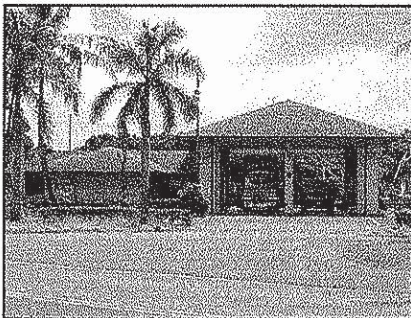
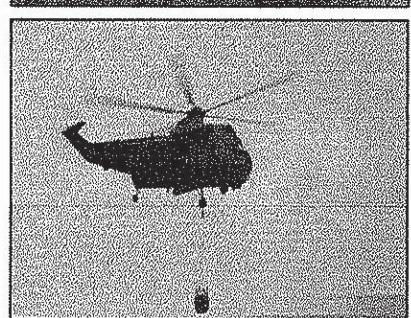


Figure 5: Fire response map for the island of Kauai shows the areas of responsibility for the different fire fighting agencies on island. KFD is the primary responder to all fires. Fire Resource Map courtesy of DOFAW.



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

Station Response # Data: BrushFires 2003-June 2008

Map of Oahu showing station response data for brushfires from 2003 to June 2008. The map displays the island's coastline with numerous black dots representing fire stations. A scale bar at the bottom left indicates distances from 0.51 to 10 miles. A legend at the bottom right identifies symbols for brushfire years (2003-2007) and land development density (High and Low).

BrushFires 2003-June08

- Station Response TO # BrushFires
- RES3 17 BrushFires
- ST1 60
- ST2 170
- ST3 127
- ST4 55
- ST5 43
- ST6 43
- ST7 111

CoK/IT/6-24-08

- 2007 BrushFire
- 2006 BrushFire
- 2005 BrushFire
- 2004 BrushFire
- 2003 BrushFire
- High Density Developed
- Low Density Developed

16

County of Kauai Multi-hazard Mitigation and Resilience Plan, 2015 Update

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 Kauai¹. 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

Kauai Community Wildfire Protection Plan
June 2009

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.

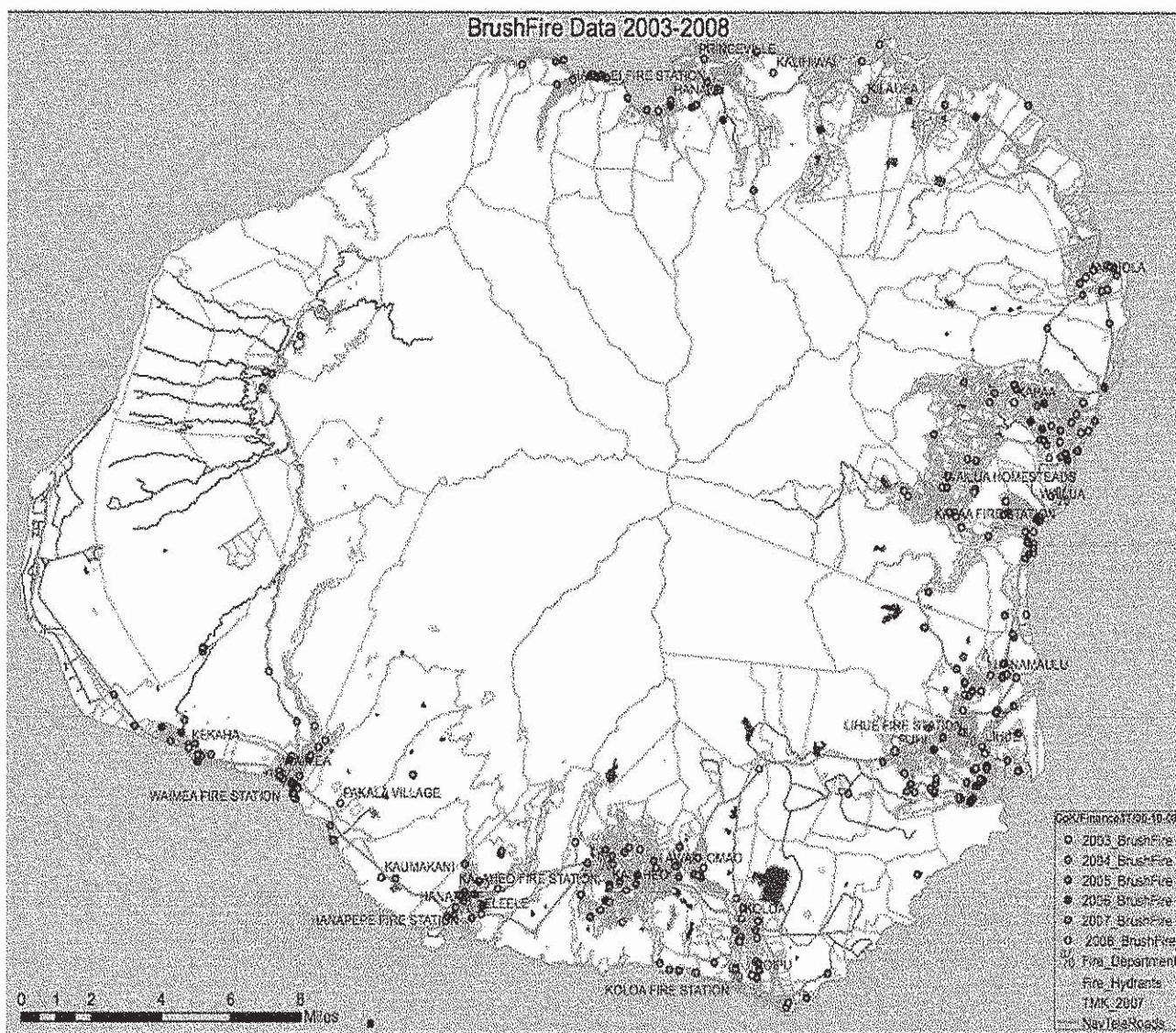


Figure 7: Map illustrating wildfires on Kauai from 2003 to 2008 and fire station locations. Map courtesy of Kauai County GIS.

Kauai Community Wildfire Protection Plan
June 2009

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	Molokaa	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

Kauai Community Wildfire Protection Plan
June 2009

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

Kauai Community Wildfire Protection Plan
June 2009

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

Kauai's Fire History 1998-2008

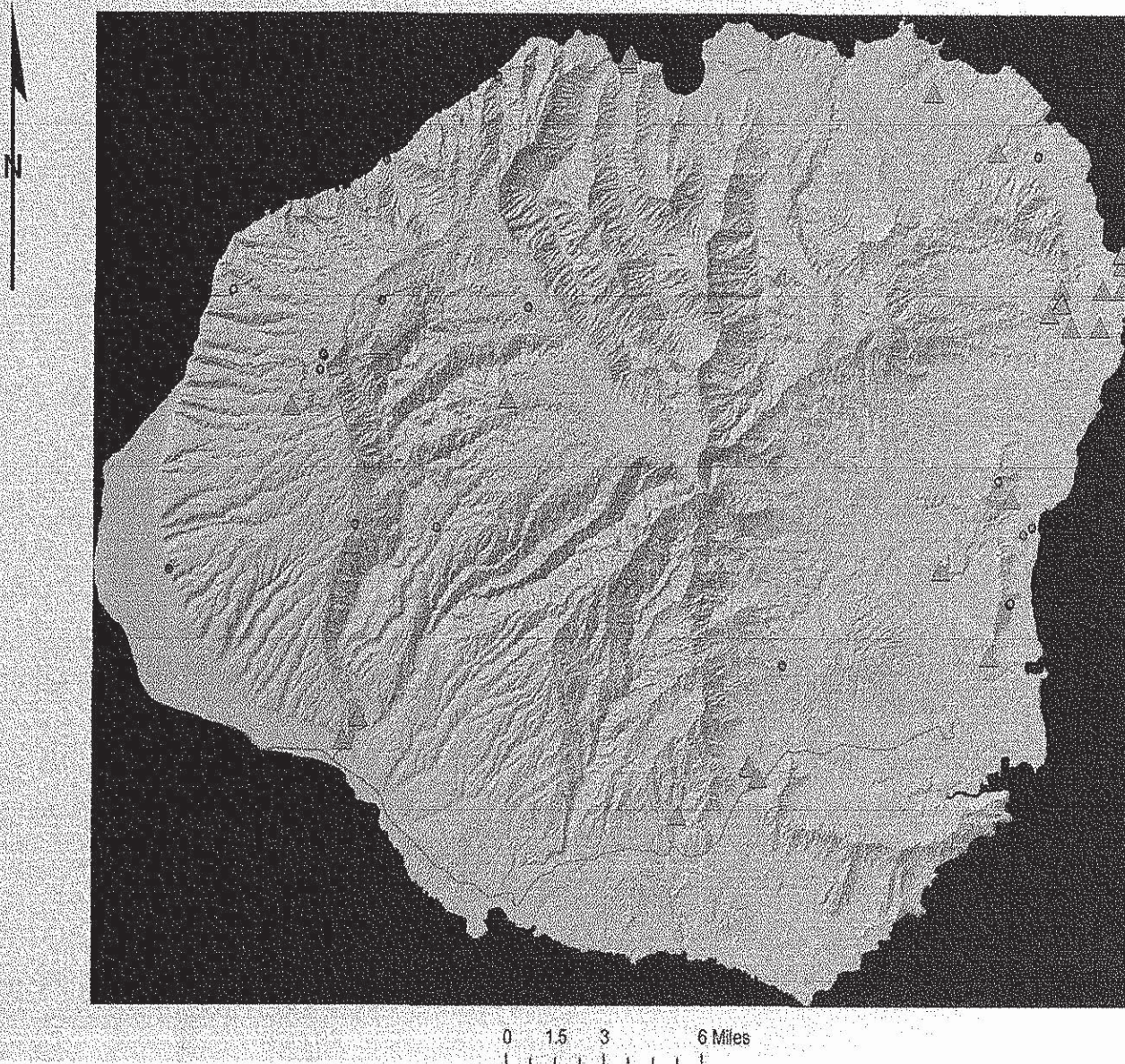


Figure 8: Map illustrating the location of wildfires responded to by DOFAW staff. Map courtesy of DOFAW.

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

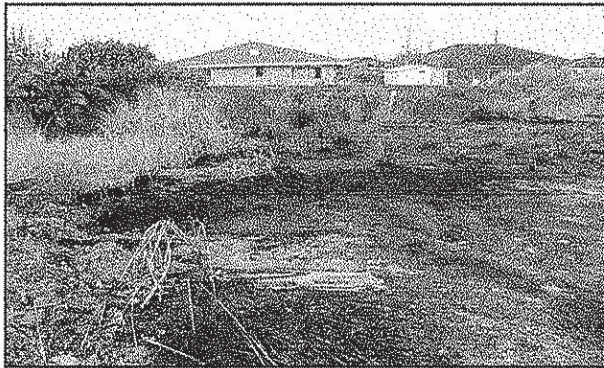
shortly thereafter, a fire was observed. The car travelled down the mountain stopping periodically, and at every stop flames erupted. They quickly contacted the authorities, however the suspect reached the main highway and fled before he could be apprehended.

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.

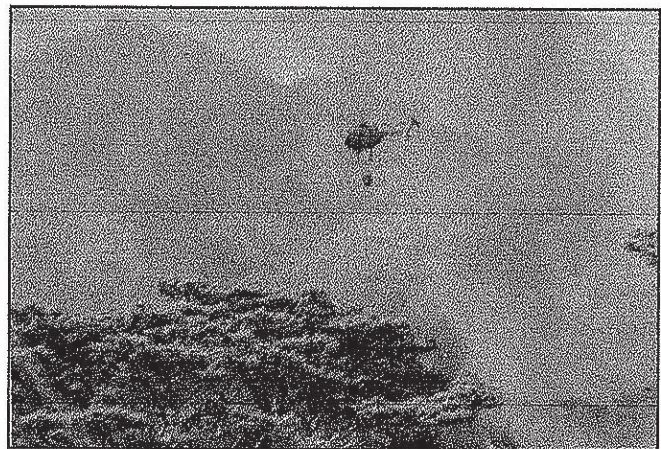
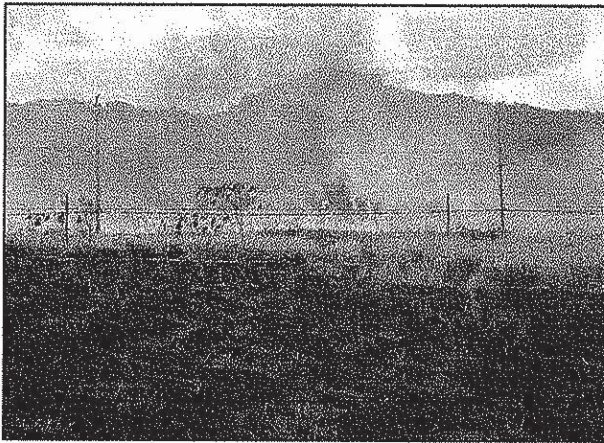
"When several engine companies are taken out of their home districts to suppress fires in Anahola, large areas of the island are left without adequate or timely fire, rescue, and emergency medical protection," Battalion Chief Bob Kaden said in media reports on the fire. (*The Garden Island Newspaper*,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

Kauai Community Wildfire Protection Plan
June 2009

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 Licon, 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 Licon, 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@grovesfarm.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 Hoochano
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

Kauai Community Wildfire Protection Plan
June 2009

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.

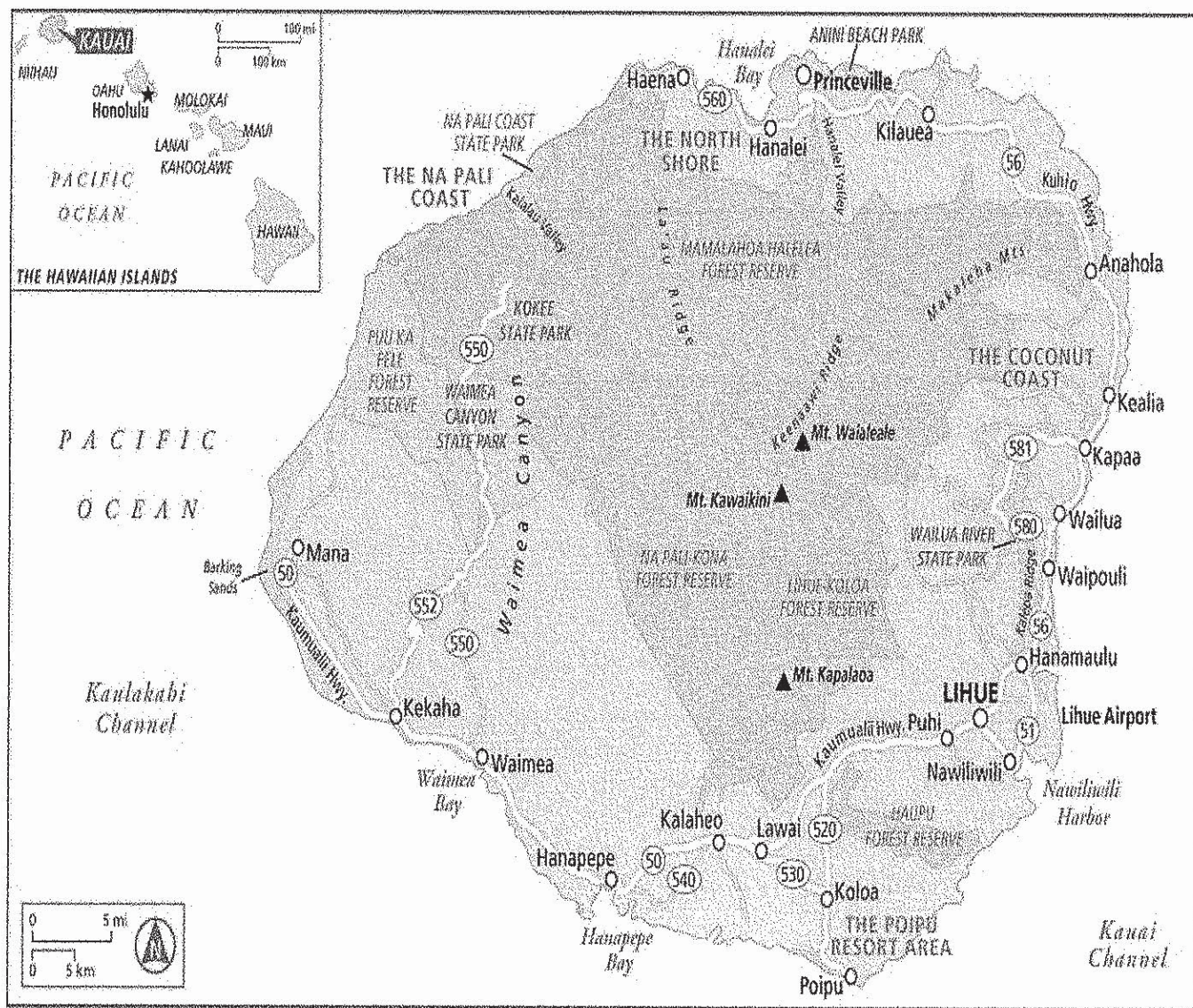


Figure 9: Base map of Kauai, showing the locations of towns, forest reserves, and highways. Map credit: frommers.com

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.

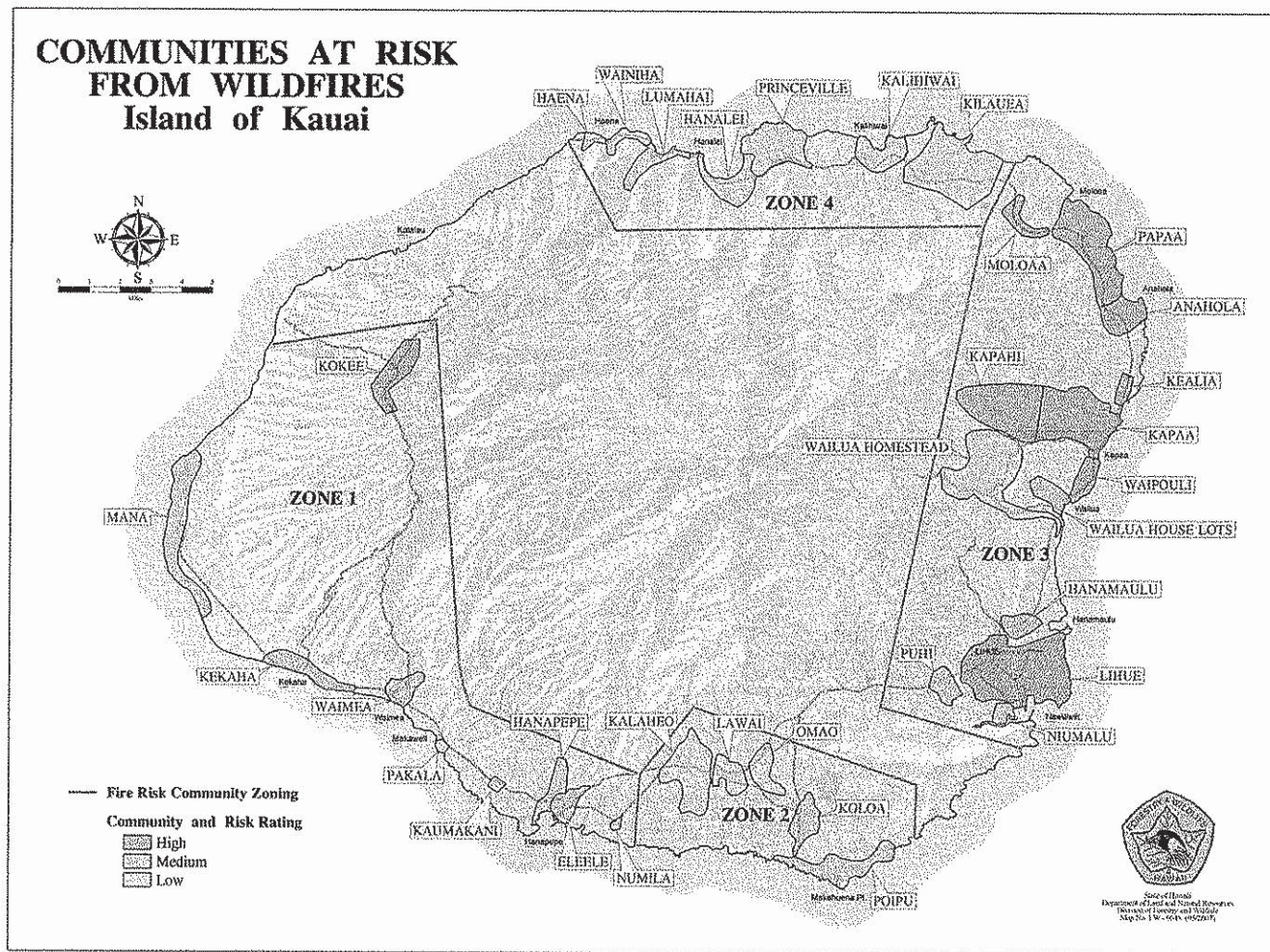


Figure 10: Kauai DOFAW staff created the above map illustrating communities at risk from wildfires based on the 2001 Federal Register: "Urban Wildland Interface Communities Within the Vicinity of Federal Lands That Are at High Risk From Wildfire," (Volume 66, Number 160). Map courtesy of DOFAW.

While the island as a whole shares certain common characteristics, the communities within it vary tremendously and deserve separate description in terms of slope, size, and water availability. 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, Manininihola 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.

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.

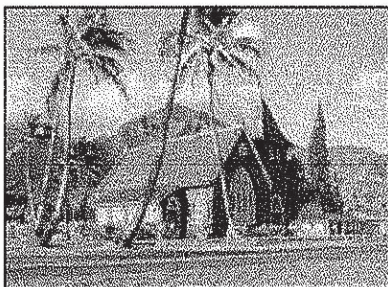
There are gently rolling hills in the area surrounded by steep mountain ridges. The land slopes from the mountains to the ocean. Normal trade winds blow from the east-northeast averaging 5 – 15 mph.

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.

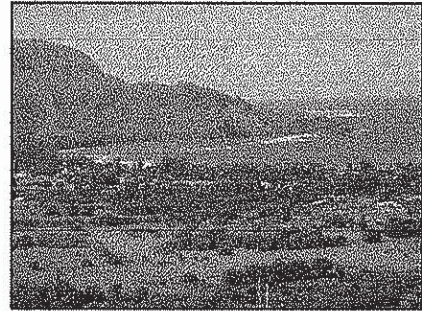
Along the coastal areas of Hanalei, Princeville, and Anini lot sizes are small (usually less than an acre). Residential areas mauka of the highway tend to be larger in size. There are several horse ranches and public riding stables in the district and some property owners have livestock, including horses, 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.

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.



Hanalei church. Photo credit:
www.tripadvisor.com



View of Hanalei Bay. Photo credit:
tripadvisor.com

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 with 15 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.

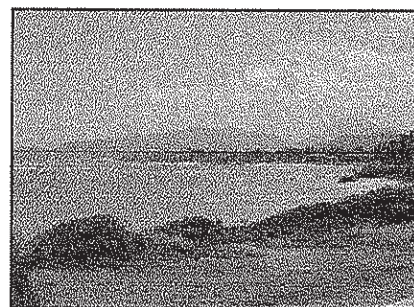
Additional development is planned for Hanalei district. Princeville Corporation's master plan calls for conservation and residential development for the hundreds of acres of undeveloped land it owns on the north shore. However, this residential development is low-density and requires residents to utilize 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.

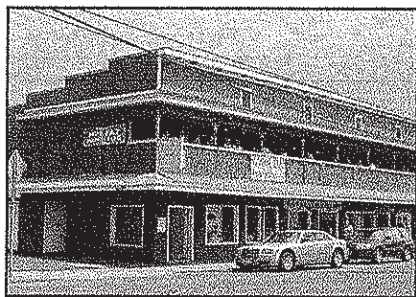
Kawaihau District

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.

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



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



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 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. 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.

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



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

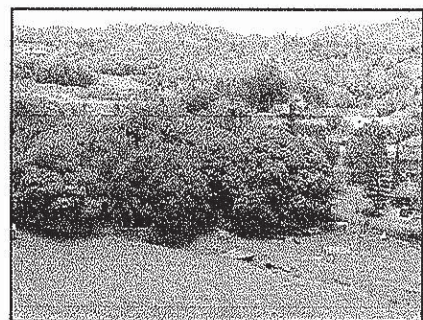
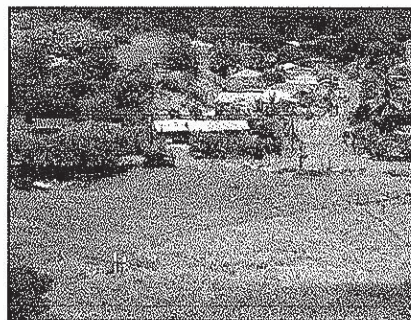
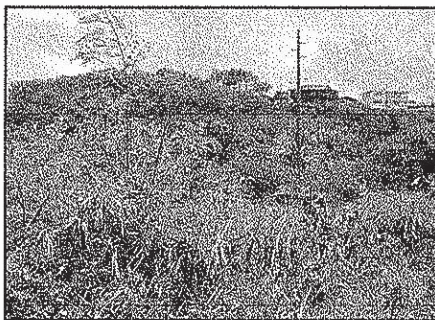
dumping of trash and green waste; as clearing defensible space around structures. Some progress was made, however, a great deal more work needs to be done.

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 communities 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

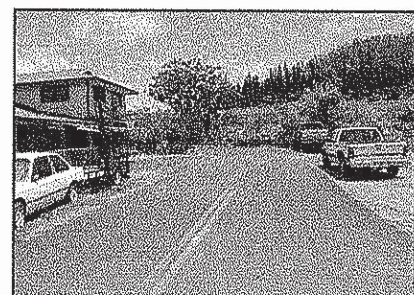
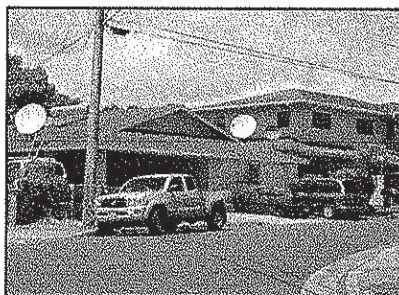
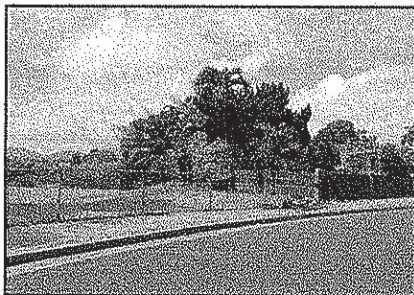
Encompassing the towns of Lihue, Hanamaulu, Puhi, and Nawiliwili, Lihue District is home to the island's governmental and commercial seat. Lihue district is also home to several natural and cultural resources, including the Grove Farm Homestead Museum, Huleia National Wildlife Refuge, the Menehune Fishpond,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

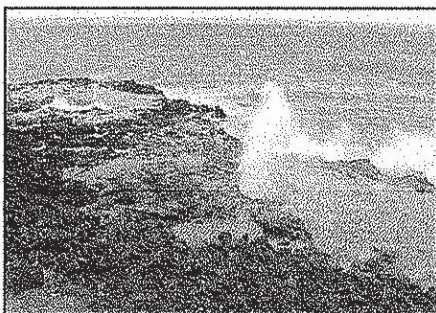
Puakea Golf Course surrounds most of the Puakea subdivision in Lihue developed by Grove Farm, although there are some parts where overgrown grasses and brush come within 100 feet of homes. Beyond the golf course is acres of open fields. Because Puakea is a new subdivision, the vegetation on individual 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.

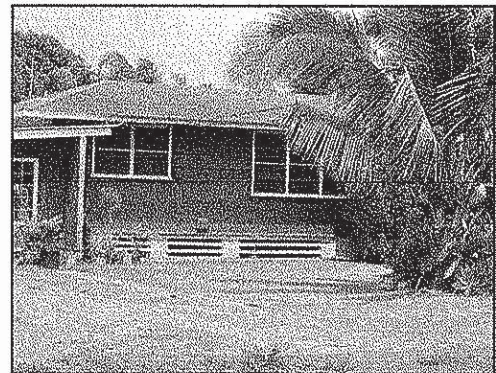
The area includes Kalaheo School and two private schools. The district is served by fire stations in Poipu and Kalaheo.



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.



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

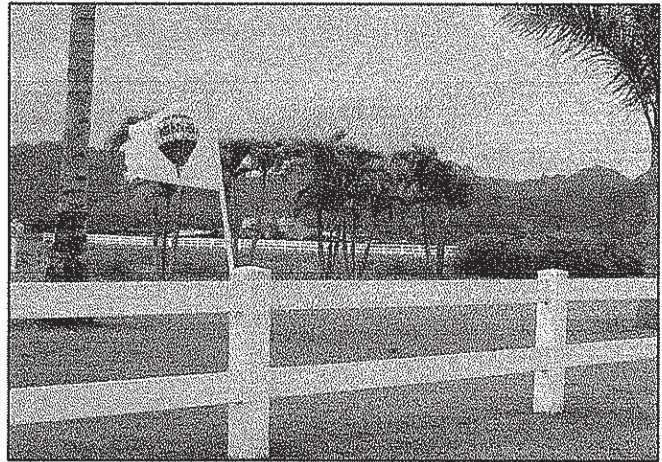
Kauai Community Wildfire Protection Plan
June 2009

Poipu and Koloa are accessible by two roads off of Kaunualii 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.



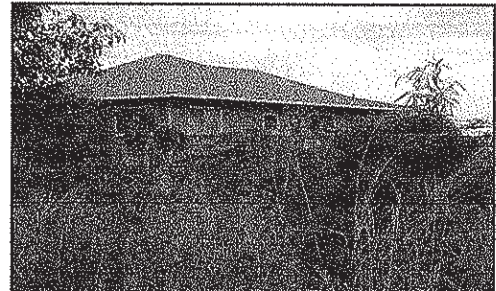
Above left and center: Built in 1835, old Koloa town contains retail shops, a post office, churches, and a community center. Right: A new subdivision Koloa Creekside Estates, is being built a few hundred feet down the street from the red wood building featured in the left and center pictures.

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 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

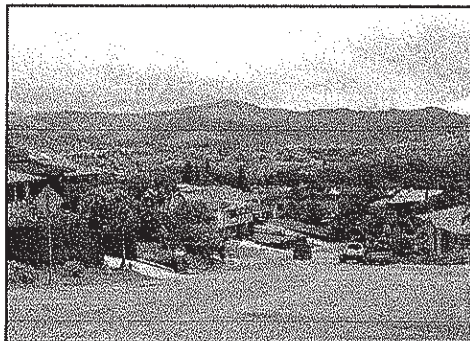
Kauai Community Wildfire Protection Plan
June 2009

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 and 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.



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

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.

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.

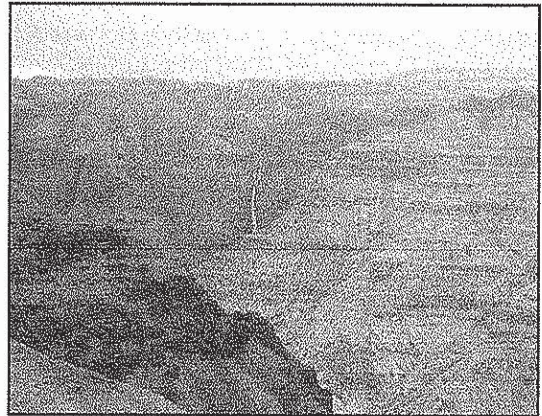
A substantial amount of development is planned for the Koloa district, primarily in Poipu. Although the current year round population of Poipu is 1,000 people, more than 4,000 residential units are proposed for former agricultural lands. Plans call for resorts, time-shares, condominiums, and single-family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

Waimea District

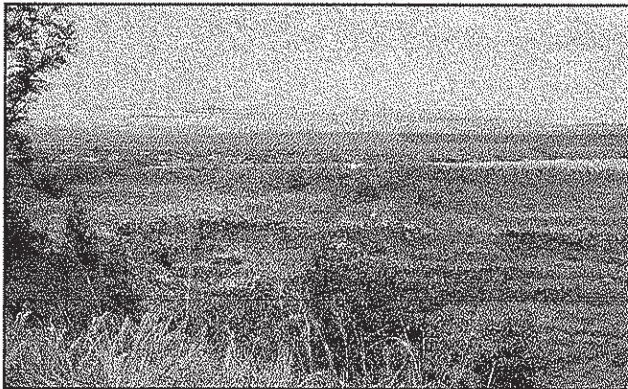
The Waimea District covers the west side of Kauai, including the towns of Kekaha, Port Allen, Waimea, Kokee, Hanapepe, and Ele'ele. These communities are primarily agricultural although tourism also contributes to the local economy.

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.

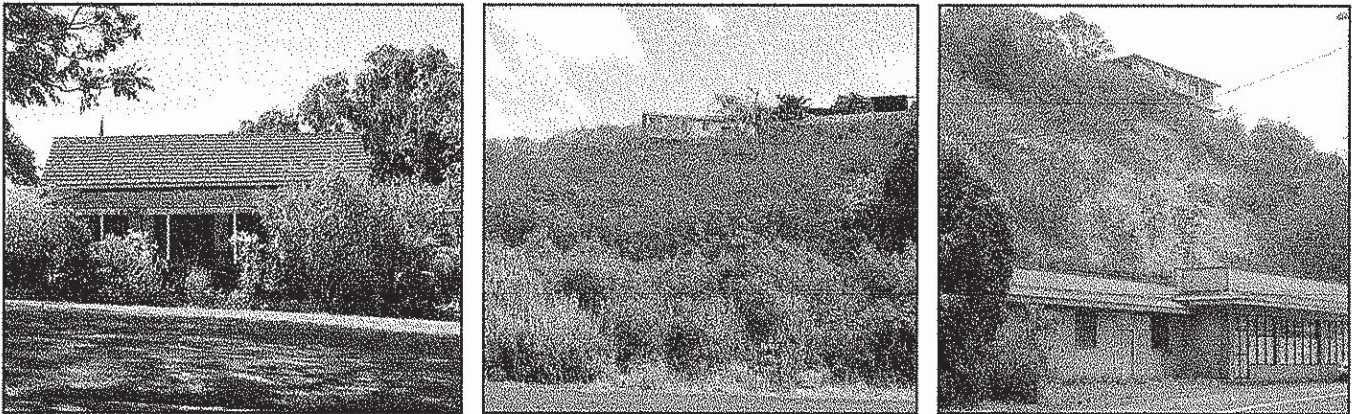
The State of Hawaii, DHHL, and the Robinson Family are the largest landowners in the district. DHHL owns 15,000 acres in this district almost all of which is agricultural or conservation land. However, a 49-lot subdivision was recently developed on 20 acres in Kekaha. In 2005, DHHL awarded 40 homestead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

Kauai Community Wildfire Protection Plan
June 2009

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.

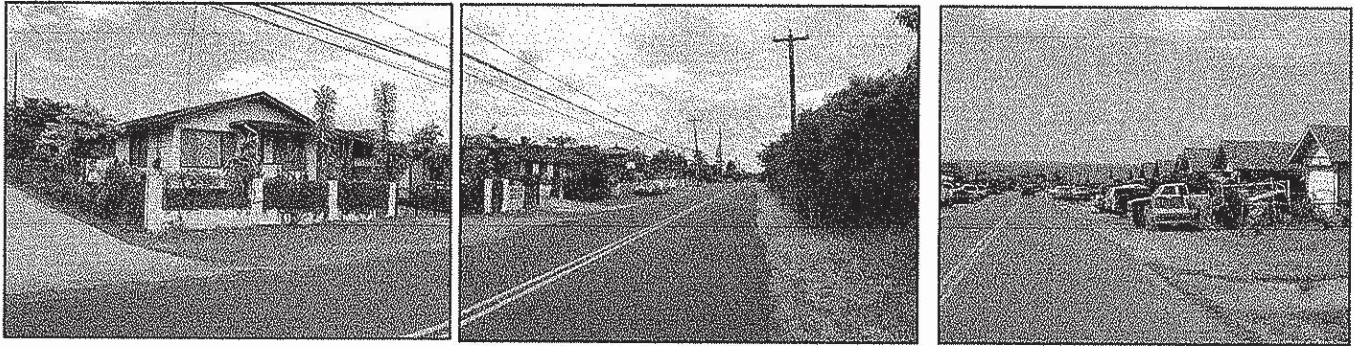
As former sugar plantations towns, neighborhoods in Kekaha, Waimea, Hanapepe, and Ele'ele, all tend to be in densely developed areas, composed of 8,000 – 12,000 square-foot lots with modest homes. House types vary between post and pier construction and concrete slab. Homes tend to be single-story with 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 and 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.

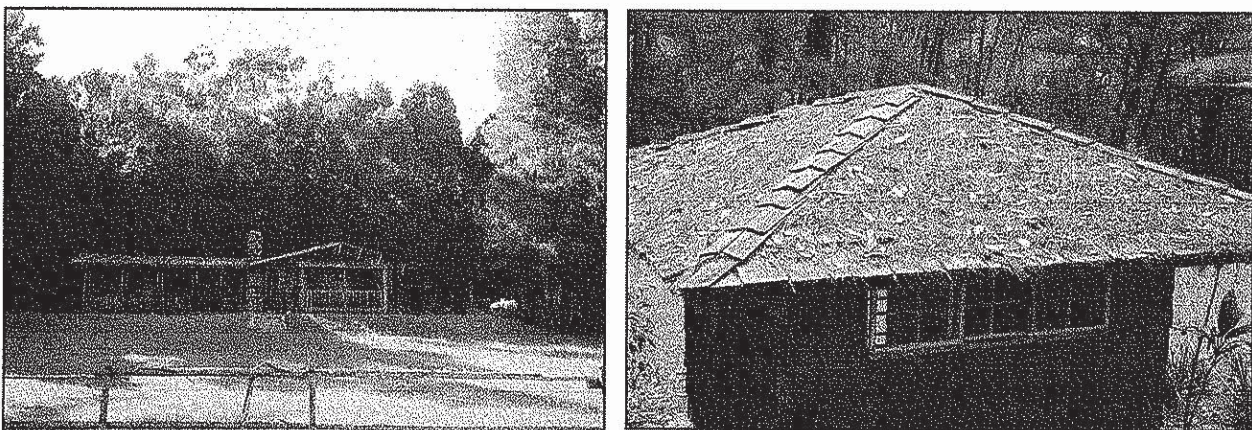
For the most part, homes have defensible space because the lots are small. However, a visual inspection of neighborhoods throughout the district found homes with vegetation growing within 10 feet of the structure, sometimes abutting the house.



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.



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.

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,

Kauai Community Wildfire Protection Plan
June 2009

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 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:

Kauai Community Wildfire Protection Plan
June 2009

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

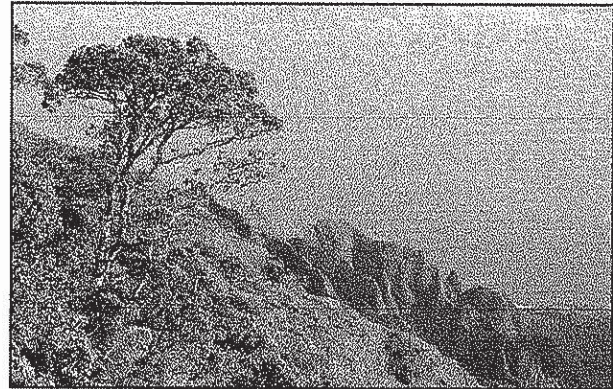
Natural / Cultural Resources:

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.

Kauai County Community Wildfire Protection Plan
September 2008

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.

Kauai County Community Wildfire Protection Plan
September 2008

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 / Hand Labor	Fuel load reduction along Wailua Corridor	Very High
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

Kauai County Community Wildfire Protection Plan
September 2008

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 Recommendation
Wailua	Installing and maintaining fuel breaks along Wailua Corridor	Multiple agencies: state and county	Cooperative Funding \$500,000	2009 - 2014	Yes
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 environmental assess-	2009 - 2014	Yes

Kauai County Community Wildfire Protection Plan
September 2008

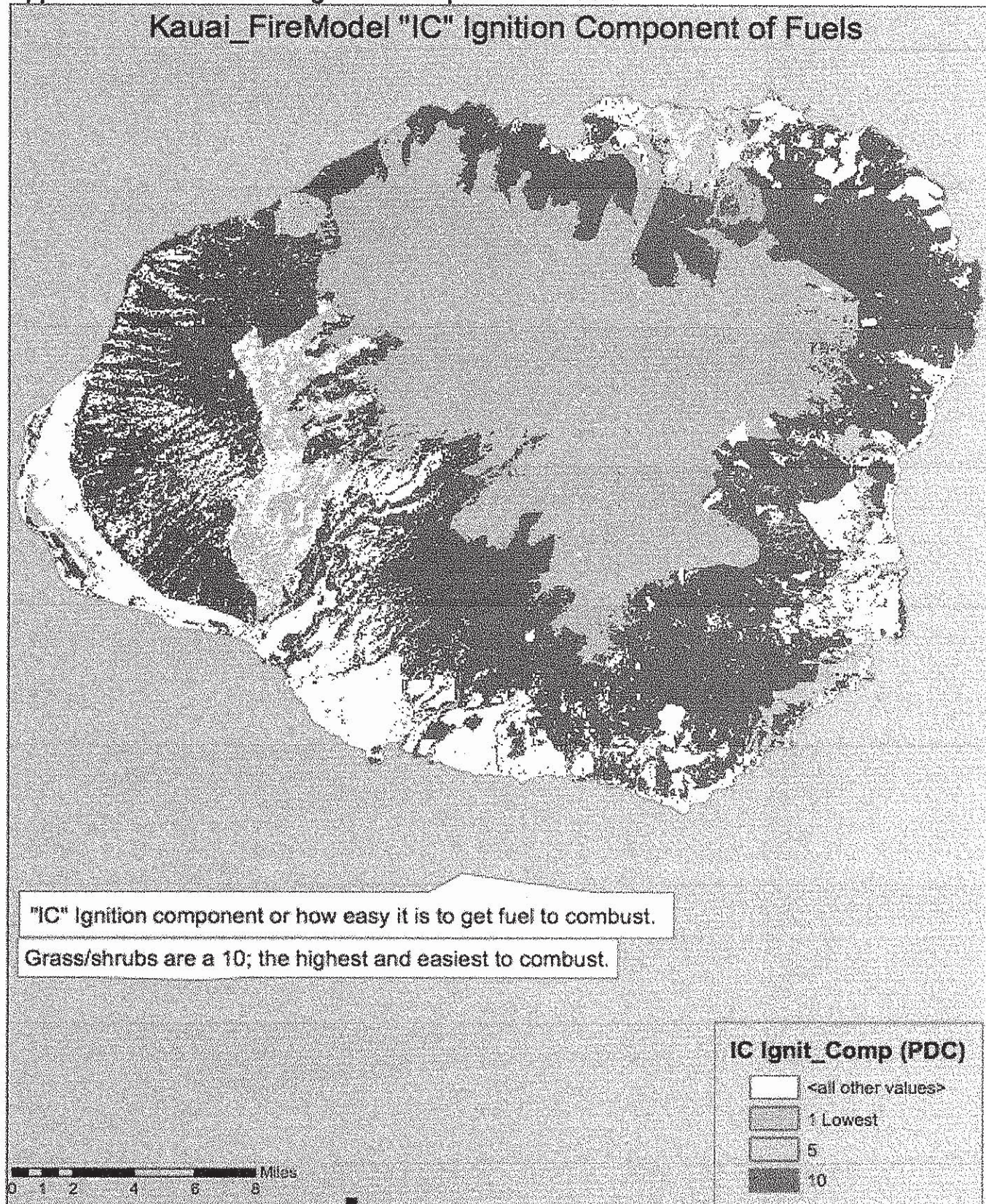
			ments required		
Island-wide	Increased effective integrated radio communication between state and county fire suppression agencies	Multiple agencies	Cooperative Funding \$80,000	2009 - 20013	Yes
Kokee	Purchase a brush truck to be staged in Kokee for fast response to wildfires.	Multiple agencies	Cooperative Funding \$75,000	2009-2013	Yes
Kokee	Install fire hydrants/stand pipes in Kokee.	Multiple agencies	Cooperative Funding \$250,000	2009-2014	Yes

Reduce Structural Ignitability:

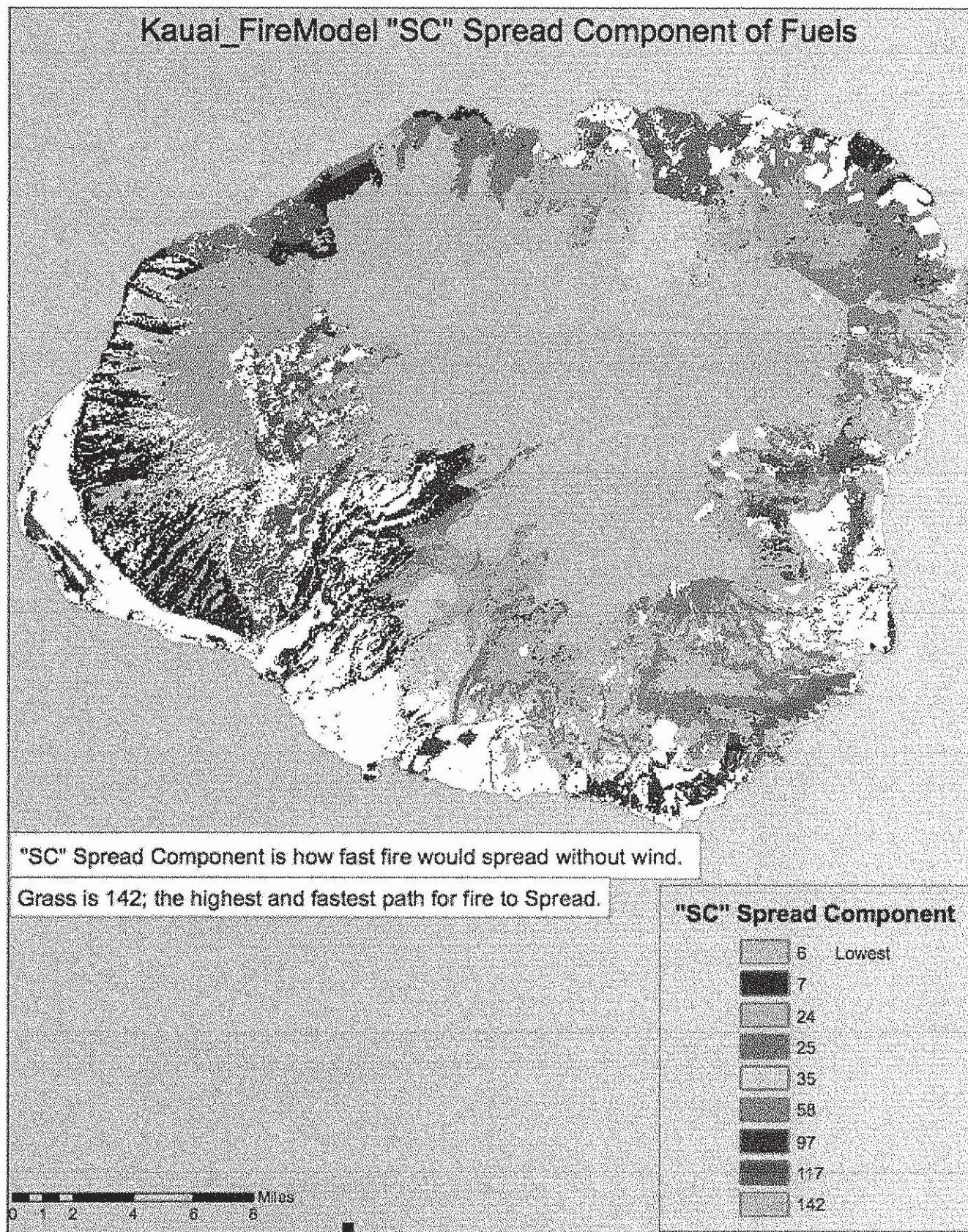
As part of its fire prevention education efforts, Firewise Communities Hawaii provides recommendations to reduce structural ignitability. Individuals and community groups around Kauai can reduce structural ignitability throughout the county by taking the following measures.

- 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	Kaunakani 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

Kauai County Community Wildfire Protection Plan
September 2008

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	Princeville 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	Mokuapee 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: <ul style="list-style-type: none"> • 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) <ul style="list-style-type: none"> • 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		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	

Kauai County Community Wildfire Protection Plan
September 2008

<p>Programs include:</p> <ul style="list-style-type: none"> • Infrastructure Protection Program • Regional Catastrophic Preparedness Grant Program 			
<p>Hawaii Tourism Authority (HTA) Natural Resources Program</p> <p>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.</p>		<p>Hawaii Tourism Authority 1801 Kalakaua Avenue Honolulu, HI 96815 (808) 973-2255</p>	
<p>Rural Fire Assistance Grants (RFA)</p> <p>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.)</p> <p>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).</p>	Varies by state	<p>Hawaii Volcanoes National Park Joe Molhoek Pacific Island Fire Mgmt. Officer PO Box 52, HNP, HI 96718 (808) 985-6042 Joe_Molhoek@nps.gov</p>	<p>The maximum award is \$20,000. RFA grants may require 90/10 cost-share.</p>