

# Community Wildfire Protection Plan for Volcano, Hawaii

Sponsored by Hawaii Volcanoes National Park  
in collaboration with the Big Island Wildfire Coordinating Group



**September 2006**

Written by Denise Laitinen  
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**Table of Contents:**

Signature page.....3  
Executive Summary.....4  
Background.....5  
    Fire History.....5  
  
Stakeholders.....6  
  
Community Base Map for Volcano.....8  
Fire Risk Assessment for Volcano.....9  
    Community Assets at Risk.....10  
Community Concerns for Volcano.....11  
Recommended Action for Volcano.....11  
Reduce Structure Ignitability.....16

**Appendix A:** Hawaii Wildland Fire Risk and Hazard Severity Assessment Form

**Appendix B:** Updated Project List 2008-2009

**Appendix C:** Additional Pre-attack maps

Cover photo: An a'a lava flow in Hawaii Volcanoes National Park sparks a wildfire.  
Picture: Greg Funderburk, HAVO staff.

## **Volcano Community Wildfire Protection Plan Mutual Agreement Page**

The Community Wildfire Protection Plan (CWPP) developed for Volcano, Hawaii by the Hawaii Volcanoes National Park (HAVO):

- Was collaboratively developed. Interested parties and federal land management agencies managing land in the vicinity of Volcano 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 Volcano.
- 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:

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**Paul J. Conry**  
**State Forester, Division of Forestry and Wildlife**

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**Date**

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**Darryl Oliveira**  
**Fire Chief, Hawaii County Fire Department**

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**Date**

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**Troy Kindred**  
**Administrator, Hawaii County Civil Defense**

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**Date**

Volcano Community Wildfire Protection Plan  
September 2006

## Executive Summary:

The community of Volcano in Hawaii County on the island of Hawaii abuts Hawaii Volcanoes National Park (HAVO) and is in a wildland urban interface (WUI) environment - that is where wildlands and houses meet. These interface areas pose the highest risk of loss of life and property due to wildland fire. 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 impacts the watershed and the habitat of threatened and endangered native Hawaiian animals. Wildfires in Hawaii also cause soil erosion, which leads to runoff that negatively impacts ocean reefs.

The overwhelming majority of wildfires in Hawaii are caused by arson or human error. Human error includes errant fireworks, rubbish, cooking, or agricultural fires that get out of control in the wildland-urban interface, as well as vehicle-caused wildfires.

Principal stakeholders who have an interest in protecting Volcano from wildfire include Hawaii County Fire Department, Hawaii Volcanoes National Park, which sponsored this CWPP, as well as the Big Island Wildfire Coordinating Group, composed of federal, state, and county agencies, including Hawaii County Civil Defense, Department of Land and Natural Resources, U.S Army, and the U.S. Fish and Wildlife Service. These decision makers were invited to participate in the development of this Plan.

An assessment determined that WUI areas in this community have a high risk of wildland fire. Wildland fires originating within the Park via human or natural causes have threatened the community of Volcano, which encompasses the Volcano Village, the Volcano Golf Course Community, Mauna Loa Estates, and Ohia Estates. Conversely, wildfires caused by human error in neighboring towns, such as Volcano, could impact the Park. The community does not have municipal water with residents and businesses alike relying on catchment water basins. There has also been an increase in invasive, non-native plant species that are high-intensity burning fuels, further increasing the fire risk within the community.

Meetings with community members and fire agency personnel identified several priority mitigation measures to reduce the chances of a wildfire starting in Volcano. These include: (1) creation of secondary emergency egress roads; (2) reduction of fuel load along roadsides and in subdivision common areas; (3) reduction of invasive species that possess inherent fire or ignition properties; (4) need for additional pre-staged static water tanks; and (5) continued fire prevention education and outreach.

Hawaii County has been fortunate in controlling large wildland fires in the community to date. However, given the fire history of the area and the fact that HAVO is home to the world's most active volcano, one need only look at the community's fire history and fuel load to understand the severe wildfire risk. The mitigation measures outlined in this Plan will enable the community of Volcano to reduce its risk to wildfire and create more efficient fire-protection systems. The priority mitigation measures listed above identify pro-active projects the community and fire agencies can undertake to minimize losses from a major wildfire.

Volcano Community Wildfire Protection Plan  
September 2006

## **Background:**

Covering a swath from sea level to a 13,000-foot mountaintop, the 377-square miles (333,000 acres) of Hawaii Volcanoes National Park on the island of Hawaii encompasses Mauna Loa, the world's largest volcano, as well as Kilauea, the world's most active volcano. The Park's ecological zones include coastal strand, dry lowland, mesic and wet rain forest, seasonally dry montane, sub-alpine, and alpine. It is home to more than 50 federally-listed endangered, threatened, and candidate endangered species, as well as numerous rare species.

Continually erupting for nearly 23 years, Kilauea has made HAVO the state's largest tourist attraction with more than 2.5 million visitors annually. The primary tourist attractions within the Park are on the south side of the Park, however, the bulk of Park lands extend north of Highway 11 for more than 40 miles as far west as Manuka State Park and as far north as the summit of Mauna Loa.

HAVO recently acquired 119,000 acres from Kahuku Ranch in Ka'u. Located at the 1,000 – 2,000 foot elevation, the area encompasses native Hawaiian forests, pasture lands, and three dormant volcanic craters. Park lands now stretch 50 miles from lower Puna to Ocean View. Given the right wind and fuel conditions wildland fire could travel the length of this land tract, causing substantial damage.

In the past, lava flows within the Park have caused several wildfires, some as large as 5,000 acres. Wildland fires originating within the Park have threatened the nearby community of Volcano, which encompasses Volcano Village, the Volcano Golf Course Community, including the Golf Course Subdivision, Mauna Loa Estates, and Ohia Estates. Conversely, wildland fires caused by human error in neighboring towns, such as Volcano, could impact the Park. The Kilauea Forest Reserve separates Volcano Village and the Golf Course Subdivision. To the east of Volcano Village is the Ola'a Forest Reserve, a land tract of Native Hawaiian forest largely untouched by invasive species.

Volcano has experienced tremendous development in recent years. Volcano Fairway Estates is a new subdivision currently under construction adjacent to the Volcano Golf Course and Country Club.

## **Fire History:**

Below is a 2004-2005 fire history chart for Volcano. Since Hawaii County Fire Department is responsible for fire suppression in residential areas and HAVO is responsible for fire suppression within the Park, each organization maintains separate fire history statistics. However, the two agencies have a Memorandum of Understanding for mutual aid in fire suppression. Average size for all wildland fires responded to by Hawaii County Fire Department in Volcano during the past two years was 0.4 acres. Between 2004 and 2005 there were three fires within Park boundaries, the Kipuka Pepeaio fire that burned more than 600 acres, the Kahuku fire that burned less than 5 acres in Kahuku, and the Pinao fire that burned less than 1 acre. However, a 2002 wildfire burned more than 1,000 acres of Park land in eight hours on the

Volcano Community Wildfire Protection Plan  
September 2006

north side of Highway 11 in Volcano. The fire jumped Mauna Loa Strip Road, which runs in a north-south direction to the west of the Volcano Golf Course Subdivision and threatened several homes along the north boundary of the Golf Course Subdivision. In the past decade HAVO has experienced 54 fires within the Park with 5 of those burning more than 1,000 acres.

<b>Volcano</b>	
Hawaii County FD Fire history 2004-2005	Date
Building fire	15-May-05 23:54:04
Building fire	10-Oct-05 04:51:33
Trash or rubbish fire, contained	26-Feb-04 10:02:00
Trash or rubbish fire, contained	14-May-05 22:46:52
Fire in mobile property used as a fixed structure, other	24-Jul-04 02:12:37
Fire in mobile property used as a fixed structure, other	26-Jan-05 13:57:19
Passenger vehicle fire	29-Apr-05 19:32:27
Passenger vehicle fire	14-May-05 05:38:15
Passenger vehicle fire	30-Jul-05 22:02:24
Passenger vehicle fire	04-Nov-05 22:11:28
Forest, woods or wildland fire	23-Feb-05 09:55:31
Brush, or brush and grass mixture fire	04-Sep-05 16:37:39
Brush, or brush and grass mixture fire	29-Dec-05 14:07:14
Brush, or brush and grass mixture fire	30-Dec-05 18:44:55
Outside rubbish, trash or waste fire	07-Aug-05 14:22:56
Outside rubbish, trash or waste fire	25-Sep-05 13:58:47
Outside rubbish, trash or waste fire	21-Nov-05 16:08:11
Outside gas or vapor combustion explosion	18-Aug-05 12:28:57
Unauthorized Burning	14-Mar-05 20:39:43
Unauthorized Burning	23-May-05 10:01:00
Unauthorized Burning	27-Aug-05 15:35:39
Unauthorized Burning	25-Nov-05 22:48:50
HAVO Fire History 2004-2005	Date
Pinao – human cause	7/29/04
Kipuka Pepeaio - lightening	12/6/04
Kahuku - human cause	8/14/05

### Stakeholders:

Stakeholders are individuals or groups who have a high level of interest in the protection of their assets from wildfire. HAVO shares nearly 11 miles of boundary with the Volcano community in wildland-urban interface areas. Additional lands adjoining Volcano include those managed by federal, state, county, and private entities.

The State of Hawaii's Department of Land and Natural Resources (DLNR) Division of Forestry and Wildlife (DOFAW) manages the 'Ola'a Forest Reserve that lies adjacent to the Volcano

Volcano Community Wildfire Protection Plan  
September 2006

community. The state-owned Kilauea Forest Reserve separates Volcano Village and the Golf Course Subdivision. There are also several large-scale private landowners in the area, who in turn lease land to other organizations. For example, Kamehameha Schools leases land to Ohia Ranch and owns large tracts of land near Volcano Village. The Keauhou Bird Conservation Center - Hawaii Endangered Bird Conservation Program is located next to the Volcano Golf Course Subdivision. Contact information for principal stakeholders is listed below.

**Federal:**

**Hawaii Volcanoes National Park**

Joe Molhoek  
Pacific Island Fire Management Officer  
PO Box 52, HNP, HI 96718  
(808) 985-6042  
[Joe\\_Molhoek@nps.gov](mailto:Joe_Molhoek@nps.gov)



**State:**

**Department of Land and Natural Resources: Division of Forestry and Wildlife**

Wayne Ching  
State Protection Forester  
1151 Punchbowl St., Room 325, Honolulu, HI 96813  
(808) 587-4173  
[Wayne.F.Ching@hawaii.gov](mailto:Wayne.F.Ching@hawaii.gov)



**County:**

**Hawaii County Fire Department**

Fire Chief Darryl Oliveira  
25 Aupuni St., Hilo, HI 96720  
(808) 961-8297  
[Hcfd1@co.hawaii.hi.us](mailto:Hcfd1@co.hawaii.hi.us)



**Hawaii County Civil Defense**

Troy Kindred  
Civil Defense Administrator  
920 Ululani St., Hilo, HI 96720  
(808) 961-8229  
[tkindred@co.hawaii.hi.us](mailto:tkindred@co.hawaii.hi.us)



### Base Map of Volcano:

Figure 1 is a base map of the community of Volcano and adjacent landowners. The inhabited areas at potential risk to wildfire include Mauna Loa Estates, Ohia Estates, Volcano Village, and the Volcano Golf Course Community, which includes a golf course and subdivision.

Areas containing critical human infrastructure, such as escape routes and communication structures include Volcano Village and the Golf Course Community. Within Volcano Village, the Peter Lee School and the Cooper Community Center could be used as “defend in place” zones if deemed necessary by fire officials given wildfire conditions.

Areas of community importance include: Cooper Community Center, Volcano Winery, Kilauea Lodge and Restaurant, Shipman Ranch House, Lee House, Ola’a Forest Reserve, ‘Ola’a Rain Forest Tract, Thurston Rain Forest, Keauhou Ranch, Ohia Ranch, Keauhou Bird Conservation Center - Hawaii Endangered Bird Conservation Program, local bed and breakfasts, farms, restaurants, and schools.

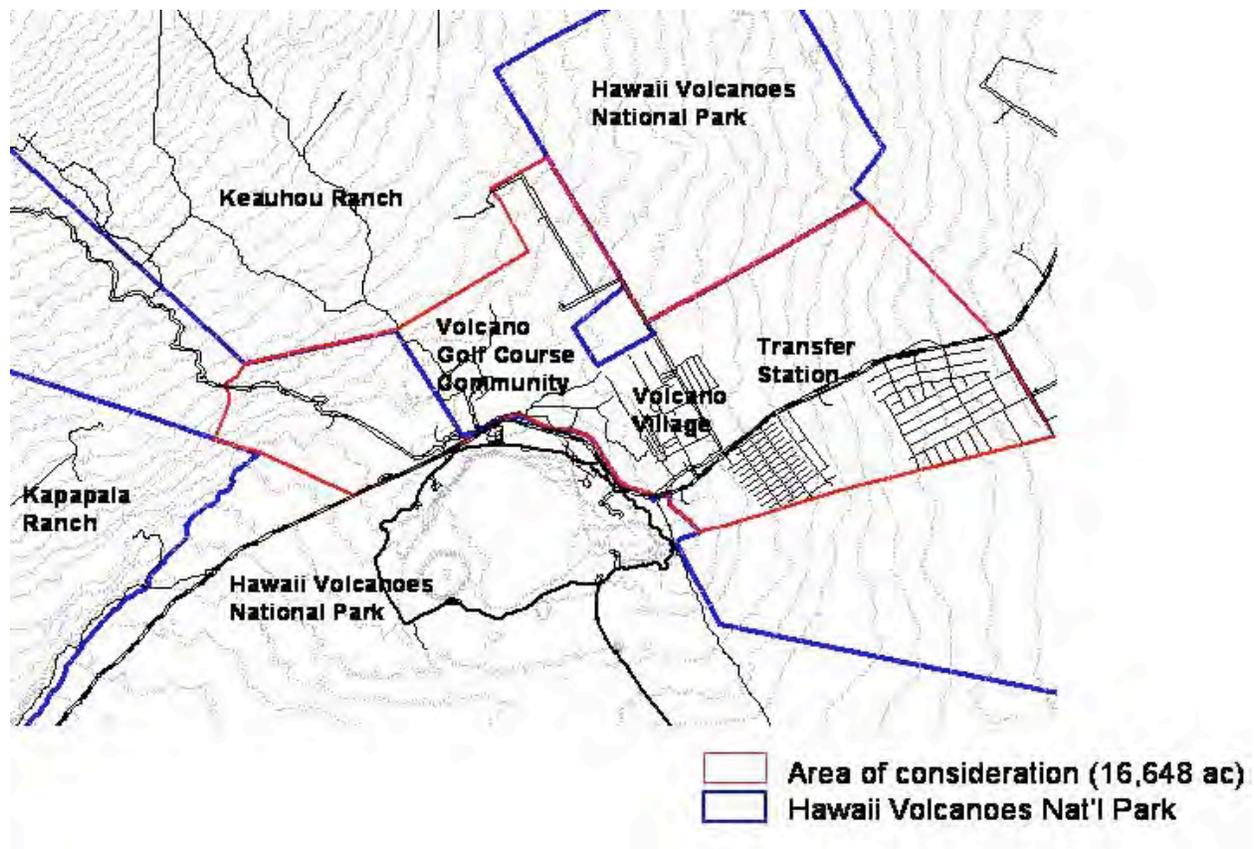


Figure 1: Area of consideration for the Volcano CWPP encompasses more than 16,000 acres and is outlined in red.

## Fire Risk Assessment for Volcano:

The Volcano community, a federally listed community at risk, is at the 4,000-foot elevation and is composed of Volcano Village, including the commercial district within the Village, the Volcano Golf and Country Club and its neighboring subdivision to the east, Mauna Loa Estates and Ohia Estates to the southeast on the south side of Highway 11. There are several commercial agricultural farm lots north of the residential units in Volcano Village. Both the Village and the Golf Course Subdivision are densely populated with lots generally smaller than an acre. Houses are spaced slightly farther apart in Mauna Loa Estates and Ohia Estates. There are two main roads each out of Volcano Village and Mauna Loa Estates and one means of ingress and egress from the Golf Course Subdivision and Ohia Estates. Roads within Volcano Village are extremely narrow, roughly ten feet in width with little or no shoulders. Roads within Mauna Loa Estates, Ohia Estates, and the Golf Course Subdivision are 18 - 20 feet wide with shoulders. Volcano Village, Ohia Estates, and the Golf Course Subdivision have little to no slope within the community. There is a slight slope within Mauna Loa Estates, although most lots are on flat land. There is no municipal water in any of the residential or commercial areas of Volcano, with homeowners and businesses relying on catchment water. A volunteer fire station is located in Volcano Village at the Cooper Community Center and a County fire station is located within the Park at the Kilauea Military Camp. There is no community association for any of the subdivisions in Volcano.



Typical road width in Volcano Village.

Much of Volcano Village is within densely vegetated rain forest. The state-owned Kilauea Forest Reserve separates Volcano Village and the Golf Course Subdivision. To the east of Volcano Village is the state 'Ola'a Forest Reserve and the Park's 'Ola'a Rain Forest Tract. These native rain forests provide critical habitat for a number of endangered plant and animal species.

Extensive land clearing has removed most of the native forest in the Volcano Golf Course Subdivision. Several fire-adapted alien grasses, such as bushy beardgrass (*Schizachyrium condensatum*), broomsedge (*Andropogon virginicus*), and molasses grass (*Melinis minutiflora*) have become widespread and increased the wildfire potential in the subdivision. The Faya tree (*myrica faya*) has also invaded the Golf Course Subdivision, pushing out native ohia (*Metrosideros polymorpha*) trees. Its rapid invasion into common areas that were originally set-aside as defensible spaces in the event of wildfire has resulted in increased fuel loads and the conversion of open spaces to dense alien forest. Keauhou Ranch, owned by Kamehameha Schools, lies to the north of the Golf Course Subdivision. The recent cessation of cattle operations is expected to result in increased fuel loads of invasive fire-adapted grasses.

A Hawaii Wildland Fire Risk and Hazard Severity Assessment based on the Assessment in Appendix A of NFPA 1144, *Standard for Protection of Life and Property from Wildland Fire*, was conducted by the Hawaii Firewise Coordinator and HAVO firefighting personnel on April 26,

Volcano Community Wildfire Protection Plan  
September 2006

2006 to identify the level of wildland fire risk of Volcano Village, the Golf Course Subdivision, Mauna Loa Estates, and Ohia Estates.

Using a pre-established point system, the 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 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 fuels in close proximity to structures, and lack of water, Volcano scored within the high-risk score range in the Assessment, a copy of which can be found in Appendix A.

### **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; rare and endangered plants and animals; scenic, cultural, and archeological sites; ranchlands; and structures.

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

Commercial resources:

Volcano Winery, Kilauea Lodge and Restaurant, local bed and breakfasts, farms, restaurants, and schools.

Historical resources:

Shipman Ranch House and Lee House. There are several structures within the Village more than 50 years old. The State of Hawaii classifies buildings over 50 years old as historical structures in accordance with National Park Service Administrative Rule Chapter 6E.

Natural Resources:

Ola'a Forest Reserve, Ola'a Rain Forest Tract, Thurston Rain Forest, Keauhou Ranch, Ohia Ranch, Keauhou Bird Conservation Center - Hawaii Endangered Bird Conservation Program. Native Hawaiian plants and animals, including rare and endangered species.

This Plan focuses on structures within the wildland urban interface in Volcano. Overgrown vegetation, narrow streets, and a lack of water create unsafe fire conditions. While the majority of homes in Volcano have metal roofs, a large number of homes within Volcano Village, the Golf Course Subdivision, Ohia Estates, and Mauna Loa Estates have wood siding and lanais (decks), further enhancing the fire problem. House lots vary greatly in the degree of defensible space around the homes from little to no defensible space to more than 30 feet of clearance. Several driveways do not have 15 feet of vertical clearance for emergency vehicle access due

Volcano Community Wildfire Protection Plan  
September 2006

to overgrown vegetation. Fewer still have turnaround access for emergency vehicles. Signage for interior roads within the Village, Golf Course Subdivision, Mauna Loa Estates, and Ohia



Estates is metal and reflectorized.

In addition, all residential areas within Volcano are experiencing rapid development. A new subdivision, Volcano Fairway Estates, is being built adjoining Volcano Golf Course and Country

Houses within Volcano Village differ dramatically in their amount of defensible space. Both houses pictured above have metal roofs and wood siding.

Club. The developer and/or lot owners are often clear cutting individual lots and dumping the green waste in common areas within the community, greatly increasing the community's fire risk. Associated with land clearing is the increased potential for invasive plants to establish. Some of these invaders (e.g. fire-adapted grasses) may have the potential to increase fuel loads and alter fire regimes.

### Community Concerns for Volcano:

Multiple meetings with community members and fire agencies specifically on the CWPP process between April and June 2006 identified the most pressing fire concerns in Volcano. These include in order of priority:

1. Lack of water;
2. Community egress and firefighting vehicle ingress during a wildfire;
3. Fuel load in common areas;
4. Reduction of invasive species possessing inherent fire or ignition properties; and
5. Public awareness of wildfire threat.

### Recommended Action for Volcano:

Multiple meetings with community members and fire agencies specifically on the CWPP process between April and June 2006 identified the most pressing fire concerns in Volcano. These include in order of priority:

1. Lack of water;
2. Community egress and firefighting vehicle ingress during a brushfire;
3. Fuel load in common areas;
4. Reduction of invasive species possessing inherent fire or ignition properties; and
5. Public awareness of wildfire threat.

Volcano Community Wildfire Protection Plan  
September 2006

Based on the results of the community risk assessment, the following mitigation measures were identified to reduce wildfire risk in Volcano. The community and fire agencies collaborated to prioritize mitigation efforts in the following order of importance:

1. Creation of secondary emergency ingress/egress roads;
2. Reduction of fuel load along roadsides and in common areas;
3. Need for additional pre-staged static water tanks;
4. Reduction of invasive species; and
5. Continued fire prevention education and outreach.

Based on the results of the community risk assessment, priority ratings have been selected for Volcano 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.

<b>Community, structure or area at risk</b>	<b>Type of Treatment</b>	<b>Method of Treatment</b>	<b>Overall Priority</b>
Volcano Village	Mechanical	Creation of secondary emergency ingress/egress roads	Very High
Volcano Village	Mechanical / Chemical / Hand Labor	Reduction of fuel load along roadsides and in common areas	Very High
Volcano Village	Mechanical	Need for additional pre-staged static water tanks	High
Volcano Village	Mechanical / Chemical / Hand Labor	Reduction of invasive species	High
Volcano Village	Public Education and Outreach	Continued fire prevention education and outreach	High
Golf Course Community	Mechanical	Reduction of fuel load along roadsides and in common areas	High
Golf Course Community	Mechanical / Chemical / Hand Labor	Need for additional pre-staged static water tanks	High
Golf Course Community	Mechanical / Chemical / Hand Labor	Reduction of invasive species	High
Golf Course Community	Public Education and Outreach	Continued fire prevention education and outreach	High
Mauna Loa Estates	Mechanical / Chemical	Reduction of fuel load along roadsides	Medium
Mauna Loa Estates	Mechanical / Chemical	Reduction of invasive species	Medium
Mauna Loa Estates	Public Education and Outreach	Continued fire prevention education and outreach	High
Ohia Estates	Mechanical / Chemical	Reduction of fuel load along roadsides	Medium
Ohia Estates	Mechanical / Chemical / Hand Labor	Reduction of invasive species	Medium
Ohia Estates	Public Education and Outreach	Continued fire prevention education and outreach	High

Volcano Community Wildfire Protection Plan  
September 2006

Community Federal agencies and private landowners surrounding Volcano were invited to submit projects that provide protection and reduce wildland fire risk. The following table displays a list of projects based on recommendations from community and fire-related organizations. HAVO intends to assess the progress annually and invite agencies and landowners to submit projects that provide community protection.

<b>Community, structure or area at risk</b>	<b>Project</b>	<b>Agency</b>	<b>Funding Needs</b>	<b>Timetable</b>	<b>Community Recommendation</b>
Volcano Village	Creation of secondary emergency ingress/egress roads	HAVO	Cooperative Funding	2006 - 2007	Yes
Volcano Village	Reduction of fuel load along roadsides and in common areas	Private	Cooperative Funding	2006 - 2007	Yes
Volcano Village	Reduction of invasive species	HAVO	Cooperative Funding	2006 - 2007	Yes
Volcano Village	Need for additional pre-staged static water tanks	Multiple agencies: federal, state, county, and private	Cooperative Funding	2006 - 2007	Yes
Volcano Village	Continued fire prevention education and outreach	Multiple agencies	Cooperative Funding	2006 - 2007	Yes
Golf Course Community	Reduction of fuel load along roadsides and in common areas	Multiple agencies	Cooperative Funding	2006 - 2007	Yes
Golf Course Community	Need for additional pre-staged static water tanks	Multiple agencies	Cooperative Funding	2006 - 2007	Yes
Golf Course Community	Reduction of invasive species	Multiple agencies	Cooperative Funding	2006 - 2007	Yes
Golf Course Community	Continued fire prevention education and outreach	Multiple agencies	Cooperative Funding	2006 - 2007	Yes
Mauna Loa Estates	Reduction of fuel load along	Private	Cooperative Funding	2006 - 2007	Yes

Volcano Community Wildfire Protection Plan  
September 2006

	roadsides				
Mauna Loa Estates	Reduction of invasive species	Multiple agencies	Cooperative Funding	2006 - 2007	Yes
Mauna Loa Estates	Continued fire prevention education and outreach	Multiple agencies	Cooperative Funding	2006 - 2007	Yes
Ohia Estates	Reduction of fuel load along roadsides	Private	Cooperative Funding	2006 - 2007	Yes
Ohia Estates	Reduction of invasive species	Multiple agencies	Cooperative Funding	2006 - 2007	Yes
Ohia Estates	Continued fire prevention education and outreach	Multiple agencies	Cooperative Funding	2006 - 2007	Yes

### Secondary road for ingress/egress

With narrow interior roads and only two roads connecting to the main highway, a secondary emergency access road for emergency vehicles is needed for more effective fire suppression. Currently there is an unpaved access road parallel to Mauna Loa Strip Road that runs along the western border of the golf course subdivision. This firebreak is on HAVO land and the Park maintains the road, removing overgrown vegetation twice a year. However, this fuel break dead ends behind golf course homes adjacent to the Volcano Winery. An additional access road is needed to connect the end of this fuel break to the interior roads within the Golf Course Subdivision to increase effective safe firefighting operations.

In order to remain effective, the secondary emergency access road must also be maintained on a regular basis. Funding should be secured to ensure that the road is maintained (cleared of overgrown vegetation) at least twice a year. The organization that is determined to be responsible for the access road may want to consider the purchase of a chipper to remove vegetation on the access road.

### Reduction of fuel load

Reducing vegetation along roadsides will improve accessibility of emergency vehicles. Reduction of green waste in common areas within the community will also reduce the wildfire threat. The creation of fuel breaks in common areas, as well as green waste pick-up projects are recommended to reduce fuel load. It is also strongly recommended that outreach efforts include alerting residents and developers to the fire risk of dumping green waste. The organization that is determined to be responsible for fuel load reduction may want to consider the purchase of a chipper to remove vegetation. For examples of how communities in other states have developed effective green waste removal projects, please go to [www.firewise.org](http://www.firewise.org).

Volcano Community Wildfire Protection Plan  
September 2006

### **Pre-staged static water tanks**

Given that area residents rely on catchment water and there are no fire hydrants within Volcano, lack of water for fire suppression was identified as one of the most important challenges facing the community. Pre-staged static water tanks for ground and aerial fire suppression will greatly increase effective fire suppression and firefighting efficiency.

### **Reduction of invasive species**

Invasive non-native plant species have the potential to alter fire regimes, and inhibit the recovery of native plants and animals from wildfire. Invasive fire-adapted grasses are high-intensity burning fuels that carry fire to other fuels. Faya trees rapidly displace native ohia trees as the dominant canopy tree after wildfire. Its invasion into common areas within the Golf Course Community has increased fuel loads, converted open areas to dense forest, and compromised defensible spaces used in wildfire suppression.

### **Continued fire prevention education**

Fire agencies in Hawaii County have partnered with Firewise to promote community wildfire awareness in wildland urban interface communities. The objective is to increase overall awareness of fire hazard issues that affect residents within the wildland urban interface. While a Firewise coordinator has provided much needed outreach in the community, funding for such a position has been intermittent. Stable funding for an outreach coordinator should be developed to ensure consistent fire prevention outreach. With a new subdivision being built and a continued influx of residents from the mainland who are unaware of Volcano's unique fire risks, it is crucial to continue a comprehensive fire education and outreach campaign. This program should consist of the following:

1. Continued development and coordination of community meetings and outreach events. Coordination with other community groups, such as the local disaster preparedness committee and civic organizations, to provide wildland fire safety information on defensible space and Firewise building materials. Provide outreach at community events, such as the Kilauea Cultural Festival.
2. Develop educational materials specific to community fire threat and continue outreach in local publications. HAVO staff and the Firewise coordinator are currently providing monthly editorial to local publications on fire prevention. Continued outreach is needed with large numbers of new residents moving into the area. A handbook "How to Build in the Forest" is currently available to area residents. Handbook should be updated to include Firewise recommendations for defensible space and fire-resistant building materials.
3. Development of fire prevention outreach materials, including TV and radio public service announcements, posters, and handouts.

### **Reduce Structural Ignitability:**

As part of its fire prevention education efforts, Firewise provides recommendations to reduce structural ignitability. Individuals and the Volcano community can reduce structural ignitability throughout the community 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. And whenever 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.

Volcano Community Wildfire Protection Plan  
September 2006

**Appendix A:**

Please see attached Hawaii Wildland Fire Risk and Hazard Severity Assessment Form.

**Appendix B:****Updated Project List 2008-2009**

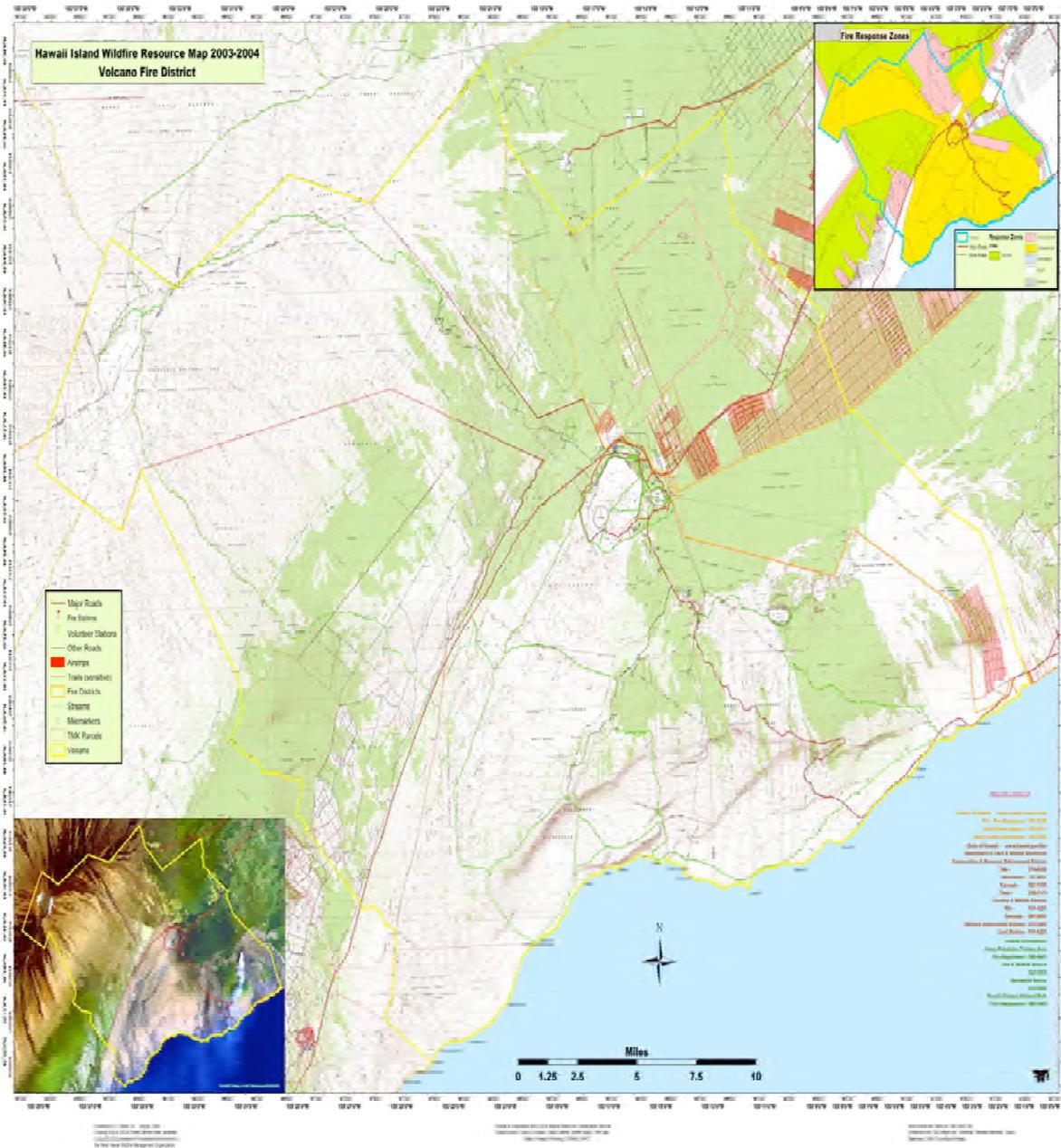
Federal agencies and private landowners surrounding Volcano were invited to submit projects that provide wildfire protection and reduce risk. The following table displays a list of recommended projects.

<b>Community, structure or area at risk</b>	<b>Project</b>	<b>Agency / landowner</b>	<b>Funding Needs</b>	<b>Timetable</b>	<b>Community recommendation</b>
Volcano Village	Maintenance of secondary emergency access road	HAVO	Cooperative Funding	2008-9	Yes
Volcano Village, Golf Course Community, Mauna Loa Estates, Ohia Estates	Reduction of fuel load along roadsides and in common areas	Private	Cooperative Funding	2008-9	Yes
Volcano Village, Golf Course Community, Mauna Loa Estates, Ohia Estates	Reduction of invasive species	HAVO, Private	Cooperative Funding	2008-9	Yes
Volcano Village, Golf Course Community, Mauna Loa Estates, Ohia Estates	Continued fire prevention education and outreach	Multiple Agencies	Cooperative Funding	2008-9	Yes

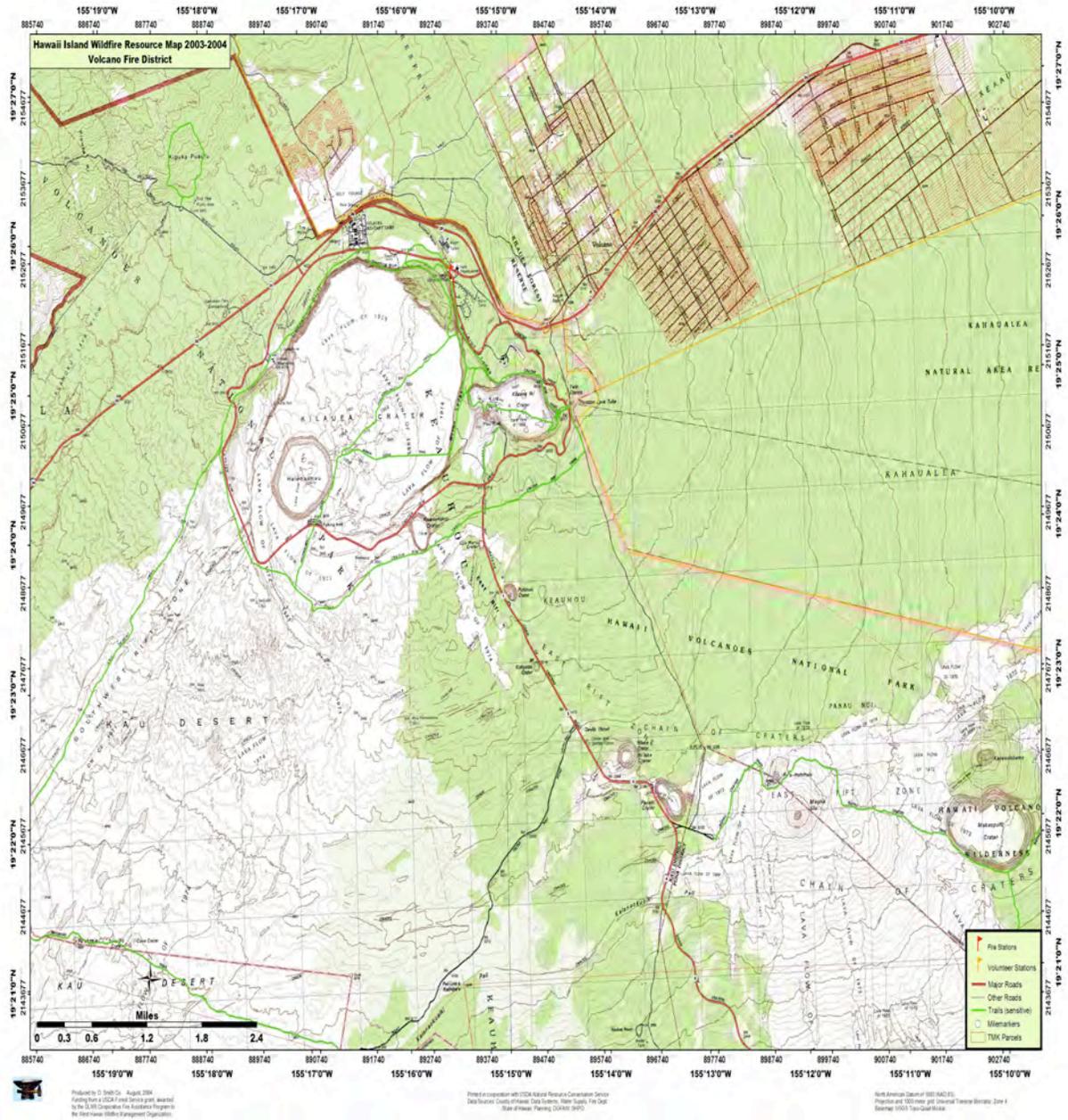
Volcano Community Wildfire Protection Plan  
September 2006

Appendix C:

Pre-Attack Maps for Volcano, Hawaii



Volcano Community Wildfire Protection Plan  
September 2006



Maps courtesy of West Hawaii Wildfire Management Organization.