



Codes, Standards, and Permitting

Mitigation Assessment Team Summary Report and
Recommendations
State of Hawai'i
Maui Wildfires

February 2025



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1. Executive Summary

In early August 2023, a series of wildfires broke out in the State of Hawai'i. The island of Maui was particularly affected as multiple wind-driven fires prompted evacuations and caused widespread damage to Lahaina and Kula. The fires burned 6,721 acres resulting in the loss of 2,173 structures, with many more damaged.¹ The spread of the wildfires was attributed to dry, gusty conditions created by wind funneling between a strong high-pressure area north of Hawai'i and Hurricane Dora several hundred miles to the south.²

Following the fires, the Federal Emergency Management Agency's (FEMA) Building Science Disaster Support Program (BSDS), in conjunction with FEMA Region 9 and supported by the Strategic Alliance for Risk Reduction (STARR II), provided specialized architectural and engineering expertise through its Mitigation Assessment Team (MAT) to assess building performance; develop customized Recovery Advisories; provide tailored training and subject matter expertise; and document observations, conclusions, and recommendations. The outputs from these efforts resulted in the development of products and technical assistance that are meant to support the State of Hawai'i and Maui County in ongoing recovery from the August 2023 fires and to support resiliency in the face of future similar events.

The MAT worked with local agencies to assess damage to buildings and learn how buildings performed during the fires. After conclusion of the field investigation, the MAT analyzed the field data as well as damage reports and studies conducted by others. The MAT prepared conclusions and developed recommendations based on these findings. This information is presented in two targeted reports:

- Codes, Standards, and Permitting
- Performance of Residential Buildings

This summary report focuses on the use of hazard-resistant provisions of building codes and standards. The recommendations resulting from building performance and forensic assessments help FEMA coordinate with agencies and organizations to assess and implement the hazard-resistant provisions of the adopted building codes and standards. In addition, recommendations support community development of long-term strategies to reduce future damage and impacts from hazard events and improve community resilience.

The recommendations provided in this document and the referenced Recovery Advisories were created, in part, to assist the State of Hawai'i and Maui County in outlining a path forward for building code adoption with enforcement that promotes the resilient construction, repair, and alteration of buildings. The state and county can also use these recommendations to help guide and

¹ <https://www.mauicounty.gov/2023-Wildfire-After-Action-Report>

² mauicounty.gov/DocumentCenter/View/149693/FI23-0012446-Lahaina-Origin-and-Cause-Report_Plus-Appendix-A-B-C-Redacted

better prepare communities, property owners, and other stakeholders for future hazard events and encourage them to take specific action, where possible. As Maui is subject to multiple hazards including high winds, flooding, tsunami and seismic events, a multi-hazard and holistic approach should be applied during recovery and rebuilding. Table 1 summarizes the detailed recommendations found in Section 4 and proposes leadership to facilitate and implement each recommended action.

Table 1. MAT Summary of Recommendations

#	Recommendation	Leader for Implementation
Codes and Standards		
1a	Reduce the time it takes to adopt each new edition of the Hawai'i State Building and Residential Code to ensure that the latest version or the immediate prior version of the International Codes (I-Codes) are in place and enforced with amendments specific to the Hawai'i.	State of Hawai'i
1b	Reduce the time it takes to adopt each new edition of the Hawai'i State Building and Residential Code to ensure that the latest version or the immediate prior version of the I-Codes are in place and enforced with amendments specific to the county.	Maui County
1c	Encourage the reduction in time between state and county adoption of the building code by encouraging the counties to work in parallel with the SBCC on local amendments.	State of Hawai'i and/or State Building Code Council (SBCC)
2a	Add language to Hawai'i HRS 107-28 to require county adoption of hazard-resistant and fire provisions of the Hawai'i Building Code for which they are at high risk.	State of Hawai'i
2b	Prohibit the SBCC from weakening the hazard resistant provisions of the ICC and the IRC.	State of Hawai'i
3a	Amend the moratorium on building code changes to allow for interim amendments related to fire resistance and review current codes given the disaster impacts.	State of Hawai'i
3b	Convene a panel to review any conflicts that may arise in the codes at the state and county level if the codes are adopted without amendment.	State of Hawai'i
3c	Provide support to the counties regarding hazard-specific local code amendments.	State of Hawai'i
4a	Seek clarification from the ICC on the scope of Appendix BB on Tiny Homes or Appendix BC on Accessory Dwelling Units (ADUs) to determine if these code requirements apply to structures similar to 'ohanas found in Maui County.	SBCC and/or Maui County
4b	Provide a code change proposal to the next version of the IRC to ensure the Appendix for ADUs is consistent with IRC Appendix Q on Tiny Homes for fire resistance. The fire resistance of the ADU should not be diminished in Appendix BC on Accessory Dwellings.	U.S. Fire Administration (USFA)

#	Recommendation	Leader for Implementation
5a	Study the impact of multiple ADUs on each parcel for fire spread. The State of Hawai'i should consider delaying the mandate requiring counties to allow at least two ADUs per lot prior to study finalization.	State of Hawai'i
5b	Provide clear direction on fire resistance requirements of ADUs, setbacks and defensible space requirements through the Hawai'i State and Maui County Building and Residential Codes.	State of Hawai'i and Maui County
6a	Update the Maui County Code and ordinances to futureproof them against similar confusion arising from automatic code adoptions triggered by state law.	Maui County
6b	Ensure that county websites (including information provided on municode.com) and outreach materials consistently and accurately state which code is adopted and enforced.	Maui County
7a	Update codes and standard language to account for wildfire safety requirements for structural hardening enhancements and defensible space requirements for various site constraints (i.e., setback limitations, defensible space limitations, fire separation distances).	Consensus-based Code Bodies (i.e., ICC, NFPA)
7b	Review the recommendations set forth in Table A of National Institute of Standards and Technology's (NIST's) Hazard Mitigation Methodology (HMM) and incorporate, at a minimum, the recommendations regarding separation distances and defensible space into the Maui County Building and Residential Code.	Maui County
7c	Review Tables B and C in the NIST HMM guidance and incorporate the recommendations into the Maui County Building and Residential Code.	Maui County
8a	At a minimum, language consistent with Chapter 5, Chapter 6, Section A102.3, Section A105 and Section A107 of the International Wildland Urban Interface Code (IWUIC) should be considered for amendment of the Maui County Residential and Building Codes.	Maui County
8b	Add language into the Maui County Residential and Building Codes that is consistent with Section 302 of the IWUIC on Wildland-Urban Interface Area Designations or NFPA 1140, Standard for Wildland Fire Protection.	Maui County
9	Work directly with the Permitting Department to ensure that the applicable information from the WUI education program is available to designers and building owners during design and construction of new structures.	Maui County Fire Department
10a	Review available wildfire codes and standards and adopt portions of the code that can be met considering the unique water supply, cultural traditions, and local building practices found on Maui.	State of Hawai'i and Maui County
10b	Incorporate Section 507, Replacement or Repair of Roof Coverings, from the IWUIC into the local code.	Maui County
11	Require all construction replacing 2023 wildfire-destroyed structures to meet the currently adopted codes and not the code in place at the time of original permitting/design.	Maui County
12	Amend the Maui County Fire Code, NFPA 1, Chapter 17 to provide maps with clearly delineated WUI areas.	Maui County

#	Recommendation	Leader for Implementation
13	Ensure enforcement for brush and debris maintenance requirements as outlined in the Maui County Fire Code.	Maui County
14	Review and update county wildfire hazard maps detailing fire hazard severity zones supplemented with best practices for inclusion in local building code.	Maui County
15	Require additional fire resistance measures for adjacent structures where limited setbacks are allowed or possible due to parcel size.	Maui County
16	Consider a consolidated, enforceable document which incorporates comprehensive wildfire management and landscape management strategies consistent in all planning and zoning regulations, building codes and standards, policy, and guidance documents.	Maui County
17a	Consider a code revision proposal to the 2027 IWUIC that requires accessory buildings located less than 50 feet from any building to have exterior walls of at least 1 hour fire resistance rating.	USFA
17b	Continue reviewing NIST HMM for incorporation into IWUIC Section 504.1.1.	ICC
17	Review the Maui County Building and Residential Code for conflicts between hazard-resistant provisions which may increase the vulnerability of a building.	Maui County
Ordinances, Permitting, and Code Enforcement		
18	Update Maui County Hazard Mitigation Plan (HMP) to include updated wildfire hazard vulnerability, 2023 wildfire impacts, lessons learned, academic studies, and updated mitigation strategies reflecting post-disaster needs.	Maui County
19	Update the West Maui CWPP and integrate hazard risk maps and other wildfire mitigation into the Maui County Fire Code.	Maui County
20	Maui County Fire Department should lead the coordination and alignment efforts to provide specific guidance for high-risk areas locally aligned and relevant/applicable.	Maui County Fire Department and Planning Department
21	Work to increase staff knowledge and enforcement capabilities including training, pre-approved designs, and clear requirements for submission of calculations in all plans and permit submissions. Do not remove the provisions that govern administrative actions in the code.	Maui County
22	Issue a policy or regulatory change to provide Maui County Fire with a clearly defined role and responsibility to oversee fire-safety regulatory needs (development, adoption and enforcement) for building and planning codes, and should increase technical capacity in this expanded role.	Maui County
23a	Develop additional information, resources, incentives, and training to assist state and local governments to better understand, adopt, and enforce relevant codes, standards and best practices.	FEMA, in coordination with USFA
23b	Update and republish P-737 Home Builder's Guide to Construction in Wildfire Zones and P-754 Wildfire Hazard Mitigation Handbook for Public Facilities as appropriate based on the latest research to support compliance with the modern consensus-based codes and standards.	FEMA

2. Acronyms and Abbreviations

ADU	Accessory Dwelling Unit
AHJ	Authority Having Jurisdiction
BSDS	Building Science Disaster Support
CRRC	Community Risk Reduction Coordinator
CWPP	Community Wildfire Protection Plan
DLNR	Department of Land and Natural Resources
EOC	Emergency Operations Center
FEMA	Federal Emergency Management Agency
HI-EMA	Hawai'i Emergency Management Agency
HMM	Hazard Mitigation Methodology
HMP	Hazard Mitigation Plan
HWMO	Hawai'i Wildfire Management Organization
I-Codes	International Codes®
IBC	International Building Code®
ICC	International Code Council®
IECC	International Energy Conservation Code®
IRC	International Residential Code®
IWUIC	International Wildland Urban Interface Code
MAT	Mitigation Assessment Team
MEMA	Maui County Emergency Management Agency
NEC	National Electrical Code
NFPA	National Fire Protection Association
NIST	National Institute of Standards and Technology

NWS	National Weather Service
NWCG	National Wildfire Coordinating Group
SBCC	State Building Code Council
SFC	State Fire Council
STARR II	Strategic Alliance for Risk Reduction
UPC	Uniform Plumbing Code
USFA	U.S. Fire Administration
WUI	Wildland-Urban Interface

3. Event Description and Purpose of Study

3.1. Background

There are many terms that carry specific meaning in the context of wildfire which are important to understanding the contents of this report. Most of these definitions are based on the National Wildfire Coordinating Group's (NWCG's) online glossary³, other nationally recognized fire organizations and existing FEMA terminology.

- **Conflagration** – Defined by the National Fire Protection Association (NFPA) 101®, Life Safety Code Handbook as “a large destructive fire that can threaten human life, property, animal life, and health.”
- **Wildfire** – An unplanned, unwanted fire burning in a natural area.
- **Wildland** – A natural environment that has not been significantly modified by human activity.
- **Wildland-Urban Interface (WUI)** – Defined by the NWCG online glossary as “the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetation fuels.”

Wildfires are a natural part of many of Earth's wildland ecosystems. Fundamentally, three ingredients are necessary for fires to occur (also known as “the fire triangle”): oxygen, which starts and sustains combustion; heat, which raises the fuel temperature or simply heats fuel to its ignition point; and fuel, which sustains and carries flames. Reducing the likelihood of initial ignition (heat) and limiting the available fuel after ignition are known to be effective strategies for controlling fire behavior.

Wildfires, however, are complex and challenging. The nature of the wildfire problem is a product of natural and man-made ignition sources, vegetative fuels, topography, weather, and characteristics of the built environment (e.g., building typologies, urban fuel loads, density). Understanding how these factors interact, along with fire history, fire ecology, climatology, and human interactions with these various facets, is central to developing appropriate and effective mitigation strategies. Each year, only a small fraction of wildfires become large enough to produce significant property damage or casualties. A common misperception of the WUI is that it occurs only near forested areas; however, grasslands and shrublands can also be in the WUI. As environmental conditions continue to change the landscape and as human development continues to expand into vegetated areas near what has traditionally been deemed the WUI, the definition of “interface” may need to change.

Damaging fires can be attributed to a combination of environmental conditions favorable to wildfire, including limitations in adoption and/or implementation of WUI codes and standards, limited knowledge of wildfire hazards/risks, limited resources for retrofits, increasing construction in high

³ <https://www.nwcg.gov/publications/pms205>

wildfire areas, and availability of firefighting resources to effectively respond to fire incidents (especially during the incipient stages of fire development). It should be noted, however, that wildfire occurrence, damages and injuries are increasing, attributable to changes in land use as well as climate change. Three major factors contributing to wildfire occurrence are:

- **Weather** – the most variable element of the wildland fire environment. Important components of weather that influence wildfire behavior are temperature, relative humidity, precipitation, and wind. All these elements have the potential to enhance or slow wildfire spread and intensity.
- **Vegetation** – the primary fuel source for wildfires and, along with weather, a key factor in determining the risk of wildfire hazards. In the WUI, both vegetation and urban fuels present a hazard. Locally, the abundance of non-native trees and shrubs used as landscaping vegetation and screening as well as unmaintained fallow agricultural lands have a negative effect on the wildland fire environment.
- **Urban Fuels** – urban sources of fuel such as combustible structures (e.g., houses, businesses, industrial facilities, outbuildings), combustible non-structural features (e.g., decks, fences, ornamental landscaping), vehicles, fuel tanks, etc., can contribute to the fire environment and significantly influence the fire behavior.
- **Topography** – the configuration of the earth’s surface and the most stable of the elements in the fire environment. Topography significantly impacts wildfire behavior as it influences local winds by sheltering areas from prevailing winds or channeling winds through prominent canyons and drainages. Factors of topography that affect fire behavior include slope, aspect, terrain features, and elevation, with the steepness of slope being the most influential.

Multi-Hazard Wildfire Interactions

Wildfire behavior is largely influenced by fuel, weather, and topography but other natural hazards can also influence wildfire behavior and severity. For example, lightning is a common ignition source for wildfire, especially in conditions of low relative humidity and abundant dry fuels. Extreme heat can work in tandem with drought to increase the volume of dry fuel available for ignition. High winds can increase the speed at which wildfires travel, help spread embers to ignite new fuel sources, and hinder fire suppression efforts. For the purposes of this report, wildfires that occur in combination with other natural hazards are considered “multi-hazard wildfire events.”

In turn, wildfires can influence the severity and behavior of other natural hazards. In post-fire conditions, the significant loss of vegetative cover and erosion control can increase the risk of secondary natural hazards, such as floods, landslides, and debris-flows in and downslope of burned areas. These post-wildfire hazards often have cascading effects on the local natural and built environment, including incursions of invasive species and loss of watershed function, as well as impacts to critical infrastructure, buildings, and people.

3.2. Maui Wildfire History and Risk

Maui's land use evolution is an important factor contributing to Maui's current wildfire risk levels. The *County of Maui Hazard Mitigation Plan Update* (2020) provides a helpful historical and cultural overview that illustrates the changing land uses in rural and developed areas of the island throughout the centuries.

The first inhabitants of the islands that make up Maui County arrived from the southern islands of Polynesia, approximately 800 to 1,000 years ago. These original inhabitants formed societies across the islands, but detailed prehistoric information is limited. European settlers arrived in the late 1700s. From that point onward, the islands of Maui County saw development that was similar but distinctive for each island. The towns of Hāna, Makawao, Wailuku, and Lahaina housed most of the native and arriving population in the early years after European contact.

In 1848, Kamehameha III proclaimed the Great Māhele, or land division, establishing private ownership of lands in Hawai'i. Sugar planting and refining throughout Hawai'i was established between 1836 and 1861. In 1876, the Hawaiian Reciprocity Treaty with the United States allowed for duty-free admission of Hawaiian sugar to the U.S., resulting in a substantial increase of profits for island growers. With the massive growth of the sugar industry, the need for labor grew, resulting in the importation of workers from other countries. The pineapple industry began on Maui in 1890. By 1930, over 28 percent of Maui's cultivated lands were dedicated to pineapple.

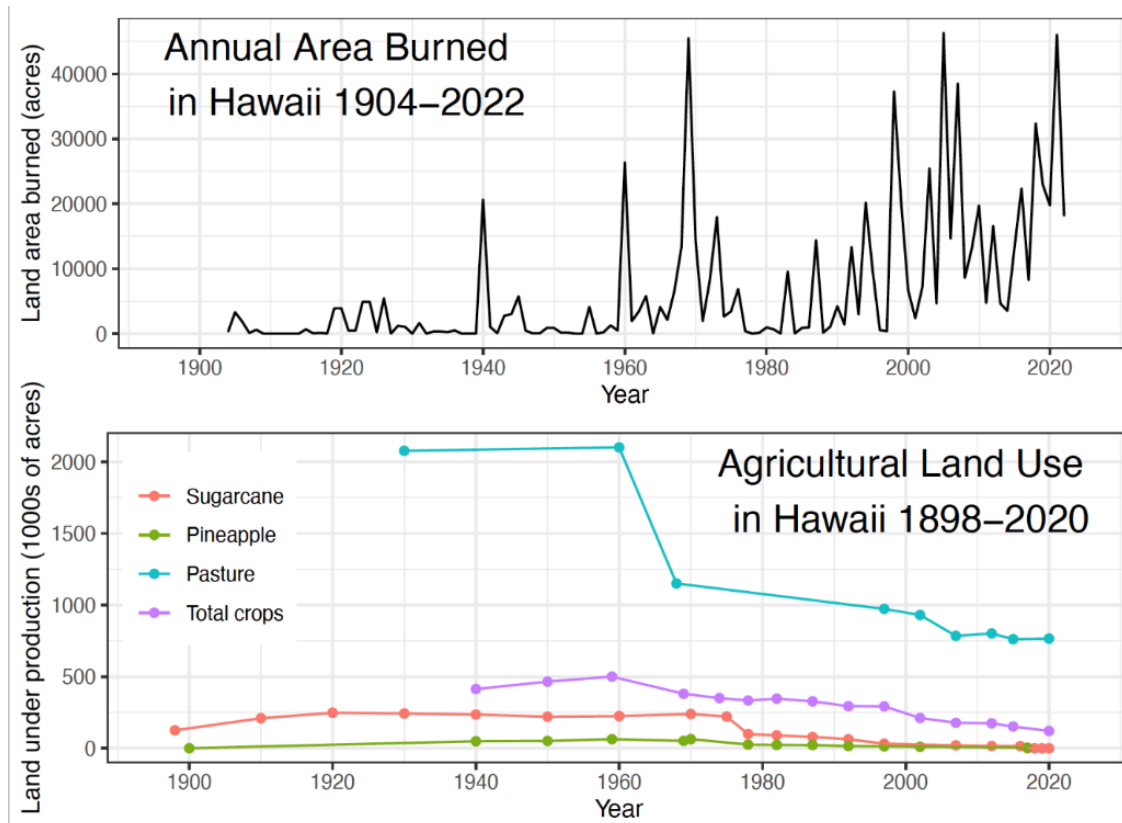
With a decline of the sugar and pineapple industries after World War II and burgeoning economies on Oahu and the U.S. mainland, Maui lost 24 percent of its population between 1940 and 1960. In 1959, the Report of Land Use for the Island of Maui proposed that, to reverse the trend, Maui could work to capture a greater share of Hawai'i's tourist industry. The need for visitor facilities gave birth to the concept of the resort destination area, and in 1961 Kā'anapali became the first of its kind in Hawai'i.

As Maui's population grew, settlement patterns expanded rapidly, spreading out from existing population centers. Central, South, and West Maui have grown significantly in the subsequent decades with the birth of new subdivisions and visitor accommodations. Maui's rapidly expanding population eventually spread to the Upcountry area of the island, which experienced significant growth in the residential market beginning in the 1970s.⁴

When agricultural operations relocated or left Maui between the 1970s to 1990s, the land became fallow, covered with extremely flammable buffelgrass and guinea grass (Figure 1). These changes

⁴ <https://www.mauicounty.gov/DocumentCenter/View/125977/2020-Maui-County-Hazard-Mitigation-Plan-Final>

were a contributing factor for increased wildfire risk, occurrence, and acres burned on Maui in recent decades. Additionally, as residential areas developed on Maui, urban and suburban fuels increased.



Source: Pacific Fire Exchange⁵

Figure 1. Hawai'i Fire History and Agricultural Decline

Maui's topographic features and land use history, coupled with extended drought, make the island more susceptible to wildfires. Weather conditions, especially unique island wind patterns due to Maui's topography, create challenges for monitoring and suppression of wildfire.

The *County of Maui Hazard Mitigation Plan Update (2020)* outlined historical wildfires on Maui between 1999 and 2019. During this 20-year period, 80 fires occurred within Maui County, including 28 in West Maui. Figure 2 illustrates the locations of historic wildfire perimeters during this period.

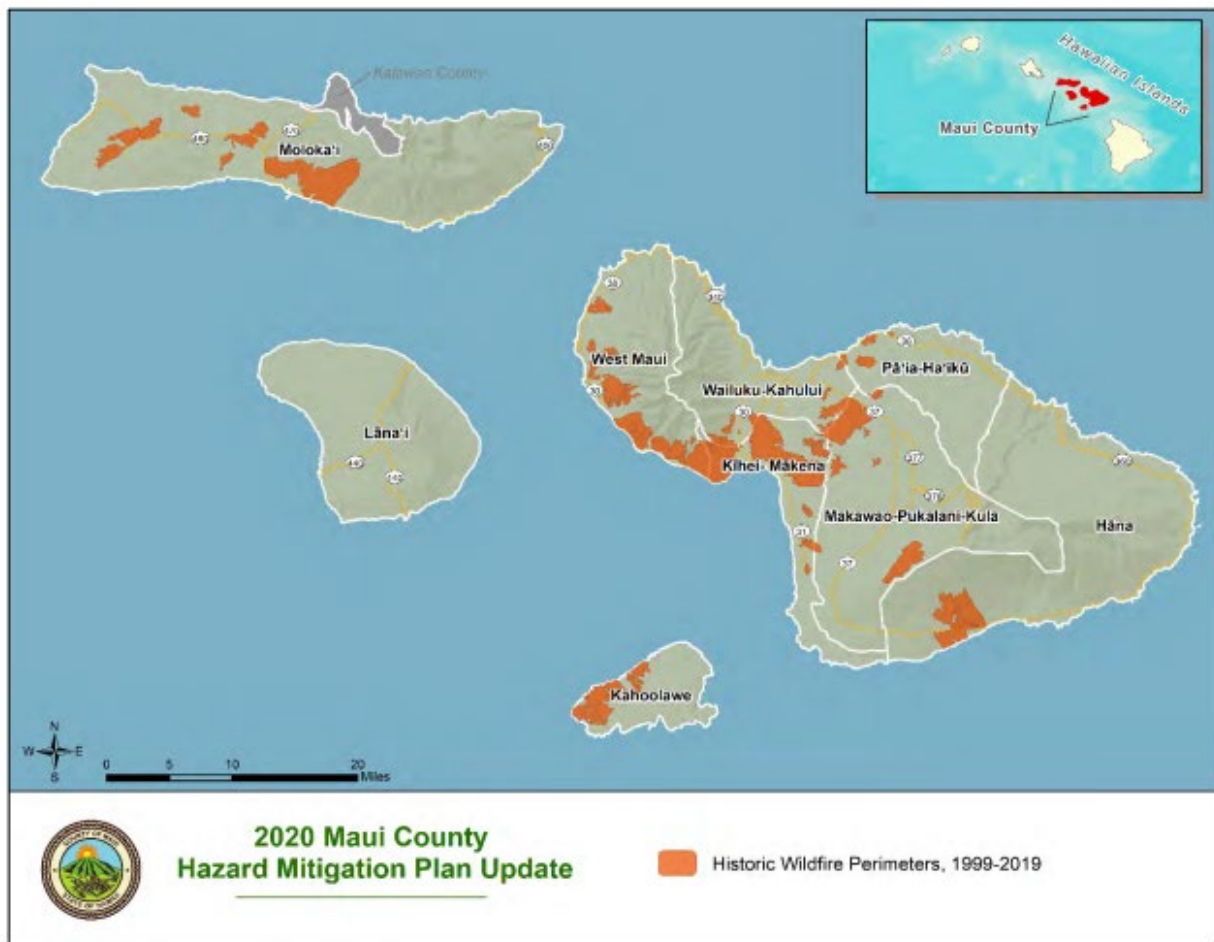
The *Western Maui Community Wildfire Protection Plan (2014)* noted that most of the Lahaina area was rated as extreme for overall wildfire risk.⁶ The *Upcountry Maui Community Wildfire Protection Plan (2016)* mapped several areas in the Upcountry region with risk ratings varying from medium to high risk.⁷ The *County of Maui Hazard Mitigation Plan Update (2020)* also rated wildfire risk across the county, labeling the West Maui area at high risk and the Upcountry area as low to medium risk.

⁵ <https://pacificfireexchange.org/resource/fire-data/>

⁶ <https://www.hwmo.org/resource-library/western-maui-cwpp-2014>

⁷ <https://www.hwmo.org/resource-library/upcountry-maui-cwpp-2016>

This Plan also noted, “Maui County has experienced increased drought conditions over the last 30 years and is expected to experience increases in drought frequency and intensity as climate change brings warmer temperatures, decreased streamflows, and decreased precipitation. Drought conditions greatly increase the risk of wildfires. Further, as changing climate conditions make native species more vulnerable to competition from non-native species; continued increases in fire-prone non-native species could increase wildfire frequency and intensity in future.”

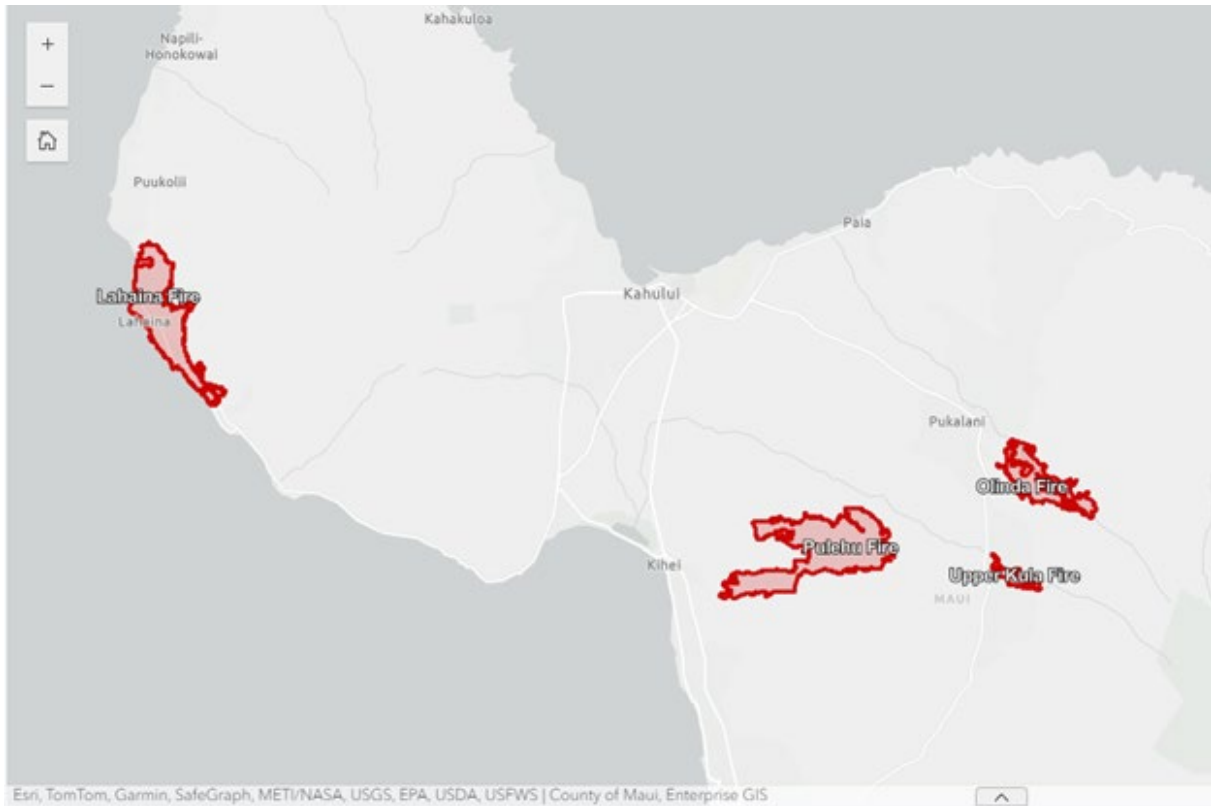


Source: 2020 County of Maui Hazard Mitigation Plan Update

Figure 2. Wildfires in Maui County, 1999-2019

3.3. August 2023 Event Overview

Throughout the day on August 8, 2023, four major fires erupted on the island of Maui: the Lahaina Fire, the Olinda Fire, the Upper Kula Fire, and the Pulehu Fire (see Figure 3). On August 9, 2023, the state government of Hawaiʻi issued a state of emergency for the entirety of the state followed by President Biden’s issuance of a federal major disaster declaration on August 10, 2023. The fires destroyed 2,173 structures across Maui. The MAT specifically focused field data collection and analysis on the areas affected by the Lahaina and Upper Kula fires.



Source: mauirecovers.org

Figure 3. August 2023 Wildfire Extent Locations on Maui

The Lahaina fire burned 2,170 acres, including much of the downtown Lahaina Historic District, a designated National Historic Landmark. Lahaina was the capital of the Kingdom of Hawai'i for 35 years, and featured many important historic and cultural landmarks. The 3.4-square-mile area lost to the fire served as its commercial, residential, and cultural center. Ninety-six percent of burned structures were residential.

For more detailed information about the timeline and fire suppression efforts for the August 2023 fires on Maui, refer to the *Lahaina Fire Comprehensive Timeline Report* (Fire Safety Research Institute, 2024)⁸ and the *2023-Wildfire-After-Action-Report* (County of Maui Department of Fire and Public Safety, 2023).⁹

⁸ <https://ag.hawaii.gov/wp-content/uploads/2024/04/FSRI-Lahaina-Fire-Timeline-Phase-1-Report-Press-Conference-240417.pdf>

⁹ <https://www.mauicounty.gov/2023-Wildfire-After-Action-Report>

Summary of the Lahaina Fire -- Excerpt from Lahaina Fire Comprehensive Timeline Report

In the days preceding August 8, 2023, Maui found itself in the crosshairs of potential disaster as Hurricane Dora approached from the south, passing approximately 500 miles offshore, it created a pressure gradient that meteorologists warned would bring damaging winds, low humidity, and an elevated risk of wildfires to the island. Recognizing the impending threat, several organizations including the National Weather Service (NWS), the Maui County Department of Fire and Public Safety, the Maui County Emergency Management Agency (MEMA), and the Hawai'i Emergency Management Agency (HI-EMA) issued numerous alerts about the possibility of high winds and extreme fire danger on August 8, 2023. In anticipation of hazardous conditions, MEMA partially activated the Emergency Operations Center (EOC) on the evening of August 7, 2023.

During the early morning of August 8, 2023, the predicted high winds arrived across central and western Maui. Trees toppled, utility poles fell, and power lines were downed, blocking critical roadways and making evacuation challenging.

Enabled by the dry fuels, sustained winds, and the dense urban landscape, a fire that began near Lahaina Intermediate School spread rapidly, overwhelming initial efforts to contain it. The origin of the Lahaina fire can be traced back to 06:35 (6:35 a.m.), when a fast-moving brush fire, later dubbed the "Lahaina AM fire" ignited near Ku'ialua Street and Ho'okahua Place. Intense winds, rocky terrain, a ravine, and utility poles with overhead electrical wires in the fire area would also complicate fire suppression efforts. Firefighters responded to the scene, employing private bulldozers and water tankers to construct perimeter lines and soak the fire area with water. They later reported that the fire was extinguished and returned to quarters at 14:17 (2:17 p.m.).

At 14:55 (2:55 p.m.) the "Lahaina PM fire" or "Ku'ialui fire" was reported at the same location as the earlier fire. This time, fueled by sustained high winds, the fire spread rapidly. Embers carried by the wind ignited unburned grassland areas downwind from the initial fire location and continued to spread, reaching homes and other structures. From there, the fire spread through direct flame contact, radiant heating, and flying embers. The high winds, funneling the fire into Lahaina Town and towards the Pacific Ocean, created a conflagration that overwhelmed the town's limited evacuation routes, some of which were blocked by downed utility poles and electrical lines. At times, people were forced to use the ocean for safe refuge.

Hawai'i Route 3000 (Lahaina Bypass), a primary evacuation route, was among the roadways impacted. Smoke, pushed low to the ground by the wind, made visibility difficult and soon overwhelmed the efforts of police and firefighters to evacuate the area. Many residents found themselves trapped, unable to escape the advancing flames and thick blinding smoke. On Lahainaluna Road, vehicles became stranded and civilians were trapped by the rapidly encroaching fire. A similar scenario played out north on Kahua Street, where the fire's path of destruction would claim numerous lives. Responders and residents created several alternate evacuation routes by opening locked gates and clearing access to dirt roads in the area.

As the fire was moving quickly and roadways remained blocked, several crews of firefighters became trapped near Pauoa Street by the advancing fire and were overwhelmed by the flames. Fire apparatus became entangled by power lines or were unable to evacuate the area due to obstructions—and had to be abandoned, further hampering efforts to combat the growing blaze. One (1) firefighter rescued seven (7) colleagues, including an unconscious officer who required urgent medical attention. Numerous firefighters administered emergency care to the officer.

No longer just a wildfire, the fire had also become an urban conflagration, consuming more buildings than the firefighters were able to protect. Burning structures, vehicles, and vegetation all produced embers and became sources of radiant heat and flames. The fire quickly spread across Honoapi'ilani Highway (Hwy-30) and all the way to the ocean's edge.

As homes and other buildings burned, the water pipes failed and water flowed unrestricted. Pressure in the water mains dropped to the point that there was no water coming from fire hydrants in some parts of Lahaina.

In the aftermath of this catastrophe, questions linger about the adequacy of warning systems, evacuation planning, and preparedness of communities for such extreme fire events. The tragedy serves as a sobering reminder that the threat of grassland fires, wildfires, and wildfire-initiated urban conflagrations, fueled by climate change and urban encroachment into wildland areas, is a reality that must be addressed with the utmost urgency and diligence—not just in Hawai'i, but around the globe.

While the physical scars of this disaster will take time to heal, the emotional toll on the people of Lahaina and the wider Maui community will be felt for generations to come. As the island and nation mourn the lives lost, the focus must also turn to learning from this tragedy, strengthening emergency response capabilities, and building more resilient communities that can withstand the increasing challenges posed by a changing climate and the ever-present threat of wildfires.

3.4. Purpose of the Study

Following the August 2023 fires, FEMA's BSFS Program, in conjunction with FEMA Region 9 and supported by STARR II, deployed a MAT to assess building performance and support resiliency to

inform recovery. In September 2023, a pre-MAT was deployed to Maui to document damages and potential building successes in the Lahaina and Upper Kula Fires. The pre-MAT also assembled a list of key observations for further exploration during the full MAT deployment which would define the study parameters. In June 2024, the MAT deployed to Maui and worked with local agencies to assess damage to residential buildings. The MAT also studied the adequacy of current building codes and other relevant regulations based on observed post-disaster damages and undamaged properties. Upon conclusion of the field investigation, the MAT analyzed the field data, as well as other damage reports and studies by Federal, State and County government agencies. Finally, based on the analysis of data and reports, the MAT prepared conclusions and developed recommendations which are provided in Section 4 of this report and summarized in Table 1.

The purpose of the MAT study was to develop guidance and recommendations that can aid local officials and property owners in their efforts to recover quickly and rebuild effectively to help mitigate future damage and losses from wildfires. Identifying building vulnerabilities and effective mitigation strategies to address wildfire can help focus recovery efforts to areas of most benefit. The recommendations resulting from this MAT summary report are intended to help the State of Hawai'i and Maui County outline a path forward for reconstruction that promotes resilient construction, repair, and alteration of buildings and the surrounding sites. The state and county also can use these recommendations to help guide and better prepare design professionals, contractors, and property owners for future hazard events through clear and wide-reaching communication.

4. Observations, Conclusions, and Recommendations

A small group of experts visited Maui in September 2023 as the Pre-MAT to determine a scope of study. The MAT visited Maui in June 2024 and made numerous observations related to codes, standards, local guidance documents and permitting functions. The conclusions and recommendations presented in this report are based on the MAT's observations in the areas studied; evaluation of relevant codes, standards, and regulations; and meetings with state and local officials and other interested parties. The recommendations are intended to assist the governments of the State of Hawai'i and Maui County in establishing processes and requirements that continue to support recovery and help reduce future damage and impacts from not only wildfire but all hazards that pose risk to the islands.

The recommendations are presented as guidance to the State, County and those who are involved with the design, construction, and maintenance of the built environment across the Hawai'ian Islands. Codes continue to evolve and meeting the most current building code is not a guarantee of building survival in a severe event. Other factors, such as defensible space, accessory structures, vehicle location, and water supply can impact building performance during a wildfire. The State of Hawai'i, Maui County and the entities involved in reconstruction and mitigation efforts will need to consider these recommendations in conjunction with their existing priorities and resources when determining how they can or will be implemented.

Many of the conclusions and recommendations center on encouraging the State and County to assess their code development and enforcement and implement a robust code and standards program that will withstand the test of time and the forces of nature. Additionally, the MAT recognizes the complex land use issues on Maui and the need for affordable housing. These recommendations attempt to provide a balanced approach to provide resilience while acknowledging the complex issues associated with Maui residential construction.

4.1. Codes and Standards

One of the most effective ways to safeguard Hawai'i against natural disasters is to adopt and enforce hazard-resistant building codes and referenced standards, and to follow the recommendations put forth in both Maui MAT summary reports. Modern building codes address many concerns, including public health, safety, and resiliency. As Maui recovers from the August 2023 wildfires, the rebuilding of damaged and vulnerable buildings in accordance with hazard-resistant building codes offers one of the greatest opportunities for long-term resilience. Hawai'i and Maui County can help break the cycle of destruction from multiple hazards by continually adopting and implementing modern, hazard-resistant building codes.

It should be noted that the State of Hawai'i and Maui County adopt codes at differing times and may have local amendments specific to each. Therefore, the process and description for both the State and County are detailed below. Additionally, while the State of Hawai'i and Maui County are at risk for multiple hazards, the following sections address mainly the wildfire risk and do not fully discuss the codes and standards related to other potential hazards. These will also need to be considered.

4.1.1. STATE CODE ADOPTION

The State of Hawai'i adopts a core set of building codes and standards through the State Building Code Council (SBCC). The purpose of the SBCC is to “establish a state building code through the timely adoption of national building codes and would include the latest fire code as adopted by the State Fire Council (SFC), the latest edition of the International Building Code (IBC), the latest edition of the Uniform Plumbing Code (UPC), and Hawai'i design standards to implement Act 5, Special Session Laws, 2005 as applicable to emergency shelters and essential government facilities.” The council is comprised of 12 voting members and one non-voting member.

The International Code Council (ICC) publishes updated editions of building codes every three years. The group of coordinated building codes is collectively referred to as the “I-Codes.” Upon publication of the updated I-Codes by the ICC, the SBCC is provided two years to review and amend the building codes and reference standards to form the updated Hawai'i State Building Codes. While counties may also amend the Hawai'i State Building Code, state construction must comply with the minimum performance requirements of the state building codes within one year of their adoption. State buildings are exempt from any county codes that are not based on the current Hawai'i State Building Code and any county code amendments that are inconsistent with the minimum performance objectives of the state building codes.

Per Hawai'i Revised Statutes § 107-25, the Hawai'i State Building Codes are required to be based on the state fire code adopted by the state fire council as well as the UPC, IBC, International Residential Code (IRC) and the National Electrical Code (NEC).¹⁰ Additional design standards include those for emergency shelters built to comply with hurricane-resistant criteria and for essential government facilities. Per Hawai'i Revised Statutes § 107-26¹¹, the SBCC shall not adopt provisions that relate to administrative, permitting, or enforcement procedures of each county.

Per the Hawai'i Department of Accounting and General Services website, accessed October 2024: “Due to the suspension of the authority and duties of the State Building Code Council (SBCC) per the *Governor's Proclamations Relating to Affordable Housing*, no code amendments have been adopted by the SBCC during the term of these proclamations. However, updates to the following building codes, without any amendments from the SBCC, have automatically become part of the Hawai'i State Building Codes per HRS § 107-24(c).” Due to the suspension of the SBCC's duties, the 2021 IBC and 2021 IRC, both published by ICC on October 23, 2020 and on January 29, 2021 respectively, automatically became part of the State Building Codes without amendments two years after each code's publication date by operation of law per Hawai'i Revised Statutes § 107-24(c). The State of Hawai'i Department of Accounting and General Services website shows the adoption of the 2021 I-codes without amendment as the code being enforced for state buildings. However, based on the language provided in the December 2024 proclamation, the SBCC is suspended of their duties which implies that no additional amendments will be made to the building code during this

¹⁰ <https://casetext.com/statute/hawaii-revised-statutes/division-1-government/title-9-public-property-purchasing-and-contracting/chapter-107-public-improvements/part-ii-state-building-code-and-design-standards/section-107-25-hawaii-state-building-codes-requirements>

¹¹ https://www.capitol.hawaii.gov/hrscurrent/Vol02_Ch0046-0115/HRS0107/HRS_0107-0026.htm

suspension. While the 2021 I-codes have been adopted automatically by the state without revision, the governor has suspended HRS § 107-31 which requires all state building construction to comply with the state building code. Therefore, while the state has automatically adopted the 2021 I-codes, the codes are not being enforced. It is unclear from the language of the proclamation if state building construction is required to comply with a previous version of the state building code or if it can be designed and constructed without adherence to a building code.

Additionally, the proclamation suspended the requirement for counties to adopt the Hawai'i State Building Code every two years. While Maui has adopted the 2018 Hawai'i State Building Codes with amendments, the requirement to update the building codes to the 2021 I-codes with state and/or county amendments required in December 2024 has been paused.

Per the Hawai'i Department of Accounting and General Services website, accessed October 2024: "Due to the suspension of the authority and duties of the State Building Code Council (SBCC) per the *Governor's Proclamations Relating to Affordable Housing*, no code amendments have been adopted by the SBCC during the term of these proclamations. However, updates to the following building codes, without any amendments from the SBCC, have automatically become part of the Hawai'i State Building Codes per HRS § 107-24(c)."

At the time of this publication, local news reports indicate that the governor plans to "fast-track" adoption of building codes and bring the state into compliance with the latest nationally recognized building codes and standards by hiring two technical advisors to support SBCC adoption of code revisions. The code revisions would be pre-drafted with the "hope to streamline the code adoption process for the counties and the State Building Code Council – when it is reinstated – so that they can better focus on their own particular priorities and building code requirements."¹²

On July 17, 2023, Hawai'i's Governor issued the first Proclamation Relating to Housing¹³, the Governor addressed several points including that a "critical barrier to speedy development of housing is the lengthy, cumbersome and antiquated regulatory process, which leads to Hawai'i having the highest level of regulatory restrictions to development in the United States." The proclamation was amended several times with the latest version (at the time of this publication) being published in December 2024. The proclamation can be updated at any time and must be re-signed every 60 days by the Governor. The proclamation includes details which are intended, in part, to expedite construction, repair, renovation, and occupancy of housing intended to provide emergency relief but the proclamation does not apply to the areas affected by the Lahaina wildfire. More recent versions of the proclamation¹⁴ addressed specifics related to building codes including amendments of building codes, duties of the SBCC and the design of state buildings. The intent and implications of these proclamations remain unclear and confusing—it is difficult to understand how the proclamation will impact these items long term.

¹² <https://www.usnews.com/news/best-states/hawaii/articles/2024-11-20/safer-buildings-vs-more-housing-how-new-building-codes-may-impact-hawaii>

¹³ <https://hale.hawaii.gov/emergency-proclamation/>

¹⁴ https://governor.hawaii.gov/wp-content/uploads/2024/12/2412013_Tenth-Proclamation-Relating-to-Affordable-Housing.pdf

4.1.2. MAUI COUNTY BUILDING AND RESIDENTIAL CODE AMENDMENTS

While the state utilizes the SBCC to amend and adopt the state building codes, Maui County may choose to amend, adopt, or update the Hawai'i State Building Code and the Hawai'i State Residential Code without approval of the SBCC.¹⁵ While counties are required by the state to have a minimum set of codes, they are not required to maintain the hazard resistant provisions in the state building code or the associated International Codes (I-Codes). Therefore, Maui County and other Hawaiian counties may choose to weaken or strengthen the building codes through addition or deletion of hazard-resistant provisions.

The counties are provided two years from the time of state level adoption of the building code to either adopt the state's versions of the building codes or provide county-specific amendments. If a county does not amend the state building code within the two-year timeframe, the state building code becomes applicable as an interim county building code until such amendments are made. Therefore, the two years between the adoption of the I-codes by the state and the additional two years from state adoption to county adoption, results in a potential four-year delay between the publication of a new I-code and implementation at the county level. In practice, the time from publication of the latest version of the I-Codes to adoption by the counties has gone beyond four years. The deadline for Maui County to adopt the 2021 Hawai'i State Building Code (based on the 2018 IBC) with local amendments was April 20, 2023, two years after the SBCC adopted it on April 20, 2021. The deadline for Maui County to adopt the 2021 Hawai'i State Residential Code (based on the 2018 IRC) with local amendments was November 17, 2022, two years after the SBCC adopted it on November 17, 2020.

At the time of the fire, Maui County was still enforcing the 2006 IRC and IBC with county-specific amendments. This code was in place until April of 2023 when Maui County adopted the 2018 IBC with state and county amendments and the 2018 IRC with state but without county amendments, with enforcement beginning October 28, 2023. Due to the lack of amendments by the county for the residential code as of January 2024, the code adopted and enforced in Maui County reverts to the 2018 IRC with Hawai'i state amendments.

Due to the lack of location-specific amendments for Maui County and adoption of the 2021 Hawai'i State Residential Code (based on the 2018 IRC) without change, residential design requirements can be confusing. For example, the Maui County Residential Code historically has amended the separation distances between certain structures which would be reduce wildfire risk. However, the current unamended code reverts to a reduced separation of buildings, which vary based on whether sprinklers are present, which may increase the likelihood of fire spread in dense neighborhoods.

There is inconsistency in the documentation of code adoption and enforcement in Maui County. Based on the language in the County of Maui, Hawai'i – Code of Ordinances, Chapter 16.08A, Version August 9, 2024, the following is provided: "Part I, Part II, and Part III (Chapters 1–10) of the "International Residential Code, 2006 Edition", herein referred to as the International Residential

¹⁵ https://www.capitol.hawaii.gov/hrscurrent/Vol02_Ch0046-0115/HRS0107/HRS_0107-0028.htm

Code. (Ord. No. 3929, § 3, 2012)”. However, the Maui County Government webpage under the Building Plans Review Section¹⁶ lists the 2018 IRC with state amendments (and with county amendments to be determined), as the code which is enforced. Therefore, the County Code of Maui indicates that the 2006 IRC is still enforced while other county sources indicate adoption of a more recent code. For this analysis and in conjunction with the MAT’s interviews with those knowledgeable of the County building code, it has been determined that the Maui County government website has correct information.

Since 2023, Maui County Code contains an emergency permits section (Maui County Code 16.25.105.2.2 - Ordinance No. 5629) that allows repair and reconstruction of structures in disaster affected areas using a less stringent, more streamlined permitting process for a four-year period beginning from the day the governor proclaims the state of disaster or emergency; the period may be extended by a mayoral emergency proclamation. For reconstruction under this section, owners and design professionals may resubmit previously approved construction plans. This means that structures damaged during the 2023 wildfires which were built within the four years prior to the fires may resubmit their buildings plans for expedited approval. These buildings would have been designed to the code in place during the initial design period. In many cases, this could be the Maui County Building and Residential Code based on the 2006 IBC and IRC, respectively.

Accessory Dwellings

Accessory dwelling units (ADUs), known locally as ‘ohanas, are considered an important means of expanding the affordable housing stock in Maui County. An ADU is defined in the county zoning code as “an attached or detached dwelling unit which is incidental or subordinate to the main or principal dwelling on a lot.” These dwellings are codified under the current Maui County Code and have been part of the Maui County Code since Ordinance Number 1269¹⁷ was adopted in 1982.

Per the scope of the IRC, the code applies to “detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress and their accessory structures not more than three stories above grade plane in height.” While the current Maui Residential Code does not specifically address ADUs in its provisions for residential homes, the state amendments to the 2018 IRC address them in Appendix Q regulating tiny homes. The IRC defines a “Tiny House” as a dwelling that is 500 square feet or less excluding lofts. The appendix provides provisions on ceiling height, lofts and emergency escape and rescue operations. Other aspects of the design and construction, including fire separation and fire resistance, are regulated in the main chapters of the code.

¹⁶ <https://www.mauicounty.gov/1308/Building-Plans-Review-Section>

¹⁷ <https://www.mauicounty.gov/DocumentCenter/View/17327/Ord-1269#:~:text=read%20as%20follows%3A-%2219.04.,use%20as%20a%20separate%20dwelling.>

Design and construction requirements for ADUs, such as those relating to number and type of units, are specified in Maui County Code Chapter 19.35.¹⁸ For lots, or property parcels, less than 7,500 square feet, the maximum gross floor area of an ADU is 500 square feet. For lots greater than 87,120 square feet, the maximum gross floor area of the ADUs on property should not exceed 1,200 square feet. Table 2 details the size and number of ADUs allowed per property.

Table 2. ADU Size and Number Limitations

Lot Size (square feet)	Maximum Cumulative Floor Area (square ft)	ADUs allowed per lot
7,499	500	1
7,500 – 9,999	600	2
10,000 – 21,779	720	2
21,780 – 43,559	840	2
43,560 – 87,119	960	2
87,120 or more	1,200	2

Residents of Maui are encouraged to build ADUs on their property through the “‘Ohana Assistance Program.” To support long term housing opportunities for Maui full time residents, the program provides grants up to \$100,000 to property owners to build ADUs on their properties. The ADUs are allowed to be rented at a price equivalent to the Federal Affordability Guidelines for at least 10 years.

A state bill relating to urban development was signed into law (Act 39, Session Laws of Hawai‘i 2024) by Governor Josh Green on May 28, 2024 (2024 Senate Bill 3202). This law mandates that, by 2026, counties must adopt or amend their current ordinance to allow for at least two accessory dwellings on all residential zone lots. The law prohibits private covenants for residentially zoned lots from limiting the number of accessory dwellings.

While not adopted by the State of Hawai‘i or Maui County, the 2024 IRC addresses ADUs in Appendix BC, Accessory Dwelling Units. The appendix limits ADUs to one per property and exempts the requirements for fire resistance of the walls and floor if the ADU is attached to the main structure and shares in the interconnection of smoke alarms and carbon monoxide alarms. This reduction in fire resistance makes ADUs more susceptible to ignition and fire spread. Per the scope of IRC Appendix BB on Tiny Homes, this appendix applies to tiny houses used as single dwelling units. The tiny homes are required to comply with the IRC unless specified in the appendix. Per the scope of Appendix BC, Accessory Dwelling Units, the appendix applies to ADUs proposed for existing residential construction and requires that they be constructed in accordance with the appendix and

¹⁸https://library.municode.com/hi/county_of_maui/codes/code_of_ordinances?nodeld=TIT19ZO_ARTIICOZOPR_CH19.35_ACDW_19.35.05ONUACDWPELO

other requirements in the code and prohibits the existing building together with the ADUs from exceeding the scope limitation in Section R101.2. The potential overlap and lack of clarity between an ADU and a tiny home may cause confusion between designers as to which portion of the code applies. Additionally, fire doesn't distinguish between a tiny home and an ADU, therefore, equivalent fire-resistant requirements should be provided between the two building types.

4.1.3. FIRE CODE

Hawai'i and Maui County have a history of adopting and enforcing fire codes. The Hawai'i SFC is an administrative agency and recognized as Hawai'i's equivalent of the State Fire Marshal's Office. The SFC includes each of the "four county Fire Chiefs and the Fire Chief of the Hawai'i State Aircraft Rescue Fire Fighting unit, a representative of the Division of Forestry and Wildlife of the Department of Land and Natural Resources (Gov. Act 142), an[d] administrative support staff."¹⁹ The mission of the SFC "is to develop and support the fire service emergency management network for the protection of life, property, and the environment for the State." The SFC is responsible for the adoption and amendment of the State Fire Code and supports the efforts of the SBCC in a collaborative approach to the adoption and development of a comprehensive building code for the state.²⁰

In 2020, the SFC was successful in facilitating passage of Senate Bill 2130, SD 1, HD 1 which enabled the State Fire Code to bypass the Hawai'i Administrative Rules process for adoption. The bypass of the Hawai'i Administrative Rules means that the SFC was not impacted by the suspension of the authority and duties of the SBCC per the Governor's Proclamations Relating to Affordable Housing. This allows for a significantly simpler process for amendment and adoption of the State Fire Code. The State of Hawai'i adopted the latest State Fire Code (NFPA 1, Fire Code, 2021 Edition with amendments), which became part of the Hawai'i State Building Code and took effect in January 2023.

The Maui County Fire Prevention Bureau is tasked with abating fire and life safety hazards to prevent injury and property damage,²¹ and is responsible for code enforcement, fire education, fire investigation, and plans review. The code enforcement section "focuses on performing inspections, investigating complaints, and answering questions from the public" regarding the fire codes and regulations. The plans reviewing section "reviews building plans during the permit process and conducts preliminary site assessments to ensure that fire safety standards are being met prior to construction."²²

¹⁹ <https://labor.hawaii.gov/sfc/>

²⁰ https://www.capitol.hawaii.gov/hrscurrent/Vol02_Ch0046-0115/HRS0107/HRS_0107-0026.htm

²¹ <https://www.mauicounty.gov/1465/Fire-Prevention-Bureau>

²² https://www.capitol.hawaii.gov/hrscurrent/Vol02_Ch0046-0115/HRS0107/HRS_0107-0028.htm

Maui County Fire Code

Maui County Ordinance No. 5451, effective October 2022, adopted the Hawai'i State Fire Code, which is based on NFPA 1, Fire Code, 2018 Edition²³, with county-specific amendments. Local amendments of note include requirements for brush compliance which is the clearance of flammable vegetation. Building owners or those who lease a property which is adjacent to hazardous fire areas or required by an authority having jurisdiction (AHJ), are required to maintain a firebreak from areas within 30 feet of the structure. Property owners may be required to maintain an area free of combustible vegetation for up to 100 feet from a structure if extra hazardous conditions exist. Portions of trees within ten feet of a chimney must be removed, and the roof structure is required to be clear of combustible vegetation and debris.

Chapter 17 of NFPA 1 addresses the WUI and remains unamended by the state and Maui County. The section applies to areas that the local jurisdiction has declared an area a WUI as determined by an assessment tool. The code directs the AHJ to perform a wildland fire hazard assessment of each structure in this ignition zone (a defined area surrounding a home in a WUI). The wildland fire hazard assessment should include, at a minimum, the identification of the wildland fire hazards in the ignition zone, determination of mitigation measures for vegetation or other combustibles, establishment of priorities relative to the risks from wildfire, and evaluation of the site for conflagration hazards associated with the property. While Maui County has adopted NFPA 1 and has not amended Chapter 17, it does not appear that areas associated with a WUI have been assessed. Additional details of Chapter 17 include separation distance of accessory structures to the main structure by at least 30 feet or meeting Chapter 4 of NFPA 1144.

4.1.4. WUI CODES

The International Wildland-Urban Interface Code (IWUIC), first published in 2003, establishes standards for protection of structures most at risk of wildfire. It is currently adopted by four states and an additional 200 jurisdictions. Other states, such as California, have adopted their own requirements to address structures in the WUI. The wildland-urban interface area is defined as the geographical area where human development meets or intermingles with wildland or vegetative fuels. These codes typically provide requirements on defensible space, ignition-resistant materials and practices, fire separation, and water supply. As of January 2025, the State of Hawai'i and Maui County had not adopted WUI codes or provisions.

In December 2024, the ICC released the first draft of ICC 605, Standard for Residential Construction in Regions with Wildfire Hazard. While not finalized, this standard will specify advanced methodologies for wildfire-resistant design and construction for new and existing wood-framed, steel-framed, concrete or masonry structures in wildfire-prone areas. It will provide detailed guidelines for walls, floors, roofs, foundations, windows, doors and other construction components. Additionally, it

²³ https://library.municode.com/HI/county_of_mau/ordinances/code_of_ordinances?nodeId=1189291

will offer a methodology for identifying, assessing and retrofitting existing homes to protect against wildfire hazards.

Additional WUI codes and standards include NFPA 1140, The National Fire Protection Association Standard for Wildland Fire Protection. NFPA 1140 has not been adopted by the State of Hawai'i or Maui County.

Wildfire Regulations

Hawai'i is experiencing a rapidly changing environment due to climate and land use changes which may increase the intensity, spread and probability of another wildfire event like the August 2024 Maui wildfire. Yet, the State of Hawai'i has limited wildfire regulations, codes, standards or ordinances related to the prevention and mitigation of wildfires. Also, the Maui County Residential and Building Code lacks specific language related to WUI. Below is a summary of the current WUI guidance documents and programs for the State of Hawai'i.

- The Land Fire Protection Law, Chapter 185, Hawai'i Revised Statutes, mandates the Department of Land and Natural Resources (DLNR) to “take measures for the prevention, control, and extinguishment of wildland fires within forest reserves, public hunting areas, wildlife and plant sanctuaries, and natural area reserves.” DLNR is also statutorily required to cooperate with established county and federal government fire control agencies “in developing plans and programs and mutual aid agreements for assistance for the prevention, control, and extinguishment of fires on forest, grass, brush, and watershed lands not within the department’s fire protection responsibilities described above.”²⁴
- There are 13 Community Wildfire Protection Plans (CWPPs) throughout the State of Hawai'i.²⁵ The CWPPs help communities address wildfire response, hazard mitigation and community preparedness. Each county has at least one CWPP.

4.1.5. ADDITIONAL MAUI COUNTY WILDFIRE PROGRAMS AND REGULATIONS

Maui County, through the Maui Fire Department, created a WUI Education program prior to the wildfire.²⁶ This program directs information to communities and their leaders on the effects of wildland fire, providing specific guidance and support to implement wildfire resilience.

Additionally, the Maui Fire Department has created the Community Risk Reduction Program for the Wildland Urban Interface. This program provides guidance to the community and leaders to affect meaningful change. Three goals for this program include:

²⁴ <https://dlnr.hawaii.gov/forestry/fire/land-fire-protection-law/>

²⁵ <https://dlnr.hawaii.gov/forestry/fire/community-risk-reduction/>

²⁶ <https://www.mauicounty.gov/DocumentCenter/View/142946/-Maui-County-Wildland-Urban-Interface-WUI-Program>

1. Educate communities about how to prepare for WUI fire events and mitigate hazards in accordance with current fire codes.
2. Eliminate fire hazards by ensuring communities follow the fire code.
3. Provide proactive measures involving the community and the Maui Fire Department to improve mitigation and response to WUI fire events.

The Community Risk Reduction Coordinator (CRRRC) supports Firewise USA® certification and education. The community leadership provides the CRRRC with a completed Community Concern Site Plan with potential violations and owner mediated concerns. Violations may include sites, places or properties that do not comply with the Brush Compliance portion of the Maui Fire Code. A Maui County fire inspector is responsible for conducting an inspection of the areas listed on the plan and providing a summary of recommendations to the community. More information can be found at <https://www.mauicounty.gov/DocumentCenter/View/142946/-Maui-County-Wildland-Urban-Interface-WUI-Program>.

The NFPA, with funding received from the U.S. Forest Service, developed and manages the Firewise USA® Program. The program helps educate homeowners on appropriate steps to better protect their home from wildfire through home hardening and vegetation management. Homeowners can form a Firewise USA® community (typically at a neighborhood level) by establishing a site boundary of focus, collaborating with local fire departments and emergency managers to create a framework of action for reducing the risk of wildfire. Firewise USA® communities gain significant education in wildfire risk reduction and may be eligible for homeowners insurance discounts. This program prioritizes support to motivate and empower homeowners to take action to protect the lives of families and property in their neighborhood from wildfire. The program also provides resources to help homeowners learn how to adapt to living with wildfire and encourages neighbors to proactively work together to prevent losses. Firewise USA® recognizes communities that meet its standards. This program began “in 2002 and now has nearly 1,000 active member communities in 40 states, as well as a participation retention rate of 80 percent over the past decade.”²⁷ This program is supported in part by the Hawai'i Wildfire Management Organization (HWMO) in Hawai'i, with twenty-four communities joining the Firewise USA® program in Hawai'i, six of which are on Maui: Waiohuli (est. 2016), Kahikinui (est. 2016), Launiupoko (est. 2016), Lanikeha Homeowners (est. 2024), Vintage Kā'anapali (est. 2024), and Islands and Bluffs (est. 2024). More information is available at <https://www.hwmo.org/articles/firewise-program/>.

4.1.6. CONCLUSIONS AND RECOMMENDATIONS

The MAT provides the following conclusions and associated recommendations for codes and standards.

²⁷ <https://www.nfpa.org/education-and-research/wildfire/firewise-usa/become-a-firewise-usa-site/frequently-asked-questions>

Conclusion 1

The Hawai'i State Building Code Council has two years from the publication of a new IBC and a new IRC to amend and adopt each code before it automatically becomes part of the Hawai'i State Building and Residential Code.²⁸ Maui County has two years from the adoption of the Hawai'i State Building and Residential Code to make amendments before the state codes are automatically adopted and automatically become the interim county building and residential code.²⁹ Therefore, the current code in Maui County was typically published four years prior, as is the case with the previous interim county building codes (based on the 2018 IBC and IRC). Thus, Maui County residential and critical infrastructure design may lag behind current codes and may impact overall community resilience.

The hazard-resistant provisions of the latest I-Codes and standards referenced by the I-Codes enable new and existing buildings to better resist the impacts of natural and man-made hazards. *Building Codes Save: A Nationwide Study*, published by FEMA in November 2020 and focusing on flood and seismic hazards, concluded that state, local, tribal, and territorial governments that have adopted the I-Codes and continue to adopt the latest updated editions can avoid billions of dollars in annual losses.

A *Building Codes Save* study with a focus on fire hazards is under development by FEMA. A handout summarizing *The Building Codes Save: Fire Hazards Pilot Study* was published in September 2024 by FEMA. The pilot study found that adoption of the post-2000 I-codes and the California Building Code, Chapter 7A/IWUIC will save billions of dollars in avoided future losses throughout the nation. One of the pilot locations, California, the study found that the statewide average annual savings for implementing these higher standards was \$58.2 million for structure fires provisions and \$325.1 million for wildfire provisions.

With the current state and county adoption cycle, many years may pass between I-Code update adoptions, delaying enactment of the latest hazard-resistant building code provisions. The delay in adoption of current building codes may result in outdated construction practices.

Recommendation 1a:

The State of Hawai'i should reduce their time to adopt each new edition of the applicable code after publication from the ICC. The State of Hawai'i should ensure that the latest version or immediate prior version of the I-codes are in place and enforced with amendments specific to Hawai'i.

²⁸ https://www.capitol.hawaii.gov/hrscurrent/Vol02_Ch0046-0115/HRS0107/HRS_0107-0024.htm.

²⁹ https://www.capitol.hawaii.gov/hrscurrent/Vol02_Ch0046-0115/HRS0107/HRS_0107-0028.htm.

Recommendation 1b:

Maui County should reduce the time it takes to adopt each new edition of the Hawai'i State Building and Residential Code to ensure that the latest version or the immediate prior version of the I-Codes are in place and enforced with amendments specific to the county.

Recommendation 1c:

The State of Hawai'i and/or the SBCC should encourage the reduction in time between state and county adoption of the building code by encouraging the counties to work in parallel with the SBCC on local amendments.

Conclusion 2

Hazard-resistant provisions in the codes provide a minimum level of protection against natural hazards. While counties are required to adopt the Hawai'i State Building and Residential Code, they are allowed to amend the code with county-specific amendments and no legislation exists requiring that the counties maintain the strength of the hazard-resistant provisions. Therefore, when the state adopts building and residential codes with hazard-resistant provisions, there is no guarantee that counties will adopt hazard-resistant requirements. Lack of county adoption of hazard resilient provisions may leave newly designed and renovated building stock susceptible to the impact of climate change and natural disasters.

Recommendation 2a:

The State of Hawai'i should add language to Hawai'i HRS § 107-28 to require county adoption of hazard-resistant and fire provisions of the Hawai'i Building Code for which they are at high risk.

Recommendation 2b:

The SBCC should be prohibited from weakening the hazard resistant provisions of the ICC and the IRC.

Conclusion 3

The current moratorium on code changes impacts the ability to introduce and adopt interim code amendments prior to the rebuilding of many residential homes after the 2023 wildfires. While the moratorium on code changes does not prohibit the counties from amending their code, it is unclear if counties have adequate staff to address necessary amendments. Therefore, while not intentional, the moratorium on code changes may impact the county at the crucial time when buildings destroyed by the 2023 wildfires are being designed and built. There are also conflicts between hazard provision requirements of various codes, causing confusion and potential challenges with enforcement.

Recommendation 3a:

The State of Hawai'i should amend the moratorium on building code changes to allow for interim amendments related to fire resistance.

Recommendation 3b:

The State of Hawai'i should convene a panel to review conflicts in the codes at the state and county level if the codes are adopted without amendment. Deconfliction between the state and county level ordinances with the unamended code should be addressed.

Recommendation 3c:

The State of Hawai'i should provide technical assistance to counties regarding hazard-specific local code amendments.

Conclusion 4

The 2024 IRC provides an appendix detailing requirements for Accessory Dwelling Units. If adopted, the appendix reduces the fire provisions of the code by exempting attached ADUs from the 1-hour fire resistance requirement for wall and floor assemblies if they meet smoke alarm and carbon monoxide alarm requirements. For 'ohanas in Maui County and throughout Hawai'i, inconsistent information exists on whether the 'ohana is considered a tiny home, dwelling unit, accessory dwelling unit, or all. The lack of clear delineation between these definitions may cause confusion if the 2024 IRC is adopted in Hawai'i.

Recommendation 4a:

The SBCC and/or Maui County should seek clarification from the ICC on the scope of Appendix BB on Tiny Homes or Appendix BC on Accessory Dwelling Units to determine if these code requirements apply to structures like Maui County 'ohanas.

Recommendation 4b:

The U.S. Fire Administration (USFA) should propose a code change to the next version of the IRC to ensure the Appendix for ADUs is consistent with IRC Appendix Q on Tiny Homes for fire resistance. This would prevent diminished ADU fire resistance in Appendix BC on Accessory Dwellings.

Conclusion 5

Maui County allows up to two accessory buildings on each parcel based on the size of the ADU and size of the lot. There is no current guidance on wildfire mitigation for accessory structures except for standard requirements for fire resistance and fire separation in the building code. A new state law (Act 39, Session Laws of Hawai'i 2024) requires counties to adopt or amend ordinances to allow for at least two accessory dwelling units on all residentially zoned lots by 2026. Lack of adequate fire

separation and fire resistance requirements for ADUs in the Maui County residential code increases the fire risk to ADUs and may increase the risk of fire spread to adjacent structures.

Recommendation 5a:

The State of Hawai'i should study the impact of multiple ADUs on each parcel for risk of fire spread. The State of Hawai'i should consider delaying the mandate requiring counties to allow at least two ADUs per lot prior to study finalization.

Recommendation 5b:

The State of Hawai'i and Maui County should provide clear direction on fire resistance requirements of ADUs, setbacks and defensible space requirements through the Hawai'i State and Maui County Building and Residential Codes. The state and county should consider adopting the recommendations set forth in the National Institute of Standards and Technology's (NIST) Hazard Mitigation Methodology (HMM).

Conclusion 6

Maui County's 2012 adoption of the 2006 IRC has been superseded by the automatic adoption after two years of the SBCC's 2018 IRC per state law (HRS § 107-28). The Maui County website states that, in accordance with the state law requirement, the county enforces the 2018 IRC. But the County Code has not been updated consistent with this development. County Code Section 16.08A.R100, reflecting the county's local residential code adoption ordinance, has not been updated since the county's 2012 adoption of the 2006 IRC. Additionally, the same state law now means that the 2021 IBC has recently superseded the county's 2018 IBC adoption, yet the county website has not kept up to date with the state law automatic adoption. Similarly, the 2021 IRC automatically replaced the county's 2018 IRC adoption in January 2025. This may cause confusion amongst designers and building owners on which code is adopted and enforced. The Maui County Code should align with, rather than contradict, the county's website, and both the county website and the county code should be kept up to date with changes in code adoption and enforcement required by state law.

Recommendation 6a:

Maui County should update the Maui County Code and ordinances to clarify current codes in effect, whether automatically triggered by state law or adopted/amended by the County. Maui County should add language such as "unless or until superseded by subsequent editions per state law." Specifically, the county should add this language to Section 16.08A, R100 (IRC adoption) and Section 16.26C.100 (IBC adoption), and other sections similarly at risk of being superseded by state law. If desired, the county should consider adding language to its local building and residential code indicating that they will automatically carry forward amendments into any new code adoption, including automatic code adoptions triggered by state law, and shall be interpreted to reflect any renaming or renumbering of sections in the new code edition.

Recommendation 6b:

Maui County should ensure that the county websites county websites (including information provided on municode.com) and outreach materials consistently and accurately state which code is adopted and enforced.

Conclusion 7

Designers and building owners are provided limited guidance on how to increase the fire resistance of their homes, particularly on parcels that lack 100 feet of defensible space and structure separation. This may result in increased vulnerability to wildfire and an increased probability of damage and loss.

Recommendation 7a:

The ICC, NFPA and other consensus-based code bodies should update codes and standards to account for wildfire safety requirements for structural hardening enhancements and defensible space requirements for various site constraints (i.e., setback limitations, defensible space limitations, fire separation distances). It should be determined if these requirements are sufficient to reduce structure-to-structure ignition risk. Consult NIST HMM Appendix A for more information.

Recommendation 7b:

Maui County should review the recommendations set forth in Table A of NIST’s HMM and incorporate, at a minimum, the following regarding separation distances and defensible space into the Maui County Building and Residential Code:

- No. 30: Remove combustibles in a 0 to 5 feet zone around decking.
- No. 32: Introduce a noncombustible barrier/section between steps and house, minimum one foot.
- No. 33: Introduce noncombustible barrier/section between combustible attachment and residence or replace with noncombustible, minimum one foot.
- No. 36: Remove vegetation, detached from residence, and have a two-foot open space/separation from residence.

Recommendation 7c:

Maui County should review Table B, Surrounding Parcel Hazard Mitigation, and Table C, Primary Parcel Hazard Mitigation, in the NIST HMM guidance and incorporate the recommendations into the Maui County Building and Residential Code.

Conclusion 8

The Maui County Residential and Building Code lacks specific language related to WUI. Adding specific language related to WUI will enhance the resilience of structures throughout the island.

Recommendation 8a:

At a minimum, language consistent with the following sections of the IWUIC should be considered for amendment of the Maui County Residential and Building Codes:

- Chapter 5. Special Building Construction Regulations
- Chapter 6. Fire Protection Requirements
- Section A102.3. Clearance of brush and vegetation growth from electrical transmission and distribution lines
- Section A105. Control of Storage
- Section A107. Protection of Pumps and Water Storage Facilities

Recommendation 8b:

Maui County should add language into the Maui County Residential and Building Codes that is consistent with Section 302 of the IWUIC on Wildland-Urban Interface Area Designations or NFPA 1140, Standard for Wildland Fire Protection.

Conclusion 9

The Maui County Fire Department has created a WUI Education Program to educate the community and leaders on wildfire prevention and mitigation. To increase the benefits of program objectives, the program should be integrated into recovering communities and areas where future development is projected.

Recommendation 9:

The Maui County Fire Department should work directly with the Permitting Department to ensure that WUI Education Program information is provided to designers and building owners during design and construction of new structures.

Conclusion 10

Best practices for wildfire mitigation provided in the IWUIC and other best practice documents are not enforced in Maui County, limiting the likelihood that they will be implemented in Maui County. To achieve the benefits of these practices, they should be codified to enable enforcement.

Recommendation 10a:

The State of Hawai'i and Maui County should review available wildfire codes and standards and adopt portions of the code that can be met considering the unique water supply, cultural traditions, and local building practices found on Maui.

Recommendation 10b:

Maui County should incorporate Section 507, Replacement or Repair of Roof Coverings, from the IWUIC into their local code. This requires that roof coverings on existing buildings that are

replaced or have more than 25% replaced in any given year, meet the ignition resistant construction requirements of the code.

Conclusion 11

Maui County allows for reconstruction of residential structures affected by a disaster based upon the original permits and plans submitted for 48 months following the disaster declaration. This enables many structures to be designed to the code in place during their original permitting. This results in many structures that fall under this program to be required to meet the 2006 I-codes that were in place in the preceding 48 months of the fire. This may increase the hazard risk exposure.

Recommendation 11:

Maui County should require all construction replacing 2023 wildfire-destroyed structures to meet the currently adopted codes and not the code in place at the time of original permitting/design.

Conclusion 12

Chapter 17 of NFPA 1 with amendments, as adopted by the State of Hawai'i and Maui County, provides guidance on the WUI. This portion of the code is applicable to areas a jurisdiction declares to be WUI areas based upon an assessment tool. Additional requirements are in place for structures in this defined area. Maui County has not amended NFPA 1 to define the areas designated as a WUI. Therefore, confusion may exist as to which requirements are in place for each structure and may leave many structures vulnerable to wildfire.

Recommendation 12:

Maui County should amend NFPA 1, Chapter 17 to provide maps with clearly delineated WUI areas

Conclusion 13

Local amendments to the Maui County Fire Code (Ordinance 5451) require clearance of brush and vegetative debris. Additionally, a firebreak may be required for areas at increased wildfire risk. The MAT observed many locations where this requirement was not enforced leaving structures at an increased risk of fire damage because of unmanaged flammable vegetation. It appears that there is an enforcement gap which can increase the risk of fire spread.

Recommendation 13:

Maui County should ensure there is enforcement for brush and debris maintenance requirements as outlined in the Maui County Fire Code.

Conclusion 14

Maui County wildfire hazard maps may not be current or sufficient and have not been codified. Communities at risk have been identified but future conditions have not been considered. The code

currently lacks any trigger for wildfire mitigation requirements based upon wildfire hazard mapping. Therefore, there is a risk that areas at increased wildfire risk lack code requirements which would improve wildfire resiliency because of a lack of identified wildfire risk.

Recommendation 14:

Maui County should leverage local technical experts in emergency management, wildfire risk, land use, building codes and fire suppression should review and update its wildfire hazard maps detailing fire hazard severity zones supplemented with best practices for inclusion in its building code. Example maps can be found in Chapter 7a of the California Building Code, 2022. Updated maps require detail and granularity. Separate maps should address future development and wildland vegetative management to reduce flammable fuels. Clarity should be provided on specific maps cited in the Maui County Fire Code for WUI designation.

Conclusion 15

Current setback requirements in the Maui County Code are insufficient for the protection against wildfires. The lack of setback requirements for carports and continued allowance of combustible materials increases fire risk. Zero lot line setbacks increase the chance of wildfire spread between homes.

Recommendation 15:

Where limited setbacks are allowed or possible due to parcel size, Maui County should require additional fire resistance measures for adjacent structures. Table C of the NIST HMM should be considered for inclusion into the Maui County Code where limited setbacks or separation distances are present.

Conclusion 16

While Maui County has incorporated and coordinated multi-hazard planning, open space management, and community design into wildfire risk assessments and mitigation strategies, these strategies are not consistent across all levels of planning. Therefore, there is an increased risk of confusion among developers when trying to determine proper hazard mitigation and resilience requirements to be followed in planning, designing, and building projects.

Recommendation 16:

Maui County should consider a consolidated, enforceable document which incorporates comprehensive wildfire management and landscape management strategies consistent in all planning and zoning regulations, building codes and standards, policy, and guidance documents.

Conclusion 17

The IWUIC requires that detached accessory structures located less than 50 feet from a building containing habitable space shall have exterior walls of at least 1-hour fire resistance rated

construction. An increased risk of fire spread can exist when the adjacent building does not contain habitable space because the code in that case does not require the accessory structure to have 1-hour fire rated exterior walls.

Recommendation 17a:

The USFA should consider a code revision to the 2027 IWUIC that requires accessory buildings located less than 50 feet from any building to have exterior walls of at least 1-hour fire resistance rating.

Recommendation 17b:

ICC should continue review of the NIST HMM for incorporation into IWUIC Section 504.1.1. Compliance with the current study findings on structure separation should be encouraged. If the current IWUIC is not compliant with the latest research and/or the HMM, ICC should consider an action to update the IWUIC.

4.2. Permitting, Planning and Zoning

The catastrophic damage from the Maui wildfires has damaged thousands of buildings and structures throughout the island. Many buildings and structures have not been repaired or rebuilt. This results in numerous building permits being requested and inspections being performed by the Maui County Planning Department. Permitting and inspection are the enforcement tools that implement the building code and floodplain management regulations. Adherence to the permitting, inspection, and enforcement processes helps produce more sustainable and resilient buildings.

4.2.1. ZONING

The Maui County Department of Planning is responsible for zoning regulation for the county. Per Chapter 2.28 of the Maui County Code³⁰, a Maui Planning Commission is established with the power to prepare and submit zoning regulations. Zoning regulations can include setbacks, building height requirements, and other elements of urban planning. The details of the requirements for zoning throughout Maui can be found in the Maui County Code. Ordinance No. 5499, effective March 2023, allows each zoning district to specify the distance from a lot line to a setback line.

Chapter 19.02A of the Maui County Code specifies the minimum lot area and setbacks requirements for single family homes, the minimum lot area is 6,000 square feet, minimum lot width is 60 feet. The minimum yard setback is 15 feet in front and 6 feet for the side and rear of the property. Example setbacks are illustrated in Figure 4.

Several structures are allowed in the setback area: walls and fences not exceeding 7 feet in height, and roof eaves which may extend up to 3 feet into the setback area at no less than 8 feet in height at their lowest point. Porches, lanais, decks, and walkways may extend into the setback by three

³⁰ https://library.municode.com/hi/county_of_maui/codes/code_of_ordinances?nodetid=TIT2ADPE_CH2.28PLCO

feet. Minor utility equipment and their enclosures, on lots less than 7,500 square feet, may extend into the setback. These requirements are found in Maui County Code Section 19.08.050.

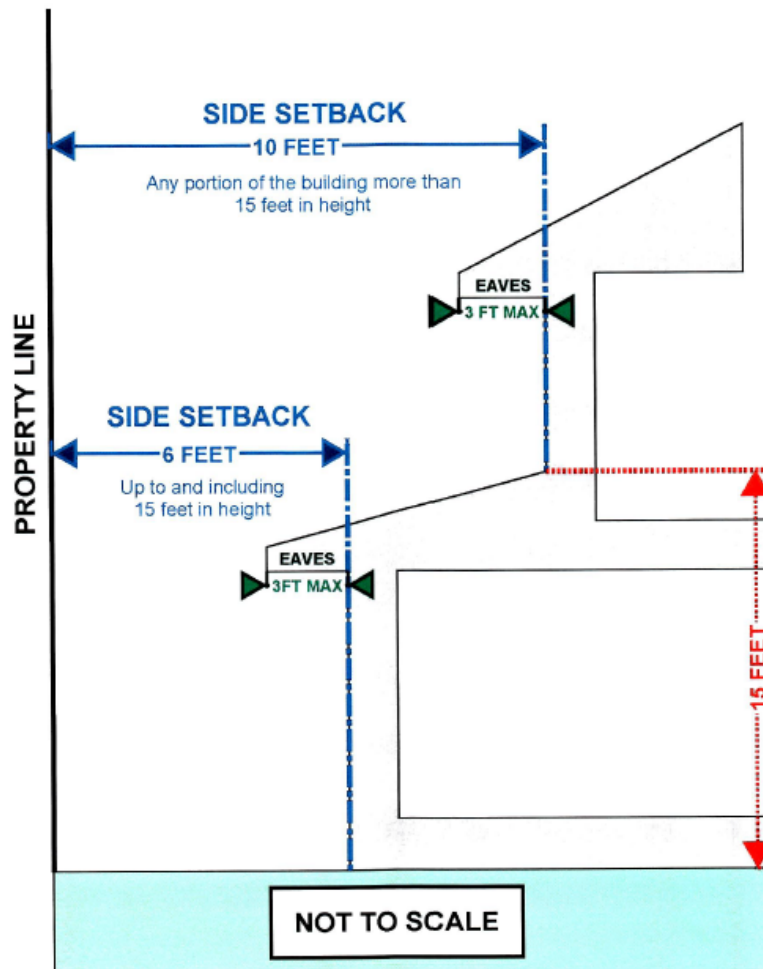


Figure 4. Example Setbacks in Maui County Comprehensive Zoning Ordinance

Affordable housing is encouraged through the R-0 zero lot line residential districts. The R-0 zero lot line provisions allow for single-family home construction on a 3,000- to 6,000-square foot parcel with little to no setback. While not more than one zero-lot line is permitted on abutting properties, two garages or carports on abutting properties are allowed. For lots where a zero-lot line of a lot is not adjoined by a zero-lot line of an adjacent lot, the adjacent lot shall provide a 10-foot setback line and shall include a 5-foot-wide maintenance easement. The zero-lot line program allows for separation of 10 feet between residential structures or zero feet if the garage or carports abut.

4.2.2. COUNTY GENERAL PLAN

The Maui County General Plan is a long-term, comprehensive blueprint for the cultural identity of the county, as well as its physical, economic, and environmental development.³¹ The plan was adopted by the County in 2010 and provides the framework for development of the Maui Island Plan and nine community plans. The Maui Island Plan was adopted in 2012 and establishes urban and rural growth areas based on current and future needs. The nine community plans provide recommendations on land use and development for each specific region; Lahaina is included in the West Maui Community Plan.

The West Maui Community Plan details wildfire as a potential hazard risk due to climate change. The document sets various goals related to wildfire, including:

- The West Maui CWPP and Maui County Multi-Hazard Mitigation Plan should be followed.
- Improve resilience of the transportation system to account for climate change hazards, such as wildfire.
- Develop a wildfire information campaign with signage to build public awareness of wildfire hazards. Improve community awareness of the human, economic, and environmental costs associated with wildfires caused by negligence or accident. Engage the community to create and maintain fire breaks, and to encourage native dryland plants in landscaping in the drier areas of West Maui.

4.2.3. MAUI COUNTY HAZARD MITIGATION PLAN

In August 2020, the County of Maui adopted the Updated Hazard Mitigation Plan (HMP) as part of an ongoing effort to reduce the negative impacts and costs from natural hazards. The HMP is consistent with the Maui County General Plan and provides a policy framework for the nine community plans. The HMP is intended to integrate with the county's in-place planning mechanisms, including building and zoning regulations.

The HMP provides details on areas at greatest risk for wildfires. The Hawai'i DLNR Wildfire Risk Area data is used to map at-risk WUI communities on the major Hawai'ian Islands (Figure 5). The permitting process and the wildfire ignition density derived from past fire data supported identification of Lahaina's high risk of wildfire (Figure 6).

³¹ <https://www.mauicounty.gov/421/General-Plan-2030>

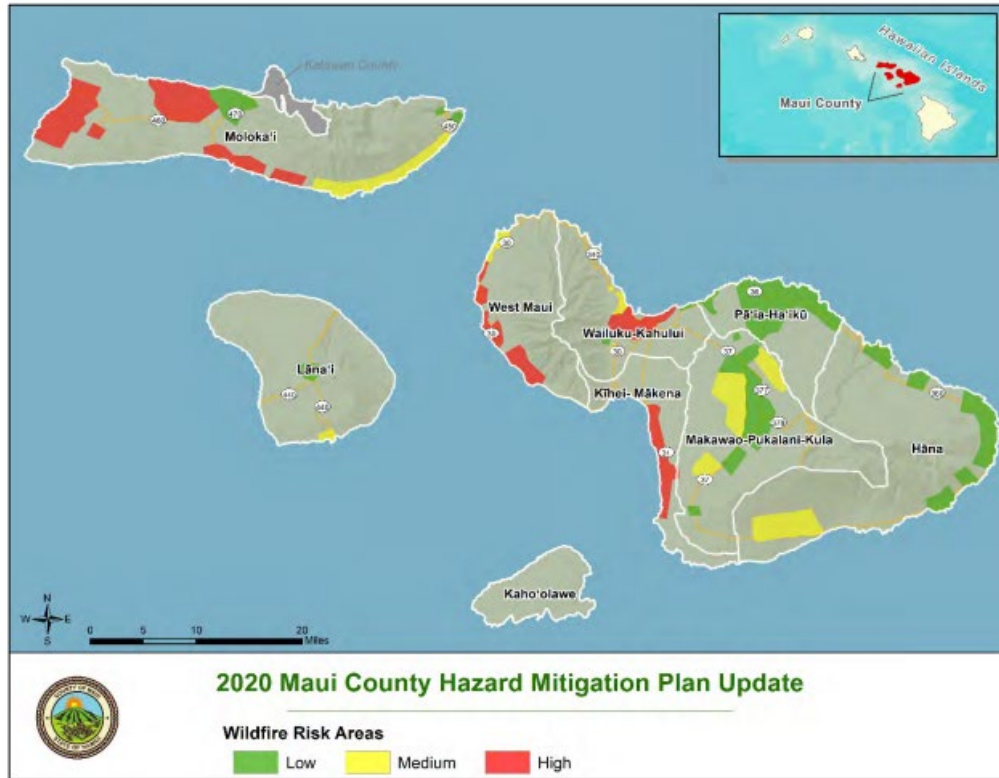


Figure 5. Mitigation Plan Wildfire Risk Area Map

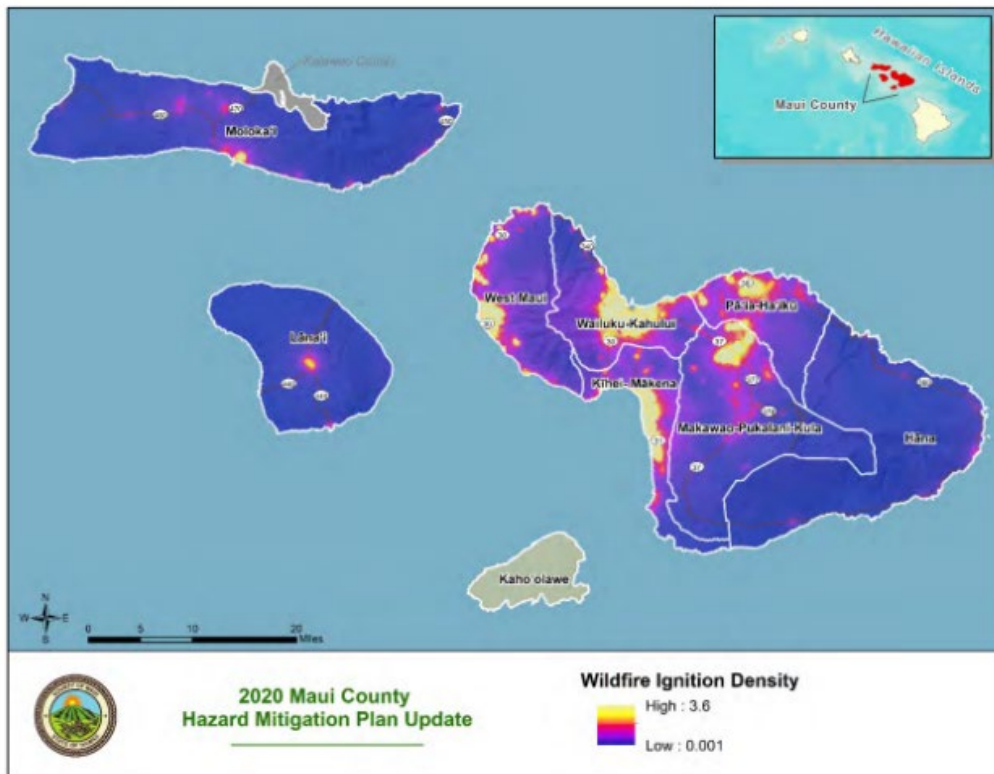


Figure 6. Mitigation Plan Wildfire Ignition Density Map

Some areas within the county are more susceptible to wildfire than others. Geospatial analysis was used to determine buildings and infrastructure within these areas, using Hawai'i DLNR data, building footprints, critical facilities data, and parcel data from county tax assessor records.

As part of the 2020 HMP update process, the County reviewed mitigation actions included in the 2015 Hazard Mitigation Plan and detailed the then-current status (as of 2020) of each recommended action, with several pertaining to wildfire. The following wildfire-related 2015 mitigation actions were listed in the 2020 plan as “delayed,” and were included again in the 2020 plan for implementation:

- Retrofit at-risk county structures with ignition-resistant materials.
- Implement mitigation action items as identified in the Western Maui CWPP.
- Implement mitigation action items from Moloka'i CWPP and Central Maui CWPP once the plans are finalized.
- Support the revitalization of the Firewise USA® program.

The 2020 HMP provided the following new mitigation actions related to wildfire:

- Integrate the hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions in the community, including capital improvement programs, the general plan, recovery plans and strategic plans.
- Support the revitalization and expansion of the Firewise USA® program to additional communities.
- Implement the guidance and tools identified in the 2019 Guidance for Disaster Recovery Preparedness in Hawai'i.³²
- Research, promote, and support the implementation of wildfire mitigation practices for WUI and other areas identified as high risk but not covered by current CWPPs. Practices may include but not be limited to the following:
 - Retrofit at-risk County structures with ignition-resistant materials.
 - Initiate programs aimed at reducing fuel loads (removing/replacing non-native grasses and shrubs with native/fire-resistant species).
 - Prevent wildfire burn areas from being replanted with non-native vegetation.
 - Implement defensible space and firebreaks in rural developments through existing codes and development standards.
- Support the Hawai'i Wildfire Management Organization, the Maui Wildfire Coordinating Group, local fire task forces, and other stakeholder organizations with the implementation of mitigation action items as identified in all current CWPPs.

The plan is scheduled to be updated in 2025. It is unclear which of these recommendations have been implemented and when the updated plan is scheduled to be published.

³² <https://seagrant.soest.hawaii.edu/guidance-for-disaster-recovery-preparedness-in-hawaii/>

4.2.4. WESTERN MAUI CWPP

The Western Maui CWPP was developed by the Hawai'i Wildfire Management Organization (HWMO) with support from federal and state agencies, community members and other groups³³. The plan was published in January 2014 with the goal of identifying and prioritizing areas for hazardous fuel reduction and recommendations to reduce the ignitability of structures.

The plan provides the details from a risk assessment for the communities in Western Maui. The purpose of the risk assessment was to provide site-specific information to the public to promote wildfire awareness, identify areas for treatment and determine the highest priority uses for financial and human resources. An overall risk assessment table is included for each community in West Maui as a compilation of the five individual ratings, indicating that most of the area ranks as extreme or high risk to wildfire. Of the many maps created for the Western Maui CWPP, five are worth noting in this report: Community Subdivision Wildfire Hazard Rating Map (Figure 7), Vegetation Wildfire Hazard Rating Map, Building Wildfire Hazard Rating Map, Fire Environment Hazard Rating Map, and the Fire Protection Hazard Rating Map. The Building Wildfire Hazard Rating Map was based on the presence and combustibility of siding and soffits, the roof assembly, structural ignitability, skirting and utility placement (Figure 8).

The CWPP provides an action plan for mitigation of wildfires. This plan includes recommended next steps during the five years after publication (2014-2019) to improve wildfire resiliency. The actions include projects on restoration for watersheds, creation of nine miles of fire breaks, increase in water tank size and quantity, and education. It is unclear whether these projects were implemented prior to the 2023 wildfires.

³³ <https://dlnr.hawaii.gov/forestry/files/2024/01/Western-Maui-CWPP.pdf>

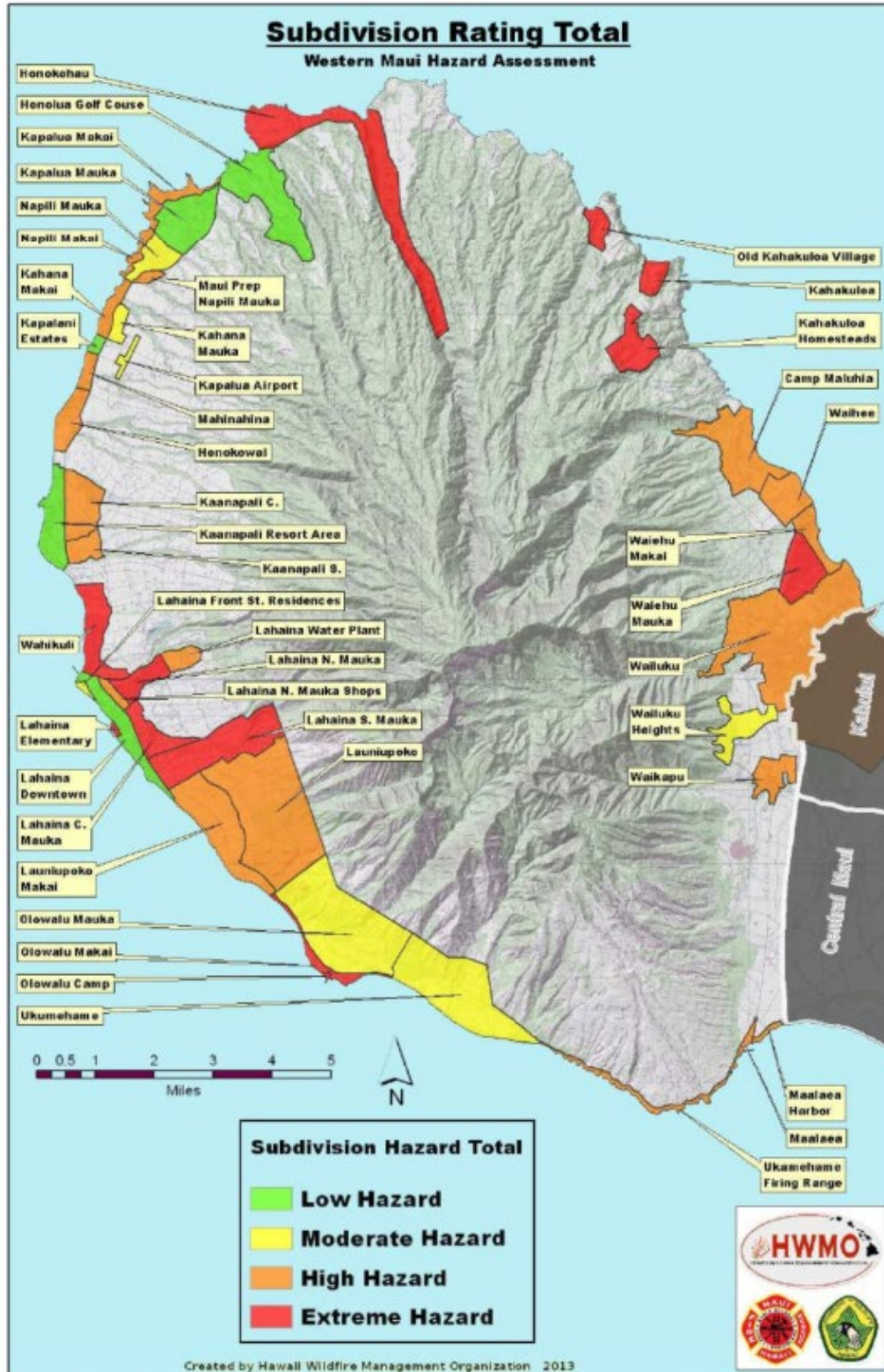


Figure 7. Maui County CWPP Community Subdivision Wildfire Hazard Rating Map

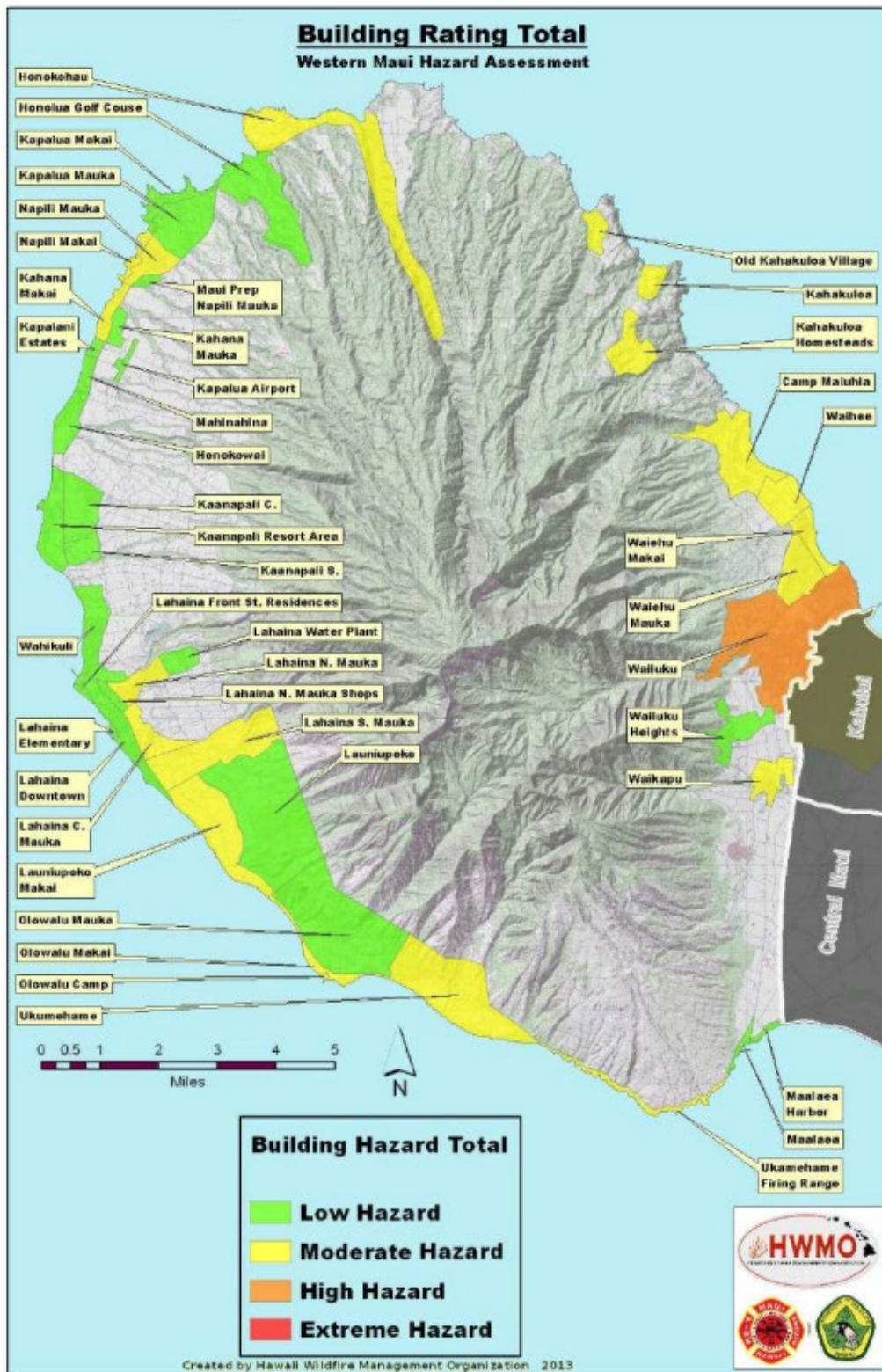


Figure 8. Maui County CWPP Building Wildfire Hazard Rating Map

4.2.5. PERMITTING

Based on the Hawai'i State Building Code, each county may, by ordinance, require a permit for any area regulated by the building code. The State of Hawai'i defers to individual counties on building permit requirements.³⁴

In Maui County, a building permit is required for construction, alteration, moving, demolition, repair and change of occupancy of any building or structure within the county. Depending on the scope of the new permit, several agencies may be involved in the review and approval of the permit. Separate permits are required for Hale (Indigenous Hawai'ian Architecture) Structures.

Maui County Ordinance No. 5629, effective in March of 2024, amended the county code section related to building permits. The bill allowed for reconstruction, alteration, repair, and reconstruction of a structure within the disaster-affected area during a four-year period using a modified building permit process. The modified process allows for consolidation of the electrical, plumbing, driveway, grading and other associated permits. The building official may review the approve the permit without interdepartmental review. For commercial and residential properties, plans approved prior to the 2023 wildfires may be submitted if the owner and design professional authorize in writing the use of previously approved plans. If the building official does not approve or deny the application within fifteen calendar days, the permit is automatically approved.

In April 2024, the county opened a Disaster Recovery Permitting Center operated by 4LEAF under contract to support and expedite the permit process for those impacted by the wildfire. A consolidated residential building permit was provided which addressed single family homes, accessory dwellings and accessory buildings. The consolidated building permit includes grading, driveway, electrical and plumbing work as shown on building plans. In the early stages of recovery, initial building permit submission lacked detailed information such as structural load calculations and design specifications. Information was shared with the public to clarify what information must be submitted for plan review and approval.

4.2.6. CONCLUSIONS AND RECOMMENDATIONS

Conclusion 18

The 2020 Maui County HMP, published in 2020, was updated prior to publication of recent fire research as well as August 2023 wildfires after-action reports. The HMP lacks sufficient detail and best practices reflecting recent advances in fire science and technology and does not adequately address wildfire risk in the county.

³⁴ https://ags.hawaii.gov/wp-content/uploads/2021/06/2018StateBuildingCode_20210518.pdf

Recommendation 18:

Maui County should update their HMP to include updated wildfire hazard vulnerability, 2023 wildfire impacts (2023 wildfires including after-action reports), lessons learned, academic studies, and updated mitigation strategies reflecting post-disaster needs. The recommendations in the HMP should act to include the control of ignition sources, as well as fire spread.

Conclusion 19

The 2014 West Maui CWPP includes an action plan for 2014-2019. While the plan is detailed and provides significant information, it is outdated. Because the plan is not codified, it is unclear how it will be implemented.

Recommendation 19:

Maui County should update the West Maui CWPP and integrate hazard risk maps and other wildfire mitigation into the Maui County Fire Code.

Conclusion 20

Guidance documents with usable information for wildfire vulnerability and disaster are not shared through a single source or hub to stakeholders (e.g., homeowners, designers, decision makers, regulators, engineers, etc.) and may limit the ability for the area to recovery and build more resilient buildings.

Recommendation 20:

Maui County Fire and Planning Departments require specific guidance for high-risk areas which are locally aligned and relevant/applicable. The Maui County Fire Department should lead the coordination and alignment efforts. It may also be helpful to work across counties as well.

Conclusion 21

Lack of thoroughness during site plan review and the permitting and inspection process can cause uncertainty and increase the risk of unsafe designs. Administrative provisions require calculation submittal, but compliance with and enforcement of these provisions is lacking.

Recommendation 21:

Maui County should work to increase staff knowledge and enforcement capabilities including training, pre-approved designs, and clear requirements for submission of calculations in all plans and permit submissions. Maui County should not remove the provisions that govern administrative actions in the code.

Conclusion 22

Limited influence and staff within and across departments hinders the ability to develop, adopt and enforce fire-safety provisions and best practices for new construction, repair and maintenance during the wildfire recovery period.

Recommendation 22:

Maui County should issue policy or regulatory change to provide Maui County Fire with a clearly defined role and responsibility to oversee fire-safety regulatory needs (development, adoption and enforcement) for building and planning codes, and should increase technical capacity in this expanded role.

Conclusion 23

Local government agencies do not have adequate information, resources and/or training to effectively understand wildland fire risk, mitigation, and comprehensive wildland fire safety regulation and enforcement.

Recommendation 23a:

FEMA, in coordination with the USFA, should develop additional information, resources, incentives, and training to assist state and local governments to better understand, adopt, regulate and enforce relevant wildland fire safety codes, standards and best practices.

Recommendation 23b:

FEMA should update and republish *P-737 Home Builder's Guide to Construction in Wildfire Zones* and *P-754 Wildfire Hazard Mitigation Handbook for Public Facilities* as appropriate as appropriate based on the latest research to support compliance with the modern consensus-based codes and standards.