

# Lahaina Fire Forward-Looking Report



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# EXECUTIVE SUMMARY

On August 8, 2023, Hurricane Dora, spinning south of the Hawaiian Islands added unprecedented winds to a landscape that was already susceptible to fire. By the end of the day, multiple wildfires moved across the island of Maui. The Lahaina Fire, sparked by downed powerlines and whipped by winds gusting over 80 miles per hour, quickly grew into an urban conflagration that would eventually overtake and destroy most of Lahaina Town. Burning over 2,000 structures and resulting in the loss of 102 lives, the Lahaina Fire became the most deadly wildfire in the United States in the last 100 years. The State of Hawai'i (the State), through Attorney General Anne Lopez, determined to understand this tragic event in all its complexities so that every effort could be made to prevent similar catastrophes from happening again. The Fire Safety Research Institute (FSRI) was contracted to complete three reports in an independent, comprehensive analysis of the Lahaina Fire and provide suggestions for a path to a safer Hawai'i.

The Lahaina Fire Comprehensive Timeline Report<sup>1</sup> (Phase One) presents a chronology of the events captured from an extensive data collection effort, resulting in more than 12,000 timeline entries. This report focuses on the time period beginning at 14:55 on August 8, 2023, and concludes at 08:30 on August 9, 2023, and includes the relevant events that occurred prior to, and during, this time, such as preparedness efforts, weather and its impact to infrastructure, and other fires occurring on Maui. Phase One includes hundreds of data points used to create a fire progression map showing the path the fire took as it impacted the built environment mauka (toward the mountain) to makai (toward the ocean), and to the south and to the north. Phase One was published April 17, 2024, with the comprehensive timeline.<sup>2</sup>

The Lahaina Fire Incident Analysis Report<sup>3</sup> (Phase Two) presents relevant background information; discusses weather, fuel, and infrastructure conditions; describes communication, incident management, fire suppression, and evacuation efforts; and details the impact of the fire on Lahaina's built environment. It also considers these factors in the context of the National Cohesive Wildland Fire Management Strategy<sup>4</sup> (Cohesive Strategy). The analysis of the nearly two terabytes of data collected for Phase One includes detailed explanations of how the fire impacted zones where there was a collection of destroyed, damaged, and undamaged structures. Analyzing each system component against organizational policies and procedures and evidence-based research resulted in 84 Findings and 140 Recommendations (see Appendix 7.1). The Findings and Recommendations highlight areas demanding attention to improve fire safety. This report does not include an analysis of recovery efforts or the fire's cause and origin, which was investigated by the County of Maui with assistance from the United States Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF). Phase Two was initially published September 13, 2024, with revision one published October 2, 2024.

A portion of this Lahaina Fire Forward-Looking Report (Phase Three) organizes these findings. A prioritized list of action items is provided to the State and all counties so that changes can be made that improve Hawaii's response to wildfires. Phase Three includes a Community Risk Assessment (CRA), Community Risk Reduction (CRR) plan, a Standards of Cover (SOC) analysis, and a review of the codes and standards adoption and use processes for the County of Maui. Each of these components are in progress.

FSRI has provided the State and counties with their own guidance documents, identifying the 10 highest priorities for enhancing wildfire readiness. In addition, FSRI has also engaged with the

# EXECUTIVE SUMMARY

Department of the Attorney General (DOAG) and Hawai'i Wildfire Management Organization (HWMO) to address the preparations needed for the Office of the State Fire Marshal (OSFM) to be effective as soon as possible.

Currently, the CRA, CRR, and SOC for the County of Maui are underway. The Maui Fire Department (MFD) has been provided with the resource demands for each analysis and the data needs for the SOC. FSRI has also identified data sources via public websites that the MFD will validate and review for accuracy. Timeline for completion of these analyses for the County of Maui is expected to take several months due to anticipated challenges validating data, and ultimately, completing the final report.

Section 3.0 of Phase Three outlines the 10 highest priorities for enhancing wildfire readiness in each county within the State of Hawai'i and recommends that all counties complete a CRA, CRR, and SOC. To date, each county fire chief has received the County Priorities and Recommendations and personal briefings have been completed. The briefings served to ensure the 10 priorities are actionable and modified for each specific county's circumstance, where needed.

Section 2.0 of Phase Three highlights the 10 highest priorities for enhancing wildfire readiness in Hawai'i and was prepared at the request of Governor Josh Green and delivered in October 2024. Like Section 3.0, this distills Phase Two's 84 Findings and 140 Recommendations into 10 areas of focus concentrated on the most urgent needs. A high-priority item for the State is staffing the OSFM and engaging state agencies in addressing Phase Two Findings and Recommendations.

Building codes and standards play a critical role in public safety by providing standardized requirements for building construction. Phase Three reviews the

adoption process, and the versions of the codes that were in effect at the time of the August 8, 2023, fires. The adoption of contemporary codes and standards, and the use of advancements in building materials and construction techniques, are crucial components of a community's resilience in the face of wildfire.

The Phase Three building codes and standards section complements the Federal Emergency Management Agency's (FEMA), Maui Wildfire Mitigation Assessment Team's (MAT) Recovery Advisories 1 through 4, and Codes, Standards, and Permitting Summary and Recommendations Report (90% Draft as of December 22, 2024).<sup>5</sup>

Just prior to publishing this report, the County of Maui released the Lahaina Long-term Recovery Plan.<sup>6</sup> The plan includes several "Priority Projects" within Section 7 that align with the Lahaina Fire Incident Analysis Report<sup>7</sup> (Phase Two) Findings and Recommendations, which are also included within the State and County Priorities of this report.



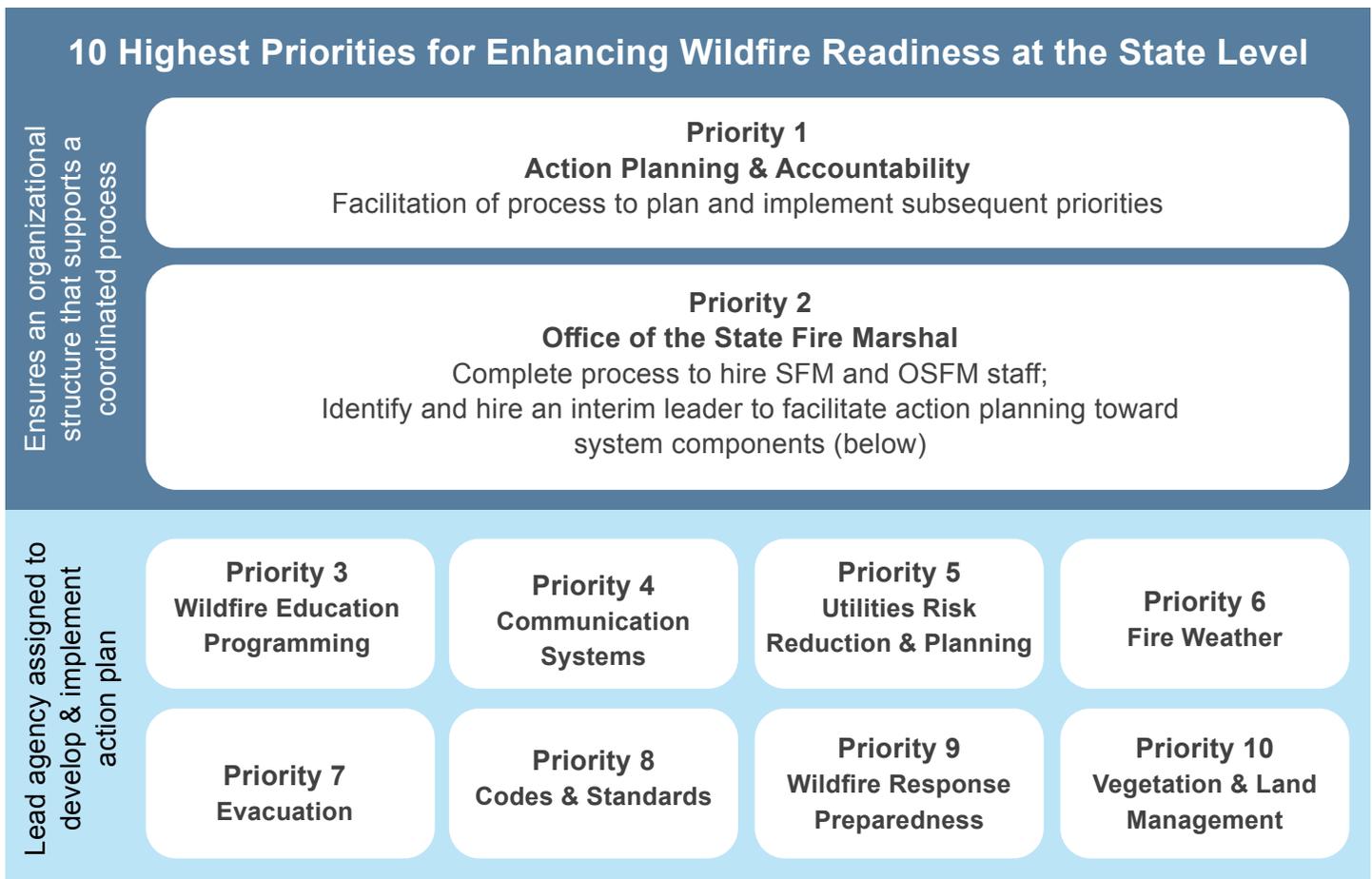
# 2.0 STATE OF HAWAI‘I PRIORITIES AND RECOMMENDATIONS

## 2.0 State of Hawai‘i Priorities and Recommendations

The Lahaina Fire Incident Analysis Report (Phase Two) was released on September 13, 2024. In a briefing, Governor Green asked FSRI to identify the 10 key priorities for the State of Hawai‘i to address to enhance wildfire safety statewide. By distilling the report’s 140 Recommendations into these 10 areas of focus, the State (See Table 1) can create an immediately actionable plan concentrated on the most urgent and impactful areas. This streamlined approach provides a clear roadmap for

the State to initiate progress and take the critical first steps necessary to establish a solid foundation that supports future meaningful improvements. While these 10 priorities are crucial for immediate action, the remaining recommendations are also vital and should be urgently addressed to ensure comprehensive wildfire system improvement across the state. This document includes recommendations for “how” to address each priority. These recommendations are limited by FSRI’s understanding of the State of Hawaii’s organizational structures but bolstered by FSRI’s experience within each of the priority areas. We realize there may be different approaches that better align with state, county, and non-profit organizational processes.

Table 1. The 10 highest priorities for enhancing wildfire readiness at the state level.



# 2.0 STATE OF HAWAI‘I PRIORITIES AND RECOMMENDATIONS

## Priority 1. Action Planning and Accountability

Require Department of Land and Natural Resources, Division of Forestry and Wildlife (DLNR-DOFAW), Hawai‘i Building Code Council (HBCC), Hawai‘i Public Utilities Commission (HPUC), State Fire Council (SFC), Office of Planning Sustainable Development (OPSD), Hawai‘i Emergency Management Agency (HI-EMA), Hawai‘i Department of Law Enforcement (DLE), Hawai‘i Department of Transportation (DOT), and Commission on Water Resource Management (CWRM) to prepare a preliminary action plan for addressing Phase Two Findings and Recommendations pertaining to their areas of responsibility.

*Findings and Recommendations Addressed\*:*

- Finding 1 (page 303) - Recommendations 1 and 2

### Recommendations for how to address Priority 1

Select a Priority 1 task owner from a state government organization.

This priority could benefit from leadership from an individual or organization having the most knowledge of the wildfire system components addressed in Phase Two. In many states, this would be the State Fire Marshal (SFM). However, because there is no currently appointed fire marshal in Hawai‘i, an alternative should be identified. Consider contracting with the non-profit HWMO to share a leadership role with a leader from a state organization having current wildfire responsibilities. The HWMO has knowledge and experience in wildfire prevention, preparedness, multi-partner coordination, and project management, and was also an excellent resource to FSRI throughout Phase One and Phase Two. They

also work closely with all county, state, and federal fire agencies, public utilities, community groups, the National Weather Service (NWS), and code and standards organizations such as the National Fire Protection Association (NFPA), International Code Council (ICC), and Underwriter’s Laboratories Standards and Engagement (ULSE).

The leader of this priority could be responsible for scheduling and facilitating meetings with the group of state organizations listed, sharing work product examples, preparing a timeline, using a project planning tool to document progress toward completion, and providing status reports to Priority 1 owner, while ensuring all tasks are completed, as per the timeline.

This priority sets the table for the subsequent priorities. Each state organization leading the development of their action plan should avoid working in isolation or reinventing existing processes, as this can lead to inefficiencies and fragmentation. Collaboration with other agencies and stakeholders is encouraged and essential to avoid duplication, competition, and potential harm. Achieving more cohesive and effective outcomes requires building on existing data, programs, and knowledge.

## Priority 2. Office of the State Fire Marshal

State agency selected to oversee the OSFM to recruit and hire the SFM and individuals required to fill critical roles within the OSFM. The SFM (or interim leader) to work closely with SFC and other state agencies to prepare an action plan for addressing Phase Two Findings and Recommendations related to codes, standards, zoning, vegetation management, wildfire data collection, mutual aid response, and firefighter training and operations standards (including private contractors).

# 2.0 STATE OF HAWAII PRIORITIES AND RECOMMENDATIONS

## *Findings and Recommendations Addressed\*:*

- Finding 3 (page 303) - Recommendations 1 and 2
- Finding 9 (page 304) - Recommendations 1, 2, 3, and 4
- **Note: Priority 2 is already in progress from the last legislative session. FSRI provided input to the job description to support the effort; however, the status of the hiring process is unknown.**

## **Recommendations for how to address Priority 2**

This is a two-part project where both are completed concurrently. One project is to hire individuals needed to establish an OSFM, and the second is to identify an interim SFM who can work on the tasks that will ultimately be managed by the SFM once hired.

The first task is to select a Priority 2 owner. This could be the leader of the organization most responsible for managing the recruitment and hiring of the SFM and staff, which may come from the state agency the OSFM will report to, Department of Human Resources Development (DHRD), State Personnel Office, and/or a member of the SFC. Each one of these organizations has been, or will likely be, involved in the hiring process.

The organizations listed above should finalize the class specification and associated job duties to ensure it includes, but not be limited to, wildfire (including wildland urban interface - WUI) prevention, preparedness, response, and recovery, as well as multi-agency and multi-sector coordination and strategy.

The recruitment and hiring of the SFM should include a project plan with tasks, task owners, completion timelines, and other components of a

well-developed work plan that ensures efficiency and accountability.

The second part of this project includes identifying an interim leader to address the system components of Phase Two that will ultimately be the responsibility of the SFM. This is another area where the HWMO may be able to assist as a contractor. As mentioned in Priority 1, they have knowledge, experience, and the professional network to develop a project plan to address each of the items listed in Priority 2, and several of the subsequent priorities where the SFM is listed.

## **Priority 3. Wildfire Education Programming**

Provide educational programming for the diversity of audiences across the state regarding wildfire preparedness. Programming should include mitigation best practices, defensible space and vegetation management, fire weather, and fire behavior. Develop and implement a plan for ongoing financial support for this programming.

## *Findings and Recommendations Addressed\*:*

- Finding 11 (page 305) - Recommendation 1
- Finding 13 (page 305) - Recommendation 1
- Finding 18 (page 306) - Recommendation 4
- Finding 37 (page 309) - Recommendation 1
- Finding 39 (page 309) - Recommendation 1
- Finding 75 (page 316) - Recommendations 2 and 3

# 2.0 STATE OF HAWAII PRIORITIES AND RECOMMENDATIONS

## Recommendations for how to address Priority 3

This is another two-part project where both tasks are completed concurrently. One task is to identify a state government organization that will be responsible for ensuring wildfire-related educational programming is prioritized and supported at the state-level (accountability). The second is to fund and support the ongoing work to be adequately carried out (implementation).

The first task is to select a Priority 3 owner from a state government organization. Ensuring ongoing state-level accountability and support for this priority may eventually fall under the SFM's purview, or potentially DLNR-DOFAW's, should their responsibilities expand beyond conservation areas. In the meantime, the interim SFM, as identified in Priority 2, could take on this responsibility.

The second task is to ensure existing programming is supported and implemented. Currently, the HWMO serves as the lead coordinating entity for wildfire outreach campaigns, educational resources, and training programs, collaborating with the DLNR-DOFAW, county fire departments, emergency management agencies, and communities to deliver statewide, multi-sector wildfire preparedness and mitigation programs. However, with minimal to no state funding at present, securing financial support will be crucial for the sustained implementation of this priority.

## Priority 4. Communication Systems

HI-EMA and SFM to assess the resiliency and functionality of communication systems and the All-Hazard Outdoor Warning Siren System (OWSS), and establish redundant public alerting and warning processes, including best practice messaging guidance.

### *Findings and Recommendations Addressed\*:*

- Finding 36 (page 309) - Recommendation 1
- Finding 37 (page 309) - Recommendation 1
- Finding 75 (page 316) - Recommendations 1 and 2

## Recommendations for how to address Priority 4

Select a Priority 4 task owner from a state government organization.

Due to HI-EMA having responsibility for the OWSS they may be best positioned to own and lead this priority. Other organizations that can assist include county emergency management agencies, DLNR-DOFAW (could provide wildfire input on behalf of the SFM until one is selected, or have the interim SFM from Priority 2 engage), NWS, telecommunications providers, and Hawaiian Electric (may be able to help with addressing resilient electrical power options).

## Priority 5. Utilities Risk Reduction and Planning

HPUC and SFM to work with public utilities (electric and water) to identify immediate improvements to vegetation management programs to protect infrastructure from wildfire and enhance resiliency, and to provide guidelines for supporting incident management and operations.

### *Findings and Recommendations Addressed\*:*

- Finding 29 (page 308) - Recommendation 1
- Finding 31 (page 308) - Recommendation 1
- Finding 56 (page 311) - Recommendation 1

# 2.0 STATE OF HAWAII PRIORITIES AND RECOMMENDATIONS

## Recommendations for how to address Priority 5

Select a Priority 5 owner from a state government organization.

Since the HPUC falls under the Department of Commerce and Consumer Affairs (DCCA), DCCA may be best positioned to own and lead this priority with assistance from the interim SFM identified in Priority 2. DLNR-DOFAW, DLNR-Land Division, land owners, Hawaiian Electric, and CWRM can also contribute to this effort.

To address guidelines for incident management and operations, the interim SFM mentioned in Priority 2 can work closely with the SFC to develop expectations/guidelines for cooperators supporting incident commanders.

It should be recognized that this priority is in-progress. Hawaiian Electric has developed Interim Wildfire Safety Measures<sup>8</sup> to reduce the risk of wildfires associated with utility infrastructure and continues to work closely with government agencies to make improvements to their wildfire preparedness and prevention efforts.

## Priority 6. Fire Weather

DLNR-DOFAW, SFC, and SFM to support NWS in improving weather forecasting and historical record keeping by ensuring Remote Automatic Weather Stations (RAWS) are positioned in high wildfire danger areas statewide. Also, engage other stakeholders, such as Hawaiian Electric and University of Hawai'i, who are currently installing weather stations that may provide additional fire weather information.

### *Findings and Recommendations Addressed\*:*

- Finding 5 (page 303) - Recommendation 2

- Finding 6 (page 303) - Recommendation 1
  - Note: This can be expanded to installing more RAWS in West Maui and other wildfire prone areas since two (2) RAWS have been positioned in Lahaina.
- Finding 7 (page 303) - Recommendation 1
- Finding 8 (page 304) - Recommendation 1

## Recommendations for how to address Priority 6

Select a Priority 6 task owner from a state government organization.

The DLNR-DOFAW is the only state organization with wildland firefighters possessing national qualifications and having extensive knowledge of weather and other factors influencing wildland fire behavior. The DLNR-DOFAW could work closely with the interim SFM mentioned in Priority 2 and the SFC to complete this priority.

## Priority 7. Evacuation

HI-EMA, DLE, DOT, and OPSD to coordinate with county law enforcement, fire, emergency management, and planning agencies in preparing a standardized format for documenting and executing evacuation plans for high wildfire risk areas.

### *Findings and Recommendations Addressed\*:*

- Finding 16 (page 306) - Recommendation 1
- Finding 17 (page 306) - Recommendation 1
- Finding 18 (page 306) - Recommendations 1 and 3
- Finding 19 (page 306) - Recommendations 1 and 2
- Finding 71 (page 314) - Recommendations 1 and 2
- Finding 72 (page 315) - Recommendations 1, 2, 3, 4, 5, and 6
- Finding 76 (page 316) - Recommendations 1, 2, and 3

# 2.0 STATE OF HAWAII PRIORITIES AND RECOMMENDATIONS

## Recommendations for how to address Priority 7

Select a Priority 7 task owner from a state government organization.

The DLE is the state law enforcement agency responsible for collaborating with federal, state, county, and private sector stakeholders. In addition to working closely with the organizations identified in the priority, the DLE should also work with the HWMO to learn where the wildfire risk areas are located throughout the state, where these risks are expanding to, and which communities currently have neighborhood evacuation plans and safe refuge locations already identified and/or developed.

## Priority 8. Codes and Standards

SFM, HBCC, and SFC collaboratively evaluate and enhance the review and adoption processes for codes and standards, ensuring they effectively address wildfire risks, particularly in the WUI. Continued work is needed to align and coordinate codes to reduce fire risks to the built environment. Jointly ensuring organizational structures are prioritized and appropriately staffed to efficiently adopt and implement updated codes that reflect the state's wildfire threat will help provide a unified approach to wildfire resilience.

### *Findings and Recommendations Addressed\*:*

- Finding 14 (page 305) - Recommendation 3
- Finding 15 (page 306) - Recommendation 1
- Finding 77 (page 316) - Recommendation 2
- Finding 78 (page 316) - Recommendation 1
- Finding 80 (page 316) - Recommendation 2

## Recommendations for how to address Priority 8

Select a Priority 8 task owner from a state government organization.

Until an SFM is appointed, and if the HBCC does not have full-time administrative staff, a member of the Department of Accounting and General Services (DAGS) could be designated as the owner. DAGS and the interim SFM identified in Priority 2 could work closely with the HBCC, SFC, ICC, NFPA and other code and standards stakeholders to complete this priority.

## Priority 9. Wildfire Response Preparedness

SFM, SFC, HI-EMA, and DLNR-DOFAW to improve the coordination of wildfire preparedness and response of emergency responders across all agencies and private contractors to ensure the effective and efficient use of shared resources and to provide expectations for incident management organization.

### *Findings and Recommendations Addressed\*:*

- Finding 40 (page 309) - Recommendation 2
- Finding 41 (page 310) - Recommendation 1
- Finding 42 (page 310) - Recommendation 1
- Finding 43 (page 310) - Recommendation 1

# 2.0 STATE OF HAWAII PRIORITIES AND RECOMMENDATIONS

## Recommendations for how to address Priority 9

Select a Priority 9 task owner from a state government organization.

The DLNR-DOFAW may be best positioned to be the owner and leader of this priority due to their specialized wildland firefighting training and operational expertise. The other organizations identified in the priority, including the interim SFM identified in Priority 2, can assist by expanding response to the WUI and other types of emergencies.

## Priority 10. Vegetation and Land Management

Identify the state agency responsible for vegetation management of non-conservation areas and establish a framework for land owners to follow for responsible land management. Appropriate agencies to lead this effort include those with experience in natural resource and land management, zoning, education, and enforcement.

### *Findings and Recommendations Addressed\*:*

- Finding 9 (page 304) - Recommendations 1, 2, 3, 4, and 5
- Finding 10 (page 305) - Recommendations 1, 2, and 3
- Finding 11 (page 305) - Recommendation 1
- Finding 12 (page 305) - Recommendations 1 and 2
- Finding 13 (page 305) - Recommendations 1, 2, and 3
- Finding 78 (page 316) - Recommendation 1

## Recommendations for how to address Priority 10

Select a Priority 10 task owner from a state government organization.

Currently, there is no state organization tasked with developing or enforcing vegetation management guidelines, directives, or laws, and there is no framework governing responsible land management or related codes and policies that ensure public safety is prioritized in such land management practices. In other states, this is often the responsibility of the SFM, state forestry, and/or land management agency.

For this priority, the DLNR-DOFAW may have the most state agency experience in the design and implementation of vegetative fuels management for fire risk reduction, even though its efforts are restricted to conservation areas.

The HWMO currently provides training, best practice information, and mitigation planning support for vegetation management. They have also developed statewide vegetation management maps and reports, and collaborated with communities, land stewards, and agencies on small defensible space and fuel break projects.

Perhaps the owner of this priority is the DLNR-DOFAW with assistance from the interim SFM identified within Priority 2. Other relevant partners, such as the HWMO (described above) and UH Economic Research Organization (UHERO), who have initiated a study about the economics related to this issue, could also be engaged for an informed and collaborative approach to developing the action plan and framework.

# 3.0 COUNTY PRIORITIES AND RECOMMENDATIONS

## 3.0 County Priorities And Recommendations

The Lahaina Fire Incident Analysis Report (Phase Two) was released September 13, 2024. The report includes 84 Findings and 140 Recommendations. At the request of Governor Green, FSRI identified 10 key priorities for the State of Hawai'i to address to enhance wildfire safety statewide. The document was released September 30, 2024.

The follow-up to the state priority list is the county list. This list includes what the counties should focus on immediately to address the increasing threat of wildfire and urban conflagration (See Table 2). The 10 priorities draw on the recommendations from Phase Two that pertain to all Hawai'i counties and other published reports that include references to

the Lahaina Fire Findings and Recommendations.<sup>9</sup> Some of the priorities are consistent with the 10 priorities FSRI identified for the State.

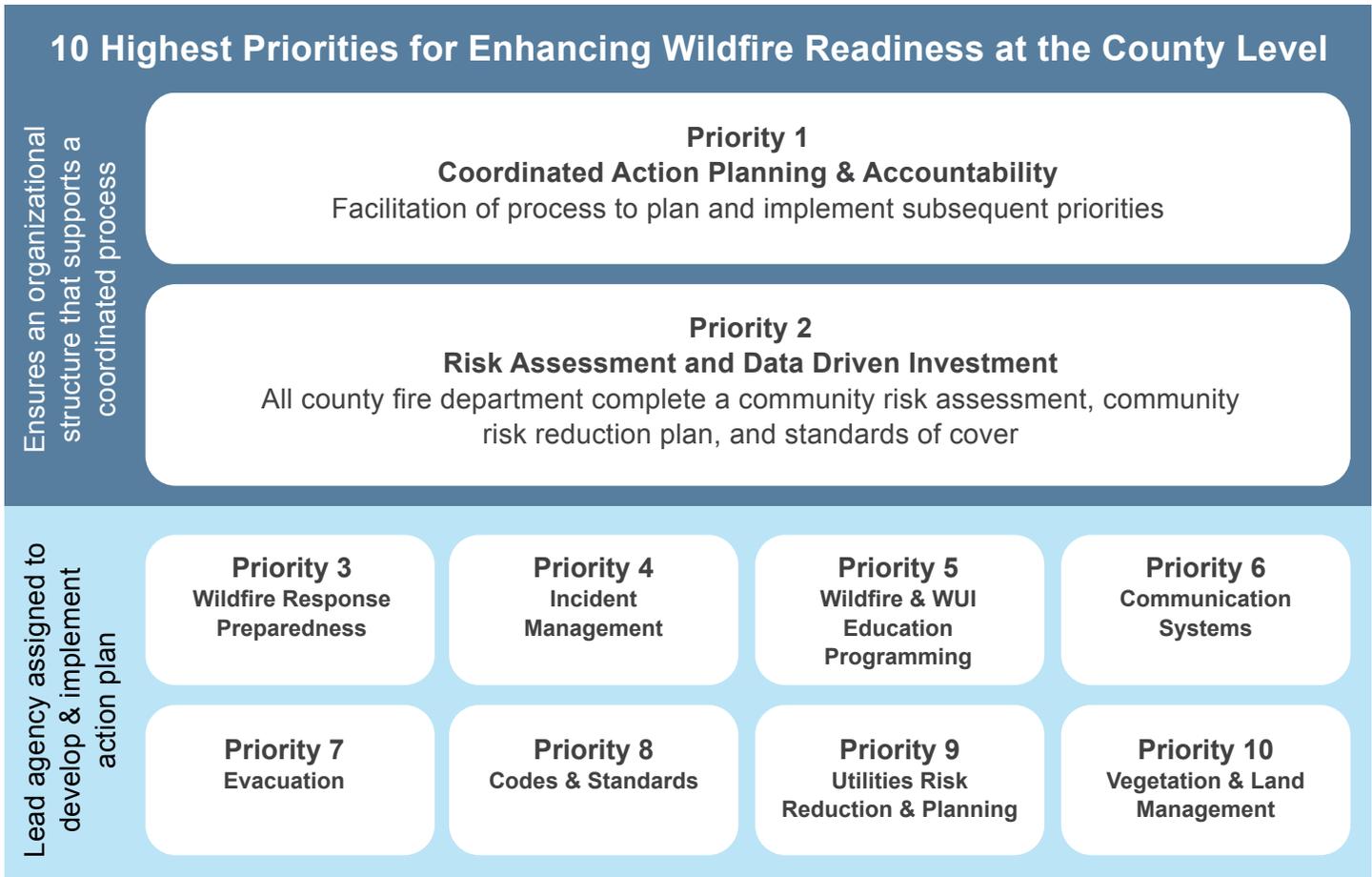
This streamlined approach provides a clear roadmap for the counties to initiate progress and take the critical first steps necessary to establish a solid foundation that supports future meaningful improvements. While these 10 priorities are crucial for immediate action, the remaining recommendations are also vital and should be urgently addressed to ensure comprehensive wildfire system improvements across each county.

The priorities were reviewed with each county fire chief. The chiefs provided valuable input that was incorporated within the document to make the “how” to implement more actionable and achievable for all counties.



# 3.0 COUNTY PRIORITIES AND RECOMMENDATIONS

Table 2. The 10 highest priorities for enhancing wildfire readiness at the county level.



## Priority 1. Coordinated Action Planning and Accountability

Assign county-based organizations — including fire, law enforcement, emergency management, the mayor’s office, county corporation counsel, water department, planning department, and public works — to prepare a preliminary action plan for addressing Phase Two Findings and Recommendations pertaining to their areas of responsibility. County-based representatives from the electrical utility provider, emergency medical services contractors, and state and federal agencies, such as DLNR-DOFAW, National Park Service, and Airport Rescue Fire Fighters (ARFF) and other relevant government

and non-governmental organizations (NGOs) involved in wildfire/WUI prevention, preparedness, and response should also engage in this exercise. Together, these entities can conduct the learning and research necessary to begin planning and taking action, and coordinate their work plans to best address the recommendations applicable to their organization.

### Findings and Recommendations Addressed\*:

- Finding 1 (page 303) - Recommendations 1 and 2

# 3.0 COUNTY PRIORITIES AND RECOMMENDATIONS

## Recommendations for how to address Priority 1

Assemble a Leadership Team to facilitate and oversee this coordinated multi-partner effort. The team should include experts in pre-suppression, suppression, and collaborative multi-system wildfire mitigation to guide effective wildfire planning across county agencies. This team will ensure stakeholder collaboration and alignment, while safeguarding the accuracy and adherence of technical components to best practices.

The Leadership Team could be responsible for the following:

- Scheduling and facilitating meetings with federal, state, inter-county, and NGO partners to foster a collaborative and unified approach to wildfire/WUI prevention, preparedness, and response

Each organization listed above should designate an internal lead and point of contact to serve as the Priority 1 Task Owner. This individual will be responsible for ensuring that the work remains on track and is effectively prioritized within their organization.

As the plans are being developed, a strategy for ensuring wildfire/WUI topics are appropriately prioritized is to include them within upper-, mid-, and lower-management meeting agendas. This can ensure the county's wildfire threat is given the consistent organizational attention required.

Each organization's Priority 1 Task Owner could be responsible within their organization for:

- Selecting wildfire/WUI agenda topics relevant to their organization
- Developing work plans to address these priority topics effectively
- Facilitating internal and external meetings to coordinate efforts and address organizational priorities

This priority sets the table for the subsequent priorities. The Leadership Team can encourage or ensure that as each county organization leads the development of their specific action plan, they should avoid working in isolation or reinventing existing processes, as this can lead to inefficiencies and fragmentation. Collaboration with other agencies and stakeholders is encouraged and essential to avoid duplication, competition, and potential harm. Achieving more cohesive and effective outcomes requires building on existing data, programs, and knowledge.



# 3.0 COUNTY PRIORITIES AND RECOMMENDATIONS

## Priority 2. Risk Assessment and Data Driven Investment

Each county fire department should complete a CRA and CRR plan according to NFPA 1300. All fire departments should also complete an SOC analysis. These analyses provide the data needed to identify the investment in fire department resources to comprehensively address fire risk, as well as all the other hazards that exist throughout each county.

### *Phase Two Findings and Recommendations Addressed\*:*

- Mentioned on page 302 of Summary

*Other sources of information that also address the need for the MFD to complete a risk assessment and SOC. These recommendations extend to all counties within the state.<sup>10 11 12</sup>*

## Recommendations for how to address Priority 2

Currently, the State contract with FSRI includes a CRA, CRR, and SOC for the MFD. Because wildfire and urban conflagration hazards exist within all four counties, it is highly recommended all four county fire departments conduct these critically important analyses if they have not been completed in the past five years. The analyses includes the following:

### Community Risk Analysis

The CRA evaluates and enumerates natural, technological, and societal contributors to the health and safety of county residents, businesses, and visitors. This assessment benefits from the active involvement of county residents and local businesses in community-centered discussions of risk perception, societal and cultural contributors to risk, and the impact of multiple factors in the county's risk profile.<sup>13</sup>

Data needed for this work primarily consists of

emergency incident, planning, and building information. Data should be de-identified (if needed), aggregated, and combined with data from other public and private sources, such as Census data, to characterize risk from all hazards across each county.

### Community Risk Reduction Plan

Based on the CRA, and in concert with community groups/partners, the comprehensive CRR is designed to provide realistic strategies to increase the resiliency of the county's residents, infrastructure, and environment. The plan describes actions that can be taken by individuals, community organizations, government agencies, and others to mitigate risks, prepare to actively address risks, and make long-term progress on addressing risk in the community.

The CRR planning process should recognize the vital cultural and historical attributes of each county community by including residents and local businesses at every stage.

Data for this work will include information from county fire department staff on past risk-reduction efforts and the viability of proposed risk-reduction strategies; ideally, fire department and emergency management staff should be directly involved with all facets of the CRR planning effort.

### Standards of Cover Analysis

An independent, comprehensive SOC analysis of the deployment and performance of a county fire department is required to objectively identify areas where additional resources are needed to help protect the community from all hazards.

This analysis will quantify the fire department's ability to deliver the capabilities described in NFPA 1710—Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments.

# 3.0 COUNTY PRIORITIES AND RECOMMENDATIONS

The SOC analysis is best conducted utilizing dynamic deployment modeling that considers the activity level of MFD response units and the interaction of these units with the County's EMS provider and mutual-aid resources (e.g., AMR, ARFF, DOFAW, etc.).

Data needed will primarily include computer aided dispatch (CAD) and fire department records management system (RMS) emergency incident information that is de-identified (if needed), aggregated, and analyzed without any personally identifiable information.

## Funding and Getting Started

Completion of the same analyses for Kaua'i, Hawai'i, and Honolulu county fire departments requires additional funding. Contracting for the same services for the three counties can be efficiently executed using the same request for proposal and statement of work that is agreed upon by the three counties.

Prior to securing funding, fire departments can begin gathering the data necessary for the three different analyses. The data elements are identified in NFPA 1300 and the FSRI SOC list (provided to each county fire department Priority 1 Task Owner upon request).

The HWMO can also be contracted to assist with assembling and analyzing the data needed for the CRA and CRR. The previous and current work performed by the HWMO, fire departments, and others will help inform the new CRA and CRR.

## Priority 3. Wildfire Response Preparedness

County fire departments, police departments, emergency management agencies, county-based DLNR-DOFAW, electrical utility providers, and

water companies to improve the coordination of wildfire preparedness and response of emergency responders across all agencies and private contractors to ensure the effective and efficient use of shared resources and to provide expectations for incident management organization.

### *Findings and Recommendations Addressed\*:*

- Finding 5 (page 303) - Recommendations 1 and 2
- Finding 6 (page 303) - Recommendation 1
- Finding 7 (page 303) - Recommendation 1
- Finding 8 (page 304) - Recommendation 1
- Finding 27 (page 308) - Recommendation 1
- Finding 28 (page 308) - Recommendation 1
- Finding 34 (page 309) - Recommendation 1
- Finding 35 (page 309) - Recommendation 1
- Finding 40 (page 309) - Recommendation 2
- Finding 46 (page 310) - Recommendation 1
- Finding 55 (page 311) - Recommendations 1 and 2
- Finding 59 (page 312) - Recommendations 1, 2, 3, 4, and 5
- Finding 60 (page 312) - Recommendations 1, 2, 3, and 4
- Finding 61 (page 313) - Recommendation 1
- Finding 62 (page 313) - Recommendations 1 and 2
- Finding 64 (page 313) - Recommendation 1
- Finding 65 (page 313) - Recommendation 1
- Finding 67 (page 313) - Recommendations 1 and 2
- Finding 68 (page 314) - Recommendations 1, 2, 3, 4, 5, and 6
- Finding 69 (page 314) - Recommendation 1
- Finding 70 (page 314) - Recommendation 1
- Finding 83 (page 317) - Recommendation 1

# 3.0 COUNTY PRIORITIES AND RECOMMENDATIONS

## Recommendations for how to address Priority 3

This priority requires the following steps to ensure assisting and cooperating agencies are prepared for wildfire/WUI response.

### Pre-incident Planning, Training, and Readiness

**Task 1** - Above listed organizations become familiar with existing Community Wildfire Protection Plans (CWPP). The objective of the review is for organizational leaders through local responders to become aware of wildfire hazards, built environment vulnerabilities, and where evacuation challenges exist. The CWPP serves as an introduction to learning about the level of wildfire risk in communities and where urban conflagration is a threat to life safety and property conservation. It also identifies community- and agency-identified priorities for wildfire protection and action.

**Task 2** - Fire departments enhance training to strengthen operational readiness during forecasted extreme conditions. Focus areas include initial attack strategies, structure defense tactics, utilizing alternative water sources, safely navigating electrical hazards, and effectively managing mop-up operations for wind-driven wildland and WUI fires.

**Task 3** - Fire departments and the DLNR-DOFAW use the CWPPs to develop electronic wildland pre-attack plans / structure defense maps. The maps serve as a reference tool for responders before and during an incident. Maps can include locations for

incident command posts, incident base, helispots, public temporary refuge areas, public safe refuge areas, safety zones, staging areas, pools, reservoirs, gates, evacuation routes, structure defense groups, and hydrant locations with connection sizes and municipal vs private identification. The maps should be accessible during incidents to all responders and updated annually or when changes occur. The process of creating and maintaining the maps can be codified in policy and procedure to ensure they are available and kept current.

**Task 4** - Initiate automatic / mutual aid agreement between county fire department and county-based DLNR-DOFAW for joint response to all vegetation fires. This allows for more wildland capable resources on scene for initial attack, and for incidents requiring significant mop-up.

**Task 5** - Fire departments and the DLNR-DOFAW establish a system to track fleet readiness to ensure preparedness of reserve/relief emergency apparatus prior to forecasted weather events. The report should be available via a web based platform so officers know the real time status of vehicles as listed by apparatus identification, type, and location. This can be codified in policy and procedure to ensure it is adhered to.

**Task 6** - Fire departments and county-based DLNR-DOFAW work with private heavy equipment companies (and operators) to establish wildland firefighting expectations/standards addressing training, equipment, personal protective equipment, and operational performance.



# 3.0 COUNTY PRIORITIES AND RECOMMENDATIONS

## Weather Tracking and Response

**Task 7** - Fire and emergency departments should assign a dedicated individual or team responsible for tracking and consistently monitoring NWS fire weather forecasts, fire weather products, drought monitors, real-time conditions, and fuel conditions. This critical information should be regularly communicated to leadership and operational staff on a daily basis or as updates occur to support informed decision making and operational readiness.

**Task 8** - During wildfire season (as per county incident data), fire departments and county based DLNR-DOFAW should consider having operational conference calls with officers to share weather and fuels information, reserve/relief unit status, augmented staffing plan, and other operational preparedness issues. This can be codified in policy and procedure to ensure it is adhered to.

**Task 9** - When fire weather, or other significant weather events, are forecasted it is recommended the NWS brief fire departments, police departments, county-based DLNR-DOFAW, county-based National Park Service, electrical utility provider, public works, water department, and other cooperating agencies on expected severity of conditions and provide preparedness recommendations.

**Task 10** - Fire departments, county-based DLNR-DOFAW, and electrical utility providers should consider establishing an augmented staffing plan triggered when fire weather and/or other severe weather conditions are forecasted. The parameters for augmented staffing should be related to fire history, weather, and fuel. Analyzing when, where, and how big fires burn in relation to weather and fuels data can land decision makers on a probability of large growth where augmented staffing could make a difference in controlling the fire when it is small. Augmented staffing can also be implemented at different levels.

A basic augmented staffing plan may consist of staffing the water tenders/tankers with an additional firefighter. A more robust plan could include wildland apparatus staffed with two to four personnel, a select number of relief apparatus being positioned and staffed in high risk areas, a chief officer assigned to dispatch, and a Type 3 incident management team on call status. The augmented staffing process should be codified in policy and procedure so it is clear what weather and fuel parameters are being evaluated to trigger staffing, and to identify the individual (role/rank) responsible for making the decision.



# 3.0 COUNTY PRIORITIES AND RECOMMENDATIONS

## Priority 4. Incident Management

County emergency management agency, fire department, and law enforcement work with HI-EMA and SFM to develop and implement a statewide incident management training, qualification, and response framework consistent with the National Incident Management System (NIMS<sup>14</sup>) and in alignment with Homeland Security Presidential Directive 5.<sup>16</sup>

### *Findings and Recommendations Addressed\*:*

- Finding 40 (page 309) - Recommendations 2 and 3
- Finding 41 (page 310) - Recommendation 1
- Finding 44 (page 310) - Recommendations 1 and 2
- Finding 46 (page 310) - Recommendation 1
- Finding 47 (page 310) - Recommendation 1
- Finding 50 (page 311) - Recommendation 1
- Finding 51 (page 311) - Recommendation 1
- Finding 52 (page 311) - Recommendations 1 and 2
- Finding 55 (page 311) - Recommendations 1 and 2
- Finding 56 (page 311) - Recommendation 1
- Finding 57 (page 312) - Recommendations 1 and 2
- Finding 59 (page 312) - Recommendation 3

## Recommendations for how to address Priority 4

Although individuals from state and county emergency management and response agencies complete some NIMS courses, currently there is no standardized incident management framework for the State of Hawai'i. Establishing a NIMS framework for all county emergency management agencies, fire departments, police departments, and cooperating support agencies ensures consistent incident management preparation and operations. The NIMS framework and associated National

Wildfire Coordinating Group (NWCG) training and qualification standards provide structure that can be adapted and scaled to organizational size and response demands. Additionally, standardized training and a unified incident management framework enable reliable personnel sharing and seamless support across agencies.

This commitment to a standard should be codified in state and county regulations.

## Priority 5. Wildfire and Wildland Urban Interface (WUI) Education Programming

Provide educational programming and risk reduction support for the diversity of audiences across the county regarding wildfire preparedness. Programming to include mitigation best practices, defensible space and vegetation management, fire weather, and fire behavior. Develop and implement a plan for ongoing financial support for this programming.

### *Findings and Recommendations Addressed\*:*

- Finding 11 (page 305) - Recommendation 1
- Finding 13 (page 305) - Recommendation 1
- Finding 18 (page 306) - Recommendation 4
- Finding 37 (page 309) - Recommendation 1
- Finding 39 (page 309) - Recommendation 1
- Finding 75 (page 316) - Recommendations 2 and 3

# 3.0 COUNTY PRIORITIES AND RECOMMENDATIONS

## Recommendations for how to address Priority 5

The recommendations outlined in the State's list can also be applied at the county level.

Contract with the HWMO to prepare and implement wildfire education programming. This would help maintain consistent messaging statewide. These programs and resources, co-developed with county and state fire agencies, are already being collaboratively implemented. Ensuring financial investment in these programs is essential to their success, enabling them to function effectively, meet community needs, and drive the critical shift from community and land manager wildfire awareness to proactive mitigation action.

## Priority 6. Communication Systems and Planning

County emergency management agency to coordinate with HI-EMA to assess the resiliency and functionality of public emergency communication systems and the OWSS, and establish redundant public alerting and warning processes, including best practice messaging guidance. This priority also extends to: preparing plans for how different forms of public emergency communications will be executed and ensuring interoperability of emergency responder communications.

### *Findings and Recommendations Addressed\**:

- Finding 36 (page 309) - Recommendation 1
- Finding 37 (page 309) - Recommendation 1
- Finding 39 (page 309) - Recommendation 1
- Finding 75 (page 316) - Recommendations 1 and 2

## Recommendations for how to address Priority 6

County emergency management, fire department, and law enforcement should work closely with telecommunications providers and the Hawai'i Association of Broadcasters (HAB) to assess the functionality and resilience of communications systems in each high-hazard area of the counties, and to develop plans for how each public emergency communications form will be used. These organizations can inform emergency managers and responders of the strength and vulnerabilities of the telecommunications infrastructure, and determine how radio can be used more effectively to communicate alerts and updates when electrical and telecommunications infrastructure is compromised.

County emergency management should also work closely with HI-EMA to understand the functionality and resilience of the OWSS in each high-hazard area. Other organizations that can assist include county-based DLNR-DOFAW (could provide wildfire input), NWS, and Hawaiian Electric (may be able to help with addressing resilient electrical power options).

County agencies follow best practices to ensure alerts include language that is clear, concise, and standardized. Achieving interoperability of emergency responder communications requires planning and investment. This should start with fire, law enforcement, and emergency management working together to ensure investment in infrastructure and radio equipment achieves reliable interoperability.

# 3.0 COUNTY PRIORITIES AND RECOMMENDATIONS

## Priority 7. Evacuation

County law enforcement, fire, emergency management, and planning agencies should collaborate to prepare a standardized methodology and format for documenting and executing evacuation plans for high wildfire risk areas.

### *Findings and Recommendations Addressed\*:*

- Finding 16 (page 306) - Recommendation 1
- Finding 17 (page 306) - Recommendation 1
- Finding 18 (page 306) - Recommendations 1 and 3
- Finding 19 (page 306) - Recommendations 1 and 2
- Finding 71 (page 314) - Recommendations 1 and 2
- Finding 72 (page 315) - Recommendations 1, 2, 3, 4, 5, and 6
- Finding 76 (page 316) - Recommendations 1, 2, and 3

### Recommendations for how to address Priority 7

County emergency management, police departments, and fire departments should develop evacuation plans based on known and anticipated evacuation needs. County emergency management and law enforcement agencies should coordinate with the state DLE to ensure consistency with the state evacuation planning format. Coordination with the HWMO is also helpful to learn where the wildfire risk areas are located throughout the state, where these risks are expanding to, and which communities currently have neighborhood evacuation plans and safe refuge locations already identified and/or developed. Coordinate local community efforts to develop neighborhood-specific evacuation plans that align seamlessly with broader agency evacuation strategies.

## Priority 8. Codes and Standards

County fire departments (prevention chiefs) and county planning departments should evaluate and enhance the review and adoption processes for codes and standards, ensuring they are driven by public safety and effectively address wildfire risks, particularly in the WUI. Focus on aligning and coordinating codes to reduce fire risks to the built environment, while simultaneously building the capacity needed for plans review, permitting, inspection, and enforcement. Organizational structures should be prioritized and appropriately staffed to adopt and implement updated codes efficiently, reflecting the county's wildfire threat and fostering a unified approach to wildfire resilience.

### *Findings and Recommendations Addressed\*:*

- Finding 14 (page 305) - Recommendation 3
- Finding 15 (page 306) - Recommendation 1
- Finding 77 (page 316) - Recommendation 2
- Finding 78 (page 316) - Recommendation 1
- Finding 80 (page 316) - Recommendation 2

### Recommendations for how to address Priority 8

County fire department prevention chief tracks SFM, SFC and HBCC code amendment and adoption progress. The chief can also review code adoptions and amendments of other states and counties with similar wildfire and built environment risk. The work other states are doing in this area can inform next steps for county codes adoption and amendment process. The county prevention chief should also work closely with the ICC, the NFPA, and other code and standards stakeholders to complete this priority.

# 3.0 COUNTY PRIORITIES AND RECOMMENDATIONS

## Priority 9. Utilities Risk Reduction and Planning

County fire departments and public utilities (electric and water) should identify immediate improvements to vegetation management programs to harden and protect infrastructure from wildfire, prevent utility-ignited fires, and enhance overall resiliency. Additionally, they should develop guidelines to support incident management, operations, and responder safety.

### *Findings and Recommendations Addressed\*:*

- Finding 29 (page 308) - Recommendation 1
- Finding 31 (page 308) - Recommendation 1
- Finding 56 (page 311) - Recommendation 1

### Recommendations for how to address Priority 9

While the State is working with the HPUC to develop vegetation management guidelines/regulations for electrical installations, the county fire department should work with local electrical utilities in the same effort, while also developing incident management operations and a responder safety training program.

Responder safety training programs related to compromised electrical infrastructure should include evidence-based practices for firefighters and police officers. Programs should be codified in agency policies.

This priority should complement Hawaiian Electric's ongoing efforts toward wildfire prevention and preparedness.<sup>16</sup>

## Priority 10. Vegetation and Land Management

Identify a county agency to work with the state agency responsible for vegetation management of non-conservation areas and establish a framework for land owners to follow for responsible land management. Appropriate agencies to lead this effort include those with experiences in natural resource and land management, zoning, education, and enforcement.

### *Findings and Recommendations Addressed\*:*

- Finding 9 (page 304) - Recommendations 1, 2, 3, 4, and 5
- Finding 10 (page 305) - Recommendations 1, 2 and 3
- Finding 11 (page 305) - Recommendation 1
- Finding 12 (page 305) - Recommendations 1 and 2
- Finding 13 (page 305) - Recommendations 1, 2, and 3
- Finding 78 (page 316) - Recommendation 1



# 3.0 COUNTY PRIORITIES AND RECOMMENDATIONS

## Recommendations for how to address Priority 10

Currently, there is no state or county organization tasked with developing or enforcing vegetation management guidelines, directives, or laws, and there is no framework governing responsible land management or related codes and policies that ensure public safety is prioritized in such land management practices. In other states, this is often the responsibility of the SFM, or state/county forestry agency.

For this priority, the DLNR-DOFAW may have the most experience in the design and implementation of vegetative fuels management for fire risk reduction, even though its efforts are restricted to conservation areas.

The HWMO currently provides training, best practice information, and mitigation planning support for vegetation management. They have also developed statewide vegetation management maps and reports, and collaborated with communities, land stewards, and agencies on small defensible space and fuel break projects.

Perhaps the owner of this priority is the county-based DLNR-DOFAW unit, with assistance from individuals from the fire department and planning department.

Engagement of the departments with the capacity to inspect and enforce is necessary due to land owners receiving notification to maintain properties, in accordance with local codes and ordinances. Counties not having a local vegetation management policy should adopt one, following national best practices for clearance around structures and management of large parcels. How land owners comply with vegetation management mandates must adhere to best practices,

evidence-based research, and following ecological and environmental preservation standards. Other relevant partners, such as the HWMO (described above) and UHERO, which has initiated a study about the economics related to this issue, could also be engaged for an informed and collaborative approach to developing the action plan and framework.

Owners and managers of large vegetated land parcels in wildland or unmaintained agricultural areas should be actively engaged to promote education and encourage voluntary compliance. Additionally, they should provide critical information to aid response efforts, including gate accessibility, points of contact, staging areas, access routes, and available water resources.



## 4.0 FIRE CODE AND BUILDING CODE REVIEW



### 4.0 Fire Code and Building Code Review

A component of the Phase Three report is a comprehensive independent review of the efficacy of current building and fire codes in Maui, including the present status of code implementation, education, and enforcement in place at the time of the August 8, 2023, Maui wildfires.

Although the information available from public facing websites (see footnotes) captures the code and standards adoption elements and processes in place on and before August 8, 2023, evaluating the efficacy of the current system requires additional data. The Phase Three components of CRA and the CRR planning process will provide data needed to determine how the prevention resources and investment effectively address the risks in Maui Nui. Furthermore, understanding the efficacy of fire prevention efforts statewide requires CRAs and CRRs to be completed by the counties of Kaua'i, Hawai'i, and Honolulu, as recommended within Section 3.

FEMA's Mitigation Assessment Team's (MAT) Recovery Advisories and Report on Codes, Standards and Permitting<sup>17</sup> also includes a review of the code adoption process while also providing recommendations for addressing deficiencies.

# 4.1 BUILDING AND FIRE CODES IN THE STATE OF HAWAII

## 4.1 Building and Fire Codes in the State of Hawai'i

This section presents an overview of the State of Hawai'i and County of Maui building and fire codes that were in place prior to the August 2023 Maui wildfires. Applicable codes and regulations are included along with a profile of the established code administration programs in place for building safety and fire prevention programs as they were prior to the Maui wildfires.

### 4.1.1 Hawai'i State Building Code Council

The State Building Code Council (SBCC), authorized by Hawai'i Revised Statutes (HRS) §107-22,<sup>18</sup> establishes state building codes through the adoption and amendment of nationally recognized model building codes on a three year cycle.<sup>19 20</sup> The SBCC is comprised of 11 voting members and one non-voting member as described below:

- Four county building officials, one from each of the four counties, appointed by the mayor
- One member representing the SFC
- One member representing the Department of Labor and Industrial Relations who has significant experience in elevator safety
- One member representing the State Energy Office of the Department of Business, Economic Development, and Tourism
- One member representing the Structural Engineers Association of Hawai'i
- One member representing the American Institute of Architects, Hawai'i State Council
- One member representing the Building Industry Association of Hawai'i or the General Contractors Association of Hawai'i, who has significant experience with building codes, with alternating

four-year terms between the two organizations and the first four-year term to be served by the Building Industry Association of Hawai'i

- One member representing the Subcontractors' Association of Hawai'i who has significant experience with building codes

HRS §107-23<sup>21</sup> directs the SBCC to appoint an executive director with administrative abilities and experience with the building industry. Separately, HRS §107-23 directs the SBCC to appoint an executive assistant with experience in statutory and administrative rulemaking processes to assist in carrying out the duties of the council. The salaries of the executive director, executive assistant, and other staff are to be included annually in the budget of DAGS. These positions have not been appointed or funded since their creation in 2007.

#### 4.1.1.1 Hawai'i State Building Codes

The approved building codes adopted by the SBCC, referred to comprehensively as the *Hawai'i State Building Code Rules*, in effect at the time of the Maui wildfires were:

- The latest fire code adopted by the Hawai'i SFC (detailed in Section 4.1.2)
- The 2018 edition of the *International Building Code* (IBC)<sup>©22</sup> with state amendments<sup>23</sup>
- The 2018 edition of the *International Existing Building Code*<sup>©24</sup> with state amendments<sup>25</sup>
- The 2020 edition of the *National Electrical Code* (NEC)<sup>©26</sup> with state amendments<sup>27</sup>
- The *Hawai'i State Elevator Code*<sup>28</sup>
- The 2018 edition of the *International Energy Conservation Code* (IECC)<sup>©29</sup> with state amendments<sup>30</sup>
- The 2018 edition of the *Uniform Plumbing Code*<sup>©31</sup> with state amendments<sup>32</sup>

# 4.1 BUILDING AND FIRE CODES IN THE STATE OF HAWAII

- The 2018 edition of the *International Residential Code (IRC)*©<sup>33</sup> with state amendments<sup>34</sup>
- Hawaii design standards to implement Act 5, Special Session Laws, 2005<sup>35</sup> as applicable to emergency shelters and essential government facilities

## 4.1.2 Hawaii State Fire Council

The Hawaii SFC,<sup>36</sup> authorized under HRS §132-16,<sup>37</sup> is organized under the Department of Labor and Industrial Relations. Hawaii does not currently have an appointed SFM or have a SFM's Office.

The SFC is comprised of the fire chiefs from Hawaii's four major counties - Hawaii County, Honolulu County, Kauai County, and County of Maui. With a population under 100 people,<sup>38</sup> Kalawao County and the Village of Kalawao on Molokai are not represented on the SFC. The State Fire Council is supported by four staff<sup>39</sup>— two administrative specialists, a program specialist, and a secretary.

Under HRS §132-3,<sup>40</sup> the SFC is charged with adopting a state fire code that sets minimum requirements for the protection of persons and property from fire loss. This charge includes setting minimum requirements for the storage, handling, and use of hazardous materials and in controlling conditions considered hazardous to life or property in the design, use, or occupancy of buildings or premises.

While the Hawaii SFC adopts the state fire code, the SBCC is the authorized body to develop and adopt a comprehensive building code package for the state. The SFC Representative to the SBCC carries the State Fire Code Council's position and any concerns to the SBCC. Ultimately, the SBCC develops, adopts, and promulgates a comprehensive building code package which includes the state fire code.

FSRI anticipates there will be legislation introduced in the Hawaii Legislature's upcoming 2025 session that will create an attached agency for the SFM, which will alter some of the duties and responsibilities of the SFC, if passed.

## 4.1.3 Hawaii State Fire Codes

The Hawaii SFC adopted the *NFPA 1, Fire Code*©, 2018 Edition, as amended as the state fire code on September 10, 2020. The HBCC moved to adopt the *NFPA 1, Fire Code*© 2018 Edition,<sup>41</sup> as amended on January 19, 2021 as part of its comprehensive building code package (detailed above in Section 4.1.1.1).

## 4.1.4 Governor's Affordable Housing Initiative and the State Building Codes

On July 17, 2023, prior to the Maui wildfires, the Governor of Hawaii issued an Emergency Proclamation<sup>42</sup> relating to housing that suspended the ability of the SBCC to amend or update state building codes. By statute, this also precludes both the SFC and the SBCC from amending or updating the state fire code. This action was taken as part of a broader effort by the Governor to control home prices and encourage construction of additional residential dwellings throughout the state.

On September 15, 2023, the Governor's Emergency Proclamation<sup>43</sup> was amended and renewed following the Maui wildfires. This version of the Emergency Proclamation continued the suspension of the SBCC's authorities to amend or update the *Hawaii State Building Codes*. However, this version also included amended language allowing Hawaii's counties to update their county building codes as authorized by law.

## 4.1 BUILDING AND FIRE CODES IN THE STATE OF HAWAI'I

Subsequent amendments to the Governor's Emergency Proclamation continue to uphold the suspension of the SBCC's authorities to amend or update the *Hawai'i State Building Codes*. Amended proclamations were published:

- October 24, 2023 - Second Proclamation.<sup>44</sup> Does not apply to the area affected by the Lahaina wildfire. Statement and map included within all subsequent Proclamations.
- December 22, 2023 - Third Proclamation<sup>45</sup>
- January 18, 2024 - Fourth Proclamation<sup>46</sup>
- February 20, 2024 - Fifth Proclamation<sup>47</sup>
- April 19, 2024 - Sixth Proclamation<sup>8</sup>
- June 18, 2024 - Seventh Proclamation<sup>49</sup>
- August 15, 2024 - Eighth Proclamation<sup>50</sup>
- October 10, 2024 - Ninth Proclamation<sup>51</sup> Places a pause on the automatic adoption of county building codes, giving the counties additional time to review, amend and adopt the latest state and national building codes to suit their particular safety and design standards and needs.

Suspending the automatic adoption of the latest codes will allow the State and counties to leapfrog over amending the 2021 statewide and model codes and focus their review efforts on the 2024 codes. This will provide more consistency and stability in the construction of affordable housing.<sup>52</sup>

As per the SBCC website,<sup>53</sup> and as required by HRS§107-24(c),<sup>54</sup> the following building codes without amendments from HBCC, have automatically become part of the *Hawai'i State Building Code* package:

- State Building Code – 2021 IBC (Unamended)<sup>55</sup>
- State Residential Code – 2021 IRC (Unamended)<sup>56</sup>
- State Energy Code – 2021 IECC (Unamended)<sup>57</sup>
- State Fire Code – 2021 NFPA 1 (As amended by the SFC)<sup>58</sup>
- State Plumbing Code – 2021 UPC (Unamended)<sup>59</sup>
- State Electrical Code – 2023 NFPA 70 (Unamended)<sup>60</sup>



## 4.2 BUILDING CODES IN THE COUNTY OF MAUI

### 4.2 Building Codes in County of Maui

The general ordinances of the County of Maui, Hawai'i, are codified and published as *The Code of the County of Maui, Hawai'i*.<sup>61</sup> The County of Maui's building codes are published in *Title 16 - Buildings and Construction*<sup>62</sup> of The Code of Maui County, Hawai'i. The approved building codes adopted and enforced by the County of Maui's at the time of the Maui wildfires were:

- Chapter 16.08A - Residential Code based on the *International Residential Code*®, 2006 edition as amended
- Chapter 16.16C - Energy Code based on the *International Energy Conservation Code*®, 2018 edition as amended, as adopted by the State Building Code Council on December 15, 2020
- Chapter 16.18B - Electrical Code based on the *NFPA 70, National Electrical Code*®, 2008 Edition as amended
- Chapter 16.20C - Plumbing Code based on the *Uniform Plumbing Code*®, 2018 Edition as amended
- Chapter 16.26B - Building Code based on the *International Building Code*®, 2006 Edition as amended

#### 4.2.1 County of Maui Building Code Discussion

The County of Maui's promulgation and on-going use of both the *International Residential Code*® and the *International Building Code*®, 2006 editions, as amended, were, for several years, inconsistent with HRS §107-28. Hawai'i statute prescribes that, "Each county shall amend and adopt the *Hawai'i State Building Codes* and standards listed in section 107-25, as the referenced *Hawai'i State Building Codes* and standards for its respective county building code ordinance, no later than two years after the adoption of the *Hawai'i State Building Codes*."

#### 4.2.2 County of Maui Building Code - 2023 Updates

In April 2023, prior to the wildfires, the County of Maui adopted revised ordinances<sup>63</sup> to update and amend the county's building codes. While not published in *The Code of the County of Maui, Hawai'i* in its May 31, 2023, version, the April 2023 ordinance included updates to and adoption of:

- Chapter 16.08B - Residential Code based on the *International Residential Code*®, 2018 edition with state amendments (county amendments to be determined)
- Chapter 16.10 \*New Code/New Chapter\* - Existing Building Code based on the *International Existing Building Code*®, 2018 edition with state amendment (county amendments to be determined)
- Chapter 16.16C - Energy Code based on the *International Energy Conservation Code*®, 2018 edition as amended
- Chapter 16.25 \*New Chapter\* - Building Code Administrative and Supplemental Provisions
- Chapter 16.26C - Building Code based on the *International Building Code*®, 2018 edition as amended
- Chapter 16.18B - Electrical Code was not changed and remained on the *NFPA 70, National Electrical Code*®, 2008 Edition as amended
- Chapter 16.20C - Plumbing Code was not changed and remained on the *Uniform Plumbing Code*®, 2018 Edition as amended

The enabling ordinances took effect on approval. However, as specified within the ordinances, the County of Maui only began enforcing the updated editions of the codes on October 28, 2023, 180 days following their approval and after the August 2023 wildfires.

## 4.2 BUILDING CODES IN THE COUNTY OF MAUI

### 4.2.3 The County of Maui Building Code Administration

The County of Maui Development Services Administration (DSA) administers the County's subdivision, building, electrical, plumbing, grading, and other construction related ordinances.

#### 4.2.3.1 Organization of the County of Maui DSA

At the time of the Maui wildfires, the County of Maui DSA was one of three organizational elements under the direction and oversight of the County of Maui Department of Public Works.<sup>64</sup> These included the DSA, the Engineering Division, and the Highways Division.

The County of Maui DSA was organized into seven sections:

- Building Plans Review Section
- Building Permit Section
- Building Inspection Section
- Civil Construction and Inspection Section
- Electrical Permit and Inspection Section
- Plumbing Permit and Inspection Section
- Subdivision Section

#### 4.2.3.2 The County of Maui DSA Budget and Personnel

The County of Maui DSA operates under the *Maui County Council Adopted Budget*. The Fiscal Year 2024 adopted budget, which was in effect during the Maui wildfires, began July 1, 2023, and ended on June 30, 2024. The DSA is funded under two separate lines of effort:



## 4.2 BUILDING CODES IN THE COUNTY OF MAUI

The Development Services Administration Program,<sup>65</sup> funded by the Maui County General fund.

FY 2024 Adopted: \$2,822,519

Personnel: 21

Description: The DSA Program is primarily responsible for the administration of subdivision, building, electrical, plumbing, grading, driveway, roadway, and other construction codes. It also provides staff support for the Public Works Commission and the Board of Variances and Appeals.

See Table 3



Table 3. Developmental Services Administration Program Staffing.

Position Title	2024 Adopted
Development Services Operation Clerk	1
Electrical Engineer III	1
Electrical Engineer IV	1
Electrical Engineer V	1
Electrical Inspector II	4
Engineering Support Technician I	1
Land Use & Building Plans Examiner	1
Land Use & Codes Building Permit Clerk	3
Plumbing Inspector II	4
Secretary II	1
Specialty Plan Examiner I	1
Specialty Plan Examiner II	1
Supervisor Land Use/Build Plans Examiner	1
<b>Program Total</b>	<b>21</b>

## 4.2 BUILDING CODES IN THE COUNTY OF MAUI

The DSA - Building Permit Program,<sup>66</sup> funded by the Maui County DSA Revolving Fund.

FY 2024 Adopted: \$1,921,800

Personnel: 19

The DSA - Building Permit Program collects a plan review fee from each building permit applicant. The fees are deposited into a revolving fund for the purpose of facilitating the building permit process. The program performs plan check and inspection services, as well as permit clerk services, which include distribution, monitoring of permit status, and maintaining the permit tracking system.

See Table 4

Table 4. Developmental Services Administration Building Program Staffing.

Position Title	2024 Adopted
Chief Building Plans Examiner	1
Civil Engineer IV	1
Clerk III	1
Computer Applications Support Technician III	1
Computer Applications Support	0
Electrical Inspector II	1
Engineering Construction Clerk	1
Engineering Support Technician II	2
Land Use & Building Plans Examiner	3
Land Use & Building Plans Technician	1
Land Use & Codes Building Permit Technician	3
Land Use & Building Plans Technician	1
Specialty Plans Examiner III	1
Supervising Building Inspector	1
Supervising Plumbing Inspector	1
<b>Program Total</b>	<b>19</b>

## 4.3 FIRE CODES IN COUNTY OF MAUI

### 4.3 Fire Codes in County of Maui

*The Code of the County of Maui, Hawai'i*, Chapter 16.04D<sup>67</sup> incorporates the *NFPA 1, Fire Code*®, 2018 Edition as amended.

The County of Maui passed Ordinance 5451 on November 23, 2022, which included amendments to *NFPA 1, Fire Code*, 2018 edition, specifically addressing vegetation management.<sup>68</sup> The amendment within Subsection 10.13.10 within Ordinance 5451 extends authority to the fire department to require property owners to mitigate the vegetation around structures and to establish and maintain fuel breaks when deemed necessary.



#### 4.3.1 County of Maui Fire Code Administration

The County of Maui Department of Fire & Public Safety's (MFD) Fire Prevention Bureau administers the County of Maui Fire Code. The Fire Prevention Bureau provides services including plan review, permitting, code enforcement, fire education, and fire investigation.<sup>69</sup>

#### 4.3.2 Organization of the County of Maui Department of Fire & Public Safety

At the time of the wildfires, the MFD<sup>70</sup> was organized across five verticals:

- Fire Administration
- Training/Health & Safety
- Fire/Rescue Operations
- Fire Prevention
- Ocean Safety

The Fire Prevention Bureau was led by two Captains who reported to the Assistant Fire Chief of Support Services. The Assistant Chief of Support Services reported to the Deputy Fire Chief, who in turn reported to the Fire Chief.

#### 4.3.3 Fire Prevention Bureau and Personnel

The Fire Prevention Bureau operates under the *Maui County Council Adopted Budget*. The Fiscal Year 2024 adopted budget, which was in effect during the Maui wildfires, began July 1, 2023, and ended on June 30, 2024. The Fire Prevention Bureau is funded under three lines of effort:

## 4.3.3 FIRE PREVENTION BUREAU AND PERSONNEL

The Fire Prevention Program, funded by the Maui County General fund.

FY 2024 Adopted: \$1,493,093

Personnel: 12

Description: The Fire Prevention Program<sup>71</sup> is comprised of two Captains, two Firefighter IVs, six Firefighter IIIs, an Account Clerk III, and an Office Operations Assistant II. Its primary function is to reduce the likelihood of fires and minimize their various impacts to life, property, and the environment. It accomplishes this primarily through plans review, inspections, permitting, fire investigation, and public education.

See Table 5

Table 5. Maui Fire Department Fire Prevention Program Staffing.

Position Title	2024 Adopted
Account Clerk III	1
Fire Captain	2
Firefighter III	6
Firefighter IV	2
Office Operations Assistant II	1
<b>Program Total</b>	<b>12</b>



## 4.3.3 FIRE PREVENTION BUREAU AND PERSONNEL

### The Plan Review, Processing, and Inspection Revolving Fund; and The Fire Hazard Removal Revolving Fund<sup>72</sup>

**FY 2024 Adopted: \$474,289**

#### **Personnel: 2**

Description: The Plan Review, Processing, and Inspection Revolving Fund was established for the collection of fees for the review of plans and specifications submitted under section 132-9, HRS. Funds are to be expended for the salaries of two Firefighter IVs (plan reviewers), contracts, materials, supplies, equipment, payment of overtime, travel expenses, and training that will facilitate plans review, public education, fire investigation, permit processing, and inspections.

The Fire Hazard Removal Revolving Fund provides for the clearing of brush and debris from parcels that have been deemed as a fire hazard. The costs are recoverable against the owner or occupant of the property.

See Table 6

Table 6. Maui Fire Department Plan Review, Processing, and Inspection Revolving Fund Program Staffing.

Position Title	2024 Adopted
Firefighter IV	2
<b>Program Total</b>	<b>2</b>



## 4.4 MAUI RECOVERY PERMITTING CENTER

### 4.4 Maui Recovery Permitting Center

On April 29, 2024, the County of Maui opened a Recovery Permitting Center (RPC) in Kahului. The RPC is staffed with members from 4LEAF, Inc. the same company that led the recovery effort in Paradise, California, after the Camp Fire in 2018. Maui's RPC is expediting the processing of permits for alterations, repairs, reconstruction, and new construction of structures in areas affected by the August 2023 Maui wildfires. The Maui Recovers dashboard<sup>73</sup> shares permits issued to date.



# 5.0 STATE FIRE MARSHAL REVIEW

## 5.0 State Fire Marshal Review

On July 5, 2024, Governor Green signed Senate Bill 2085,<sup>74</sup> establishing the OSFM and re-establishing the position of the SFM that had been abolished in 1979 and replaced with the SFC.

Staffing the OSFM is expected to take time. As recruitment, selection, and hiring takes place, the state will be required to engage in critical fire safety work.

Within FSRI's 10 Highest Priorities for Enhancing Wildfire Readiness in Hawai'i document (Section 2.0), Priority 2 includes recommendations for contracting with the HWMO to perform in a project management role to ensure the State's 10 priorities are addressed, while also serving as an interim leader to address the system components of Phase Two that will, ultimately, be the responsibility of the SFM.

Since October 2024, FSRI has met with state legislators, Office of the Attorney General staff, and members of the Governor's Climate Action Team to

discuss the content of the State's 10 Highest Priority document (Section 2.0). Regarding the OSFM, FSRI has shared the following recommendations:

- Substantially increasing the budget from the \$172,000 allotted within Act 209 for the staffing of the OSFM<sup>75</sup>
- Identification of sustainable funding sources to ensure a functional annual budget
- Bolstering statutory authority required to address the wide spectrum of fire safety issues and to delineate responsibilities and reporting structures between the SFM and SFC
- Creating an organizational structure required to immediately address the 10 State Priorities effectively and other fire safety priorities unrelated to those mentioned in Phase Two<sup>76</sup>

On November 25, 2024, the Director of Labor and Industrial Relations (DLIR) provided the SFC's, SFM report to the legislature as per Act 209. The report includes duties and responsibilities, organizational structure within DLIR, proposed operating budget, and staffing model options.<sup>77</sup>



## 6.0 SUMMARY

### 6.0 Summary

In the United States of America, the destruction and loss of life caused by the Maui fires of August 8-9, 2023, are unprecedented in modern times. Recognizing the complexity of this incident, FSRI used a systems analysis methodology to comprehensively examine the many contributing factors to the August 2023 fire event in Lahaina. It is vital to reiterate, as demonstrated throughout this report, that no single factor is, or set of factors are, directly responsible for the tragic outcome. The pre-conditions for these fires have been in the making for decades, stemming from the changing landscape of Maui Nui, more frequent extreme weather events, and the increased frequency of vegetation-fueled fires. It is important to note these same conditions exist across the State of Hawai'i, in numerous other locations throughout the United States, and around the globe.

This Lahaina Fire Forward-Looking Report (Phase Three) details priorities and recommendations that can begin to be implemented by state and county leaders today to prevent future tragedies like those that took place on August 8-9, 2023. Several of these recommendations will be challenging to implement, and will demand collaboration amongst local, county, state, and federal agencies and individuals. Additionally, the recommendations will likely need to be addressed on different timelines. For example, leaders have collaboratively developed and executed plans on several initiatives to improve coordination and wildfire preparedness, while hiring an SFM and completing an SOC, CRA, and CRR plan will take months to complete. FSRI remains committed to working through the priorities and recommendations with the Department of the Attorney General, Federal, State, and County leaders, community members, and other partners that can help improve fire safety across the State of Hawai'i.



# 7.0 APPENDIX

## 7.1 Lahaina Fire Incident Analysis Report (Phase Two) Findings and Recommendations ([access the full spreadsheet](#))

7.1 Lahaina Fire Incident Analysis Report (Phase Two) Findings and Recommendations				
Reference Section (Phase Two Report)	Relevant Department	Actionable Areas	Finding	Recommendations
2.0 Analysis of Background	<ul style="list-style-type: none"> <li>State of HI</li> </ul>	Policy, Organizational	<b>1. Lack of state policy-making and investment addressing Cohesive Strategy components.</b>	<p>1. Pursue integrated solutions using a multidisciplinary team to address the entire system of factors that influence wildfire risk and outcomes, including land use and subdivision planning, agriculture, forestry and environmental protection, emergency response, economists and tax experts, and policy-makers. Use the existing and established plans and studies as starting points for discussion and action.</p> <p>2. Learn from states that already have existing advanced wild-fire-fighting policies and procedures in place that are more mature in their work on wildfire prevention, preparedness, and response.</p>
2.0 Analysis of Background	<ul style="list-style-type: none"> <li>State of HI</li> </ul>	Policy, Organizational	<b>2. Statewide wildfire prevention is led by the non-profit Hawaii Wildfire Management Organization (HWMO) without state funding.</b>	<p>1. Establish dedicated and sustained funding for HWMO to support the coordination and implementation of wildfire prevention and preparedness efforts, especially for communities and land stewards.</p>
2.0 Analysis of Background	<ul style="list-style-type: none"> <li>State of HI</li> </ul>	Policy	<b>3. Lack of standardized and consistent wildfire data collection and report submissions to federal organizations.</b>	<p>1. Standardize wildfire data collection process for all counties and require Incident Status Summary, Form 209 completion for wildfires meeting reporting criteria.</p> <p>2. Leverage the impending release of the National Emergency Response Information System (NERIS) to institutionalize fire reporting while ample resources are available and focused to onboarding and supporting fire agencies in this new federal program.</p>
2.0 Analysis of Background	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> </ul>	Policy, Organizational	<b>4. The MFD and MPD did not initiate an AAR for the 2018 Lahaina Fire. MEMA did not finalize an AAR for the same incident.</b>	<p>1. MEMA, the MFD, and the MPD should create policies that include incident parameters requiring an AAR to ensure learnings are documented and changes required for improvement are implemented.</p>
3.2 Weather	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> <li>NWS</li> <li>MEMA</li> </ul>	Policy, Organizational, Preparedness	<b>5. Actionable extreme weather forecasts were provided to fire chiefs and emergency managers prior to the August 2023 fires. However, adjusting staffing for extreme weather events and their resultant risk of extreme fire behavior was not standard.</b>	<p>1. Assign a point of contact within the MFD who is tracking weather conditions, and is disseminating that information to the rest of the department and across partner agencies.</p> <p>2. Establish standard operating procedures for Red Flag and severe fire weather warning conditions, to include: preparing and pre-positioning supplies, equipment, vehicles, and personnel in high-risk areas; ensuring clear and open lines of communication within and among agencies to optimize for rapid and coordinated deployment of resources; and communicating with the public to aid residents in translating the forecasted conditions and risks into evacuation readiness. The California Fire Weather Annual Operating Plan is a good place to start developing a Hawai'i plan.</p>
3.2 Weather	<ul style="list-style-type: none"> <li>State of HI</li> <li>NWS</li> </ul>	Research, Policy, Preparedness	<b>6. There is little perceptible difference between Hawai'i Red Flag criteria and a typical summer day, which may have contributed to the emergency manager's response to the forecast.</b>	<p>1. Engage federal partners to assist in refining Red Flag criteria to be commensurate with appropriate fire danger that is actionable by policymakers, emergency managers and responders, and the public.</p>
3.2 Weather	<ul style="list-style-type: none"> <li>NWS</li> <li>HI-EMA</li> </ul>	Policy, Organizational, Preparedness	<b>7. NWS-Honolulu fire weather forecast briefings to fire and emergency managers should occur on a more frequent basis.</b>	<p>1. Engage policymakers, emergency managers and responders, and the public with more frequent fire weather forecast briefings. This will elevate understanding of the weather, while informing the community of the risk.</p>

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Reference Section (Phase Two Report)	Relevant Department	Actionable Areas	Finding	Recommendations
3.2 Weather	<ul style="list-style-type: none"> <li>State of HI</li> <li>NWS</li> </ul>	Equipment, Organizational, Preparedness	<b>8. A lack of RAWs in West Maui, and other high wildfire risk areas, limits the capability to determine where Red Flag conditions may locally exist. The lack of resolution of fire weather data and monitoring yields uncertainty at the local level due to fire weather forecasts and Red Flag Warnings being based on data collected at the Honolulu airport, which is on O’ahu (not Maui). It does not represent the conditions observed in the diverse and numerous microclimates across all high fire risk areas across the state, including Lahaina, and therefore, serves as a point of reference (or inference, at best) for other regions.</b>	<p>1. Install and fund the maintenance for a strategic set of RAWs that can provide information with resolution across the microclimates of high fire risk locations in the state.</p>
3.3 Vegetative Fuel	<ul style="list-style-type: none"> <li>State of HI</li> </ul>	Policy, Organizational, Preparedness	<b>9. A lack of vegetation management programs, including policy, regulation development and enforcement, and funding support to address vegetation management needs across the variety of landowner types contributed to a prevalence of unmanaged vegetation on the wildland and urban areas impacted by the August 8, 2023, fire.</b>	<p>1. Develop comprehensive vegetation management programs that address the many types of land ownership and risk-reduction needs, to include thinning vegetation, removing invasive species, and creating strategic fuel breaks:</p> <ul style="list-style-type: none"> <li>- On public lands, funding for vegetation management must be commensurate with the personnel, equipment, and maintenance costs needed to strategically and consistently reduce risk.</li> <li>- On private lands, a combination of tax incentives and penalties for active land management, as well as a robust and proactive defensible space code inspection and enforcement programs are needed.</li> <li>- Such programs must be funded and staffed at a level appropriate to adequately ensure risk-reduction measures are implemented and effectively mitigate the potential for fire ignition and rapid spread through unmanaged lands.</li> </ul> <p>2. Establish specific governmental authorities, responsibilities, and goals for the management of vegetative fuels. (Currently, authority to address vegetation hazards is covered by a vague responsibility by the mayor and fire chief to address any number of hazards).</p> <p>3. Establish a system of penalties to address owners of agricultural land who are not participating in active agriculture or vegetation management.</p> <p>4. Develop programs that support coordination and implementation of an “All Hands, All Lands” approach, where vegetation management strategies and projects reduce risk across land ownerships, according to topography and anticipated fire behavior, rather than in fragmented or siloed parcels.</p> <p>5. Implement and expand use of targeted grazing for non-native forage grass removal and fuels reduction at landscape scale.</p>

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Reference Section (Phase Two Report)	Relevant Department	Actionable Areas	Finding	Recommendations
3.3 Vegetative Fuel	• State of HI	Policy, Organizational, Preparedness	<b>10. Fire risk and protective measures are not generally considered or integrated into land use planning, ordinances, or permitting processes to ensure adequate defensible space or consistent management of vegetative fuels in and around communities.</b>	<ol style="list-style-type: none"> <li>1. Require integrated land use planning through zoning regulation that requires vegetation management in high-risk areas.</li> <li>2. Educate homeowners on how to create defensible space around their properties, and require them to maintain these spaces.</li> <li>3. Incorporate community-scale, maintained green spaces that are multi-use and could act as fuel breaks and public safe refuge areas.</li> </ol>
3.3 Vegetative Fuel	• State of HI	Policy, Organizational, Preparedness	<b>11. The existing landowner and land steward risk-reduction programs, which include best practices for vegetative fuels management, have limited capacity and have not been invested in by the government at a level that meets the current need.</b>	<ol style="list-style-type: none"> <li>1. Provide land steward and community education regarding vegetation management best practices. Invest in, and grow, the existing programs of Firewise USA(TM) and educational programs for land stewards offered by existing groups, such as those already led (but underfunded) by the HWMO, University of Hawai'i, and their established partners.</li> </ol>
3.3 Vegetative Fuel	• State of HI	Policy, Organizational, Preparedness, Research	<b>12. There is no adequate system for monitoring fuel loads, fuel moisture, and other relevant characteristics.</b>	<ol style="list-style-type: none"> <li>1. Improve monitoring of fuels and utilize drones, satellite imagery, and ground-based monitoring systems to detect and assess vegetative fuel loads, fuel moisture, and high fire risk conditions.</li> <li>2. Establish an information dissemination system to fire and emergency managers to communicate high-risk locations and periods.</li> </ol>
3.3 Vegetative Fuel	• State of HI	Policy, Organizational, Preparedness, Research	<b>13. There is a need for additional public and private investment in long-term ecosystem restoration and sustainable land management practices that promote healthy ecosystems, maintain active agriculture, reduce fire risk, and control erosion.</b>	<ol style="list-style-type: none"> <li>1. This investment can be accomplished as key components of integrated land use planning, financial incentive and assistance programs, and land steward education (all described above).</li> <li>2. Invest in watershed partnerships, conservation groups, and other existing ecosystem conservation and agricultural initiatives.</li> <li>3. Invest in and bolster plant material supply chain for bulk seed production to support adequate fuel conversion and post-fire mitigation. For example, these programs could include common native seed collection, plant propagation, and outplanting.</li> </ol>
3.4.1 Planning, Zoning, and Codes	• County of Maui	Policy, Prevention, Organizational, Preparedness	<b>14. At the time of the fire, zoning in some areas of Lahaina was not commensurate with the modern built environment, environmental risks, and population growth.</b>	<ol style="list-style-type: none"> <li>1. Review and adjust zoning laws to better reflect the actual occupancy levels in Lahaina.</li> <li>2. Implement stricter enforcement to ensure compliance with occupancy limits.</li> <li>3. Enforce building codes and zoning regulations that require sufficient road width and access points in new developments to ensure better planning for future developments.</li> <li>4. Increase the availability of off-street parking solutions to reduce the reliance on narrow streets for vehicle parking.</li> <li>5. Emergency responders should have pre-determined plans, as well as uniquely adapted equipment (if available), tactics, and strategies for specific areas with narrow streets, outlining alternative access points, water supply strategies, and evacuation procedures.</li> </ol>

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Reference Section (Phase Two Report)	Relevant Department	Actionable Areas	Finding	Recommendations
3.4.1 Planning, Zoning, and Codes	<ul style="list-style-type: none"> <li>County of Maui</li> </ul>	Policy, Prevention, Organizational	<b>15. At the time of the fire, the County of Maui was enforcing the 2006 edition of the International Residential Code and International Building Code.</b>	1. Review and ensure adoption process meets requirements of state statute (HRS 107-28).
3.4.2 Road Networks	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> </ul>	Preparedness, Training, Equipment, Operational	<b>16. Emergency responders did not have ready capability to unlock emergency gates at various locations, including schools, to facilitate evacuations. They were often forced to rely on a third-party response for such access.</b>	1. The MPD and MFD should develop an assessment of its ability to access local utilities (Hawaiian Electric), flood control, waterworks, farms, resorts and public facilities (ex. private and public schools), flood control roads and gates, agricultural roads and gates, harbor areas, etc.) for emergencies. Create a system of universal lock security access that is available to all emergency responders and landowners.
3.4.2 Road Networks	<ul style="list-style-type: none"> <li>MPD</li> <li>County of Maui</li> </ul>	Preparedness, Policy, Preparedness, Operational	<b>17. Severe congestion due to parked cars along neighborhood streets hindered evacuation and response efforts.</b>	1. The MPD and county authorities should assess the parking needs and challenges within neighborhoods. This may include evaluating factors, such as population density, housing types, availability of off-street parking, street width, proximity to commercial areas or public transportation, and existing parking issues.
3.4.2 Road Networks	<ul style="list-style-type: none"> <li>MPD</li> <li>County of Maui</li> <li>MEMA</li> </ul>	Preparedness, Policy, Organizational, Operational	<b>18. Limited written traffic plans or guidelines for emergencies and escalating incidents.</b>	<p>1. Develop a pre-incident plan for the MPD to manage traffic during a wildfire that involves coordinating efforts to ensure public safety, facilitate evacuation if necessary, and maintain traffic flow in affected areas. Update MPD G.O. 405.1 Traffic Section and G.O. 405.7 Traffic Direction and Control to include instruction on wildfire evacuation.</p> <p>2. Implement and enforce strict no-parking zones on critical streets and encourage the use of off-street parking solutions to reduce the number of vehicles parked on narrow streets.</p> <p>3. Where possible, redesign traffic flow in congested areas, including implementing one-way street systems, to optimize vehicle movement.</p> <p>4. Residents in areas with narrow streets should be educated on fire safety procedures, importance of clear buffer zones/ defensible spaces, and evacuation plans to ensure a more coordinated response.</p>
3.4.2 Road Networks	<ul style="list-style-type: none"> <li>County of Maui</li> <li>MPD</li> <li>MFD</li> </ul>	Preparedness, Operational	<b>19. Roadways and evacuation routes were not adequately maintained prior to August 8, 2023, to sustain effective evacuation efforts during the fire event.</b>	<p>1. Identify, name, map, and provide signage on dirt roads that serve as alternate egress/evacuation routes so residents and emergency responders refer to them by the same name.</p> <p>2. Inspect and maintain dirt roads annually. Modernize, standardize, and maintain barriers on dirt roads to help ensure they can be used during emergencies.</p> <p>3. Where feasible, widen roads to accommodate more parking, traffic, and provide room for emergency vehicles.</p>
3.4.3 Water	<ul style="list-style-type: none"> <li>State of HI</li> <li>Maui Water</li> </ul>	Operational	<b>20. The County of Maui Department of Water Supply was seemingly in compliance with the Water System Design Standards for the State of Hawai'i in August 2023.</b>	1. Given the increasing threat of wildfires and wildfire-initiated urban conflagrations, it may be necessary for the State of Hawai'i to revisit its design standards and guidelines for storage and distribution systems that could be used for firefighting purposes.

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Reference Section (Phase Two Report)	Relevant Department	Actionable Areas	Finding	Recommendations
3.4.3 Water	• Maui Water	Operational, Equipment	<b>21. No pumps are used outside of the water production facilities to provide pressure in the system. Both systems had uninterrupted electrical power during the August 2023 fires and produced water at capacity for the duration of the fire.</b>	N/A
3.4.3 Water	• Maui Water	Operational, Equipment	<b>22. The amount of drinking water in storage tanks at the beginning of the August 2023 fires seemingly met standard design requirements as required by the Water System Design Standards for the State of Hawai'i.</b>	N/A
3.4.3 Water	• Maui Water	Operational, Equipment	<b>23. As per the Phase One report (pages 237-239), the water supply monitoring system failed at 15:30 (3:30 p.m.) on August 8, 2023, and no storage tank data was recorded for the duration of the fire event. Once this data connection was lost, the County of Maui Department of Water Supply did not know how much stored water was available for firefighting during the fire.</b>	1. Develop, install, and maintain a resilient drinking water tank level monitoring system for the Lahaina and Māhinahina storage and distribution systems that can be monitored from the County of Maui EOC and other locations.
3.4.3 Water	• Maui Water	Operational	<b>24. As homes and other structures were damaged and destroyed by fire, household plumbing (e.g., plastic and other piping) inside of the buildings failed, allowing unrestricted flow of water from one (1) or more locations in each home or structure, resulting in water freely flowing from more structures and diminishing the overall water pressure and flow in the fire area.</b>	N/A
3.4.3 Water	• Maui Water	Operational, Training, Equipment	<b>25. As per the Phase One report (page 239), County of Maui Department of Water Supply employees were unable to enter the fire area to assist firefighters due to multiple factors, including traffic congestion and the danger presented by the fire. Firefighters did not have the time, training, or tools to shut off water.</b>	1. Develop a plan to coordinate with the County of Maui Department of Water Supply to address water system needs at the incident command post (ICP).
3.4.3 Water	• Maui Water	Operational	<b>26. Due to the hydraulics of the drinking water storage and distribution system, and given the excessive demand caused by the flow from damaged/destroyed structures, water was not provided with sufficient volume and sufficient pressure (i.e., the system could not meet the required demand) for use in firefighting for the entire August 2023 fire event.</b>	1. Perform a hydraulic analysis of both the Lahaina and Māhinahina storage and distribution systems. Use the results of this analysis to design larger and/or multiple interconnected pipes between the two (2) drinking water storage and distribution systems. Consider the use of pumps, as appropriate, to supplement pressure and volume. Determine pressure and volume limits for a major fire event that stakeholders understand and can operate to.

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Reference Section (Phase Two Report)	Relevant Department	Actionable Areas	Finding	Recommendations
3.4.3 Water	<ul style="list-style-type: none"> <li>Maui Water</li> </ul>	Operational	<b>27. Water quality and cost concerns make it impractical to size a drinking water treatment, storage, and distribution system to accommodate the firefighting demands for a urban conflagration event similar to the one that occurred in August 2023.</b>	<ol style="list-style-type: none"> <li>Provide alternate means of firefighting water supply for extreme events. This may include portable pumps to draw water from public and private pools, ponds, and other bodies of water (including sea water), large diameter hose equipped apparatus, sites, or connections for marine vessels to draw water from the Pacific Ocean, and other means.</li> </ol>
3.4.4 Electrical	<ul style="list-style-type: none"> <li>Hawaiian Electric</li> </ul>	Organizational, Operational	<b>28. Hawaiian Electric (in partnership with the MFD and MPD) did not have an adequate staffing plan to prepare for the wildfire conditions of August 8, 2023.</b>	<ol style="list-style-type: none"> <li>Hawaiian Electric should work closely with the MFD and MPD to develop a staffing plan in preparation for high fire danger days. The plan should include implementing spotters and an artificial intelligence-enabled camera network, which can assess vulnerable areas of the infrastructure so failure points can be addressed quickly; operating a dedicated phone line to the MFD and MPD to communicate power and repair status; and assigning a representative to the ICP.</li> </ol>
3.4.4 Electrical	<ul style="list-style-type: none"> <li>Hawaiian Electric</li> <li>MFD</li> <li>State of HI</li> </ul>	Prevention, Policy	<b>29. A lack of electrical utility vegetation abatement regulations and enforcement may have contributed to vegetation at the base of utility poles and near transmission lines, creating a receptive fuel source for arcing electrical wires.</b>	<ol style="list-style-type: none"> <li>Hawaiian Electric should continue to work closely with the PUC to execute the Climate Adaptation Transmission and Resilience Program and develop a long-term investment plan to protect infrastructure from high wind events and wildfire. The plan should include immediate vegetation management and enforcement requirements, a phased approach for undergrounding transmission lines in vulnerable areas, strategic replacement of bare overhead wires with covered conductors, and a Public Safety Power Shut-off program.</li> </ol>
3.4.4 Electrical	<ul style="list-style-type: none"> <li>Hawaiian Electric</li> <li>County of Maui</li> <li>State of HI</li> </ul>	Prevention, Policy	<b>30. Hawaiian Electric did not have a Public Safety Power Shut-Off program in place at the time of the fire.</b>	<ol style="list-style-type: none"> <li>Establish a Public Safety Power Shut-Off and communication protocol in collaboration with the community. Shutting off power to vulnerable areas of the grid reduces the chance of ignition due to electrical infrastructure failure.</li> </ol>
3.4.4 Electrical	<ul style="list-style-type: none"> <li>Hawaiian Electric</li> <li>Maui Water</li> </ul>	Preparedness, Policy, Organizational, Operational	<b>31. The lack of execution of a Hawaiian Electric pre-event organizational plan led to having to staff more field positions during the event to address problems with electrical and water infrastructure.</b>	<ol style="list-style-type: none"> <li>Hawaiian Electric to prepare a staffing plan that is coordinated with the pre-event incident action plan (IAP).</li> </ol>
3.5 Communications	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> </ul>	Preparedness, Organizational, Operational	<b>32. Central Dispatch (“Central”) was limited by the availability of equipment and personnel.</b>	<ol style="list-style-type: none"> <li>Expand Central's surge capacity by increasing the terminals/necessary equipment for call taking and dispatching operations and consider training personnel (including members from the MFD or MPD) to serve as “call takers” capable of transferring emergency 911 calls, and managing the non-emergency/administrative calls.</li> <li>Complete a comprehensive study of Central Dispatch to assess staffing, workloads, and technology to identify any gaps or additional resource needs to help ensure resilient communication during major emergencies and disasters.</li> </ol>
3.5 Communications	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> <li>County of Maui</li> <li>MEMA</li> </ul>	Organizational, Policy, Operational	<b>33. Central Dispatch, and many other responding personnel, were deeply affected by this incident.</b>	<ol style="list-style-type: none"> <li>Continue providing opportunities for individuals and crews to meet for a “report back/debrief.” Ensure members know warning signs for PTS, PTSD, depression, suicide, and related impacts on personnel mental health. Provide access to Employee Assistance Programs (EAP) and peer support networks—encourage use when warning signs are present.</li> </ol>

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Reference Section (Phase Two Report)	Relevant Department	Actionable Areas	Finding	Recommendations
3.5 Communications	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> </ul>	Organizational, Operational	<b>34. Dispatchers were responsible for monitoring multiple large fires and other associated events. Most of the dispatchers were experienced, but all dispatchers were overwhelmed and some expressed lack of adequate knowledge, ready access to needed information, and concern about the safety of the instructions they were providing callers. There were persistent communication challenges between Central, the MPD's Department Operations Center (DOC), and the EOC.</b>	1. Staff a MFD fire officer and a MPD officer at the rank of lieutenant (or higher) in Central Dispatch to aid with operational monitoring, EOC/DOC coordinations, incident tracking, communications, and assistance with command decisions when the EOC is activated.
3.5 Communications	<ul style="list-style-type: none"> <li>MFD</li> <li>County of Maui</li> <li>State of HI Organizational, Operational</li> </ul>	Equipment, Organizational, Operational	<b>35. Private equipment operators primarily communicate with response entities and field personnel using personal cell phones.</b>	1. Create a formal communication plan for private contractors to use during emergency situations that includes resilient hardware and appropriate training.
3.5 Communications	<ul style="list-style-type: none"> <li>County of Maui</li> <li>State of HI</li> </ul>	Preparedness, Organizational, Operational	<b>36. Many residents did NOT receive a text notification from the county regarding the high winds and high fire danger.</b>	1. Assess the resiliency of communication systems and establish redundant public alert program and warning processes, including best practice messaging guidance.
3.5 Communications	<ul style="list-style-type: none"> <li>Hawaiian Electric</li> <li>County of Maui</li> <li>State of HI</li> </ul>	Preparedness, Organizational, Operational	<b>37. Only one (1) siren from the All-Hazard Outdoor Warning Siren System was operable within the burn perimeter of the Lahaina area on August 8, 2023.</b>	1. Implement a statewide sustainable program for the All-Hazard Outdoor Warning System, which includes functioning hardware resilient against mass communications failure, regular maintenance, public education, additional resources and staffing.
3.5 Communications	<ul style="list-style-type: none"> <li>County of Maui</li> <li>State of HI</li> <li>MEMA</li> </ul>	Preparedness, Operational	<b>38. The All-Hazard Outdoor Warning Siren System had not been utilized for warning of WUI fires prior to August 8, 2023. As of the publication date of this report, MEMA has implemented a process for activating sirens for wildfires.</b>	N/A
3.5 Communications	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> <li>MEMA</li> <li>County of Maui</li> </ul>	Preparedness, Policy, Organizational, Operational	<b>39. Even when people were told to evacuate and conditions seemed obvious that evacuation was necessary, many refused because there did not appear to be official notification that danger was imminent.</b>	1. Engage the community to provide additional public education regarding the importance of what to do in an emergency and to heed all evacuation instructions.
3.6 Incident Management	<ul style="list-style-type: none"> <li>MFD</li> </ul>	Policy, Organizational, Operational	<b>40. Although there were opportunities for the MFD to provide staff support for the battalion chief(s) managing the incident, a formal command team was not established. The ICs were overwhelmed with the demands of the event and possessed limited situational awareness during a rapidly expanding emergency, which included a mayday; these factors contributed to challenges with tactical decision-making throughout the Lahaina PM fire.</b>	<p>1. Review and modify the dispatch algorithm to reflect the resource availability.</p> <p>2. Provide the resources and training necessary to establish and maintain effective support for the initial incident commander (IC).</p> <p>3. Within MFD Hazard Zone Command SOG, include requirements for all chief officer engagement within the incident command structure for large complex incidents.</p>

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Reference Section (Phase Two Report)	Relevant Department	Actionable Areas	Finding	Recommendations
3.6 Incident Management	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> <li>Hawaiian Electric</li> <li>Maui Water</li> </ul>	Policy, Organizational, Operational	<b>41. The MFD and MPD never connected to establish a unified command.</b>	1. The MFD, MPD, and other assisting and cooperating agencies should include guidance within their respective incident management SOGs on when unified command should be considered and how it could be established.
3.6 Incident Management	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> </ul>	Organizational, Operational	<b>42. Available public safety resources were inefficiently utilized. This resulted in the failure to establish and scale an effective incident management organization during the first 24 hours of the incident.</b>	1. Provide sufficient staffing to establish and maintain an effective incident management organization, while maintaining the capacity to conduct unit-level tactical actions. Once established, develop a robust incident action plan (IAP). An IAP should outline objectives, strategies, and tactics for managing the incident, including evacuation procedures, traffic management, and resource allocation. Communicating the IAP to all responding personnel and stakeholders ensures a shared understanding of roles, responsibilities, and priorities.
3.6 Incident Management	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> </ul>	Policy, Organizational, Operational	<b>43. There was no comprehensive plan for the MPD's wildfire response.</b>	1. Develop a comprehensive plan in coordination with the MFD for MPD's response to a wildfire that prioritizes public safety, efficient evacuations, and effective traffic management.
3.6 Incident Management	<ul style="list-style-type: none"> <li>MPD</li> </ul>	Policy, Organizational, Operational	<b>44. Limited sharing of critical information occurred between field operations units, the MPD Department Operations Center (DOC), and the EOC.</b>	<p>1. Review and update policies and develop new processes for information flow between MPD Command Personnel on site, command staff, dispatch, and the EOC.</p> <p>2. All commanders, captains, and above should receive training on activation of the DOC and a Department Operations Center quick reference guide should be developed for commanders to be utilized for any crisis.</p>
3.6 Incident Management	<ul style="list-style-type: none"> <li>MPD</li> </ul>	Policy	<b>45. The MPD Natural and Man-Made Disaster Plan, G.O. 411.4, does not include wildfire incidents.</b>	1. Update policy to include plans specifically related to wildfires.
3.6 Incident Management	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> <li>MEMA</li> </ul>	Preparedness, Policy	<b>46. There was limited pre-event incident action planning for anticipated events or incidents by the MFD, MPD, and MEMA.</b>	1. The MFD, MPD, and MEMA should update the current policies and procedures regarding pre-event planning (including preparing pre-event incident action plans), staffing, and equipment.
3.6 Incident Management	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> <li>MEMA</li> </ul>	Policy, Preparedness, Organizational	<b>47. There were no written procedures or guidelines for Continuity of Operations (COOP).</b>	1. The County of Maui, MPD, and MFD to prepare Continuity of Operations Plans (COOP) that outline procedures to ensure essential functions can continue during and after various types of emergencies or disruptions.
3.6 Incident Management	<ul style="list-style-type: none"> <li>MEMA</li> <li>HI-EMA</li> </ul>	Preparedness, Organizational	<b>48. Communication was limited between MEMA and HI-EMA EOC.</b>	1. Additional resources are needed to have a persistent durable communication link prior to, and during, a major emergency or disaster event.
3.6 Incident Management	<ul style="list-style-type: none"> <li>MEMA</li> </ul>	Preparedness, Operational	<b>49. Given the known conditions forecasted for the County of Maui on August 8, 2023, agency representatives self-reported to the EOC throughout the day, but full activation of the EOC did not occur until 16:30.</b>	1. Under similar conditions, and given appropriate resources, consider full activation earlier to aid collaboration between all relevant emergency support functions.

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Reference Section (Phase Two Report)	Relevant Department	Actionable Areas	Finding	Recommendations
3.6 Incident Management	• MEMA	Preparedness, Policy, Organizational, Operational	<b>50. MEMA does not have a sufficient budget/personnel allocation to effectively and sustainably perform the wide range of preparedness, response, and recovery missions assigned to it.</b>	1. EOCs fulfill essential functions during emergencies and must be properly staffed and operationalized with (A) qualified overhead personnel to perform emergency management-related functions and (B) designated representatives from all cooperating/involved agencies/organizations to provide subject matter expertise, resource coordination/tracking, and immediate information relays to ICs in the field.
3.6 Incident Management	• MEMA	Organizational, Training, Operational	<b>51. During the EOC activation on August 8, 2023, there was a lack of clarity regarding the roles and responsibilities among MEMA personnel.</b>	1. Provide clearly defined roles and responsibilities for each staff member during EOC activations. Staff members should be trained and fully competent to fulfill their designated role. MEMA should also ensure staff training for secondary roles and responsibilities for when personnel are expected to shift to a different position (e.g., when vacancies occur).
3.6 Incident Management	• MEMA	Training, Operational	<b>52. Some MEMA personnel were unfamiliar with the software platform used for documentation and incident tracking during EOC activations.</b>	1. Ensure all personnel are fully trained and proficient with use of the designated EOC software program (WebEOC or any other software program designated by the MEMA Administrator).  2. Ensure all MEMA EOC personnel understand the NIMS-ICS requirements for documentation during EOC activations.
3.6 Incident Management	• MEMA	Operational	<b>53. The EOC was overcrowded and personnel had to find alternative work locations.</b>	1. MEMA should examine the needs for the physical location and expand the EOC.
3.6 Incident Management	• MFD • MPD	Policy, Operational, Equipment	<b>54. Both the MPD and MFD were unable to maintain personnel accountability for officers, firefighters, and crews during the Lahaina PM fire.</b>	1. MPD roll calls should be initiated by dispatch and/or command staff as needed to maintain accountability. A policy should be established with defined roll call procedures.  2. Ensure sufficient resources are available to support MFD Cs and division/group/unit-level supervisors with all functions of command/management, including personnel accountability.  3. Adoption and consistent use of a common and resilient AVL platform on all MPD, MFD, and cooperators' (e.g., DOFAW, ARFF, and EMS) vehicles would assist dispatchers and command officers with personnel accountability and incident management.
3.6 Incident Management	• MFD	Operational, Training	<b>55. The MFD sponsors a Type 3 IMT that was not used August 8-9, 2023.</b>	1. Consider pre-deploying the Type 3 IMT when severe weather and/or fire danger conditions are forecasted.  2. Enhance training and expand participation to include personnel from multiple disciplines, reinforcing the value of an all-hazards IMT and fostering collaboration across agencies. Consider securing training and experiences for Ocean Safety personnel to be able to perform in specific IMT overhead roles.
3.6 Incident Management	• Hawaiian Electric	Policy, Operational	<b>56. Hawaiian Electric should be at the incident command post (ICP), or tied in closely with the incident commander if an ICP is not established, to inform command of safety issues, other coordination opportunities, and act as a liaison to their organization.</b>	1. Create and follow a protocol to embed Hawaiian Electric representatives in the incident command post (when established) as liaisons.

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Reference Section (Phase Two Report)	Relevant Department	Actionable Areas	Finding	Recommendations
3.6 Incident Management	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> </ul>	Operational, Equipment	<b>57. The MPD and MFD did not deploy or use the mobile command vehicle as per MPD G.O. 304.11. Deployment and use of the vehicle in Lahaina before the PM fire may have initiated the unified command organization that was absent throughout the PM fire.</b>	<ol style="list-style-type: none"> <li>Follow G.O. 304.11 to ensure the mobile incident command vehicle is used for appropriately sized incidents, such as the Lahaina PM Fire.</li> <li>Deploy the mobile command vehicle at planned events to exercise the deployment process and equipment.</li> </ol>
3.6 Incident Management	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> </ul>	Policy, Operational	<b>58. There were no established unit identifiers for off-duty MPD officers or supplemental MFD units.</b>	<ol style="list-style-type: none"> <li>Create a call sign procedure for identification of off-duty MPD officers who self-deploy and MFD personnel assigned to supplemental MFD units. The existing MPD G.O. 301.5 policy should be revised regarding the establishment of call signs for incoming off-duty officers and self-deploying officers. The MFD should establish a policy to standardize identification of staffed supplemental resources.</li> </ol>
3.7 Fire Suppression	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> <li>MEMA</li> <li>Maui Water</li> <li>DLNR-DOFAW</li> <li>Hawaiian Electric</li> </ul>	Preparedness, Policy, Organizational	<b>59. The MFD did not have an organizational pre-plan for an anticipated high wind or extreme fire weather event.</b>	<ol style="list-style-type: none"> <li>Ensure effective sensemaking of forecasts and real-time conditions through training and pre-planning.</li> <li>Implement organization-wide start-of-shift briefings to discuss extreme fire weather conditions.</li> <li>Ensure the ICS can scale up quickly, integrating additional support, including personnel normally serving in administrative roles or other functions (e.g., fire prevention, ocean safety, and training), as needed. Provide training and protocols for pre-deployment.</li> <li>Communicate anticipated environmental conditions, risks, and performance expectations across organizations. This includes the MPD, MEMA, County of Maui Department of Water Supply, DLNR-DOFAW, and Hawaiian Electric, who reacted to environmental conditions only after problems arose.</li> <li>Develop a system for ongoing situational awareness that includes continuous monitoring of weather forecasts, fuel moisture levels, and fire behavior through real-time data and predictive models.</li> </ol>
3.7 Fire Suppression	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> <li>DLNR-DOFAW</li> <li>Hawaiian Electric</li> <li>Maui Water</li> </ul>	Preparedness, Policy, Operational, Equipment	<b>60. With the impending forecast of severe fire weather, there was limited pre-deployment of additional public safety resources prior to the first fire event.</b>	<ol style="list-style-type: none"> <li>With the potential impact of hurricanes like Dora and Red Flag conditions, the MFD, MPD, DLNR-DOFAW, and their cooperators should consider deploying additional resources across Maui Nui.</li> <li>Identify fire apparatus, incident management, and law enforcement resources for upstaffing and pre-deployment when severe conditions are forecasted.</li> <li>Ensure sufficient fire apparatus, response vehicles, portable equipment, PPE, and radios are available to resource the pre-deployment of additional response units and overhead assets. Whenever possible, standardize the equipment loadout on similar apparatus/vehicles to facilitate use by callback personnel.</li> <li>Consider providing dedicated personnel and resources for staffing management and callback, on a daily basis and before/during major incidents, to make command-level resources readily available for strategic/tactical ICS roles.</li> </ol>

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Reference Section (Phase Two Report)	Relevant Department	Actionable Areas	Finding	Recommendations
3.7 Fire Suppression	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> <li>County of Maui</li> <li>State of HI</li> <li>HI-EMA</li> <li>MEMA</li> </ul>	Preparedness, Prevention, Policy, Organizational, Training, Operational	<b>61. There appears to be a statewide culture of dismissing and/or under-recognizing wildfire risk. The underfunding and under-addressing of preparedness, planning, and mitigation efforts significantly impacts all parts of the system and fire outcomes. This cannot be overstated.</b>	1. Establish a culture of respect for extreme conditions and the need for operational adjustment.
3.7 Fire Suppression	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> <li>DLNR-DO-FAW</li> </ul>	Preparedness, Policy, Organizational, Operational	<b>62. DLNR-DOFAW resources, specialized wildfire equipment, and trained personnel were underutilized due to restrictive fire response zone guidelines.</b>	<p>1. Incorporate land ownership maps into incident reporting and tracking to ensure that state and federal agencies with response duties and wildland firefighting capacity are notified and activated.</p> <p>2. Review and revise master mutual aid agreements for all fire suppression resources on Maui Nui, including, but not limited to, the MFD, ARFF, DLNR-DOFAW, and National Park Services to ensure optimal readiness and response for multi-hazard disasters.</p>
3.7 Fire Suppression	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> <li>County of Maui</li> </ul>	Preparedness, Policy, Operational	<b>63. Densely populated and narrow roadways hindered both MFD and MPD movement during suppression (as well as evacuation and rescue) efforts. Apparatus positioning was not always optimal, due in large part to an overall lack of situational awareness about the location, severity, and trajectory of the fire(s).</b>	<p>1. Responding MFD units should have pre-determined plans and operating practices for specific areas with narrow streets, outlining alternative access points, water supply strategies, evacuation procedures, and addressing the needs of vulnerable members of the community.</p> <p>2. Place hardcopy maps, mapbooks, and pre-incident plans in all response vehicles to provide redundancy if cellular network communication is unavailable.</p>
3.7 Fire Suppression	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> <li>Hawaiian Electric</li> </ul>	Policy, Operational	<b>64. The uncertainty around the status of power in the area created numerous impacts on MPD and MFD response to the incident.</b>	1. As previously mentioned, Hawaiian Electric should have a representative at the ICP (when established).
3.7 Fire Suppression	<ul style="list-style-type: none"> <li>MFD</li> <li>DLNR-DO-FAW</li> </ul>	Policy, Operational, Equipment, Training	<b>65. Private heavy equipment contractors lacked appropriate training, PPE, equipment, and communications.</b>	1. Strengthen the coordination with private contractors and address limitations in training, equipment (including standardizing equipment to ensure compatibility with all fire suppression resources), PPE, and communication.
3.7 Fire Suppression	<ul style="list-style-type: none"> <li>MFD</li> <li>DLNR-DO-FAW</li> </ul>	Policy, Operational, Training	<b>66. A portion of the mopup area was difficult to access and posed safety threats.</b>	<p>1. Include DLNR-DOFAW resources on initial response to vegetation and WUI fires.</p> <p>2. Ensure all personnel have the training to identify and establish safety zones and escape routes, and have protocols in place for communicating this to crews.</p> <p>3. Communicate the wildfire risk to all department members to set and/or reinforce expectations related to fire mopup procedures.</p>
3.7 Fire Suppression	<ul style="list-style-type: none"> <li>MFD</li> </ul>	Policy, Operational, Training	<b>67. MFD firefighters performed mopup as proven successful under typical weather conditions. However, under the severe weather conditions on August 8, 2023, this level of mopup appears to have been insufficient.</b>	<p>1. Revise policies, procedures, and trainings (E.O. 302.14) that address wildland firefighting (specifically mopup operations) to be in alignment with NWCG guidelines.</p> <p>2. Implement schedules to manage responder fatigue, ensuring adequate rest periods and meals.</p>

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Reference Section (Phase Two Report)	Relevant Department	Actionable Areas	Finding	Recommendations
3.7 Fire Suppression	• MFD	Policy, Operational, Training	<b>68. MFD wildland firefighting training, equipment, and staffing should be commensurate with the level of wildfire risk faced by firefighters.</b>	<ol style="list-style-type: none"> <li>1. Conduct a comprehensive audit and gap analysis of existing MFD operating procedures/practices against relevant Occupational Safety and Health Administration (OSHA) regulations, National Fire Protection Association (NFPA) standards, fire service best practices, and NWCG standards/guidelines to help ensure compliance with industry regulations and best practices. By conducting an audit and implementing recommended improvements, the MFD can create a safer working environment for its personnel and enhance the effectiveness of its firefighting and rescue efforts for all incident types.</li> <li>2. Review the implementation of the MFD's 36-hour rule for alignment with operational needs during disasters and major emergencies.</li> <li>3. Consider developing a WUI firefighting playbook to address the increasingly severe wildfire threat across Maui Nui. Look to departments that respond to WUI incidents for expertise and protocols, such as California.</li> <li>4. Deliver training on, and provide a copy in all response vehicles, the NWCG Incident Response Pocket Guide (IRPG), PMS 461.</li> <li>5. Provide additional wildfire and WUI firefighting training and experiences (such as shadowing incident management personnel in other areas) for MFD personnel.</li> <li>6. Continue providing medical monitoring and behavioral health support for responders and support personnel.</li> </ol>
3.7 Fire Suppression	• MFD	Policy, Training, Operational	<b>69. Many initial attack resources were burned over due to fighting fire from a downwind position.</b>	<ol style="list-style-type: none"> <li>1. Train firefighters about the impact of wind on fire progression and fire suppression techniques as per evidence based information and best practices.</li> </ol>
3.7 Fire Suppression	• MFD • DLNR -DO-FAW	Policy, Training, Operational	<b>70. Standard wildland firefighting operating procedures for the DLNR-DOFAW and MFD are not in alignment.</b>	<ol style="list-style-type: none"> <li>1. The DLNR-DOFAW and MFD should collaborate to update and integrate standard operating guidelines and training for wildland firefighting.</li> </ol>
3.8 Evacuation	• MFD • MPD	Policy, Training, Operational	<b>71. Unified coordination of evacuation procedures among the MPD, MFD, and other agencies may have facilitated more efficient egress of residents.</b>	<ol style="list-style-type: none"> <li>1. Create, review, and implement an interagency comprehensive evacuation plan based on risk and resources. Integrated emergency response plans involving local, state, and federal agencies, as well as non-governmental organizations, should be developed, with regular joint training exercises to ensure smooth coordination during actual emergencies.</li> <li>2. The MPD should regularly train for wildfire evacuations, familiarizing themselves with evacuation procedures and protocols. This training enhances response capabilities and ensures a swift and organized evacuation process when wildfires threaten communities.</li> </ol>

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Reference Section (Phase Two Report)	Relevant Department	Actionable Areas	Finding	Recommendations
3.8 Evacuation	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> <li>County of Maui</li> </ul>	Preparedness, Policy, Operational	<b>72. During the evacuations, there were lapses in coordination and communication that could have reduced efficiency.</b>	<p>1. Pre-plan evacuation routes. Effective evacuations during a wildfire, such as the Lahaina PM fire, require planning, coordination, and adherence to best practices. A key aspect is comprehensive pre-event planning, which involves identifying evacuation routes (including unnamed dirt roads), establishing communication protocols, and conducting drills to ensure readiness.</p> <p>2. Sufficient personnel are needed to manage traffic, provide assistance to evacuees, and maintain public safety. Adequate staffing levels enable timely and orderly evacuations, reducing the risk of congestion and confusion.</p> <p>3. Create and implement comprehensive traffic management plans that account for limited access and egress routes, including pre-planned alternate routes and strategies to manage congestion.</p> <p>4. Ensuring gates blocking potential evacuation routes are equipped with standardized locks and that emergency responders have the necessary keys or access codes is also vital.</p> <p>5. Develop comprehensive support systems for residents who need to evacuate—especially those with access and functional needs—including temporary housing, transportation assistance, and access to essential services. By addressing these key areas, the Maui community can improve its preparedness for future wildfires and other emergencies, ensuring better protection of lives and property.</p> <p>6. Volunteer training programs, such as those for Community Emergency Response Teams (CERT), should be expanded to assist with evacuation efforts and provide support during emergencies. Additionally, specific evacuation plans for vulnerable populations, including the elderly, disabled, and those without transportation, should be created, with community support networks established to assist these individuals during evacuations. Engage community organizations and CERT teams to provide additional support in evacuation efforts.</p>
3.8 Evacuation	<ul style="list-style-type: none"> <li>MPD</li> </ul>	Policy, Operational, Equipment	<b>73. While some Body-Worn Cameras (BWC) were activated (in keeping with the current policy), several files provided by the County of Maui were unreadable.</b>	<p>1. Update the MPD's G.O. 304.12 policy to have BWCs activated upon dispatch and include a quality-control program to ensure all equipment is functioning properly and producing usable audio visual assets.</p> <p>2. The MPD should follow G.O. 304.12.</p>
3.8 Evacuation	<ul style="list-style-type: none"> <li>MPD</li> </ul>	Equipment, Training	<b>74. MPD officers experienced difficulty hearing radio traffic due to the wind and noise from the fire.</b>	<p>1. Issuing radio earpieces to all officers will enhance communication, allowing them to stay informed and coordinate effectively during incidents. Officers should receive training on the proper use and maintenance of these earpieces to maximize their benefits.</p>

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Reference Section (Phase Two Report)	Relevant Department	Actionable Areas	Finding	Recommendations
3.8 Evacuation	<ul style="list-style-type: none"> <li>County of Maui</li> <li>MEMA</li> </ul>	Preparedness, Policy, Equipment, Operational	<b>75. The alert systems in place did not adequately inform residents of inherent dangers.</b>	<ol style="list-style-type: none"> <li>Developing and implementing multiple alert systems, including sirens, radio broadcasts, and door-to-door notifications, can ensure that evacuation orders reach all residents, especially when cell service and electrical power are lost.</li> <li>Expand community engagement and preparedness efforts with public awareness campaigns that emphasize the importance of evacuation and the risks of staying behind during wildfires, encouraging residents to have a personal evacuation plan that includes considerations for pets and family members with special needs.</li> <li>Educate the public about evacuation procedures and safe routes, and the importance of establishing family evacuation plans and having prepared “go-bags.” Regular drills and informational sessions can reinforce this knowledge, while localized communication networks, such as neighborhood watch groups or community liaisons, can assist in disseminating information.</li> </ol>
3.8 Evacuation	<ul style="list-style-type: none"> <li>MFD</li> <li>MPD</li> </ul>	Preparedness, Policy, Equipment, Operational	<b>76. MPD officers encountered barriers to roads that could have been (and eventually were) used as alternate egress routes and lacked equipment to navigate these barriers.</b>	<ol style="list-style-type: none"> <li>Perform annual status checks of emergency gates throughout the community.</li> <li>Equip police vehicles with disaster response kits, including appropriate PPE, to be able to facilitate evacuations and remove barriers from potential escape exits, such as chain link fences, gates, and boulders.</li> <li>The MFD to establish new policy/General Order for the provision of fire- and disaster-related emergency tools for patrol, such as bolt cutters, tow straps, etc.</li> </ol>
4.0 Built Environment	<ul style="list-style-type: none"> <li>MFD</li> <li>County of Maui</li> <li>State of HI</li> </ul>	Prevention, Preparedness, Policy	<b>77. Numerous stakeholder organizations (state, county, community, and HWMO) have collaborated to evaluate wildfire risk per West Maui CWPP.</b>	<ol style="list-style-type: none"> <li>Hold a statutory organization accountable for executing the preparedness plans commensurate with the risk identified through these efforts.</li> <li>Adopt and enforce contemporary codes and standards for building construction in wildfire prone areas.</li> </ol>
4.0 Built Environment	<ul style="list-style-type: none"> <li>MFD</li> <li>County of Maui</li> <li>State of HI</li> </ul>	Prevention, Preparedness, Policy	<b>78. Codes and standards exist for addressing fire hazards of exterior vegetation (16.04D Subsection 10.13.10), but they require enhancement based on risk and current guidelines.</b>	<ol style="list-style-type: none"> <li>Update, implement, and enforce fuel management and defensible space around structures.</li> </ol>
4.0 Built Environment	<ul style="list-style-type: none"> <li>MFD</li> <li>County of Maui</li> <li>State of HI</li> </ul>	Research, Prevention, Policy	<b>79. Some vegetation adjacent to structures survived where the structure was not destroyed.</b>	<ol style="list-style-type: none"> <li>Additional research is necessary to understand the potential for lush, well-watered, and well-maintained vegetation to provide benefits (e.g., radiation shielding) that is not outweighed by the hazard.</li> </ol>
4.0 Built Environment	<ul style="list-style-type: none"> <li>MFD</li> <li>County of Maui</li> <li>State of HI</li> </ul>	Prevention, Policy	<b>80. Ember penetration through building envelopes, including roofs, vents, and windows, is a common pathway for building ignition.</b>	<ol style="list-style-type: none"> <li>Buildings should be constructed and maintained to resist ember intrusion. This will include construction features (vents, roofs, etc.).</li> <li>Adopt stronger WUI codes (e.g., ICC International Wildland-Urban Interface Code and NFPA 1140: Standard on Wildland Fire Protection) or WUI Structure/Parcel/Community Hazard Mitigation Methodology guidance.</li> </ol>

# 7.1 APPENDIX

Reference Section (Phase Two Report)	Relevant Department	Actionable Areas	Finding	Recommendations
4.0 Built Environment	<ul style="list-style-type: none"> <li>• MFD</li> <li>• County of Maui</li> <li>• State of HI</li> </ul>	Prevention, Policy	<b>81. Window and doors were left open prior to evacuation.</b>	1. Residents and citizens should be educated on the importance of closing building openings as an important component of preparation for, and departure from, a home during an evacuation—part of a “Ready, Set, Go: Close Before You Go” campaign.
4.0 Built Environment	<ul style="list-style-type: none"> <li>• MFD</li> <li>• County of Maui</li> <li>• State of HI</li> </ul>	Prevention, Policy	<b>82. Age of construction is not a primary indicator of structure survival (correlation not causation).</b>	1. Ensure properties and areas around structures are well-maintained, despite the structures’ age (i.e., newer structures are not exempt).
4.0 Built Environment	<ul style="list-style-type: none"> <li>• MFD</li> <li>• County of Maui</li> <li>• State of HI</li> </ul>	Prevention, Policy, Operational	<b>83. Defensive actions appear to have lessened fire impact in the built environment.</b>	1. Identify fire suppression strategies and tactics commensurate with resources and infrastructure capabilities and availability. Preplan based on these limitations and local conditions.
4.0 Built Environment	<ul style="list-style-type: none"> <li>• MFD</li> <li>• County of Maui</li> <li>• State of HI</li> </ul>	Prevention, Policy	<b>84. Fuel breaks, such as Kahoma Stream, Kaua’ula Stream, Keawe Street Apartments at the Villages of Leiali’i construction site, and grass athletic fields by the Boys and Girls Club/Lahaina Recreation Center, appear to have impacted fire progression.</b>	1. Investigate zoning changes to incorporate fuel breaks in areas within the community to slow fire progression and to act as safe refuge areas for evacuating residents.

# 8.0 ACRONYMS AND MEANINGS

Acronym	Meaning
AG	Hawai'i Attorney General
ARFF	Aircraft Rescue and Firefighting
ATF	United States Bureau of Alcohol, Tobacco, Firearms, and Explosives
CAD	Computer Aided Design
CRA	Community Risk Assessment
CRR	Community Risk Reduction
CWRM	Commission on Water Resource Management
CWPP	Community Wildfire Protection Plan
DAGS	Department of Accounting and General Services
DCCA	Department of Commerce and Consumer Affairs
DHRD	Department of Human Resources Development
DLE	Hawai'i Department of Law Enforcement
DLIR	Department of Labor and Industrial Relations
DLNR	Department of Land and Natural Resources
DOAG	Department of the Attorney General
DOFAW	Hawai'i Division of Forestry and Wildlife
DOT	Hawai'i Department of Transportation
DLIR	Director of Labor and Industrial Relations
EMS	Emergency Medical Services
FSRI	Fire Safety Research Institute
HAB	Hawai'i Association of Broadcasters
HBBC	Hawai'i Building Code Council
HI-EMA	Hawai'i Emergency Management Agency
HPUC	Hawai'i Public Utilities Commission
HRS	Hawai'i Revised Statutes
HWMO	Hawai'i Wildfire Management Organization
IECC	International Energy Conservation Code
IBC	International Building Code
ICC	International Code Council
IRC	International Residential Code
MAT	Maui Wildfire Mitigation Assessment Team
MFD	County of Maui Fire and Public Safety, aka Maui Fire Department

## 8.0 ACRONYMS AND MEANINGS

Acronym	Meaning
NFPA	National Fire Protection Association
NGO	Non-Governmental Organization
NIMS	National Incident Management System
NWCG	National Wildfire Coordinating Group
NWS	United States National Weather Service
OPSD	Office of Planning Sustainable Development
OSFM	Office of the State Fire Marshal
OWSS	All-Hazard Outdoor Warning Siren System
RAWS	Remote Automatic Weather Stations
RMS	Records Management System
RPC	Recovery Permitting Center
SFC	State Fire Council
SOC	Standards of Cover
SFM	State Fire Marshal
UHERO	UH Economic Research Organization
UL	Underwriters Laboratories
ULRI	UL Research Institutes
ULSE	UL Standards and Engagement
WUI	Wildland-Urban Interface

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As this report deals with topics related to Hawaiian culture, geography, environment, and language, FSRI chose to include Hawaiian diacritical marks, such as the ‘okina (‘) and kahakō (macron) over vowels, throughout this report when writing Hawaiian words. These markings are essential features of modern, written Hawaiian language, serving to represent the proper pronunciation and meaning.

While we have made our best effort to use these marks properly, we acknowledge there may be unintentional errors. We did not include diacritical markings where we were unable to identify the proper spelling of a particular Hawaiian word (eg., Aa Street) or in instances where the information is from a third party’s direct record (e.g., social media posts).

By including these marks, we aim to honor the Hawaiian language and show respect for its linguistic traditions – and for the people of Maui.



# Lahaina Fire Forward-Looking Report



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