

Introduction to Hazard Mitigation in Kaua'i

1.0 Introduction to Hazard Mitigation Planning

The Disaster Mitigation Act of 2000 (DMA 2000) requires that each State develop a hazard mitigation plan, in order to receive future funding following a disaster. This requirement provides some funding to each State to engage in activities to prepare the mitigation plan. The requirements also call for the development of local or county plans for that particular county to be eligible for post-disaster funding. The purpose of these requirements is to have programs and projects in place that will help minimize the loss of life, property, and overall cost of disasters. The State plans must be updated every three years, and the local mitigation plan must be updated every five years. This document provides an update to all sections of Kaua'i County's mitigation plan, including hazard identification, asset identification, risk and vulnerability assessments, current mitigation activities and capabilities, mitigation strategy, and plan maintenance to meet requirements set forth by DMA 2000.

DMA 2000 §201.6 (3) of the requirements outlines the process for localities in developing their mitigation strategies. Specifically, a Local Hazard Mitigation Plan must “include a mitigation strategy that provides the jurisdiction’s blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.” These strategies are built on an assessment of hazard risks and vulnerabilities. The plans include measures to mitigate hazard risks and demonstrate the benefit of these activities. The plan identifies gaps in knowledge and data and employ strategies to continually update the data, projects, information, and the overall mitigation plan as needed over time. The next section of this chapter provides an overview of the requirements and identifies where these requirements have been met within this updated hazard mitigation plan.

The initial hazard mitigation strategy for the County of Kaua'i was based on findings of the hazard risk and vulnerability assessment and planning efforts supported by the Project Impact grant program. Given the impact of several disasters in Kaua'i County since 2003, including a dam breach in Kaloko in 2006, flooding, and wildfires, there have been significant efforts undertaken during the past few years. These efforts utilized the coordination and cooperation among government agencies and the private sector to learn from these hazards and address these risks in the future. This document details the findings of these assessments and the process used to develop Kaua'i's hazard mitigation strategy.

1.1 Local Mitigation Plan Requirements

1.1.1 Adoption by the Local Governing Body

Requirement §201.6(c)(5): [The local hazard mitigation plan shall include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).

The Mayor of Kaua'i County, Bernard P. Carvalho, Jr., has signed an executive order to establish Kaua'i County as a Disaster Resilient Community. This executive order sets up a comprehensive mitigation program to address natural hazards. The executive order not only adopts the current mitigation plan, but also supports the plan through actions to maintain and update it, improve building codes, incorporate hazard analyses into land use decisions, and encourage partnerships with the private sector and local communities. It further establishes the executive branch of the government as the County Hazard Mitigation Committee to oversee implementation of hazard mitigation actions.

1.1.2 Multi-Jurisdictional Plan Adoption

This is an updated plan for the County of Kaua'i, but it is not a multi-jurisdictional plan.

1.1.3 Multi-Jurisdictional Planning Participation

This is an updated plan for the County of Kaua'i, but it is not a multi-jurisdictional plan.

1.1.4 Documentation of the Planning Process

IFR Requirement §201.6(c)(1): [The plan must document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

The jurisdiction is the County of Kaua'i bordered by ocean on all sides with no neighboring border. The first disaster resilient community executive order was established September 09, 2003, and has been continued by the current Mayor with the support of the leaders in Kaua'i County. The plan describes Federal, State and local participation in the plan development. Participants from both private and government sectors are represented.

Chapter Two of this document describes the planning process used, including methods for the risk and vulnerability assessment, lists of meetings, and a description of the public awareness campaign. The first hazard mitigation planning activities began with support from the Project Impact initiative. During the two years of funding, Project Impact enabled Kaua'i Civil Defense to establish partnerships, organize an advisory committee that became the County Hazard Mitigation Committee, and increase public awareness about hazard mitigation through a variety of forums, including television, media, and fairs. During the risk and vulnerability assessment, the planning team invited participation from the four planning districts at public meetings to identify hazard mitigation needs and verify information in the maps. During the plan update process, members of the communities were contacted to respond to questions describing changes in these districts since 2003 and were able to detail numerous initiatives up to 2009, as this plan was being developed. Disasters occurring since the first plan provided opportunities for engaging communities in public meetings to update actions required to improve risk reduction, including the development of updated evacuation routes and awareness of actions to take in disasters for the resident and visitor populations.

The plan has been used by many of the county departments as a cornerstone of other planned development. In addition to working with county agencies, Kaua'i Civil Defense has continually engaged the private sector and general public through planning and outreach activities. The plan provided critical information for the private sector regarding permitting and development planning. The NOAA Pacific Services Center used the initial plan in 2003 to build an ArcIMS web-based software tool in 2004 and 2005 that enabled county planners and permittees to reference hazard information. These tools have continued to be updated and refined, and the County currently operates well-integrated GIS-based planning tools. NOAA Pacific Services Center aided in the development of the Kaua'i Online Hazard Assessment (KOHA) tool updated and released in early 2009 (<http://csc-s-maps-q.csc.noaa.gov/khat/viewer.html>). In addition, all of the county plans were used as the foundation for the State of Hawai'i Multi-Hazard Mitigation Plan in 2004. The 2007 Update of the State's plan involved additional consultation with the County of Kaua'i to ensure that the most updated information was presented.

1.1.5 Identifying Hazards

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the type ... of all natural hazards that can affect the jurisdiction.

Chapter Three identifies natural hazards that can affect Kaua'i County. As described in chapter three, the hazards that have been identified are consistent with the hazards included in the State of Hawai'i Multi-Hazard Mitigation Plan, 2007 Update. Chapter Three provides a description of these hazards as they affect Kaua'i County. Not all hazards have the same impacts in every county. For example, Kaua'i County has less risk from volcanoes and earthquakes, although the past three years has included an increase in the amount of vog, or volcanic gas, that degrades air quality and increases respiratory illness. The hazard areas included in this plan include: hurricanes and strong winds, flooding (including stream floods and coastal storm inundation), drought, wildland fire, *climate variability and change*, earthquake, tsunami, volcanoes and airborne hazards, erosion, landslides, *dam breaches*, *hazardous materials*, *homeland security and terrorism*, and *health-related hazards*, such as pandemic flu and dengue fever outbreaks. [Note: italicized hazards have been included beginning 2009.]

1.1.6 Profiling Hazards

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the ... location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

Chapter Three contains historical occurrences of the natural hazards. Chapter Three Appendix 1 contains maps from the Atlas of Coastal Hazards prepared by USGS and the University of Hawai'i showing the areas that are most at risk from several different types of geologic hazards, with summary maps for tsunami, high waves, flooding, and high winds. The atlas has not been updated since it was published, but the USGS Atlas still provides a sound overview of hazards affecting Hawaii. In each section discussing hazards, the historical chronology of disasters has been updated to the most current records. Maps along coastal segments of Kaua'i show the severity of risk for erosion, tsunami, storms, landslides, and an aggregation of different hazards. Chapter Three Appendix 2 shows that Kaua'i has recently completed an extensive study of

shoreline erosion, and has used this to begin considering implications of sea level rise and hazard events combined with extreme climate events. Chapter Three Appendix 4 shows the dams for the County of Kauai that fall under state jurisdiction and have been included in recent inspections for dam safety, to prevent incidents, such as the dam failure at Ko Loko in March 2006. Additional map appendices show tsunami and flood zones and drought and wildfire areas.

1.1.7 Assessing Vulnerability: Overview

Requirement §201.6(c)(2) (ii)(A): [The risk assessment shall include a] description of the jurisdiction’s vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. The plan should describe vulnerability in terms of:

- ***The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas...***

In Chapter Four, the Assets have been identified for Kaua'i County. Assets have been categorized in the following areas: Emergency Services Infrastructure; Economic Assets; Critical Energy Infrastructure; Critical Telecommunications Infrastructure; Critical Transportation Infrastructure; Critical Water Infrastructure; Social, Cultural, and Environmental Assets; Government Facilities; and, Vulnerable Populations. Chapter Five integrates information on hazard risks with the important assets to understand risk and vulnerability of hazards and impacts on Kaua'i County. The tables and maps for each community in Chapter Five Appendix 2 show the areas of critical facilities referenced by hazard risk.

1.1.8 Assessing Vulnerability: Addressing Repetitive Loss Properties

Requirement §201.6(c)(2)(ii): The risk assessment must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged floods.

In Chapter Three, the flood hazards have been identified. In Chapter Five, the National Flood Insurance Program’s requirement for repetitive flood loss identification is provided. In Chapter Six, current flood mitigation tools to address flood risks are identified. Chapter Seven makes specific recommendations to address flood hazards. Where the County has experienced some problems with levees damaged from a flood event may have an impact on future certifications under NFIP; however, Kaua'i County has developed a plan to address these risks that has been submitted to the Army Corps of Engineers for assistance in addressing these issues. The Kaua'i County Flood Coordinator has conducted community meetings and outreach to ensure that residents in the County are aware of their flood risks and that they know how to address these risks.

1.1.9 Assessing Vulnerability: Identifying Structures

Requirement §201.6(c)(2) (ii)(B): The plan should describe vulnerability in terms of an estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate.

Table 5-15 located at the end of Chapter Five provides values for structures and property identified as critical facilities and infrastructure for different sectors. The values were obtained from the tax database for the county. Other methods to determine loss estimates, such as

average annualized loss are described in the last section of Chapter Five, although loss values, if known or estimated (based on the best available data) have been included at the end of each hazard discussion.

1.1.10 Assessing Vulnerability: Estimating Potential Losses

Requirement §201.6(c)(2) (ii)(C): [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

The first section of Chapter Four provides an overview of land use and development. Section Three of Chapter Five describes assets within the County that require protection or have been identified as essential or critical facilities and infrastructure. The mitigation plan references the Kaua'i County General Plan that determines land use policies for the county. Mitigation options have been developed in reference to these policies. Chapter Six identifies actions and activities that have been used to reduce risks and the capability of the county to continue to mitigate impacts of hazards. Kaua'i County has flood ordinances, coastal management, and practices to reduce erosion. Most recently, there have been programs to address dam safety, planning for evacuations from hurricane and tsunami, and ongoing public awareness and outreach activities to ensure that Kaua'i residents and visitors are well-informed of their hazard risks.

1.1.11 Assessing Vulnerability: Analyzing Development Trends

Requirement §201.6(c)(3) (i): [The hazard mitigation strategy shall include: a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Chapter Seven describes the mitigation goals and objectives determined by the Disaster Mitigation Committee. Kaua'i County has identified sustainable development as a foundational framework for disaster risk reduction activities with approaches that focus on enhancing community resilience. This requires understanding and integrating considerations of land use, environmental changes, community health and well-being, and social justice.

1.1.12 Multi-Jurisdictional Risk Assessment

Requirement §201.6(c)(3) (ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

Chapter Seven identifies mitigation actions, policies, and projects that have been in place to reduce hazards. It further identifies the way that the Disaster Management Committee has prioritized projects in order to address critical needs for mitigation.

1.1.13 Local Hazard Mitigation Goals

Requirement: §201.6(c)(3) (iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

Chapter Seven describes the hazard mitigation goals and objectives identified by the Disaster Mitigation Committee. Chapter Seven describes the plan for implementation of these actions. The projects have not undergone extensive benefit-cost calculations, although the county has successfully received mitigation funding in the past for building retrofits in Kaua'i County. The DMC has reviewed the projects to ensure that the costs of resources and implementation will likely have higher benefit cost ratios. Many of the identified actions include support for policies and activities that could be implemented through existing programs and daily operations by the county.

1.1.14 Identification and Analysis of Mitigation Actions

Requirement §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

Chapter Six identifies the ongoing and current range of mitigation actions and projects being used to reduce the effects of each hazard. Chapter Seven targets gaps recognized in sector areas and hazard types based on the risk and vulnerability assessment. The risk and vulnerability assessment considers critical facilities and lifelines in several key areas, including government, economic areas, emergency services, and telecommunications.

1.1.15 Identification and Analysis of Mitigation Actions: National Flood Insurance Program (NFIP) Compliance

Requirement §201.6(c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.

Kaua'i County has implemented flood ordinances to reduce hazard risks and participates in the State's National Flood Insurance Program. Kaua'i County has an active flood coordinator, who engages community and participates in activities to enable community members to reduce their flood risks. With the number of streams and high levels of rainfall in Kauai, there is active attention to complying with NFIP requirements for citizens.

1.1.16 Implementation of Mitigation Actions

Requirement §201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

Chapter Five on the risk and vulnerability assessment identified costs of inaction and failing to engage in mitigation. The policies and programs that are incorporated into the governance in the county do not have an explicit cost reduction value; however, these are critical to instilling risk reduction measures. The final prioritization of projects will be based on review of availability of funding programs suited for the action and the benefit-cost ratio. Since the engineering analyses are currently beyond the scope of the planning update and timing is critical for approval of the updated plan, the extensive analyses will be conducted once the proposed sources of funding have been identified. For FEMA's PDM and HMGP programs,

Kaua'i has previously conducted full benefit-costs analyses for submitted projects and successfully received funding for project implementation.

1.1.17 Multi-Jurisdictional Mitigation Actions

This plan is not multi-jurisdictional, although the County of Kaua'i participates in State of Hawai'i mitigation programs in addition to local mitigation actions.

1.1.18 Monitoring, Evaluating, and Updating the Plan

Requirement §201.6(c)(4)(i): [The plan maintenance process shall include a section describing the] method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Chapter Eight describes the plan maintenance process, including the schedule for monitoring, evaluating, and updating the mitigation plan. The first big review will occur in the next year in conjunction with the planned update for the State of Hawai'i Multi-Hazard Mitigation Plan to assess the success of the identified mitigation strategy and process.

1.1.19 Comprehensive Planning

Requirement §201.6(c)(4) (ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

Kaua'i County currently utilizes comprehensive land use planning and zoning, capital improvements planning, and building codes and standards to guide and control development in the County. Since the Mayor has officially adopted the Multi-Hazard Mitigation Plan, the existing planning mechanisms will integrate hazard mitigation strategies. The permit process integrates the risk and vulnerability assessment and maps in the geographic information system (GIS) to improve decision making for allowing future development. The Kaua'i County General Plan already establishes land use policies that will mitigate the impacts of natural and man-made hazards.

As described in Chapter Six, the Building Division in the Department of Public Works have used updated wind risk analyses to review and adopt the International Building Code.

1.1.20 Public Participation

Requirement §201.6(c)(4) (iii): [The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

Since the adoption of the first plan, the County of Kauai has continued to involve the public in planning and mitigation activities through outreach and community events. Kaua'i County Civil Defense Agency will distribute the copies of the plan to relevant agencies and organizations in the county. They will also collect comments and suggestions for review and consideration by the Disaster Mitigation Committee, and extend solicitation for future projects on an annual basis.

In addition, copies of the plan and any proposed changes will be posted on the State Hazard Mitigation Forum website, www.mothernature-hawaii.com, for Kaua'i County mitigation planning. This site contains an email address and phone number to which people can direct their comments or concerns.

The Disaster Mitigation Committee will hold public meetings to gather input from the larger community to ensure that the plan continues to implement mechanisms to reduce hazards throughout the county.

1.2 Adoption by the Local Governing Body

To meet the requirements of DMA 2000 to conduct updates to their approved plan every five years, Kaua'i County has formally approved the plan, as indicated in the Executive Order at the beginning of this document. The Disaster Mitigation Committee contributed significantly to updating information in all sections of the plan. The Mayor of Kaua'i has adopted the County Multi-Hazard Mitigation Strategy through an Executive Order to Sustain Kaua'i County as a Disaster Resilient Community.

Since the adoption of the first plan in 2003, Kaua'i County has demonstrated their commitment to building disaster resilient communities. Several of the best practices and key mitigation actions are detailed in the Chapter Six Appendix. Not only has Kaua'i County adopted the mitigation plans formally, but they have strived to demonstrate the importance of mitigation through their actions.

References

County of Kaua'i Hazard Mitigation website. http://www.mothenature-hawaii.com/county_kauai/county_kauai.htm 2007. Accessed 6/2009.

County of Kaua'i. 2000. County of Kaua'i General Plan. <http://www.kauai.gov/Government/Departments/PlanningDepartment/TheKauaiGeneralPlan/tabid/130/Default.aspx> 2007. Accessed 6/2009.

Flu Tracker
(<http://flutracker2.rhizalabs.com/cbi/snapshot/page?concept=~fd000a02514f427d6c114918049a5efc175eb4803e9d9cf73e9f>).

Hawai'i State Department of Business, Economic Development and Tourism, Tourism Research Branch, *Annual Visitor Research Report* (annual) and records. See <http://www.hawaii.gov/dbedt> 2009. Accessed 6/2009.

Hawai'i State Hazard Mitigation Forum website. www.mothenature-hawaii.com 2007. Accessed 6/2009.