

Executive Summary:

County of Kaua'i Multi-Hazard Mitigation and Resilience Plan

Introduction to the Mitigation and Resilience Plan

In this third plan, the longer term needs for sustaining mitigation efforts and building disaster resilience have emerged and guided the expansion of the name of the plan to include “Resilience.” This better reflects the ongoing activities of the county, which were revealed in the evaluation of the current plan and the challenges to implementation. The current plan still follows the criteria for local hazard mitigation plans, as authorized by §322 of the Robert T. Stafford Act, amended by §104 of the Disaster Mitigation Act of 2000 (DMA 2000), 44 CFR Part 201, Hazard Mitigation Planning. The development of local hazard mitigation plans is critical for maintaining eligibility for future Federal Emergency Management Agency (FEMA) mitigation and disaster recovery funding. Yet, many of the hazard mitigation and resilience activities of the County will not be eligible for FEMA funding and will require on other agencies and private partnerships for implementation.

The County of Kaua’i Multi-Hazard Mitigation Strategy was formally approved December 2003 as one of the first county plans in the United States to receive approval. DMA 2000 requires that the county plan is updated every five years. The State plan, which must be approved for disaster funding, builds on the county plans and is updated every five years. The second plan, County of Kaua’i Multi-Hazard Mitigation Plan, was approved in August 2010.

For the mitigation plan update process requirement, the County of Kaua'i used the best available data, as with the previous plans. For this planning process, the planners started with an evaluation and review of the previous plans, specifically the proposed mitigation actions, to see what was implemented and the reasons that actions were not implemented. The findings were not surprising to the team in that the mitigation actions that were identified as part of an agency mandate and were funded through budget cycles, either from the county, state or federal sources to meet compliance issues were completed. Activities that required external funding were subject to economic fluctuations and the reduction in allocations of funding sources, including federal continuing resolutions on budget that delayed or prevented grant applications and reduced funding for many projects.

The significant changes and additions during the last five years have been the improved tsunami inundation modeling that resulted in the development of new evacuation maps for the county. The process for approval of the evacuation routes involved a series of public information meetings to get input and to demonstrate how to use the new information. It further involved sign installation marking the evacuation routes.

There have not been significant changes in development in the last five years, and the projected losses have not changed significantly. The update includes proposed mitigation plans and projects based on information in the risk and vulnerability assessments. It identifies best practices and local activities that contribute to risk reduction efforts. The goal is to build disaster resilient communities in the County of Kaua'i.

County of Kaua'i Multi-Hazard Mitigation and Resilience Plan

The County of Kaua'i is committed to a long-term strategy for reducing the risks of natural hazards. Kaua'i has experienced a range of climate and hydrological hazards, geological hazards, and technological hazards that have resulted in great costs to lives, property, and the economy of the county. The hazards that were identified were chosen for consistency with the State's planning efforts, and include: hurricanes, floods, drought, wildfire, erosion, landslides, climate change, earthquakes, tsunami, dam failure, hazardous materials, homeland security threats, and health-related hazards. Since there are no active lava flows and the volcanic emissions or vog is experienced to a lesser degree than other counties because of the distance from the volcano, it was removed in 2015 from the list of hazard concerns. Climate change and dam failure were added in 2009, as communities and government expressed concern over these hazards and the potential impact on lives and livelihoods. Despite the commitment to hazard mitigation, as detailed in the approved County of Kaua'i Multi-Hazard Mitigation Strategy of 2003, Kaua'i experienced major disaster declarations for the state that specifically impacted the county: 1640 Severe Storms, Flooding, Landslides, Mudslides and Dam Failure in 2006; 1743 Severe Storms, High Surf, Flooding, and Mudslides in 2008; and 1814 Severe Storms and Flooding declared in 2009, and one Flood Declaration in the period from 2010-2015, in March 2012.

Several rockslides occurred along shoreline highways, cutting off major traffic routes, which required government funding to clear debris and implement response actions. In March 2012, the rockfall caused several days of lost transportation and difficulties for emergency vehicles responding to situations. Additional costs included business losses as employees could not get to work.

In response to disaster experiences, the county developed a framework and an ongoing process for hazard mitigation. Hazard mitigation refers to *actions and measures taken before an emergency occurs and includes any activity to reduce the impacts from a disaster*. The purpose of a hazard mitigation plan is to protect lives and property from loss and destruction during a natural hazard. Hazard mitigation helps to maintain the quality of life by reducing the immediate costs of response and recovery to hazards and long-term costs to the economy. This has evolved into addressing and reducing risks, and then considering the longer term needs for risk reduction, which stresses the need to develop resilience.

By conceptualizing hazard mitigation in a disaster risk reduction framework, the County can reduce the cost and extent of disasters by addressing the underlying risks. The better we can understand the hazard threat in relation to the sensitivity of people and key sectors to the hazard, the greater likelihood of preventing disaster. The consideration of resilience helps

communities and government to not only address risks and vulnerability, but to consider strengthening capacity. Communities that thrive will better resist the devastating impacts of disaster and will recover more quickly. This focus is aligned with the Mayor's Vision of supporting communities. The hazard impacts are usually experienced in localized settings, in the ahupua'a or communities of Hawai'i. To reduce disaster risks requires an integrated, multi-level, multi-sector, collaborative approach to risk reduction with an emphasis on building community resilience.

Development of the County's Mitigation Planning Process

The Disaster Mitigation Act of 2000 required local mitigation plans to be developed prior to the development of the standard state plan. Because the State recognizes the importance of the roles that the county governments play in enacting programs at the local level, the State Hazard Mitigation Forum supported the development of county plans as the foundation for the state's hazard mitigation plan.

For the development of the initial plan, the County of Kaua'i executive branch and the civil defense agency convened a steering and technical advisory committee, and invited partners to participate in planning and mitigation activities. Through a series of committee meetings, the planning teams conducted briefings on hazard mitigation and on the development of a risk and vulnerability assessment and a hazard mitigation plan. As the information flow increased among the committees and planning teams, the process improved and the assessment and strategy became better informed. This established process has continued to inform and support the 2015 Plan Update. The formal start of the update process began in September 2014 with the evaluation and interviews with key stakeholders and government staff, moving to community meetings held in January 2015 (following the Mayor's re-election in November 2014), determining goals and objectives for the plan, identifying mitigation actions within agencies and communities, previewing drafts with the general public at the annual CAK Home Show, and preparing final revisions based on feedback and recommendations for approval in August 2015.

The County of Kaua'i invited the general public to participate in the hazard mitigation planning processes. The Mayors have held discussions on public television and radio shows that support risk reduction and resilience; Civil Defense presented discussions about hazard mitigation and the goals of hazard mitigation planning programs to community groups and local organizations; the Contractor's Association of Kaua'i published a newsletter that featured a series of articles about natural hazards and mitigation measures; and other media forums directed attention to the Kaua'i County website, where county-specific mitigation actions are publicly available. The Structural Engineers Association of Hawai'i has provided technical expertise in promoting the improvement of building codes to meet higher standards for hazards. Partnered with Hawai'i State and county agencies, they have conducted advanced training courses across the state. Relationships established with the private sector have been critical to sustaining efforts in hazard reduction.

Public awareness and education programs have continued, and the plan update process provides an additional opportunity to build awareness of hazard mitigation and resilience with the general public. NOAA National Weather Service and other federal agencies participated in an array of activities to educate the general public and engaged in training exercises to improve capacity for disaster response and mitigation. NOAA also developed an assessment tool for tsunami risks available on the web for use by the general public. The Hazard Loss Mitigation incentive program developed by the State provides specialized information for homeowners on retrofit projects. KCDA participated in numerous public fairs and events and attended community and local organization meetings to distribute materials on hazard risks. At the annual Contractors Association of Kaua'i Building and Home Show in 2014 and 2015, seminars and small group discussion provided information to the public on tools to assess flood risk and then mitigate these impacts by participating in the National Flood Insurance Program (NFIP). The 2015 Update was made available for public comment.

The following are the studies or analyses have contributed to knowledge in this plan:

1. County of Kaua'i Development of the New Wind Design Code Project. The updated maps enabled approval of the IBC 2006 Building Code with hazard amendments in 2012. An additional study has not been integrated but was allocated, and once this structural risk assessment occurs, there will be added improvements to the building code. The new study will improve the information and enable the adoption of the 2012 IBC.
2. University of Hawai'i System Multi-Hazard Mitigation Plan. This project will result in a Hazard Mitigation Plan for the university's ten campuses, including the Kaua'i Community College, which participated in the 2015 Plan Update process for Kaua'i.
3. County of Kaua'i Critical Infrastructure GIS Data Assessment and Updated Risk Layers for the 2015 Plan Update. This initiative substantially enhanced the update of this County of Kaua'i Multi-Hazard Mitigation Plan. It provides GPS, GIS layer update to critical infrastructure such as roads, water, electric facilities, etc. The project informed this update.
4. The Tsunami Evacuation Zone Certification, 2013. Based on new analysis of tsunami inundation from modeling conducted by Dr. Kwok Fai Cheung at the University of Hawaii, the evacuation zones have been reviewed. New evacuation routes were marked with signage in 2014.
5. Kaua'i Wildfire Risk Assessment, 2013. The project was conducted by the Hawaii Wildfire Management Organization and provided an assessment and mapping of high risk areas.
6. The Sea Level Rise technical study for the County General Plan Update 2015. UH Sea Grant provided an analysis and mapping of the shoreline under different scenarios to inform coastal development over the coming decade.
7. FEMA's digital Flood Insurance Rate Maps were approved after the last plan approval, in November 2010, and have been integrated into decision-support tools at the County and State.

Mitigation Plan Update Process

The 2015 update relies on extensive input from experts representing County, State, and Federal government agencies. Research and updates have been included from university researchers, private engineers and planners, hazard advisory committees, professional associations, public information officers, and regional organizations. By learning lessons and applying them to risk management in Kauaʻi, the County strengthens its risk reduction practices.

Expert review of sections of the old plan and interviews with key personnel were conducted as part of the update process. Documents were separated and sent to each of the agencies for review to ensure that updated information and project recommendations were included in the plans. The planning team questioned whether projects were still relevant, whether they made an impact, and tried to understand reasons for not pursuing the same actions.

The following agencies provided significant input into the revision of the plan by reviewing sections pertaining to their mandates and their knowledge. These include: Kauaʻi County Office of the Mayor; Kauaʻi County Civil Defense; Kauaʻi County Public Works Department, including the engineering division, building division, solid waste division, waste water division, and flood coordination; Kauaʻi County Office of Economic Development; Kauaʻi County Water Department; Kauaʻi County Housing Department; Kauaʻi County Finance Department; Kauaʻi County Planning Department; Kauaʻi County Transportation Agency; Kauaʻi County Agency for Elderly Affairs; Kauaʻi County Fire Department; Kauaʻi County Police Department; Kauaʻi Island Utilities Cooperative; Contractors Association of Kauaʻi; Salvation Army; Red Cross; the Poʻipu Resort Association; Kauaʻi Visitors Bureau, and the Hanalei Watershed Hui.

Through numerous meetings and work products from the State, US Federal and regional organizations contributed to the state and county update process, including: the Hawaiʻi State Hazard Mitigation Forum; the Hawaiʻi State Earthquake Advisory Committee (HSEAC); the State of Hawaiʻi Drought Council; the State of Hawaiʻi Building Code Council; the Hawaiʻi State Department of Business, Economic Development & Tourism, Office of Planning; Hawaiʻi State Land Use Commission; Hawaiʻi State Department of Land & Natural Resources; Hawaiʻi State Department of Education; Hawaiʻi State Department of Transportation; Hawaiʻi State Department of Accounting & General Services; Hawaiʻi State Department of Defense; Hawaiʻi State Department of Health; University of Hawaiʻi (School of Ocean, Earth Sciences & Technology, Hawaiʻi Coastal Geology Group, UH Sea Grant, UH Social Science Research Institute); Martin & Chock, Inc.; US Army Corps of Engineers; US Geological Survey (USGS); NOAA National Weather Service; the Pacific ENSO Applications Center; the International Tsunami Information Centre; NOAA Pacific Services Center; FEMA Region IX Pacific Area Office; the Pacific Risk Management ʻOhana (PRiMO); the Pacific Disaster Center (PDC); and, the Pacific Regional Integrated Sciences and Assessment (Pacific RISA).

The Kauaʻi County Disaster Management Committee convened to discuss the plan update in 2014 and 2015, and to provide input in key areas and approvals. The DMC members reviewed proposed projects submitted for risk reduction activities. Few of the proposed projects target funding cycles for FEMA's Pre-Disaster Mitigation Grant Program (PDM) or the Hazard

Mitigation Grant Program (HMGP). Many projects will not be eligible for these sources. Other projects may be eligible for State funding under agency mandates or from other federal funds. NOAA, USGS, the US Army Corps, and NRCS are currently funding projects that aid in disaster reduction (Table 7-2 provides a list of potential programs for resources to implement the mitigation actions). The DMC discussed prioritization of projects in terms of high, medium, and low importance to mitigation efforts in the County. Any of the discussed projects that were deemed low priority were not submitted to the plan. The projects will be eligible to very different funding based on the type of hazard addressed and the activity proposed; therefore, the DMC will prioritize submissions for each funding opportunity as these opportunities appear over the next year. The list will be reviewed and revised by the DMC on an annual basis.

The final element of the plan update process requires adoption by the Mayor of the County of Kaua'i. An Executive Order to Sustain the County of Kaua'i as a Disaster Resilient Community was signed in June 2015 that adopts the mitigation plan and the associated hazard plans.

Risk and Vulnerability Assessment

Kaua'i County assessed hazard risks and vulnerability based on information compiled in a geographic information system (GIS). Hazard layers were developed using a variety of data sources, but were most important in assessing county risks and vulnerabilities. The County assessment included the State's critical facilities and lifeline infrastructure in their risk and vulnerability assessments. The County assessment contributes significantly to form the basis of the State's risk and vulnerability assessment.

Studies conducted locally by Martin & Chock, Inc. have demonstrated the need to include topographical information in wind risk modeling to improve building codes and standards. Other studies have improved knowledge of changing shorelines and erosion rates, as well as methods for beach replenishment. New technologies in LIDAR and remote sensing imagery offer the ability to improve building inventories and footprints to improve modeling. There are many ongoing studies that will be incorporated into models and mapping assessments over the next few years that will continue to improve information for decision-making and planning.

For this assessment, it was important to continue to acknowledge the wealth of assets in Kaua'i and the way that these contribute to the overall resilience of Kaua'i (Chapters 4, 5, and 6). Community organizations coordinating best environmental practices and watershed management contribute to hazard mitigation and local resiliency.

Some of the gaps that need to be addressed include: 1) better attention to improving communication and communication infrastructure; 2) attention to funding upgrades and retrofits to shelters and public facilities; 3) addressing issues of water and energy use and the impacts that these actions can have on reducing climate risks; 4) integrating ecological studies and best environmental practices into risk management as mitigation measures; 5) building better awareness of disaster risks and impacts among leaders, decision makers, and the general public, and 6) developing Climate and Disaster Resilience Plans similar to the North Shore, Hanalei to Hā'ena.

In addition to the technical aspects used in conducting risk and vulnerability assessments, there is a need to understand the deeper causes of disaster, which can also result from poor socio-economic conditions of an affected community. When this underlying condition is present, it deepens the impact on a community's ability to respond and recover to disasters. Some of these issues include poverty and social justice. The high cost of housing for working families on Kaua'i increases the risks to families because they may not be able to afford adequate housing, or several families may dwell in homes with supporting infrastructure designed for fewer tenants. Other issues that need to be considered are the gendered divisions of labor and how this information is incorporated into livelihood recovery projects. The Mayor's Proclamation to end the wage gap has been one action to address issues of discrimination that heighten risk. These in-depth analyses have not been incorporated into current disaster risk management analyses.

Mitigation Priorities

The County of Kaua'i has been committed to hazard mitigation for decades. The review of implemented mitigation measures and actions in chapter six demonstrates this dedication. The county recognizes that hazard mitigation depends on appropriate land use policies and practices, including zoning and coastal zone management, flood control, building codes and standards, infrastructure development and standards, regulatory measures, incentive programs, and participatory planning methods.

The county developed goals and objectives and have tied these to the projects listed in Chapter 7 (see Table 7-1). These goals and objectives provide a foundation for the mitigation actions and policies that will be developed in this plan. In addition to comments collected with initial input from the broader hazard community who reviewed the recommendations, the County Disaster Mitigation Committee reviewed and approved the inclusion of the goals and objectives for mitigation hazards. These goals and objectives will drive the strategic planning process for the County and the promotion of mitigation actions. The projects included in Table 7-1 include identified goals and objectives that support the recommendation.

The county mitigation plan provides the basis for setting mitigation priorities at the local level, which will be incorporated into the state mitigation planning. The Kauai'i County Disaster Mitigation Committee established goals, objectives, and priorities for mitigation plans and actions. The County will continue to involve the broader Hawai'i hazard mitigation community in developing effective mitigation measures and to provide input into the upcoming state efforts.

Mitigation Plan Implementation and Maintenance

The County of Kaua'i developed a structure for disaster risk management that ensures implementation of the multi-hazard mitigation plan. The experiences of the past six years in dealing with disasters and the recent experience in updating the hazard mitigation plan has

highlighted gaps in hazard knowledge in and coordination of efforts that need to be improved to support the process developed for mitigating hazards.

Coordination and collaboration issues will need to be addressed in the implementation of the plans and actions. The DMC will meet and discuss disaster-related issues quarterly and review progress on implementation of the multi-hazard mitigation plan and mitigation actions.

The County recognizes that the current effort is based on the best available data and information, but that there are significant gaps in information that will be addressed over the next five years. As projects and programs are completed and as new policies are implemented, it will be important to update the document and reprioritize management strategies. The DMC will assist Kaua'i Civil Defense in developing an update process that will become an essential part of mitigation responsibilities. The update process has highlighted the need to keep aware of information as it occurs rather than trying to compile the written information into the plan once a year.

Support by the Mayor and government leaders in Kaua'i ensures that hazard mitigation will remain a priority in the future. The increased awareness and participation by the general public will make it easier to implement projects and provide input into future needs in minimizing risks and vulnerability to hazards. As the County begins to address gaps in mitigation, the plans will become more robust. The plan requires implementation of proposed measures to improve. It further requires collaboration among government agencies, the private sector, non-governmental organizations, and communities to reduce disasters.