

## **CHAPTER 6: Kaua'i County Current Mitigation Actions & Risk Reduction Capacities**

### **6.0 Introduction and Analysis of Cross-sector Mitigation & Risk Reduction Planning & Policies**

As described in previous chapters, the County of Kaua'i has been proactive in implementing hazard mitigation measures in all areas throughout the county. This includes mitigation measures implemented through county laws and regulations, administrative rules in agencies, and within county ordinances. Furthermore, hazard mitigation has not been limited to regulatory action, but has been incorporated into county planning frameworks and programmatic measures in pursuit of disaster risk reduction.

The intent of this chapter is to provide the background for the strategy that the county pursues, which will be outlined in the next chapter. Mitigation policies and actions that have been undertaken are described in detail by each type of hazard.

State and County plans and policies relevant to hazard mitigation and risk reduction planning are highlighted and discussed here (Table 6-1), identifying particular governance, community development, Integrated Resource Management, among other resources and capacities addressed. This is followed by updates to the 2009 proposed Kaua'i County Hazard Mitigation Actions (Table 6-2).

**Table 6-1. Relevant State & County Plans & Policies for Mitigation & Risk Reduction Cross-Pollination Strategy**

Name	Year	Lead Agency/ Organization	Mitigation/Risk Reduction Actions/ Recommendations	Resources & Capacities Addressed
Holo Holo 2020 projects (& safe routes to school/walkable communities)	2015	Mayor’s Office	Actions support community resilience through renewable energy, improved transportation, and cultural resources restoration and management.	Still under development; current matrix does not mention hazards or climate change. Activities address some aspects of community resilience – food security, renewable energy, and cultural restoration using ahupua’a management. Includes a proclamation to end the wage gap and eliminate discrimination.
South Kaua’i Community Plan	2015	Community Advisory Committee	Plan will include Natural Hazards & Climate Risk Considerations (Sea Level Rise scenarios).	TBD: Still under development.
East Kaua’i Community Plan (under revision as of 2/2015)	2015	East Kaua’i Community Development Plan Citizen Advisory Committee Members	No information available as of 4/2015.	TBD: Still under development.
Climate Change Impacts in Hawai’i	2014	UH SG	Overview of potential climate change impacts to Hawai’i’s ecosystems and communities, with ideas for Adaptation, Mitigation & Response.	Covers shoreline restoration and recommendations for reduced impacts on coastal ecosystems. Addresses potential long-term impacts of sea level rise.
<a href="#">Kaua’i General Plan Update Technical Study: Kaua’i Climate Change Assessment</a>	June 2014	UH SG	Will primarily review shoreline ecosystems and development impacts related to long-term expected impacts of	TBD: Still under development.

			climate change and sea level rise.	
Līhu‘e Town Core Plan	Approved Final Draft 11/14	County of Kaua‘i Planning Dept. & Community Working Group	Plan will include Natural Hazards (within Natural Environment section) & Climate Risk Considerations (Sea Level Rise scenarios) within policies and planning	The LCP’s policies support the implementation of actions recommended in the Kaua‘i County Multi-Hazard Mitigation Plan 2009 (pp 179). These policies contribute to hazard mitigation and overall DRR in the Līhu‘e District. For Climate Change, the LCP policy recommendations for climate change in the Līhu‘e District are adapted from the Kaua‘i Climate Change and Coastal Hazards Assessment (UH Sea Grant Program 2014) (pp 180). They are intended to address gaps in planning information and guidance (including conducting a HRVA for coastal Līhu‘e areas) and put in place measures for community resilience to coastal hazards.
<b>Kaua‘i County Hurricane Response Logistics Concept of Operations (CONOPS)</b>	2013	Kaua‘i County Civil Defense Agency	Hurricane Response planning to ensure that the County has made plans, agreements, Memorandums of Understanding, and administrative preparation for dealing with evacuation related to hurricane disasters.	Annexes include consideration for: lifesaving measures; designated shelters and shelter management; mass care; minimizing impacts to visitors; maintaining water distribution; fuel distribution and maintaining essential services; debris clearance; critical resource protection; maintaining port operations; and, restoring power.
State Of Hawai‘i Multi-Hazard Mitigation Plan 2013 Update	2013	State of Hawai‘i Civil Defense Agency	Multi-Hazard Risk Reduction Strategy & Cross-Sector Recommendations of all Counties including Kaua‘i.	Infrastructure assets & capacities & recommendations.
State Of Hawai‘i Multi-Hazard Mitigation Plan	2010	State of Hawai‘i Civil Defense	Multi-Hazard Risk Reduction Strategy &	Infrastructure assets & capacities & recommendations.

2010 Update		Agency	Cross-Sector Recommendations of all Counties including Kaua`i.	
Kaua`i County Multi-Hazard Mitigation Plan Update 2009	2009	Kaua`i County Civil Defense Agency	Multi-Hazard Assets, Vulnerability & Risk Identification, Analysis & Reduction Recommendations (Mitigation, Preparedness, Response)	County & State government resource improvement to address gaps in capacity; community resilience planning strategic support & best practices.
County Of Kaua`i -- Emergency Operations Plan--Basic Plan	2007	Kaua`i County Civil Defense Agency	Multi-Hazard Risk Reduction Strategy & Cross-Sector Recommendations incorporated.	Assets & capacities assessments & recommendations.
Kaua`i Economic Development Plan 2005-2015: Kauai's Comprehensive Economic Development Strategy (Ceds) Report	2004	Kaua`i County Office of Economic Development & Kaua`i Economic Development Board	Economic Development Risk Review & Recommendations	Economic development-based assets & capacities assessments & recommendations.
<a href="#">County of Kaua`i General Plan</a>	2000 (Update underway for 2015)	County of Kaua`i Planning Dept.	County of Kaua`i is legally mandated to prepare and adopt a General Plan by State law and the County Charter. Chapter 46 of the Hawaii Revised Statutes (HRS) states zoning must be based on a General Plan. Current update will include references to both the KCDA Kaua'i County Multi-Hazard Mitigation	TBD: Still under development.

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Plan 2009 & the Kaua'i  
Climate Change and  
Coastal Hazards  
Assessment (UH SG 2014).

County of Kaua'i Disaster Debris Action Manual	2001 (update is requested)	County of Kaua'i Department of Public Works Solid Waste Division	Identifies safe areas for solid waste disposal prior to the impact of the disaster.	Negotiated agreements (memorandum of agreement) to coordinate debris collection, use of heavy equipment, and disposal sites for emergencies.
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Upon review of the relevant past and current plans (Table 6.1), there arises a clear need for improved integration and cross-referencing of both the Kaua'i County Multi-Hazard Mitigation Plan (KCDMA 2009) and the Kaua'i Climate Change and Coastal Hazards Assessment (UH SG 2014). Incorporation of disaster risk reduction, mitigation and climate change considerations into community plans and the General Plan, and vice versa, are crucial for integrated sound planning and development.

The information, case studies, policies and programs should be driven locally, with community development plans and programs, and disaster resilience initiatives informing countywide development and mitigation planning, as well as County-scale risk maps and information, should support initiatives at more localized scales, such as community-level Hazard, Risk & vulnerability Analyses/Assessments (HRVA) including impacts from climate change. For instance, County departments and community initiatives can utilize HRV maps, analyses, and data from the Kaua'i County Multi-Hazard Mitigation Plan, and the Kaua'i Climate Change and Coastal Hazards Assessment short- and long-term ecological, economic, social and other impacts anticipated. Various adaptation, mitigation and response options can be shared across sectors, including water conservation, shoreline protection, infrastructure designs that accommodate flooding, renewable energy resources, food and water sustainability practices, among others.

While the Kaua'i Economic Development Plan does not explicitly call-out any hazards or disaster risks, it does analyze and formulates recommendations for economic development risk reduction measures, including economic self-sufficiency and economic diversification, which may have overall risk reduction implications including socio-economic vulnerability reduction.

The Disaster Debris Action Manual (DDAM), in accordance with the *Steps to Develop County Disaster Debris Response Planning* contained in the *Hawaii Disaster Debris Management Plan (June 2000)*, was developed for use by all County agents to prepare for and respond to disasters such as hurricanes, floods, and tsunamis. The level of disbursement and awareness of all such relevant plans is not well-known, so efforts to highlight and share information are crucial. For all such plans, it is critical that all County agents and community disaster preparedness groups are aware of, and receive and share relevant information, to best coordinate hazard, assets, resources, vulnerability and risk information and planning.

In review of cross-cutting County departmental mitigation actions proposed in the 2009 Plan Update, the following table (6-2) identifies relevant updates including accomplishments, barriers and the relevance for the next 5 years.

**Table 6-2. Evaluation of Kaua'i County Mitigation Actions Proposed in 2009.**

Lead agency/ organization	Goals & Objectives	Action Description Project Timeframe	2015 Evaluation: Accomplishments, Barriers, Relevance for Next 5 years
<b>Multi-Hazard Actions</b>			
<b>Incorporate into operations using existing resources</b>			
Office of the Mayor and Kaua'i Civil Defense	G1	Ensure widespread awareness for reducing disaster risks and mitigating impacts of hazards in policies, planning, and program implementation.	Additional staff provisions for KCD have enabled this ongoing initiative. Encourages training of personnel and communities. February 2015 reorganization of KCDA included an Emergency Management Administrative Officer position dedicated to preparedness, community outreach/awareness, resilience and mitigation initiatives.
Office of the Mayor, Planning Department, and Kaua'i Civil Defense	G1	Ensure hazard mitigation is incorporated into the Kaua'i County General Plan (ten-year plan, 2011-2020).	General Plan 2011 completed with integrated hazard mitigation components. 2014 General Plan underway currently, with plans to integrate current Community Plans as well as hazard mitigation and climate change recommendations of the Kaua'i Climate Change and Coastal Hazards Assessment Sea Grant publication.
Department of Public Works Building Division	G4 O1 G7 O1,2	For new construction of public buildings, designate areas to serve as a shelter. (Construction would require new resources; see specific requests for project funding for shelters).	There are no new facilities since 2009 that have sheltering capacity. The Pi'ikoi building has a hardened atrium area, but this has not been used for sheltering.
Kaua'i Civil Defense	G4 O2,3,5	Review and ensure agreements are in place among private utilities, the executive government agencies, Kaua'i Civil Defense (KCD), and the Red Cross to ensure that high priority facilities and shelters are maintained.	Still relevant. Includes Kaua'i Visitors Bureau and the Hotel Association. Review and ensure agreements are in place among private utilities, the executive government agencies, Kaua'i Civil Defense (KCD), and the Red Cross to ensure that high priority facilities and shelters are maintained.

Department of Public Works Building Division	G7 O1,2	Consider options to secure funds to retrofit facilities with hurricane shutters, roof tie-downs, and other improvements, such as emergency power generation equipment.	Specific projects done funded from mitigation grants: Moikeha, Piikoi, and the Historic County Building, and Kaiakea Fire Station were hardened as an essential facilities.
Kaua'i Civil Defense & Economic Development Office	G4 O4,5 G7 O2	Continue to develop agreements with hotels and resorts to house their own guests and worker families during hurricanes and other major natural disasters. In Hawai'i, legislation enables private facilities to house the public with relief for negligence liability. Hawai'i Revised Statutes (HRS) 128-19 provides relief for negligence liability to private sector owners who volunteer the use of their facilities as an emergency shelter. The immunity protection that may be provided applies when an owner or controller of the facility meets the following criteria: (1) Their actions relating to the sheltering of people are voluntary; (2) They receive no compensation for the use of the property as a shelter; (3) They grant a license or privilege, or permit the property to be used to shelter people; (4) The Director of Civil Defense, or delegated agency or person, has designated the whole or any part of the property to be used as a shelter; (5) The property is used to shelter persons; and (6) The use occurs during an actual impending, mock, or practice disaster or attack.	The updated relevant policies of HRS 127 and 128 have been replaced by HRS <u>127A-19</u> and <u>127A-20</u> .  Given prior challenges, Makani Pahili hurricane exercise recommendations and issues during the Hurricane/TS Iselle and Ana activations, a statewide committee was formed and continues to attempt to address these areas.
Kaua'i Civil Defense with civil society (Red Cross), Agency on Elderly Affairs, Human & Social Services	G4 O3	Identify People with Access and Functional Needs and sheltering requirements, and facilitate dialogue with key segments of the population to ensure that there are places for these populations to shelter and remain safe during disasters. For example, sheltering in place options may be preferred for mental health clinics with patients requiring specific medications and care, elderly care homes may have non-ambulatory patients, or domestic violence centers may have women who would be unsafe in another facility.	This is still Ongoing. However there have been recent changes due to FEMA and Hurricane Response Frameworks consultant guidance in the wake of Super Storm Sandy. A state-wide approach is needed. Guidance is full integration of persons with access, functional and medical needs into general population shelters. More time will be needed regarding areas such as staffing, effects on capacity (floor space per person), accessibility, etc.
Kaua'i Civil Defense	G1 O1-5	Continue to develop plans that integrate national goals and initiatives into the	This is still Ongoing, and efforts continue to ensure compliance with

		County of Kaua'i plans for disaster risk management to ensure synergy in programs with limited resources and maximize benefits from disaster funding and required programmatic implementation.	NIMS.
Kaua'i Civil Defense with the Office of Economic Development and State Department of Agriculture	G4 O2 G5 O4	Continue to encourage the integration of agricultural planning and coordination into disaster risk management community to improve local food security, sustainability, and community resilience to hazards. Food security is critical for coping with disasters where it may be weeks to receive goods and services on island, as Kaua'i experienced with Hurricane Iniki in 1992, so it should be coordinated with sheltering activities and lifeline security.	This is still Ongoing.
Kaua'i Civil Defense and Department of Planning	G1	Develop a post-disaster recovery plan that incorporates mitigation considerations to better enable mitigation objectives in rehabilitation and reconstruction, and to prevent additional problems from improper development, land use, or further environmental degradation during the chaos of post-disaster recovery. This will enable policies and programs to be identified ahead of time so that when a disaster occurs, time will not be wasted in determining the best course of action.	This has been developed in segments with regulations in the planning department. The effort is Ongoing with hope of the development of a comprehensive recovery plan following the General Plan update cycle. One of the UH Sea Grant technical studies recommends a Post-Disaster recovery plan, looking to Maui County once their Recovery Plan (the first in the State) is finished.  <b>New Estimated Time:</b> 2016
American Red Cross—Hawai'i Chapter	2015 Goal 5	The 2009 Plan identified sheltering needs as a high priority. The American Red Cross worked with several facilities to conduct surveys, which have been completed for use and will be available for the next five year plan.	Kaua'i Veteran's Center Facility was surveyed 8/5/2013 and determination was made to add private facility to serve as a disaster shelter with Red Cross to serve as evacuation shelter for flooding and fire and post-impact shelter when possible for large disaster when people in Koloa and Poipu area are displaced. Shelter Agreement signed 2/24/2014. This shelter was included in the 2014 Makani Pahili exercise.  <b>Proposed:</b> Aug. 2013 <b>Completed:</b> Feb. 2014

American Red Cross—Hawai'i Chapter	2015 Goal 5		Church of the Pacific United Church of Christ Facility was surveyed 11/20/2009 and determination was made to add private facility to serve as a disaster shelter with Red Cross to serve as evacuation shelter for flooding and fire and post-impact shelter when possible for large disaster when people in Kilauea area were displaced. Shelter Agreement signed 7/12/2010.  <b>Proposed:</b> Nov. 2009 <b>Completed:</b> July 2010
American Red Cross—Hawai'i Chapter	2015 Goal 5		Kaua'i Christian Fellowship Post-Impact Shelter Facility was surveyed 7/8/2014 and determination was made to add private facility to serve as a disaster shelter with Red Cross to serve as evacuation shelter for flooding and fire and post-impact shelter when possible for large disaster when people in Koloa and Poipu area are displaced. Shelter Agreement signed 8/27/2014.  <b>Proposed:</b> July 2014 <b>Completed:</b> Aug. 2014
<b>Requires external funding or resources</b>			
Kaua'i County Planning Department	State Plan	Emergency By-Pass Road. To connect North Kaua'i with South Kaua'i in case Wailua River Bridge is compromised after a catastrophic event using existing cane haul roads and widening resurfacing gravel based finish and refurbishing south fork bridge crossing and north culvert ford crossing.  <b>Proposed: 2009 Estimated Time: 1 year</b>	Finished 2010.
Kaua'i County Office of Economic Development and KIUC	State Plan	Energy Emergency Plan Update. To update the County EEP plan to be consistent with the State EEP Plan.  <b>Proposed: 2009 Estimated Time: 9 months</b>	No update. May reference an antiquated KIUC plan under the Utility/Energy Council of the Department of Water.
Kaua'i Fire Department	G1 O1 G3 O1	Command Vehicle & Portable Headquarters. To provide a secure area to perform incident command functions in the event of a disaster or major incident.	Completion date uncertain. Through KCD grant support, the KFD Mobile Command and Communications Vehicle (MCCV) was purchased. The

		<p>This vehicle could also be used to maintain functionality of Fire Headquarters in the event that our permanent Headquarters is damaged. (COOP Plan). Critical public safety operations will be able to continue, allowing first responders and other public safety employees to assist the community and themselves during crises</p> <p><b>Proposed: 2009 Estimated Time: 9 months</b></p>	<p>4-wheel drive van package contains an interoperable communications gateway device, along with a portable repeater package and satellite capability, both fixed and via Broadband Global Area Network (BGAN) units.</p>
Kaua'i Fire Department	G3 O1	<p>Handheld Portable Radio for Every First Responder. Providing a handheld portable radio for each 1st Responder helps ensure their safety while responding to hazardous conditions. Everyone will immediately receive the evacuate notice or other types of warnings without having the delay of waiting for the person with the radio to notify them.</p> <p><b>Proposed: 2009 Estimated Time: 6 months</b></p>	<p>This initiative has continued via both County General Fund and KCD-administered DHS grant funding.</p>
Kaua'i County Planning Department	State Plan	<p>Emergency Permitting Procedures. Funding to hire a consultant for the study of emergency permitting regulations and procedures that could be enacted after a hazard event. A study and recommendation based on analysis of other counties and municipalities administrative rules for emergency permitting.</p> <p><b>Proposed: 2009 Estimated Time: 2 years</b></p>	<p>No update available from Planning Department; likely an antiquated not-pursued initiative</p> <p><u>Per 127A-13</u>, the Mayor may: (2) Suspend any county law that impedes or tends to impede or be detrimental to the expeditious and efficient execution of, or to conflict with, emergency functions, including laws which by this chapter specifically are made applicable to emergency personnel.</p>
Kaua'i Island Utility Cooperative	G1 O6	<p>Harden Electrical Distribution Supply to Kaua'i Veterans Memorial Hospital.</p> <p><b>Proposed: 2004</b></p>	<p>The Wilcox Hospital currently has a generator, and KIUC installed an automatic transfer switch for continued generator substation power.</p> <p>This activity is not in the KIUC Project Scope [i.e. the 5-year capital budget plan or the long-range 3-5 year construction work plan] but the redundancy created by the transfer switch ensures power generation for the hospital and the physical hardening project is considered lower priority because of implemented</p>

			hazard mitigation actions.
Kaua'i Island Utility Cooperative	G1 O1 G3 O1	Provide Emergency Electrical Backup Supply to customers in Koke 'e area.  <b>Proposed: 2004</b>	Some Federal funding was received from PMRF (year unknown) to provide general increased electrical service up to 7 miles of the 11.5mi. Koke'e area (half of Koke'e).
Kaua'i Fire Department		Purchase of Helicopter. Having a county owned helicopter to be able to provide assistance in rescuing stranded individuals. It will also result in faster response times and provide aerial assessments of the damaged areas after a major disaster.  <b>Proposed: 2009 Estimated Time: 6 months</b>	The KFD Helicopter was obtained via lease-purchase, funded mainly with County General Funds, supplemented with \$600K in SHSP funds (KCD) and approximately \$100K in CDBG funding (via Housing Dept.)  Related, Air-1 is used in fire suppression efforts such as brush and forest fires, which are related to drought and climate variability.
Kaua'i Fire Department		Purchase of 16' rigid hull boat with outboard motor would give KFD the ability to rescue people stranded near rivers or in the ocean. During or directly following a hurricane, heavy rainfall, dam breach, coastal inundation, erosion, wildfires, landslides, earthquakes or tsunamis, we would have the ability to search and rescue, assess situations, and transport victims from remote areas only accessible by rivers or ocean.  <b>Proposed: 2009 Estimated Time: 3 months</b>	This was not done via KCDA-administered grants. The item that is "still in use" is the 26' Radon purchased under the State Homeland Security Grant Program prior to the current Mitigation Plan. This item refers to a KFD initiative to purchase a smaller response watercraft. KFD did this via the Assistance to Firefighters Grant Program.
<b>Hurricane and Strong Winds</b>			
<b>Incorporate into operations using existing resources</b>			
Department of Public Works Building Division	G1 O2 G6 O4 G7 O1,2	Integrate information about wind risks into mapping, planning, and improvements in local building codes. Probabilistic wind speed hazard micro-zonation maps incorporate topographic speed-up effects appropriate for structural design codification. The wind speed maps have been used to develop hurricane loss estimation models, which should be taken into consideration in building development and retrofits.	The 2006 building code update was integrated with high winds. Currently trying to update winds to meet 2012 building code update.  The grant for the high wind appendix was adopted as part of the grant; the ordinance was signed by the Mayor on June 14, 2012. Disks are publicly available in the Building Div.
<b>Requires external funding or resources</b>			

<p>Kaua'i County Office of Economic Development</p> <p>KVB</p>	<p>G4 O2, 3</p>	<p>Certify hotels and condominium units as official shelters. Set up and hold training and certification programs around the islands for the hotels, timeshare, condominiums, vacation rentals and bed and breakfast units to educate them on how to harden, retrofit and build safe rooms for sheltering. Extensive benefit to visitor industry to be able to provide shelter.</p> <p><b>Proposed: 2009 Estimated Time: 1 year</b></p>	<p>This has not and will not happen. Current procedures are established but not written, however hotels have been communicated to around when/if to evacuate vs. shelter guests in place. Hotel employees have participated in training activities to ensure appropriate care of the visitor population during disasters.</p>
<p>Kaua'i County Office of Economic Development</p>	<p>G1 O1 G3 O1</p>	<p>Emergency Generation for Līhu'e Town Core Government District. Project to provide emergency power generation (about 1 mW) for the Līhu'e Town Core Government District so all County and State support agencies can be operational immediately after a major disaster.</p> <p><b>Proposed: 2009 Estimated Time: 3 months</b></p>	<p>This has not been done and it is currently not in the KIUC Project Scope [i.e. the 5-year capital budget plan or the long-range 3-5 year construction work plan]. KIUC conducted an island-wide inventory of generators, but as all were not maintained, they do not all work. KCDA hosted a microgrid training in February 2015, arranged by the County's Energy Coordinator, including KIUC and various stakeholders. It included concept development of microgrids in the Līhu'e area. KCDA worked with the US Army Corps of Engineers to do assessments to identify facility needs, hook-ups, generator availability, functionality and requirements, last conducted in 2014.</p>
<p>Kaua'i County Office of Economic Development</p>	<p>G1 O1 G3 O1</p>	<p>Emergency Generation for County Facilities. Project to provide emergency power generators for County facilities so they can be operational immediately after a disaster. Existing generators are vintage 1990 era units and need to be replaced. Many facilities do not have backup generation so facilities and operations cannot be used during and after disasters. Līhu'e Civic Center complex is not included in this proposal. Facilities include but are not limited to the Police/Civil Defense facility, transportation baseyard, neighborhood centers, wastewater treatment facilities, and automotive baseyard and refuse transfer stations. Program includes an Ongoing maintenance program to keep generators functional and in good condition and a quick-connect reconfiguration of the</p>	<p>This has not been done and it is currently not in the KIUC Project Scope [i.e. the 5-year capital budget plan or the long-range 3-5 year construction work plan]. KIUC conducted an island-wide inventory of generators, but as all were not maintained, they do not all work. KCDA hosted a microgrid training in February 2015, arranged by the County's Energy Coordinator, including KIUC and various stakeholders. It included concept development of microgrids in the Līhu'e area. KCDA worked with the US Army Corps of Engineers to do assessments to identify facility needs, hook-ups, generator availability, functionality and requirements, last</p>

		facility's electrical system to accommodate the generator hookup. <b>Proposed: 2009 Estimated Time: 1 year</b>	conducted in 2014.
Kaua'i County Housing Agency	G1 O1 G3 O1	Hardening of Kalepa Village. To update the County EEP plan to be consistent with the State EEP Plan. Provides plan to address disaster situations and market disruptions, and to hasten economic recovery. <b>Proposed: 2009 Estimated Time: 1 year</b>	As of 12/17/14 this was not completed. However, original buildings were designed to withstand 100 mph sustained winds, which were the improved building code wind standards at the time of building. New buildings are designed to current adopted building code standards, 2006 IBC.
Kaua'i County Housing Agency	G1 O1 G3 O1	Hardening of Paanau Village. Provide exterior sheathing to increase wall strength, harden windows, doors and glass doors and/or provide hurricane shutters to reduce structural failures in the event of a hurricane. Provides 60 families with a secure facility and reduces impact on Koloa area shelters. <b>Proposed: 2009 Estimated Time: 9 months</b>	As of 12/17/14 this was not completed due to budgetary constraints. The buildings are designed with the most recent IBC codes in place. New buildings are designed to current adopted building code standards, 2006 IBC  KCHA is pursuing financing opportunities to harden facility as part of project rehabilitation.
Kaua'i Fire Department	G3 O1 G7 O1,2	Hardening the generator room and LP tanks at every fire station on Kaua'i will ensure that 1 <sup>st</sup> responders have power for communications and the ability to operate equipment during any type of hazardous conditions. <b>Proposed: 2009 Estimated Time: 3 years</b>	No update available as of January 2015.
Kaua'i County Office of Economic Development	State Plan	Emergency Kits for County Agencies and Training Program. Provide emergency kits for County agencies that contain key items required in emergencies, with the proper training to use the various supplies and equipment. Kits would be on hand for use by County personnel and to respond to public requests for assistance. <b>Proposed: 2009 Estimated Time: 9 months</b>	This has not yet been done, though they are currently investigating options to pursue this in the future (e.g. HR Department could take the lead, coordinate with KCDA, and/or send staff to get trained in CERT).
Kaua'i County Office of Economic Development	State Plan	Community Education & Hazard Publication Distribution. Purchase and distribute University of Hawaii, Sea Grant publications, <a href="#">Purchasing Coastal Real Estate in Hawaii</a> and the <a href="#">Homeowner's Handbook to Prepare for Natural Hazards</a> at any opportunity, including community meetings, annual Contractor's Expo, County Fair and the front counter of the	Some of these types of activities have been done and are Ongoing by Economic Development, KVB, KIUC, KCDA, Sea Grant, FD through CERT, and Contractor's Association, County Fair (August) by Economic Development.

		<p>Planning Department.</p> <p><b>Proposed: 2009 Estimated Time: continuous</b></p>	
Kaua'i County Office of Economic Development	G3 O1	<p>SATPHONES for Emergency Coordination of Business, Government and Private Sector Post-Disaster. Purchase of 20 Satellite phones for use during emergencies when there is little communication ability. SATPHONES would be located at predetermined areas around the island including several on the North, West, South and East shores as well as exit locations such as the airport and with those coordinating essential communication between business, government and community after the emergency event.</p> <p><b>Proposed: 2009 Estimated Time: 4 months</b></p>	<p>Not done, however conversations continue around improving communications via other mechanisms (KCDA now has plan to use the helicopter to distribute repeaters to replace any ones damaged) to improve emergency radio communications.</p>
<p>Kaua'i County Office of Economic Development</p> <p>Kaua'i Visitors Bureau (KVB)</p> <p>KCDA</p>	G1 O4	<p>COOP Training for Kauai 's Visitor and Business Industry (Continuity of Operations Planning). Trainers would travel around the island to work with the visitor and business industry to build or update their COOP plan. Topics would include but not be limited to: plan what to do if your building, plant or store is not accessible, plan for payroll continuity, put a team together to be active members on behalf of your company as the emergency management team, develop relationships with other businesses in the area to support each other, define crisis management procedures, talk with first responders, emergency managers, etc.</p> <p><b>Proposed: 2009 Estimated Time: 1 year</b></p>	<p>KVB E.D. has been trained. Now reaching out to activity companies, hotel GM's, etc. to offer them trainings.</p>
Kaua'i Fire Department	G7 O1,2	<p>Construct Safe Rooms at Every Fire Station. Construction of a safe room at every fire station on Kaua'i where 1st responders can wait out hazards such as a hurricane to ensure their ability to respond and help save lives once the immediate danger has passed.</p> <p><b>Proposed: 2009 Estimated Time: 5 years</b></p>	<p>No update given by the Department as of January 2015.</p>
Kaua'i Fire Department	G7 O1,2	<p>Replace Generator at Every Fire Station. Replacing the generator at every fire station on Kaua'i will ensure that 1st responders have power for</p>	<p>No update given by the Department as of January 2015.</p>

		communications and the ability to operate equipment during any type of hazardous condition. <b>Proposed: 2009 Estimated Time: 1 year</b>	
Department of Public Works, Building Division	G1 O1 G1 O3	Hardening of the Historic County Building. <b>Proposed: 2004 Funds Pending</b> <b>Estimated Time: 1 year</b>	Completed 9/12/11. Final inspection 2/28/2013. \$500K
Department of Public Works, Building Division	G1 O3	Hardening of the Kapule Building. <b>Proposed: 2004 Estimated Time: 1 year</b> <b>Piikoi Building hardening</b> <b>Moikeha Building hardening</b>	Completed.  PB – 2 phases. Last phase 2012. MB - 2011
Kaua’i Island Utility Cooperative	G1 O1, 2	Install Photovoltaic Systems at Emergency Shelters. <b>Proposed: 2004</b> <b>Estimated Time: 1 year</b>	Currently not in the 5-year capital budget or long-range 3-5 year construction work plan plans.
<b>Floods</b>			
<b>Incorporate into operations using existing resources</b>			
Department of Public Works Engineering – Flood Plain Management	G1 O4	County of Kaua’i is already addressing compliance with NFIP as required. This policy recommendation is that attention to NFIP continues. Since Kaua’i has recently been mapped digitally as part of FEMA’s Map Modernization Program, there should be continued attention to reducing flood risks, especially in areas that have revealed frequent or repetitive flooding. <b>Estimated Time: Ongoing</b>	Still Ongoing. New FIRMs November 2010.
Department of Public Works Engineering – Flood Plain Management	G1 O4 G6 O4	Work with the State NFIP coordinator to develop the program for participation in the Community Rating System. The County of Kaua’i has developed new online digital tools to aid the public in understanding flood risks and has participated in the development of the updated hazard mitigation plan. The activities for reducing flood risks would contribute to the points needed for participating in the Community Rating System (CRS), and the County is exploring ways to engage in CRS so that flood insurance rates would decrease for	The County aims to participate in CRS, but still isn’t compliant with items found in the community assessments visit. Kaua’i County turned over to FEMA in 2012.  Residences in non-compliance in VE zones, structures illegally built. Transient visit accommodations lucrative, so have converted bottom area for flood, no regulations. In trying to sort out transient accommodation compliance, there

		<p>residents. The Community Assistance Visit (CAV) has been requested for this purpose.</p> <p><b>Estimated Time:</b> 2013</p>	<p>needs to be visits to sort out illegal properties. Upcoming tasks include finishing compliance with non-conforming items, and requesting FEMA to do a CAV, wherein FEMA will specify properties that need to be considered.</p> <p><b>Estimated Time:</b> 2015</p>
<p>Department of Public Works Engineering – Flood Plain Management with Kaua’i Civil Defense</p>	G2 O1,2	<p>Ensure public awareness of flood risks and ways to mitigate flood hazards, including participation in the National Flood Insurance Program. NOAA has developed a dashboard web-based tool that looks at all stream gauges/data in real time to help emergency managers make assessments/decisions regarding flood incidents. This tool is scheduled for delivery by 2011.</p> <p><b>Estimated Time:</b> Ongoing</p>	<p>Web application. No public meetings in the last year.</p> <p>KC staff are not highly exposed to the NOAA tool, and need more information and training in order to engage.</p> <p>Building Division handles building permits, so NFIP and FIRM maps are considered; individuals can go online and check permits and status of the permits.</p>
<b>Requires external funding or resources</b>			
<p>Kaua’i County Office of Economic Development</p>	G4 O2, 3	<p>Certify hotels and condominium units as official shelters. Set up and hold training and certification programs around the islands for the hotels, timeshare, condominiums, vacation rentals and bed and breakfast units to educate them on how to harden, retrofit and build safe rooms for sheltering. Extensive benefit to visitor industry to be able to provide shelter.</p> <p><b>Proposed: 2009 Estimated Time: 1 year</b></p>	<p>Adjusted: NFIP has not worked w/OED, but has worked with the Planning Department who permits the vacation rentals.</p> <p>Status: This has not and will not happen. Current procedures are established but not written. But hotels have been communicated to around when/if to evacuate vs. shelter guests in place.</p>
<p>Kaua’i County Office of Economic Development, KVB &amp; KCDA</p>	G1 O4	<p>COOP Training for Kauai's Visitor and Business Industry (Continuity of Operations Planning). Trainers would travel around the island to work with the visitor and business industry to build or update their COOP plan. Topics would include but not be limited to: plan what to do if your building, plant or store is not accessible, plan for payroll continuity, put a team together to be active members on behalf of your company as the emergency management team, develop relationships with other businesses in the area to support each other, define crisis</p>	<p>NFIP has not done public awareness with the Kaua’i Visitor and Business Industry. KVB E.D. has been trained. Currently reaching out to activity companies, hotel GM’s, etc. to offer them trainings. May look into COOP Trainings for all County agencies and potentially the visitor industry.</p>

		management procedures, talk with first responders, emergency managers, etc. <b>Proposed: 2009 Estimated Time: 1 year</b>	
Kaua'i Fire Department	G7 O1,2	Construct Safe Rooms at Every Fire Station. Construction of a safe room at every fire station on Kaua'i where 1st responders can wait out hazards such as a hurricane to ensure their ability to respond and help save lives once the immediate danger has passed. <b>Proposed: 2009 Estimated Time: 5 years</b>	Hardening fire stations, but not specific safe rooms.
Kaua'i Fire Department	G7 O1,2	Replace Generator at Every Fire Station. Replacing the generator at every fire station on Kaua'i will ensure that 1st responders have power for communications and the ability to operate equipment during any type of hazardous condition. <b>Proposed: 2009 Estimated Time: 1 year</b>	No update given by the Department as of January 2015.
Kaua'i County Planning Department	State Plan	Hire consultant to update and create DEM data layers. <b>Proposed: 2009 Estimated Time: 6 months</b>	Has been done for flooding. New FIRMS; Need to find out if this includes the updated tsunami evacuation zones AND super tsunami evacuation zones? Ask Mark M./Elton for latter Stanford Iwamoto or Larry Dill (Ruby offered to forward my email to him)
Kaua'i Civil Defense Agency	G1 O3	Waialua Bridge Pass. <b>Proposed: 2004</b>	In the event the Wailua bridge washes out, there is a need to identify an alternate evacuation route. Current status: route has been identified but roadway development is ongoing.
Kaua'i Island Utility Cooperative	G1 O1, 2	Install Photovoltaic Systems at Emergency Shelters. <b>Proposed: 2004</b>	Currently not in current Scope [the 5-year capital budget or long-range 3-5 year construction work plan plans]
<b>Drought</b>			
<b>Incorporate into operations using existing resources</b>			
Kaua'i Civil Defense and Department of Finance Information Technology GIS working with	G1 G2 G6	To account for microclimates in Hawai'i, it is important to include rain gauges from all sources (federal and local) to ensure spatial rain gauge coverage so that the resulting maps are truly useful and representative. The rainfall data are from numerous local volunteer observers, such as sugar plantations, ranchers, pineapple	Ongoing. No departmental updates as of January 2015.

agriculture organizations		companies, and individuals. The gauges provide good coverage of most of Kaua'i. Combining the County and federal networks would yield the optimal spatial coverage for analysis. Further GIS based impact analysis using the improved data should be performed.  <b>Estimated Time:</b> Ongoing	
Kaua'i Civil Defense and the Water Department	G1 O4 G6 O3	Improve data gathering and accounting for risk and vulnerability assessments for drought and wildfires. Integrating information on the risk and vulnerability specifically for Kaua'i County would be beneficial for planning by water resource managers, planners, and land use managers.  <b>Estimated Time:</b> 2013	Water Audit Training April 8, 2014 for water utility manager –  Ongoing. Water Department began water audit on 12/14.
Kaua'i Civil Defense and the Water Department	G1	Implement the County drought mitigation strategies. Currently, drought mitigation plans exists for the State of Hawai'i and the County of Kaua'i. The plans need to be implemented at a local level, and updated regularly to address new needs.  <b>Estimated Time:</b> 2013	Ongoing.  Related, the Community Wildfire Protection Plan Process is underway via a joint effort of KFD, KCDA and DLNR DOFAW.
<b>Requires external funding or resources</b>			
Kaua'i DOW	G1 O3	Emergency Interconnection-DOW Koloa Water System-Grove Farm Koloa System.  <b>Proposed: 2004</b>	Completed. DoW currently buys water from Grove Farm who leases land. In 2019 Grove Farm surface treatment water plant (from Kapaia Reservoir from old sugar cane ditches and tunnels) will go to DoW (serves Līhu'e, Hanamalu, Puhī) as a supplemental water resource. This plant may be located near the proposed landfill; plant reported to have vulnerability, it shuts down with heavy rains leading to increased turbidity). Plant supports water security, though generally this issue is not of top concern due to high rainfall and water volume availability (adequate source, storage and transmission). Water source protection of this facility will be a proposed new project.
Kaua'i DOW	G1 O3	Emergency Interconnection-Kekaha Sugar System and DOW Kekaha Water System.  <b>Proposed: 2004 (Actually completed</b>	N/A—Not required. Interconnection exists already between Waimea and Kekaha for a long time.

		<b>2003)</b>	
DOFAW, Grove Farm, Knudsen Trust, lessees, Kahili Adventist School	G4 O2, 4	Emergency Water Supply Measures for Mahaulepu-Kipu-Haiku-Kahili. <b>Proposed: 2004</b>	No departmental updates as of January 2015.
Kaua'i DOW, U.S. Department of Defense, private irrigation systems	G5 O2, 4	County-Wide Conservation and Education Program. <b>Proposed: 2004</b>	Ongoing. Partnering with CCH Board of Water Supply in this effort.
DOFAW	G5 O2, 4	Fire Prevention Education and Outreach. <b>Proposed: 2004</b>	No departmental updates as of January 2015.
Department of Land and Natural Resources (DLNR) Division of Forestry and Wildlife (DOFAW)	G1 O5 G2 O5 G5 O4	Installation of Remote Automatic Weather Stations. <b>Proposed: 2004</b>	No departmental updates as of January 2015.
DHHL, DOFAW	G1 O3	Maintain and Expand Fire breaks at Anahola. <b>Proposed: 2004</b>	Project Completed. Ongoing maintenance annually. Currently not seeking funding.
Kaua'i Coffee Co., Kaua'i Fire Department, DOFAW	G4 O2, 4	Upgrade and Maintain Pump 3 ditch system and Alexander Reservoir. <b>Proposed: 2004</b>	Upgrade and maintenance done in-house. No new project proposed.
DLNR, Gay & Robinson	G4 O2, 4	Maintenance and Upgrade of the Kekaha ditch system. <b>Proposed: 2004</b>	No departmental updates as of January 2015.
DHHL, land owners	G4 O2, 4	Repair, Maintain and Reestablish the Anahola ditch system. <b>Proposed: 2004</b>	No departmental updates as of January 2015.
Kaua'i DOW	G1 O3	Kekaha Amfac Shaft Renovation and Replacement Pipeline, Kekaha Water System. <b>Proposed: 2004</b>	On hold, To Be Determined, not currently a top priority.
DOFAW, Dept. of Hawaiian Home Lands (DHHL), State Parks Division,	G1 O3	Maintain Kokee Ditch system and reservoirs (Puulua, Kitano, Puuopae) <b>Proposed: 2004</b>	Department of Agriculture and the Agricultural Development Corporation are tasked with this. State of HI Department of Agriculture's Agribusiness Development Corporation (ADC) and Kekaha Agriculture Assoc. (KAA) are

Agriculture Development Corp			tasked with maintaining ditch and reservoir. No new Project proposed.
DOFAW	G1 O3	Roadside fuel treatments. <b>Proposed: 2004</b>	Nothing done since 2004. No project proposed.
DLNR Parks Division	G1 O3	State Kokee System Wells: Develop deeper ground water wells. <b>Proposed: 2004</b>	Completed.
<b>Wildfire</b>			
<b>Incorporate into operations using existing resources</b>			
Fire Department, Kaua'i Civil Defense, and Department of Finance Information Technology GIS	G6	Use historical wildfire occurrence maps to identify hot-spots and provide a better planning tool for allocating resources and developing mitigation strategies to reduce incidence of wildfire. <b>Estimated Time: 2012</b>	No departmental updates as of January 2015.
Fire Department	G2 G3 O4,5	Engage in public education programs with schools and communities. <b>These</b> programs include: 1) Smokey Bear material/fire prevention radio and TV spots; 2) Talks to schools, civic organizations, etc.; 3) Public notices/news releases declaring high fire danger periods; and, 4) Posting of fire prevention/high fire danger warning signs and posters. <b>Estimated Time: Ongoing</b>	No departmental updates as of January 2015.
Kaua'i Civil Defense with Fire Department and State Department of Land and Natural Resources	G1 G6	Identify and reduce hazardous fuels. Identify areas with potentially hazardous fuels. Reduce "flash" fuels in high use areas. Engage in programs for conversion of "flashy" fuels in high use areas. <b>Estimated Time: Ongoing</b>	No departmental updates as of January 2015.
Planning Department, Kaua'i Civil Defense, and Fire Department	G1 G6	Minimize fires through land use policies and control. Determine appropriate restriction of the general public use within a fire hazard. Encourage land use that reduces fire dangers, such as vegetation clearing and clean-up programs. Require fire plans for all appropriate land use	No departmental updates as of January 2015.

		activities within the DLNR Department of Forestry & Wildlife's Management jurisdictions.  <b>Estimated Time:</b> Ongoing	
<b>Requires external funding or resources</b>			
Kaua'i Fire Department	G7 O1 ,2	Portable water tanks for wildfire operations. To provide alternative water supply for rural communities in the event of an emergency. To provide alternative resources to accomplish Fire Department objectives.  <b>Proposed: 2009</b>	This was identified as a priority in the CWPP process, along with other options.
Kaua'i Fire Department	G7 O1	Water tenders to provide critical resources in our rural environment and to provide an alternative water supply.  <b>Proposed: 2009 Estimated Time: 6 months</b>	This was identified as a priority in the CWPP process, along with other options. A tender has been secured, which Public Works can augment.
DOFAW	G5 O2, 4	Fire Prevention Education and Outreach.  <b>Proposed: 2004</b>	No departmental updates as of January 2015.
Department of Land and Natural Resources (DLNR) Division of Forestry and Wildlife (DOFAW)	G1 O5 G2 O5 G5 O4	Installation of Remote Automatic Weather Stations.  <b>Proposed: 2004</b>	No departmental updates as of January 2015.
DHHL, DOFAW	G1 O3	Maintain and Expand Fire breaks at Anahola. <b>Proposed: 2004</b>	Ongoing but project completed four years ago (est).
DOFAW, Dept. of Hawaiian Home Lands (DHHL), State Parks Division, Agriculture Development Corp	G1 O3	Maintain Kokee Ditch system and reservoirs (Puulua, Kitano, Puuopae)  <b>Proposed: 2004</b>	Department of Agriculture's Agribusiness Development Corporation (ADC) and Kekaha Agriculture Assoc. (KAA) are tasked with this.
DOFAW	G1 O3	Roadside fuel treatments.  <b>Proposed: 2004</b>	Maintenance to prevent fuel loading done, but no proposals for additional funding since 2004. No project proposed.

**Climate Variability and Change**

Incorporate into operations using existing resources			
Planning Department & UH Sea Grant	G1	<p>Take into consideration the impacts of climate change (higher temperatures, sea level rise, extremes in rainfall as floods or drought, and potential increases in tropical storm frequency or severity) in land use, development, and planning.</p> <p><b>Estimated Time:</b> Ongoing</p>	<p>Kaua’i Climate Change and Coastal Hazards Assessment Sea Grant included such considerations (minus higher temperatures) with a focus on coastal hazards. This information will also be incorporated into three community development plans.</p> <p><b>Estimated Time:</b> Ongoing</p>
All departments, working with community organizations and private sector	G1	<p>Take into consideration potential socioeconomic impacts from climate change for Kaua’i. Many sectors will be impacted by climate change: water resource management, disaster risk management, public health, agriculture, and tourism. Impacts will be felt first in communities, and sustainability of these communities should be considered.</p> <p><b>Estimated Time:</b> Ongoing</p>	<p>The Ha’ena to Hanalei Community Disaster Resilience Plan includes considerations for impacts from climate change.</p> <p>Governor Abercrombie held a series of “climate resilience forums” on all islands (including one w/PRiMO), for which Kaua’i County departments participated. Climate projects are also being conducted by the Pacific RISA (funded by NOAA) and NWS, and the Pacific Islands Climate Change Cooperative is developing resources for forested areas, especially.</p> <p>Additional departmental observations: Accelerated erosion along shorelines is among the first impacts of sea level rise. Additional climate change-related issues include Invasives – such as Albizia trees—with increased risk from storms/strong winds—as well as the invasive Madagascar lizard putting stress on the Hawaiian gecko.</p>
Kaua’i Civil Defense, Water Department, and Planning Department	G2	<p>Educate leaders and the public about sea level rise, increased disaster risks, and ecosystem impacts from climate change that will ultimately affect the livelihood of the people in Kaua’i. The findings of scenarios and assessments (especially those conducted by State and Federal partners in risk management) should be integrated into county policies.</p> <p><b>Estimated Time:</b> 2014</p>	<p>NOAA – PIRCA – community meetings</p> <p>Sea Grant Extension conducts community presentations around coastal management, SLR, erosion, coastal planning, etc. and presentations at County Council, governmental departments</p>

Requires external funding or resources			
Kaua'i County Office of Economic Development	G2	Sea Level Rise Inundation Maps. Building constructed to today's standards and those occupants will be in jeopardy or loss due to elevated flood waters and storm surge.  <b>Proposed: 2009 Estimated Time: 1 year</b>	Completed.
Planning Department DLNR Conservation and Coastal Lands Program (State) (in collaboration with County Sea Grant & Coastal Management Offices)	G1 O4	Develop county erosion mitigation plans (as related to climate change-influenced erosion). The erosion studies should be used to develop erosion management and mitigation plans that sync with the state plan, COEMAP, at the county level. The counties are responsible for issuing permits for shoreline development, and it is important that erosion mitigation and beach and dune protection measures be implemented at the county level. The recent shoreline studies in Kaua'i should be used to inform the development and implementation of a Kaua'i erosion management plan.  <b>Estimated Time: 2013</b>	As of January 2015, no firm update given. The County is pursuing variable setbacks based on the data developed by Dr. Fletcher's updated erosion maps. The State Office of Ocean and Coastal Lands in DLNR is working with the counties to update the county beach management plans and coastal erosion plans.
<b>Earthquake</b>			
Incorporate into operations using existing resources			
Department of Public Works Building Division	G1 G6 O1	Integrate HAZUS loss modeling information on structural risk and vulnerability with GIS to upgrade building codes, consistent with State adoption of codes with hazard amendments including seismic classification mapping.  <b>Estimated Time: 2013</b>	Adopted 2006 codes with state, which includes seismic risk.  Ongoing to update to 2012 codes.
Kaua'i Civil Defense	G4	Review the delineation potential earthquake-induced landslide hazard areas. The emphasis would be on potential hazards impacting structures, roadways, and lifelines, where seismically induced slope instability is significant. The data collected during this study will be used to generate "potential hazard" maps, which could be used to identify already developed as well as future building or development sites that may warrant further evaluation.  <b>Estimated Time:2013</b>	Slope stabilization of highways and roadways. More expertise required from Planning & State Highways.
Department	G2	Participate in State training and assistance	Trainings conducted – October 2014.

of Public Works Building Division	G7 O3	in the use of modern codes and retrofit guidelines for county officials and design professionals. Encourage sponsorship and collaboration in training with the Contractors' Association of Kaua'i .  <b>Estimated Time:2013</b>	Intend annual Hawaii Association County Building Officials.  Trainings w/CAK. Ongoing activities.
<b>Requires external funding or resources</b>			
Kaua'i Fire Department	G3 O1 G7 O1,2	Hardening the generator room and LP tanks at every fire station on Kaua'i will ensure that 1 <sup>st</sup> responders have power for communications and the ability to operate equipment during any type of hazardous conditions.  <b>Proposed: 2009 Estimated Time: 3 years</b>	No update given by the Department as of January 2015.
Kaua'i Fire Department	G7 O1,2	Construct Safe Rooms at Every Fire Station. Construction of a safe room at every fire station on Kaua'i where 1st responders can wait out hazards such as a hurricane to ensure their ability to respond and help save lives once the immediate danger has passed.  <b>Proposed: 2009 Estimated Time: 5 years</b>	No update given by the Department as of January 2015.
Kaua'i Fire Department	G7 O1,2	Replace Generator at Every Fire Station. Replacing the generator at every fire station on Kaua'i will ensure that 1st responders have power for communications and the ability to operate equipment during any type of hazardous condition.  <b>Proposed: 2009 Estimated Time: 1 year</b>	No update given by the Department as of January 2015.
<b>Tsunami</b>			
<b>Incorporate into operations using existing resources</b>			
Kaua'i Civil Defense	G1 G6 O1,3	Use Tsunami Modeling and Evacuation Planning for Kaua'i conducted by the Army Corps of Engineers, to update evacuation route planning and maps in the Chapter 3 appendix, and to inform land use planning and development. In light of lessons learned from recent nearshore tsunami in Samoa, these maps should be reviewed for Kaua'i and updated. These should inform development planning efforts to prevent extensive development in areas of high inundation risks or to consider securing funds for constructing vertical	Updated evacuation maps in 2013. With UH, KCDA ran scenarios of the five worst tsunamis in history and updated the tsunami evacuation zone plans, completed and publicized 2013. Signage campaign marks routes done in 2014 and ongoing into 2015.  Greater Aleutian modeling and evacuation zones for Kaua'i and Ni'ihau to be implemented in 2015. KCDA is also adding the normal/historic tsunami evacuation

		evacuation routes or structures in low-lying areas. <b>Estimated Time: 2013</b>	zone for Ni'ihau.
<b>Requires external funding or resources</b>			
Kaua'i County Office of Economic Development	State Plan	Community Education & Hazard Publication Distribution. Purchase and distribute University of Hawaii, Sea Grant publications, Purchasing Coastal Real Estate in Hawaii ( <a href="http://hawaii.gov/dlnr/occl/manuals-reports/Purchasing%20Coastal%20Real%20Estate.pdf">http://hawaii.gov/dlnr/occl/manuals-reports/Purchasing%20Coastal%20Real%20Estate.pdf</a> ) and Homeowner's Handbook to Prepare for Natural Hazards at any opportunity, including community meetings, annual Contractor's Expo, County Fair and the front counter of the Planning Department. <b>Proposed: 2009 Estimated Time: Ongoing</b>	Some of these types of activities have been done and are Ongoing by Economic Development, KVB, KIUC, KCDA, Sea Grant, FD through CERT, and Contractor's Association, County Fair (August) by Economic Development.  KCDA conducted extensive community outreach related to 2014 tsunami evacuation zone update. Community meetings, website and phone book/yellow book updates were preformed, along with brochure development and a supporting evacuation signage project along roads/highways. Greater Aleutian Tsunami scenario work for expanded zones is the next project that is nearing completion and should be by April 2015.
Kaua'i Fire Department	G3 O1 G7 O1,2	Hardening the generator room and LP tanks at every fire station on Kaua'i will ensure that 1 <sup>st</sup> responders have power for communications and the ability to operate equipment during any type of hazardous conditions. <b>Proposed: 2009 Estimated Time: 3 years</b>	No update given by the Department as of January 2015.
Kaua'i Fire Department	G7 O1,2	Construct Safe Rooms at Every Fire Station. Construction of a safe room at every fire station on Kaua'i where 1st responders can wait out hazards such as a hurricane to ensure their ability to respond and help save lives once the immediate danger has passed. <b>Proposed: 2009 Estimated Time: 5 years</b>	No update given by the Department as of January 2015.
Kaua'i Fire Department	G7 O1,2	Replace Generator at Every Fire Station. Replacing the generator at every fire station on Kaua'i will ensure that 1st responders have power for communications and the ability to operate equipment during any type of hazardous condition.	No update given by the Department as of January 2015.

		<b>Proposed: 2009 Estimated Time: 1 year</b>	
Kaua'i Island Utility Cooperative	G1 O1, 2	Install Photovoltaic Systems at Emergency Shelters. <b>Proposed: 2004</b>	Currently not in the 5-year capital budget or long-range 3-5 year construction work plan plans.
<b>Volcano/Vog</b>			
<b>Incorporate into operations using existing resources</b>			
County Public Health	G2 O3	Develop education programs with an early warning system to reduce impacts from "vog" or airborne environmental risks consistent with information distributed by the State. The volcanic haze, which comes often when tradewinds are not present, can cause headaches and respiratory illness. Warnings can help to reduce exposure to the risk.  <b>Estimated Time: 2012</b>	Warnings put out through public notification system; TDI/TDY special needs messaging.  Accomplished.
<b>Landslides/Mudslides</b>			
<b>Incorporate into operations using existing resources</b>			
Kaua'i Civil Defense, Department of Public Works, and Transportation with State DOT	G1 G4 G6 O3	Develop policies for identifying and mitigating landslide hazards and risks to communities for isolation. Identify and implement mitigation of landslide hazard risks to State Highways in Kaua'i. The State Department of Transportation Highways Division, including the Highways Division based in Kaua'i has been struggling to mitigate landslides on critical highway areas.  <b>Estimated Time: 2014</b>	No update given by the Department as of January 2015.
<b>Erosion</b>			
<b>Incorporate into operations using existing resources</b>			
Planning Department	G1 O4 G6 O4	Develop a Shoreline Certification based on the shoreline geology for each shore segment. Recent shoreline mapping in Kaua'i will enable recommendations for shoreline certification to be based on quality data.  <b>Estimated Time: 2012</b>	As of January 2015, no update provided by Department. May no longer be accurate/correct (these are only done on case-by-case effort by State) so are only legally good for 1 year, so cannot define a static shoreline.
Planning Department	G1 O4	Develop county erosion mitigation plans (as related to climate change-influenced erosion). The erosion studies should be used to develop erosion management and	As of January 2015, no firm update given. Unsure of plans to accomplish this in the future (perhaps this is more of Beach Management Plans).

DLNR Coast and Lands Program (State) (in collaboration with County Sea Grant & Coastal Management Offices)		mitigation plans that sync with the state plan, COEMAP, at the county level. The counties are responsible for issuing permits for shoreline development, and it is important that erosion mitigation and beach and dune protection measures be implemented at the county level. The recent shoreline studies in Kaua'i should be used to inform the development and implementation of a Kaua'i erosion management plan.  <b>Estimated Time:</b> 2013	Currently not much community interest in this. Beach restoration studies done by different departments in 2009. Variable setbacks ordinance proposed using Dr. Fletcher's updated erosion maps (ongoing updates) which overlap with the ORMP.
<b>Dam Safety</b>			
<b>Incorporate into operations using existing resources</b>			
Department of Public Works	G1 O4 G5 O1,4	Participate in the inspection, repair, and maintenance of dams and levees. The County should work with State and Federal agencies to secure resources for repair and maintenance of dams and levee systems to reduce potential disasters.  <b>Estimated Time:</b> Ongoing	Action adjusted as this pertains to County dams only, the State handles majority of the dams. Culverts under roadways were not done properly – County roads division. Public Works is currently working on this effort.  USACOE did a 2013 study and recommended in conformance that the levees need to be raised. There is a need to propose mitigation actions to raise the height of the levees for Waimea and Hanapepe. Would require \$16 Million. Dept. Public Works will continue to look at maintenance requirements to see if existing levees are in compliance. The levees have been raised with ongoing maintenance to be done, which has an effect on flood insurance to public.
Department of Public Works and Kaua'i Civil Defense	G2 O3	Educate and inform public living downstream of dams about potential dam break risks and identify evacuation routes. Using the risk maps that have been developed about dams in Kaua'i it is possible to identify areas at greatest risk from dam breaches. The residents of the areas at risk should be targeted with public awareness campaigns and evacuation protocols should be established to ensure safety. Evacuation plans for Kaua'i dams are being developed in coordination with KPD, Public Works, DLNR's Dam Safety Division, and the Pacific Disaster Center. Final plans should	This has not yet been incorporated into County Land Use Planning, so this is ongoing. There is one evacuation plan per dam in each county.

		be available by the end of 2011. <b>Estimated Time:</b> 2012	
<b>Hazardous Materials</b>			
<b>Incorporate into operations using existing resources</b>			
Department of Public Works	G5	Collection of household hazardous waste materials is done on an annual basis for all residents of Kaua'i. This includes but is not limited to batteries, paint, pesticides, chemicals and other hazardous materials. The County has a comprehensive hazardous waste disposal program for County-generated waste. <b>Estimated Time:</b> Current and Ongoing	
KCDA and Fire Department	G1 O4	Identify areas of hazardous materials that could pose additional risks in hurricanes, tsunami, severe flooding, coastal inundation, and other hazards, and determine ways to mitigate these risks. <b>Estimated Time:</b> 2013	LEPC group convenes at KCDA. The KFD Battalion Chief Albert Kauai is the lead. KCDA receives and complies Tier II reporting requirement information on hazardous materials (Karleen maintains our files). This year's CBRN/WMD Exercise to address a release in Līhu'e
<b>Homeland Security and Human-Induced Hazards</b>			
<b>Incorporate into operations using existing resources</b>			
Kaua'i Civil Defense	G 5 G7 O1,2	The Critical Infrastructure Program (CIP) needs to be integrated with hazard mitigation programs in the county, hazardous materials management in the Department of Health, and localized for protection at the county level. <b>Estimated Time:</b> 2014	Ongoing. Some of these actions have been done, including the assessment of critical infrastructure. The local emergency planning committee previously put vulnerabilities on their public website, but this is now confidential.  FEMA CIKR protection trainings and exercises (AWR213 and MGT414) were brought to Kaua'i in 2014, with further training set to occur in 2015.
Kaua'i Civil Defense	G2 O2,3	Engage in public education, outreach, and partnerships. With limited staff in local agencies, agencies must be ready to deal with every aspect of disaster management. Partnering includes developing relationships with non-traditional institutions, agencies, commissions, retail, etc., and also working through the volunteer agencies to ensure the citizens and business are integrated with the emergency	Completed and Ongoing. KCDA's internal reorganization and inclusion of a dedicated position assigned to these areas will be extremely useful for this end.

		management community. <b>Estimated Time:</b> Ongoing	
Finance Department – Information Technology	G1 O4 G3 G6 O2,4,6 G7	Secure cyber information and technology, which are critical to support of economy, lifelines, and government operations. The potential damage and financial losses from a cyber attack would devastate the economic infrastructure. Information technology is very important in sharing of data and information in the areas of law enforcement, emergency preparedness, shelter operations, volunteer management, resource management, and in reality every aspect of operations – technology enhancements improvements are imperative. <b>Estimated Time:</b> Ongoing	
Kaua’i Civil Defense	G O	Enhance the multi-hazards exercise and training programs to ensure integrated risk reduction for hazards that considers additional threats. The primary strategy is to conduct exercises as actual events. The gaps in the exercises should be evaluated to suggest improvements in response and recovery actions and pose additional mitigation measures. <b>Estimated Time:</b> Ongoing	Ongoing. Annual Makani Pahili hurricane exercise and Civil Support team anti-terrorism and cyber-security classes, done annually as part of exercises. <b>Currently underway:</b> Vigilant Guard 2015 will include (1) Makani Pahili hurricane ex, (2) CBRN/Hazmat ex with a Civil Support Team, (3) CERFP/USAR collapsed structure ex, (4) Disease component and (4) Cyber component.
<b>Health-Related Disasters</b>			
<b>Incorporate into operations using existing resources</b>			
Kaua’i Civil Defense	G1 O4 G5	Plan and prepare for Pandemic Flu Risks working with the State Department of Health, county hospitals, and the school system. Develop plans and protocols to minimize spread of pandemic flu and to ensure continuity of government and health facility operations in an event. Kaua’i Civil Defense is also a partner of the City and County of Honolulu in their Regional Catastrophic Planning Grant focusing on pandemic flu planning. A Regional-specific plan will be produced by the end of 2010. <b>Estimated Time:</b> 2011	Pandemic Flu Plan was completed in October 2010.
Kaua’i Civil	G1 O4	Advocate research to understand the links	Ongoing. Pandemic Flu Plan

Defense		<p>between health and climate change, and disaster risk. Following a disaster or extreme climate event, such as a hurricane or drought, the public is at risk from water-borne diseases, including gastrointestinal diseases and cholera. Additional threats occur from increased temperatures related to heat stroke. There are links in diseases such as malaria, dengue, and leptospirosis from extremes in flooding and drought. These considerations need to be built into the public health programs in Kaua'i. Planning should include consideration of the amounts of medicines and medical resources that may be needed during climate extremes.</p> <p><b>Estimated Time:</b> Ongoing</p>	completed in October 2010.
<b>Requires external funding or resources</b>			
Kaua'i Island Utility Cooperative	G1 O6	<p>Harden Electrical Distribution Supply to Kaua'i Veterans Memorial Hospital.</p> <p><b>Proposed: 2004</b></p>	Currently not in the <b>5-year capital plan budget</b> or long-range <b>3-5 year construction work plan plans</b> (would require 2-3 miles underground hardening \$2million/mile).
Kaua'i Civil Defense Agency	G1 O3	<p>Waialua Bridge Pass.</p> <p><b>Proposed: 2004</b></p>	Alternative route identified and bridge bypass build; however, traffic situation still requires attention to transportation flow for emergencies.

## **6.1 Hurricanes and Strong Winds Mitigation Actions**

### **6.1.1 County Capability for Coping with Strong Winds**

Kaua'i County Civil Defense is the primary agency responsible for dealing with strong winds, but relies on relationships with a host of agencies and organizations at the community, county, and state levels, to ensure that people are protected during a strong wind event. Early warnings for storm events come from the National Weather Service Forecast Office, with a local Kaua'i Weather Service Office to provide specific information for Kaua'i. As discussed in Chapter 2, the Disaster Mitigation Committee is comprised of agencies in the executive branch that have responsibility for preparing prior to hazard onset.

### **6.1.2 Sheltering for Strong Winds**

Especially following experiences with Hurricanes 'Iwa and Iniki, the County of Kaua'i has tried to ensure that there are sufficient shelter spaces to protect each community for all types of hazard occurrences. As a priority, the county has conducted an inventory and survey of sites that could be used for sheltering for different types of hazards. Efforts have been ongoing to identify funding for improving shelter facilities. Several of the proposed projects and identified future needs fall within the area of sheltering. Shelters are managed and operated by the American Red Cross.

Kaua'i Civil Defense, the Hawai'i Red Cross, the Kaua'i Visitors Bureau and the Hotel Association continue to work to ensure that high priority facilities and shelters are maintained. This includes reviewing and ensuring agreements are in place among private utilities, the executive government agencies, KCD, and the HRC. They continue to look to secure funds to retrofit facilities with hurricane shutters, roof tie-downs, and other improvements such as emergency power generation equipment. Specific projects done include Moikeha and Piikoi buildings funded from mitigation grants, and the Kaiakea Fire Station which was hardened as an essential facility.

In addition, the Kaua'i Visitors Bureau and the Hotel Association continue to develop agreements with hotels and resorts to house their own guests and worker families during hurricanes and other major natural disasters. In Hawai'i, legislation enables private facilities to house the public with relief for negligence liability. Hawai'i Revised Statutes (HRS) 128-19 provides relief for negligence liability to private sector owners who volunteer the use of their facilities as an emergency shelter. The immunity protection that may be provided applies when an owner or controller of the facility meets the following criteria: (1) Their actions relating to the sheltering of people are voluntary; (2) They receive no compensation for the use of the property as a shelter; (3) They grant a license or privilege, or permit the property to be used to shelter people; (4) The Director of Civil Defense, or delegated agency or person, has designated the whole or any part of the property to be used as a shelter; (5) The property is used to shelter persons; and, (6) The use occurs during an actual impending, mock, or practice disaster or attack.

Finally, within these efforts, the Hawai'i Red Cross and partnering agencies continue to identify People with Access and Functional Needs and particular sheltering requirements, and facilitate dialogue with key segments of the population to ensure that there are places for these

populations to shelter and remain safe during disasters. For example, sheltering in place options may be preferred for mental health clinics with patients requiring specific medications and care, elderly care homes may have non-ambulatory patients, or domestic violence centers may have women who would be unsafe in another facility.

### 6.1.3 Building Codes based on Wind Risk

Martin & Chock, Inc. conducted a wind risk study for Kaua'i County using funding from the Pre-Disaster Mitigation Grant Program. The results of the study have been used in recommending building code amendments that address structural vulnerability based on topographical wind risk effects. The County of Kaua'i Wind Mapping activities were completed in October 2008, and the Hawai'i State Building Code adopting these maps became effective for State construction during 2009 with the 2006 International Building Code (IBC). The counties (other than O'ahu) were required to adopt the Hawai'i State Building Code by 2010.

The International Code Council (ICC) and the Structural Engineers Association of Hawai'i (SEAOH) collaborated in 2009 with Gary Chock to publish the *Guide to the Wind Design Provisions of the Hawaii State Building Code* (<http://www.seaoh.org/wp-content/uploads/2014/10/Hawaii-Wind-Design-Guide-Lectures-Oct-2014-Chock.pdf>) that includes detailed maps and tables of the Hawaii wind parameters in the Hawai'i State Code, complete with discussion of their technical derivation and design examples. This publication coincides with the adoption and training requirements for the Hawai'i Statewide Building Code that will utilize the 2006 IBC. It will also include the map updates necessary for the 2012 IBC. The 2006 building code update was integrated with high winds, for which they are currently trying to update winds to meet 2012 building code update. The grant for the high wind appendix (for which disks are publicly available via the Department of Public Works Building Division) was adopted as part of the grant; the ordinance was signed by the Mayor on June 14, 2012.

**Table 6-3. Kaua'i County Capability and Capacity for Coping with High Wind and Hurricane Risks.**

<b>Organization</b>	<b>Activity</b>	<b>Tools or resources</b>
<b>Kaua'i County Civil Defense</b>	Civil Defense provides operational infrastructure and procedures to deal with hurricanes and high winds. Coordinates warning and response with county agencies. Develops emergency response plans in line with State and Federal NIMS criteria. Develops evacuation maps. Reviews and certifies shelters. Ensures communications during disasters. Provides education and public awareness about hurricane and wind hazards. Responsible for ensuring approved hazard mitigation plan is implemented.	Kaua'i County hazard mitigation plans and actions -
<b>Kaua'i County Department of Public Works Building Division</b>	Responsible for developing and enforcing building codes through the county building permit system. Has consistently been at the forefront of implementing improved codes for reducing wind risk. Currently IBC 2006, with revisions planned once documentation is developed for the implementation of IBC 2012.	<ul style="list-style-type: none"> <li>• Kaua'i Windmaps - distributed by CD from the Building Division</li> </ul>
<b>NOAA National Weather Service</b>	Provides weather forecasts, hurricane warnings, A Weather Service Office based on Kaua'i provides localized information for residents of the state. The meteorologist stationed in Kaua'i further participates in public awareness and education activities to support the county.	Early Warning Systems and Notifications

<b>Hawaii State Emergency Management Office (formerly Civil Defense)</b>	Coordinates the Hurricane Advisory Committee and the State Hazard Mitigation Forum for recommendations on wind risk reduction measures. Engagement of scientists, researchers, and technical advisors to identify risk reduction measures.	<ul style="list-style-type: none"> <li>• Approved State Hazard Mitigation Plan</li> <li>• State applications for the Hazard Mitigation Grant Program funding and Pre-Disaster Mitigation grants</li> </ul>
<b>FEMA</b>	The <a href="#">National Hurricane Program</a> (NHP) helps protect communities and residents from hurricane hazards through various projects and activities. Established in 1985, the NHP also conducts assessments and provides tools and technical assistance to State and local agencies in developing hurricane evacuation plans. This is a multi-agency program that also involves: <ul style="list-style-type: none"> <li>• <a href="#">National Oceanic &amp; Atmospheric Association (NOAA)</a></li> <li>• <a href="#">National Weather Service (NWS)</a></li> <li>• <a href="#">U.S. Department of Transportation (USDOT)</a></li> <li>• <a href="#">U.S. Army Corps of Engineers (USACE)</a></li> </ul>	Numerous planning, technical assistance, and funding resources to support implementation of wind risk analyses and reduction measures.
<b>United States Department of Agriculture</b>	USDA has several branches that provide resources through FEMA during disaster, and that coordinate assistance for farmers, including planning to prevent impacts of disaster.	
<b>Farm Service Agency</b>	Ensures food security in cooperation with state National Guard. Provides relief assistance to farmers, ranchers, and agricultural operators for losses from disaster.	
<b>Federal Crop Insurance Corporation</b>	Provides individual farm producers with economic protection against crop disasters caused by conditions beyond their control	

## 6.2 Flood Hazard Mitigation Actions

### 6.2.1 Flood Mitigation Capability

The County has had significant problems with the recurrence of flooding, primarily from heavy rainfall events, as discussed in previous chapters. Within the County of Kaua'i, the flood coordinator is located in the Department of Public Works Engineering Division (see Chapter 2.2.2 organizational chart). The flood coordinator works with the state flood program as well as with federal and local agencies to reduce risks from flooding. Kaua'i Civil Defense Agency provides emergency services for flood events and works to ensure awareness of flood mitigation actions. Among others on the Disaster Management Committee (DMC), the County Fire Department provides education and awareness and emergency response in flood disasters.

**Table 6-4. Kaua'i County Capability and Capacity for Coping with Flood Risks.**

<b>Organization</b>	<b>Activity</b>	<b>Tools or resources</b>
<b>Kaua'i County Department of Public Works Engineering Division</b>	Division responsible for flood coordination with the State and FEMA to ensure participation and compliance with the National Flood Insurance Program. Responsible for developing the application and documentation for the Community Rating System (CRS).	<ul style="list-style-type: none"> <li>• Kaua'i Online Flood Hazard Assessment Tool (KOHA) <a href="http://coast.noaa.gov/koha/?redirect=301ocm#">http://coast.noaa.gov/koha/?redirect=301ocm#</a></li> <li>• Community education and outreach programs</li> </ul>
<b>Kaua'i County Civil Defense</b>	Civil Defense provides operational infrastructure and procedures to deal with severe flooding.	

<p><b>State DLNR Engineering Division – NFIP and Dam Safety Programs</b></p>	<p><b><i>State of Hawaii, Department of Land and Natural Resources, Flood Control Program:</i></b> Chapter 179, Flood Control and Flood Water Conservation, Hawaii Revised Statutes (HRS), established a flood control program for the State of Hawai'i within the Department of Land and Natural Resources. It provides for the coordination by DLNR of all federal and state flood control projects undertaken in Hawaii and for such technical or financial assistance to its political subdivisions as may be desirable or necessary to assure maximum benefits to the people of the State from the expenditure of state funds for flood control purposes. Mitigation activities include the development of the Hawai'i Flood Mitigation Plan in two phases, 1) interdepartmental coordination and 2) public education and awareness programs. The plan focuses on the following premises: 1) Tasks and responsibilities are in existence and have been assigned to the counties' Department of Public Works or the Department of Land Utilization relative to the enforcement of the Building Code and Flood Hazard Rules and Regulations; 2) DLNR coordinates and integrates intergovernmental Flood Hazard Mitigation Program and activities; and 3) DLNR establishes a continuing public awareness program and ensures public input in plan development. The program operates in each of the counties through the local flood coordinator.</p>	<p>Flood Hazard Assessment Tool  <a href="http://gis.hawaiiinfip.org/fhat/">http://gis.hawaiiinfip.org/fhat/</a></p>
<p><b>NOAA National Weather Service</b></p>	<p>Provides weather forecasts, flood warnings, hydrologic data and modeling, and public awareness information related to mitigating the impacts of floods. A Weather Service Office based on Kaua'i provides localized information for residents of the state. The meteorologist stationed in Kaua'i further participates in public awareness and education activities to support the county.</p>	<p>Early Warning Systems and Notifications</p>
<p><b>US Army Corps of Engineers</b></p>	<p>Engages in flood control works, flood insurance studies and floodplain management. Can provide technical assistance, such as that provided for repairing the levees to meet federal standards in Waimea and Hanapepe.</p>	<p>Community Technical Assistance programs</p>
<p><b>FEMA</b></p>	<p>Developed the National Flood Insurance Program and the Community Rating System for reduction in flood insurance rates based on implementing flood hazard mitigation actions; provides disaster assistance from severe flood events.</p>	<ul style="list-style-type: none"> <li>• Digital Flood Insurance Rate Maps (DFIRMs)</li> <li>• Hazard Mitigation Grant Program</li> <li>• Pre-Disaster Mitigation Grants</li> </ul>
<p><b>US Geological Survey</b></p>	<p>Studies and records hydrologic data.</p>	
<p><b>NOAA Pacific Services Center</b></p>	<p>Provides technical support for Kaua'i County in developing GIS in web-based tools that make it easier to access and use data. Most recently (2012), PSC implemented a flood risk tool accessible by the general population.</p>	<p>The Kaua'i Flood Hazard Assessment Tool (PSC, 2012) enables users to find their home locations on the hazard maps and understand their particular risks, especially related to flood. The tool helps to clarify the need for flood insurance.</p>
<p><b>United States Department of Agriculture</b></p>	<p>USDA has several branches that provide resources through FEMA during disaster, and that coordinate assistance for farmers, including planning to prevent impacts of disaster.</p>	
<p><b>Farm Service Agency</b></p>	<p>Ensures food security in cooperation with state National Guard. Provides relief assistance to farmers, ranchers, and agricultural operators for losses from disaster.</p>	
<p><b>Federal Crop Insurance Corporation</b></p>	<p>Provides individual farm producers with economic protection against crop disasters caused by conditions beyond their control</p>	
<p><b>Farmers Home Administration</b></p>	<p>Provides loan services to assist farmers, ranchers, and agriculture operators to cover losses resulting from a natural disaster and return the</p>	

	operation to a financially sound position.	
<b>Natural Resources Conservation Service</b>	Undertakes emergency watershed protection for runoff retardation and soil-erosion prevention to safeguard lives and property from flood, drought, and the products of erosion.	

### 6.2.2 Flood Control Measures

A number of flood control measures have been employed to minimize damage. The appropriateness in controlling a specific flood problem depends on the causes and nature of the problem. Factors that must be considered include hydrology, geology, climatology, topography, and the size and shape of the watershed.

There are three major approaches to minimizing flood damage: 1) Accommodate the use of the flood plain to the flood risk by regulating the flood plain use or by evacuating the flood plain; 2) Confine flood flows by manmade means---principally structural measures—to physically combat the problem by reducing flood flows and flood damage potential; and, 3) Use flood damage insurance to minimize economic loss from large floods.

- 1) **Regulate Land Use:** Plan and regulate the use of flood plains, including: establish buffer zones defined by encroachment lines; revise zoning ordinances to limit the type of land use within the buffer zone of parks, athletic fields, other recreational use, and buildings; revise building codes to specify flood proof construction in areas exposed to flood hazards; and, remove buildings from older areas periodically subjected to flood damage through urban renewal projects. Watershed planning will help with land use requirements.
- 2) **Evacuation of Flood Plains:** Evacuation and temporary abandonment are essential measures in accommodating the use of the flood plain to the flood risk. This activity relies on flood warning and forecasting systems, including monitoring stations. In 2010, the Kaua’i County Planning Department completed the Emergency By-Pass Road connecting North Kaua’i with South Kaua’i, in the event that the Wailua River Bridge is compromised after a catastrophic event; this was executed using existing cane haul roads and widening and resurfacing gravel based finishes, and refurbishing the South Fork Bridge Crossing and the North Culvert Ford Crossing.
- 3) **Confinement of Floods:** These include the following series of activities: 1) Implementing manmade improvements can minimize flood damage, such as constructing levees or dikes; 2) Decreasing flood run-off through reforestation and conservation practices reduce flood magnitude by increasing the rate that precipitation infiltrates soil and increases the capacity of the soil mantle to retain water (NRCS has conducted a soil classification survey and established categories of soil or soil groups by their hydrologic responses, and these categories can be used to determine storm run-off rates); 3) Improving channel capacity of a stream or channel by excavating to increase depth, width or both; clearing and removing debris and other obstructions; linking a channel with smooth concrete or rubble masonry; providing a more uniform cross section and eliminating unnecessary bends; and constructing emergency bypass channels to supplement the carrying capacity of existing channels and streams; 4) Storing floodwater in reservoirs or dams; 5) Reducing debris flow; and, 6) Reducing coastal flood damage potential by leaving natural features, such as sand dunes, where possible.

- 4) **Flood Damage Insurance:** The major purpose of the insurance should be to compensate policy- holders for damage from floods, which exceed a magnitude beyond the capacity of economically feasible flood control measures. It should never be considered a substitute for the installation of effective flood prevention facilities. Congress created the National Flood Insurance Program by enacting Public Law 90-448 in 1968, which has since been broadened and modified. Mudslide protection has been added to the enactment of the Act of 1969 (Public Law 91-152). Flood-related erosion protection has been added by the Flood Disaster Protection Act of 1973 (Public Law 92-234). The program is administered by FEMA through the Federal Insurance Administration (FIA). The Department of Land and Natural Resources (DLNR) has been designated as the State Coordinating Agency, responsible for assisting in the coordination of the program between the Federal and County governments in Hawaii. Detailed discussion of this program can be found in the DLNR publication of Circular C90 (revised) “National Flood Insurance Program in Hawaii.”

**Table 6-5. Stages in Coastal Development – Key Decisions Regarding Shoreline Management, Existing Roles of Government Agencies and Parties [County Decisions are in Gray]**

Development Stage	Key Coastal Management Decisions	Primary Agencies and Organizations
State Districts	Types of Use, Density of Use	State Land Use Commission and Planning Departments. For Urban, Rural and Ag land less than 15 acres, County Council and Planning Commissions
General and Community Planning	Character of Area, Goals and Policies for Growth and Development, Community Input to Zoning and Subdivisions, Design Standards	County Dept. of Planning & Permitting – Division of Planning & Development; County Administration, County Council, Planning Commission, Citizen Advisory Groups, Government Advisory Committees, Neighborhood Boards, Landowners, Development Companies
Local Zoning	Types of Use, Density of Use	County Dept. of Planning & Permitting – Division of Planning & Development
Subdivision of Land	Location and Size of Lots, Configuration of Lots, Mix of Lot Size, Location of Streets, Cluster Developments, Planned Developments, Planned Unit Developments, Setbacks, Variances	County Dept. of Planning & Permitting – Site Development Division
Infrastructure Improvement	Preservation of Coastal Dune, Infill of dune, Grading of Land, Grading Permits, Drainage, Utility Placement	County Dept. of Planning & Permitting – Site Development Division
Lot Transfer	Disclosure of Erosion, Flooding, and Hazard Risks	State Legislature, Landowner, Homeowner
Home Construction	Location of Home on Lot, Setbacks, National Flood Insurance Regulations, Building Codes to Address Wind, Hurricane Damage, Seismic Loads	County Dept. of Planning & Permitting - Building Division
Erosion/Hazard Noticed – Remedial Options Evaluated	Erosion & Repetitive Flooding, Seawalls, Revetments, Sand Replenishment, Dune Reconstruction, Retreat, Compensatory Mitigation, Retrofit	County Dept. of Planning & Permitting - Permits Division, State Dept. of Land and Natural Resources – Office of Conservation & Coastal Lands

(Sources: Referenced Hwang 2003/revised 2014, 3<sup>rd</sup> edition, Homeowner’s Handbook; modified for Kaua’i County in 2015)

### 6.2.3 National Flood Insurance Program.

The National Flood Insurance Program (NFIP) provides federally-backed flood insurance to property owners in communities that regulate development in flood plains. The United States' Congress established NFIP to "reduce the loss of life and property and rising cost of disaster due to flooding." The National Flood Insurance Program is a voluntary program based on agreements between federal and local governments. In order to participate, a community must adopt and enforce certain minimum building and land use standards designed to reduce property damage from flooding. These regulations, among other things, require new or substantially remodeled structures within special flood hazard areas to be engineered and/or elevated in order to withstand anticipated flood conditions. They also require communities to prohibit development in floodways-areas that allow floodwaters to discharge from special flood hazard areas. NFIP also shifts the cost of flood damage from taxpayers, who ultimately pay for disaster relief, to property owners through flood insurance premiums.

The risk of flood damage to the structure's lowest floor from a "100-year flood" provides the basis for National Flood Insurance Program premiums. Flood Insurance Rate Maps-also based on the "100-year" flood line-delineate special hazard areas and applicable risk premium zones. These Federal Emergency Management Agency-generated maps serve as primary reference documents for the National Flood Insurance Program and other flood-related policies and programs at all levels of government.

In the State of Hawai'i, coastal flood elevations from historic hurricanes have been combined with statistical information on tsunami floor inundation limits and used to establish 1%-annual-chance flood elevations and associated wave run-up. The combination includes recent significant hurricane events that exhibited tsunami-like wave bore flooding effects.

**Table 6-6. Hawaii's Flood Insurance Rate Map Special Flood Hazard Areas and Risk Premium Zones**

Coastal High Hazard Zones VE, V (also, VI to V30)	Flood Fringe Zones AE, AO, AH (also, AI to A30)	General Flood Plain Zones A, D, X
<p>Zone V: 100-year coastal flood plain. No base flood elevation.</p> <p>Zone VE: 100-year coastal flood plain. Base flood elevation determined.</p>	<p>Area of shallow flooding. No clearly defined channel exists, thus flood path is unpredictable and indeterminate.</p> <p>Zone AE: 100-year flood plain, computed base flood elevation.</p> <p>Zone AH: 100-year shallow flooding (ponding), computed base flood elevation.</p> <p>Zone AO: 100-year shallow flooding (sheeting), computed base flood elevation.</p> <p>Zone A99: Significant progress made on protective systems. No base flood elevation.</p>	<p>Zone A: 100-year floodplain, no base flood elevation nor depth.</p> <p>Zone X: moderate to minimal flood hazard area. No base flood elevation or depth.</p> <p>Zone D: Unstudied area where flood hazards are undetermined, but possible.</p>

Kaua'i County continues to work to ensure compliance with NFIP requirements (2015) and to pursue the NFIP's voluntary program—the Community Rating System (CRS)—that recognizes

community mitigation activities beyond the minimum requirements for regulating floodplain development. Kaua'i County is still working towards participating in the NFIP's CRS, anticipated for completion in 2017. Upcoming tasks to accomplish this include finishing compliance with non-conforming items, and requesting that FEMA conduct a CAV, wherein FEMA will specify properties that need to be considered.

### 6.3 Drought Mitigation Actions

#### 6.3.1 Ensuring Water Supply

Each county has a department designated with the responsibility of managing water resources. Kaua'i County, Hawai'i County, and Maui County each have a Department of Water that manages, controls, and operates waterworks in their respective jurisdictions.

The Water Department has completed and/or maintained several Emergency Interconnections of various water systems, including the Koloa Water System-Grove Farm Koloa System, the Kekaha Sugar System and CWD Kekaha Water System. In addition, the Water Department upgraded and maintained the Pump 3 ditch system and Alexander Reservoir, along with the completion of developing deeper ground water wells for the State Kokee System Wells.

#### 6.3.2 Kaua'i Drought Mitigation Planning

The Hawai'i State Water Commission convened the Hawai'i Drought Council for drought mitigation planning in 2003, and this Commission has been ongoing. A Drought Task Force made up of state and county representatives met to develop the framework for the Council and to deal with immediate concerns of drought in the state. They prepared a statewide drought mitigation plan that provided the public and state and local agencies with a clear description of the procedures and mechanisms used to monitor drought-related resources (before, during and after a drought), assess drought needs, define triggers that engage actions and mitigate drought impacts. They are responsible for monitoring water resource conditions, reviewing forecasts and notifying the public and task force members if drought conditions are expected in the future.

**Table 6-7. Kaua'i County Capability and Capacity for Coping with Drought.**

Organization	Activity	Tools or resources
<b>Hawaii Drought Council</b>	Convened throughout the state by the State by the Commission for Water Resources, the council has developed state drought mitigation plans and sought resources from the Governor, State Legislature, and federal agencies to deal with the impacts of drought.	Kaua'i County Drought Mitigation Plan
<b>Kaua'i County Civil Defense</b>	Civil Defense provides operational infrastructure and procedures to apply additional resources to meet the demands of the drought emergency from all appropriate levels of the county government. They participate in the local drought mitigation plans.	
<b>Kaua'i County Water Department</b>	The Water Department monitors supply of the water resource and ensures appropriate development of water resources for the county. In addition to monitoring supply, the water department helps to ensure quality of the water resources	

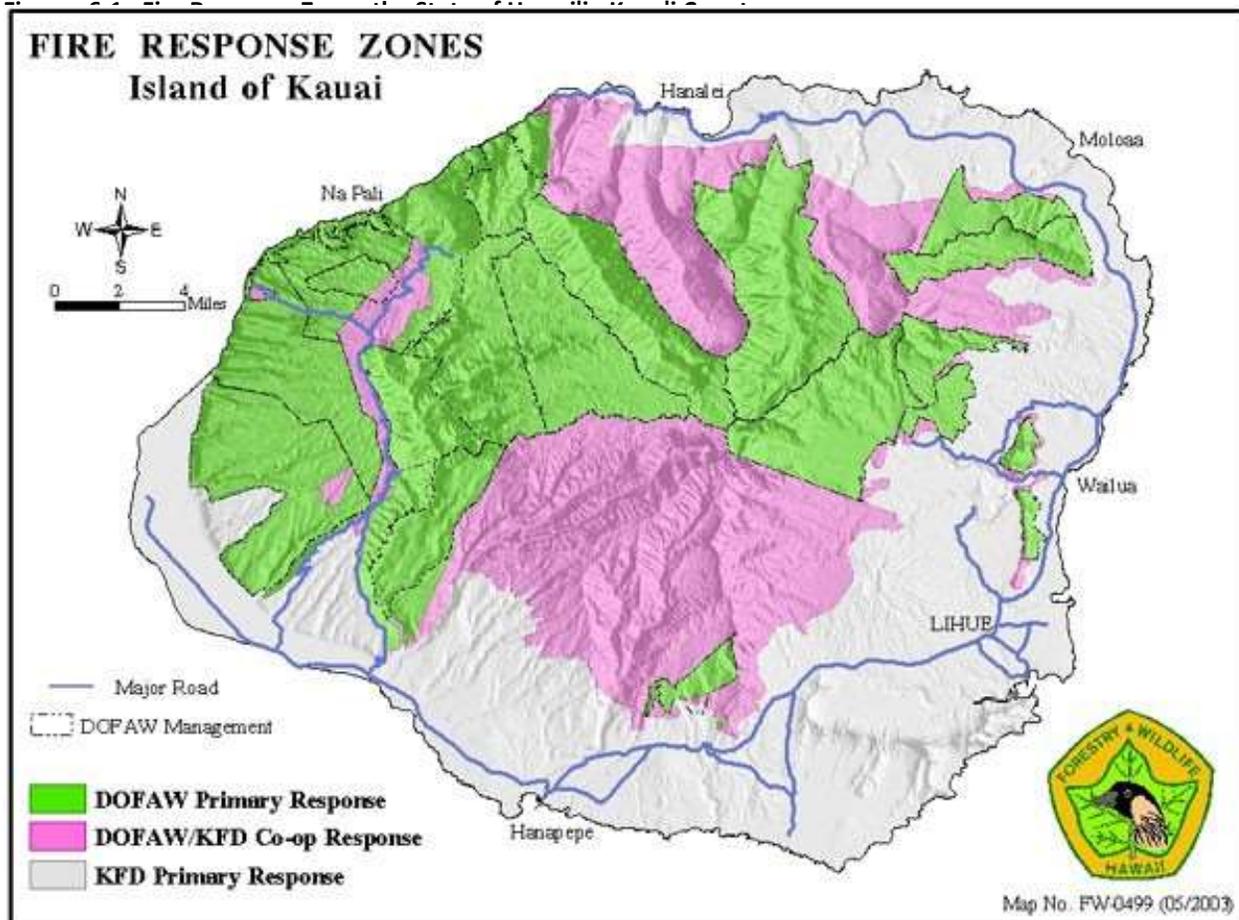
<b>United States Department of Agriculture</b>	USDA has several branches that provide resources through FEMA during disaster, and that coordinate assistance for farmers, including planning to prevent impacts of disaster.	
<b>Farm Service Agency</b>	Ensures food security in cooperation with state National Guard. Provides relief assistance to farmers, ranchers, and agricultural operators for losses from disaster.	
<b>Federal Crop Insurance Corporation</b>	Provides individual farm producers with economic protection against crop disasters caused by conditions beyond their control	
<b>Farmers Home Administration</b>	Provides loan services to assist farmers, ranchers, and agriculture operators to cover losses resulting from a natural disaster and return the operation to a financially sound position.	
<b>Natural Resources Conservation Service</b>	Undertakes emergency watershed protection for runoff retardation and soil-erosion prevention to safeguard lives and property from flood, drought, and the products of erosion.	
<b>National Integrated Drought Information System (NIDIS)</b>	NIDIS was envisioned in a Western Governors' Association Report in 2004. The NIDIS Act was introduced in the U.S. Congress and signed by the President in 2006. The NIDIS implementation plan outlines how to: develop the leadership and networks to implement an integrated drought monitoring and forecasting system at federal, state, and local levels; foster and support a research environment focusing on risk assessment, forecasting, and management; create an "early warning system" for drought to provide accurate, timely, and integrated information; develop interactive systems, such as the Web Portal, as part of the early warning system; and, provide a framework for public awareness and education about drought.	U.S. Drought Monitor, <a href="http://www.drought.gov">www.drought.gov</a> This tool provides information on the state of drought in each county within the fifty United States. In addition to the portal, NIDIS provides information and resources to aid in drought mitigation planning.

## 6.4 Wildfire Mitigation Actions

### 6.4.1 Wildfire Mitigation Capability

The Department of Land and Natural Resources Division of Forestry and Wildlife (DLNR/DOFAW) has the authority under Chapter 185, Hawaii Revised Statutes, Land Fire Protection Law, for the prevention, pre-suppression, and suppression of wildfires for forest reserves, public hunting areas, and natural area reserves. It also has the authority to cooperate with established fire control agencies for the protection of other wildlands not with the department's protection areas.

DLNR/DOFAW contributes to mitigation efforts by keeping a fire database --- <http://dlnr.hawaii.gov/forestry/fire/data/>. They also created Fire Management Maps (Figures 6-1) that delineate agencies responsibility in certain areas around the islands. In the early 1980s, a map of each county depicted areas where DOFAW has primary fire responsibility (color-coded green), areas where it could respond mutually with other firefighting agencies (color-coded pink), and areas totally out of its jurisdiction (color-coded white). DOFAW would automatically respond to fires in the green area. The pink areas generally are those areas which are adjacent to the green areas. If fires are in these areas, DOFAW would respond mutually if the request came directly from the county fire department.



In addition, there are several other county, state, and federal agencies that contribute to wildfire risk reduction. These are described in Table 6-8 Capability and Capacity for Coping with Wildfire.

**Table 6-8. Kaua'i County Capability and Capacity for Coping with Wildfire.**

Organization	Activity	Tools or resources
State DLNR/DOFAW	<p>Primary responsibility for coordinating risk reduction and response to wildland fires. The mission of the DOFAW Fire Management Program is to provide protection to forest reserves, natural area reserves, wildlife and plant sanctuaries and public hunting areas. DOFAW will cooperate with established fire control agencies for the protection of other wildlands not within department protection areas to the extent needed to provide for public safety. DOFAW will hold environmental damage below the level at which it would interfere with the high level, sustained yield of services and commodities from these lands.</p> <p>DOFAW plays a pivotal role in protecting the state's watersheds and unique forest resources, i.e. forest products, and threatened and endangered species. Because wildfire is a threat to Hawai'i's economy, society, and natural resources, all levels of government have established fire services to guard against the ravages of uncontrolled conflagration.</p>	<p>Fire Database - <a href="http://dlnr.hawaii.gov/forestry/fire/data/">http://dlnr.hawaii.gov/forestry/fire/data/</a></p>
Kaua'i County	<p><b><i>Community Wildfire Protection Plan for Kaua'i County</i></b> The CWPP was finalized in June 2009. The document identifies wildfire risk and vulnerability, actions to address and mitigate impacts, and grant funding opportunities and resources for mitigation. The CWPP is included in Chapter 6 Appendix 9.</p>	
Kaua'i County Civil Defense	<p>Civil Defense provides operational infrastructure and procedures to apply additional resources to meet the demands of the drought emergency from all appropriate levels of the county government.</p>	
911 System	<p>Each county in the state has a Fire Prevention Bureau that works to prevent fires before they can cause injuries and property damage. Emergency needs will be responded to from the centralized emergency 911 system for public safety.</p>	
Kaua'i County Fire Department	<p><b><i>Memorandum of Agreement for Fire Suppression and Management</i></b> – Agreement among rancher and farmers in rural areas working with local fire departments and DOFAW to suppress wildland fires. The improved fire protection served to provide extended coverage to rural and wildland areas. DOFAW has no full-time firefighters like the dedicated fire services, is often requested to respond to fire situations outside its legal jurisdiction. The consequence was the rapid depletion of its own fire suppression funding and subsequent inability to address fire threats on land under its own jurisdiction. To still meet its legal fire protection mandate for state-owned lands and honor its partnership with other fire services, DOFAW negotiated with its local fire departments and established a cooperative mechanism for prevention, suppression and suppression measures by way of the current Memorandum of Agreements (<a href="http://www.state.hi.us/dlnr/dofaw/fmp/firemission.htm">http://www.state.hi.us/dlnr/dofaw/fmp/firemission.htm</a>).</p>	<p><b><i>Kaua'i County Fire Code</i></b> – Provisions in the County of Kaua'i Uniform Fire Code require that homeowners clear brush and vegetation and maintain a firebreak around structures and utilities (KUFC 1103 Combustible Materials, Section 15 Clearance of Brush and Vegetative Growth from Electrical Transmission Lines and Section 16 Clearance of Brush and Vegetative Growth from Structures). The code authorizes the Fire Chief to issue fines for noncompliance.</p>
US Forest Service	<p>Manages the national forests. Provides technical expertise, resources, and program coordination to reduce fire risks. Supports several programs to locally manage risks.</p>	<p><b><i>Federal Excess Personal Property program</i></b> – Hawaii State participates in the Federal Excess Personal Property (FEPP) program that is offered through the U.S. Forest</p>

		Service. The program is used by DOFAW in acquiring federal excess property for firefighting. Equipment acquisition is wide and varied. Acquisition has included flight helmets, trucks, water tenders, and dozers. All the equipment is on loan to DOFAW and remains the property of the U.S. Forest Service. Any type of equipment can be acquired as long as it meets the requirements of the program, A physical inventory of all equipment is done annually by the fire management staff on each Branch. A program review is done once every two years with U.S. Forest Service property management specialists from Region 5.
<b>Hawaii Drought Council</b>	The Hawai'i Drought Council is the steering group that oversees the implementation of drought related activities in the State of Hawaii. The Council consists of department heads of the key state drought response agencies consisting of the Department of Agriculture (co-chair), the Department of Land and Natural Resources (co-chair), the State Civil Defense, a representative from the Governor's Office and four (4) County Officials designated by the Mayors, which ensures participation of Kaua'i in responding to and mitigating drought. The Hawai'i Drought Council has prepared Phase I of the Hawai'i Drought Plan to improve and better coordinate drought management strategies for the State of Hawai'i. The plan outlines mitigation measures and appropriate response actions during periods of drought to reduce and minimize the effects upon the people and natural resources.	
<b>Kaua'i County Water Department</b>	The Water Department monitors supply of the water resource and ensures appropriate development of water resources for the county. The Water Department heads the KC Drought Committee, and aids in ensuring water resources for fire suppression.	

## 6.5 Erosion Mitigation

### 6.5.1 Capability to Mitigate Erosion Hazards

Accelerated erosion along shorelines is among the first impacts of sea level rise. In Kaua'i, the shoreline protection and erosion mitigation responsibilities fall under the responsibilities of the county coastal management program in the Department of Planning. Since 2007, the University of Hawai'i Sea Grant Program has positioned an extension agent in the county to work on the development of the shoreline assessment (see Chapter 3 Appendix 2). As this plan was being drafted, the assessment was released and is being reviewed with recommendations for shoreline management. In the next update in 2014, some of the recommendations will have been implemented.

### 6.5.2 Coastal Zone Management

The National Coastal Zone Management Act (CZMA) was enacted in 1972 to assist coastal states in developing management policies for the coastal resources located within the state coastal zone. Coastal erosion is specifically mentioned in the CZMA as an area of concern to be addressed by state policy. The CZMA requires that state programs include a planning process

for assessing the effects of shoreline erosion, study ways to lessen the impact, and restore areas adversely affected by erosion.

The Hawai'i Coastal Zone Management Program (CZMP) was enacted in 1977 (Chapter 205A, HRS). Hawaii's coastal zone includes all lands, and all waters from the shoreline to the seaward limit of the state's jurisdiction. The State Office of Planning (OP), in the State Department of Business and Economic Development and Tourism (DBEDT), is the lead agency for administering the CZMP in Hawai'i. The OP administers the CZMP through a network of state agencies and the county planning departments, including the Kaua'i County Planning Department.

The erosion planning and management activities fall primarily under the jurisdiction of the counties through the administration of the Special Management Area (SMA) and shoreline setback provisions of Chapter 205A, HRS, and the Department of Land and Natural Resources (DLNR) Conservation District Regulations. The boundary of the SMA is from the ocean generally to the nearest highway or minimum of 300 feet. The recent shoreline erosion study of Kaua'i County (see Chapter 3 Appendix 2) provides an additional tool for determining shoreline setbacks and other measures to reduce erosion risks.

### 6.5.2 Land Use and Zoning

The Conservation District includes all submerged lands seaward of the shoreline to the limit of state territorial waters. The Board of Natural and Land Resources (BNLR), staffed by the State DLNR, is responsible for establishing the procedures and certifying where the shoreline is located, and for promulgating and administering the Conservation District use Regulations. All activities proposed within the Conservation District must submit to an application and review permit in order to obtain a Use Permit (CDUP) from BLNR. These measures help to prevent development activities on the shoreline that would result in erosion and potential economic loss for property owners.

**Table 6-9. Kaua'i County Capability and Capacity for Coping with Erosion.**

Organization	Activity	Tools or resources
<b>Kaua'i County Planning Department</b>	Works with DBEDT Office of Planning Coastal Zone Management Program and the State Office of Conservation and Coastal Lands to facilitate studies on erosion rates and implications of sea level rise, and to propose variable setback laws to account for shoreline changes and restoration. Working with erosion rate maps from the University of Hawaii Coastal Geology Group.	Erosion Maps - <a href="http://www.soest.hawaii.edu/coasts/erosion/kauai/mosaics.php">http://www.soest.hawaii.edu/coasts/erosion/kauai/mosaics.php</a>
<b>Hawaii State DLNR Office of Conservation and Coastal Lands</b>	Develops erosion mitigation measures through beach management plans, coastal restoration plans, and coastal erosion management plans.	Coastal Erosion Management Plan <a href="http://dlnr.hawaii.gov/occl/files/2013/08/COEMAP1.pdf">http://dlnr.hawaii.gov/occl/files/2013/08/COEMAP1.pdf</a>
<b>Hawaii State Coastal Zone Management Program</b>	Coordinates the Hurricane Advisory Committee and the State Hazard Mitigation Forum for recommendations on wind risk reduction measures. Engagement of scientists, researchers, and technical advisors to identify risk reduction measures.	<ul style="list-style-type: none"> <li>• Approved State Hazard Mitigation Plan</li> <li>• State applications for the Hazard Mitigation Grant Program funding and Pre-Disaster Mitigation grants</li> </ul>
<b>US Geological Survey</b>	Supports and conducts studies on shoreline change.	<a href="http://pubs.usgs.gov/of/2">http://pubs.usgs.gov/of/2</a>

## 6.6 Climate Variability and Change Mitigation Actions

### 6.6.1 Climate-Related Capability for Risk Reduction

Numerous agencies and organizations have responsibilities related to climate variability and change, as summarized in Table 6-10.

**Table 6-10. Kaua'i County Capability and Capacity for Coping with Drought.**

Organization	Activity	Tools or resources
<b>Kaua'i County Civil Defense</b>	Primary coordinating and response agency for extreme climate events, including hurricanes, flooding, drought, and wildfire. Many of these historical extreme events occur during El Niño events, and when KCD receives forecasts of an ENSO event, they are able to prepare the county for potential disasters. Along with the Water Department and the Planning Department, the KCDA continues to educate leaders and the public about sea level rise (SLR), increased disaster risks, and ecosystem impacts from climate change that will ultimately affect the livelihood of the people in Kaua'i. The findings of scenarios and assessments (especially those conducted by State and Federal partners in risk management) aim to be integrated into county policies and Community Plans. NOAA, PIRCA and UH Sea Grant Extension conduct community meetings and presentations at County Council and for governmental departments, around coastal management, SLR, erosion and coastal planning	
<b>Kaua'i County Department of Planning</b>	Continues to examine the impacts of climate change (higher temperatures, sea level rise, extremes in rainfall as floods or drought, and potential increases in tropical storm frequency or severity) in land use, development, and planning within the county. In coordination with UH Sea Grant, the publication " <i>Climate Change Impacts in Hawai'i - A summary of climate change and its impacts to Hawai'i's ecosystems and communities</i> " included such considerations (minus higher temperatures), with a focus on coastal hazards. This information will also be incorporated into three community development plans: East Kaua'i, South Kaua'i and the Līhu'e Town Core Plan.	
<b>Kaua'i County Water Department</b>	The Water Department monitors supply of the water resource and ensures appropriate development of water resources for the county. In addition to monitoring supply, the water department helps to ensure quality of the water resources	
<b>NOAA National Weather Service</b>	With a Weather Service Office on Kaua'i, the Honolulu Forecast Office, and the Pacific Regional Headquarters based in Honolulu, meteorologists and climatologists provide early warning information to KCD and others to ensure that preparedness takes place, especially with extreme climate events. NWS also provides outreach and education to counties and communities.	Early Warning System
<b>Pacific ENSO Applications Climate Center (PEAC)</b>	The Pacific ENSO Applications Center publishes a quarterly newsletter and online updates that provide forecast information on rainfall, storms, and sea level variation. Short articles educate readers in using climate information. The forecasts can be used to prepare for extreme	PEAC newsletter ( <a href="http://www.soest.hawaii.edu/MET/Enso/index2.html">http://www.soest.hawaii.edu/MET/Enso/index2.html</a> ).

	climate events associated with El Niño-Southern Oscillation	
<b>Pacific Regional Integrated Science and Assessment (Pacific RISA)</b>	The Pacific Regional Integrated Science and Assessment (Pacific RISA) program is a collaboration among agencies and organization in the US Pacific Islands to develop assessment tools and research to understand short and long-term climate impacts. The tools and information are developed to help governments prepare for changes in climate and develop adaptation strategies	<a href="http://www.pacificrisa.org">http://www.pacificrisa.org</a>
<b>Pacific Climate Information System (PaCIS)</b>	A network of agency representatives in the Pacific are coordinating activities related to climate, including the projects listed previously. Three working groups: Research and Assessment, Operational Tools and Services, and Education and Outreach will focus activities to build resilience to the impacts of climate change.	
<b>University of Hawai'i Sea Level Center (UHSLC)</b>	The University of Hawai'i Sea Level Center (UHSLC) is a research facility of the University of Hawaii/NOAA Joint Institute for Marine and Atmospheric Research (JIMAR) within the School of Ocean and Earth Science and Technology (SOEST). The UHSLC originated as the TOGA Sea Level Center for research on the El Niño Southern Oscillation in the Pacific Ocean. The mission of the UHSLC is to collect, process, distribute, and analyze in-situ tide gauge data from around the world in support of climate research. Primary support for the UHSLC comes from NOAA's Climate Program Office (CPO). Funding is also provided by NASA under the JASON program for the development of In Situ Tide Gauge/GPS Stations for Monitoring the Temporal Drift of Satellite Altimeters. The UHSLC also hosts the Joint Archive for Sea Level (JASL), a collaborative effort with the National Oceanographic Data Center (NODC).	
<b>Hazards, Climate &amp; Environment Program, University of Hawai'i Social Science Research Institute (HCEP)</b>	HCEP provides hazard mitigation planning and research related to risk reduction to help government at all levels and communities develop resilience to impacts of disasters. Climate-related research and activities focus on climate change adaptation planning.	<a href="http://www.hazards-climate-environment.org">www.hazards-climate-environment.org</a>
<b>International Pacific Research Center (IPRC)</b>	The IPRC at the University of Hawai'i seeks to understand the climate system and how it may respond to human activity by conducting experiments with computer simulation models and by analyzing the many direct and remote observations related to climate. Current research involves the development downscaled hydrologic models based on climate change projections. The results will aid in improved information to ground adaptation planning for water resources.	<a href="http://iprc.soest.hawaii.edu">http://iprc.soest.hawaii.edu</a>
<b>Pacific Island Climate Change Cooperative (PICCC)</b>	The PICCC provides a range of services and tools to help managers in Hawai'i, the Mariana Islands, American Samoa, and other Pacific Island groups make informed decisions for conservation of natural and cultural resources including climate models at the archipelagic and island scales, ecological response models, and implementation and monitoring strategies for island species, resources, and communities. Our goal is to help managers reach explicit biocultural conservation objectives in the face of climate change and ongoing threats such as fire, land conservation, and invasive species.	<a href="http://piccc.net/">http://piccc.net/</a>
<b>US Climate Change Research Program</b>	The US Climate Change Research program has conducted National Climate Assessments to identify risks and opportunities for adaptation to the impacts of climate change. The Pacific Islands assessment provides information and indicators for planning,	<a href="http://cakex.org/virtual-library/climate-change-and-pacific-islands-indicators-and-impacts">http://cakex.org/virtual-library/climate-change-and-pacific-islands-indicators-and-impacts</a>
<b>National Integrated Drought</b>	NIDIS was envisioned in a Western Governors' Association Report in 2004. The NIDIS Act was introduced in the U.S. Congress and signed by the President in 2006. The NIDIS implementation plan outlines how to: develop the leadership	U.S. Drought Monitor, <a href="http://www.drought.gov">www.drought.gov</a> This tool

<b>Information System (NIDIS)</b>	and networks to implement an integrated drought monitoring and forecasting system at federal, state, and local levels; foster and support a research environment focusing on risk assessment, forecasting, and management; create an “early warning system” for drought to provide accurate, timely, and integrated information; develop interactive systems, such as the Web Portal, as part of the early warning system; and, provide a framework for public awareness and education about drought.	provides information on the state of drought in each county within the fifty United States. In addition to the portal, NIDIS provides information and resources to aid in drought mitigation planning.
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### 6.6.2 Climate Change Adaptation Planning and Research

The State of Hawai'i has developed a climate change task force to begin to address issues of climate change in the State. Representatives include representatives from each county appointed by the Mayor, State Departments that will be critically impacted from climate change or serve critical roles in addressing these impacts (Civil Defense, Department of Health, Department of Business, Economic Development, Tourism and Energy), University of Hawai'i researchers, and legislative appointees.

In addition, there are projects being conducted by the University in the institutes listed above that are providing information that contributes to adaptation planning. Many of the actions that will improve climate change adaptation are similar to hazard mitigation projects. In addition, addressing the problem requires multidisciplinary, multi-sectoral knowledge in addressing risks and impacts.

### 6.6.3 Cross-Sector Departments Collaborating with Community Organizations and the Private Sector

The Ha'ena to Hanalei Community Disaster Resilience Plan, the first plan of its kind in the State, was completed in 2014, and includes considerations for impacts from climate change along with other multi-hazard, vulnerability and risk planning components. The government continues to take into consideration potential socioeconomic and multi-sector impacts from climate change for Kaua'i, including water resource management, disaster risk management, public health, agriculture, and tourism. Impacts likely will be felt first in communities, and thus the resilience and sustainability of these communities must be considered and integrated into Community Plans and all governmental policies and planning.

## 6.7 Earthquake Mitigation Actions

### 6.7.1 Adoption of Building Codes for Seismic Zones

The Hawai'i State Building Code became effective for State construction during 2009 with the 2006 International Building Code (IBC). Kaua'i County will be required to adopt the Hawai'i State Building Code by 2010. The State, with funding from the Hawai'i State Coastal Zone Management Program, will offer training on the requirements for the Hawai'i Statewide Building Code that will utilize the 2006 IBC. Amendments regarding seismic zone safety have been reviewed and recommended by the Structural Engineers Association of Hawaii (SEAOH) and the Hawai'i State Earthquake Advisory Committee (HSEAC).

Department of Public Works continues to integrate HAZUS loss modeling information on structural risk and vulnerability with GIS to upgrade building codes which include seismic risk, consistent with State adoption of codes (2006, with updates in 2012) with hazard amendments including seismic classification mapping. Public Works participates in State trainings and assistance in the use of modern codes and retrofit guidelines for county officials and design professionals, and encourage sponsorship and collaboration in training (2014) with the Contractors' Association of Kaua'i , and attend the annual Hawaii Association County Building Officials.

The potential seismic data collected in the State has been considered in the IBC and is used used to generate potential hazard maps. Slope stabilization of highways is ongoing, with expertise required from Planning & State Highways.

### **6.7.2 Research, Technology and Data Improvements**

The State of Hawai'i has updated quality of the building stock inventory used in the HAZUS software program for understanding potential losses from seismic hazards. The software program has enabled researchers and engineers to develop several scenarios that demonstrate potential losses given different parameters. The analysis can be used to improve information and urge the adoption of improved building code standards. In addition to the studies, training sessions have been provided to technical specialists involved with hazard mitigation planning and data management.

The current HAZUS program is also designed to assess hurricane and flood risks. Detailed analyses for the University of Hawaii System have been conducted to show applications for planning for building level information. With the 2010 update of the State Multi-Hazard Mitigation Plan, an analysis was conducted of critical state facilities valued over \$250,000, primarily shelters designated in the school system. The analysis included Kaua'i school shelters, although the seismic risk in Kaua'i County is lower than other islands in the State and the modeled risk for earthquakes was low for damages in Kaua'i.

## **6.8 Tsunami Mitigation Actions**

### **6.8.1 Adoption of Building Codes**

The Hawai'i State Building Code became effective for State construction during 2009 with the 2006 International Building Code (IBC). Kaua'i County adopted the Hawai'i State Building Code. The State, with funding from the Hawai'i State Coastal Zone Management Program, offered training on the requirements for the Hawai'i Statewide Building Code that utilize the 2006 IBC. Consideration about the impacts from tsunami are being included in the codes, although the models for assessing structural risk do not directly include tsunami.

KCDA is using newly updated Tsunami Modeling and Evacuation Planning conducted by the University of Hawaii, with assistance from the State and the Army Corps of Engineers, to update evacuation route planning and maps completed in 2014 (Chapter 3 appendix), and to inform land use planning and development. In light of lessons learned from the 2010 tsunami from

Chile and the 2011 tsunami from Japan, the tsunami evacuation zone was updated in 2013 by UH models based on historical tsunamis and modeling, and the and the new Great Aleutian island model evacuation zone is currently being updated. Following the 2013 zone updates, KCDA held a signage campaign including public postings and awareness information of tsunami evacuation zone signage and protocols, which were installed in 2014. These new evacuation zones should inform development planning and community resilience efforts to prevent extensive development in areas of high inundation risks, and to consider securing funds for constructing vertical evacuation routes or structures in low-lying areas.

### **6.8.2 Public Education and Awareness related to Tsunami**

**The following public education and awareness events related to tsunami were provided by KCDA, and are as follows:**

- New Tsunami Evacuation Mapping - Expanded Stakeholder Briefing (CIKR and EOC partners) and Review/Feedback Session, 7/16/13, 9:00 AM- 11:00 AM, KCDA EOC – Approx. 50 participants
- Final Draft layer was completed in August 2013
- 10/9/13 – Final Briefing to Mayor and Managing Director
- Mayor’s letter to Adjutant General regarding updated Tsunami Evacuation Zones - November 2013
- PIO press release
- NOAA website updates
- Various phone directory map updates
- Community outreach via Mayor’s community meetings:
  - 2/3/14 – Kapa’a Neighborhood Center (participant count not available)
  - 2/10/14 – Hanapēpē Neighborhood Center (participant count not available)
  - 2/13/14 – Kōloa Neighborhood Center (participant count not available)
- County Council presentation – 2/26/14 (televised)

### **6.8.3 Warning Systems and Response**

Responsibility of all disasters or major crises in the State of Hawai'i begins at the county level. As the disaster or crisis develops, the Hawai'i State Civil Defense System provides operational infrastructure and procedures to apply additional resources to meet the demands of the emergency from all appropriate levels of government.

- State siren retrofit satellite cell activation system, Phase II
- Siren Retrofit Project (completed in 2014) – Conversion of all Civil Defense Outdoor Warning Sirens from 800 MHz radio activation to cellular/satellite activation
- Siren Modernization Project, Phase I – 9 new sirens (completed in 2014)
- ‘Aliomanu Estates (New location)
- Isenberg Park (New – replaced long-decommissioned unit)
- Shipwreck Beach Park (New location)
- Kaula’i Veterans Cemetery (New location)
- ‘Anini Pavilion (replaced older unit)

- Kapa‘a High School (replaced older unit)
- Līhu‘e Ballpark (replaced older unit)
- Lydgate Beach Park (replaced older unit)
- Vidinha Stadium (replaced older unit)
- Siren Modernization Project, Phase II – 9 new sirens (underway April-May 2015)
- Wailua Houselots (New – replacing long-decommissioned unit)
- Wailua Golf Course (new location)
- Hanamā‘ulu Beach Park (new location)
- Puhi (New – replacing long-decommissioned unit)
- Kōloa town (New – replacing long-decommissioned unit)
- Po‘ipū Beach Park (replacing older unit)
- Halewili Road (New location)
- Kalawai Park (New location)
- Kekaha Chinese Cemetery (replacing older unit)
- Siren Retro Supplement (Targeted for late 2015-early 2016) – All units replacing older units
- Moloa‘a
- Anahola ‘Aliomanu South
- Waipouli
- Wailua Homesteads Park
- Po‘ipū Crater
- Port Allen
- Kaumakani
- Waimea Canyon Drive
- Kekaha Gardens
- Siren Modernization Phase III – To be determined

***Tsunami Warning System in the Pacific*** – An International Coordination Group for the Tsunami Warning System in the Pacific (ICG/ITSU), under the auspices of the Intergovernmental Oceanographic Commission (IOC), was established in 1968. An international cooperative effort involving many member states in the Pacific Region meets every two years to review progress and coordinate activities resulting in improvement of the service. The IOC also maintains the International Tsunami Information Centre (ITIC), whose responsibilities include: 1) monitoring the international tsunami warning activities in the Pacific and recommending improvements with regard to communications, data networks, data acquisition, and information dissemination; 2) bringing to Member and non-member States information on tsunami warning systems; 3) assisting Member States of ITSU in the establishment of national warning systems and improving preparedness for tsunamis for all nations throughout the Pacific Ocean; and, 4) gathering and promulgating knowledge on tsunamis and fostering tsunami research and its applications to prevent loss of life and damage to property. The warning systems provide information to mitigate the impact of tsunamis.

Figure 6-1. Tsunami Warning System in the Pacific.



Source: International Tsunami Information Centre (ITIC), [www.prh.noaa.gov/itic](http://www.prh.noaa.gov/itic).

### 6.8.4 Tsunami Capability

Table 6-11. Kaua'i County Capability and Capacity for Tsunami Threats.

Organization	Activity	Tools or resources
<b>Kaua'i County Civil Defense</b>	Primary agency responsible for coordinating emergency response, hazard mitigation plans, and recovery plans for catastrophic threats, such as tsunamis. Coordinated the update of tsunami inundation maps and the development of new evacuation maps, and conducted public outreach activities to inform the public of the updated maps.	
<b>Kaua'i County Planning Department</b>	Considers tsunami inundation and evacuation maps and risks for permitting shoreline development. Education and outreach activities about tsunami risk have been done and are ongoing by Economic Development, KVB, KIUC, KCDA, Sea Grant, FD through CERT, and Contractor's Association and County Fair (August) by Economic Development.	
<b>University of Hawaii Sea Grant</b>	Kaua'i County Office of Economic Development has worked with the University of Hawaii Sea Grant to engages in Community Education & Hazard Publication Distribution, through the purchase and distribution publications of the University of Hawaii, Sea Grant publications, <a href="#">Purchasing Coastal Real Estate in Hawaii</a> (SOEST 2006) and the <a href="#">Homeowner's Handbook to Prepare for Natural Hazards</a>	

	(SOEST, 2014) at any opportunity, including: community meetings, the annual Contractor's Expo, the County Fair and the front counter of the Planning Department.	
<b>International Tsunami Information Center</b>	The International Tsunami Information Centre has a public education program directed at coastal residents, their local officials, school teachers, the mass media, policy makers, and the general public. It includes lectures, audio-visual aids, seminars, posters, photographic displays, television and radio coverage, and publications. ITIC is supported by the National Weather Service, and both organizations have helped in designating the month of April as Tsunami Awareness Month annually, despite the fact that tsunamis occur without regard to season.	<a href="http://www.prh.noaa.gov/itic">www.prh.noaa.gov/itic</a>
<b>Pacific Tsunami Warning Center</b>	Monitors tsunami risk and provides warning information to the public.	<a href="http://ptwc.weather.gov/">http://ptwc.weather.gov/</a>
<b>NOAA Pacific Services Center</b>	The NOAA Pacific Services Center funded the development of a resource and planning guide for mitigation of tsunami risks. The <i>Pacific Island Tsunami Resilience Planning Guide</i> was published in 2009. It provides a good resource for planners, coastal managers, and disaster managers.	<a href="http://community.csc.noaa.gov/PRI/MO/index.php?option=com_docman&amp;task=cat_view&amp;gid=13&amp;Itemid=6">http://community.csc.noaa.gov/PRI/MO/index.php?option=com_docman&amp;task=cat_view&amp;gid=13&amp;Itemid=6</a>

## 6.9 Landslide Mitigation Actions

### 6.9.1 Landslide Mitigation Policies and Actions

The landslide risks in Hawai'i generally result from mudslides and rockslides, often during periods of heavy rainfall events. There have also been slides during seismic events. The mitigation actions focus on risks posed by both types of hazards.

The State Department of Transportation tries to address the landslide and rock fall problems through their maintenance budget. Mitigation techniques for the highest hazard sites identified include roadway realignment, cut corrected slope, rockfall protection canopy, mechanically stabilized slopes, and draped steel mesh.

The Department of Transportation preliminary mitigation plan includes:

- Installing additional warning signs along higher-priority rockfall sites.
- Installing lower-cost mitigation measures at smaller rockfall sites not on the top ten list.

Other rockfalls of concern at the State level are those that result from natural geological processes in land that is located in the interior of the islands, primarily on conservation land, although some of the slides have originated on privately owned lands. These types of slides have created liability issues for using trails, state parks, and other recreational resources. Private landowners are also being held responsible for impacted developments miles downhill from the origin of the rockslides. The state and the counties have currently been addressing these issues on a case-by-case basis; however, as these rockfalls seem to become more frequent and have greater impact on the economy and on the lives of citizens and visitors, the state recognizes the need to develop policies to address these issues.

Kaua'i Civil Defense, Department of Public Works, County Transportation Department and State DOT work together to identify and clear impaired roadways, since blocked roadways isolate communities, decrease access to critical resources, and impact the economy by preventing residents from reaching sites of employment and visitors from accessing tourist sites. In support of this, Community Plans and government policies must be developed to identify and mitigate landslide hazards and isolation risks to communities and to implement mitigation of landslide hazard risks to State Highways in Kaua'i. The State Department of Transportation Highways Division, including the Highways Division based in Kaua'i, faces continuous challenges to mitigate landslides on critical highway areas. Engaging community-based resilience groups, like that of Hanalei to Ha'ena, is one strategy that can be utilized for early warning and notification to government staff for expedited response and localized traffic control support.

## 6.10 Dam Break Mitigation Actions

### 6.10.1 Mitigation Policies and Actions related to Dams

***The National Dam Safety Program Act:*** On October 12, 1996, the Water Resources Development Act of 1996 (Public Law 104-303) was signed into law. Section 215 of Public Law 104-303 established a National Dam Safety Program and named the Director of the Federal Emergency Management Agency (FEMA) as its coordinator.

The purpose of the National Dam Safety Program, as expressed in Section 215(a) of Public Law 104-303, is to "reduce the risks to life and property from dam failure in the United States through the establishment and maintenance of an effective national dam safety program to bring together the expertise and resources of the federal and non-federal communities in achieving national dam safety hazard reduction."

#### ***State Dam Safety Program***

The state assistance program is intended to help states bring the necessary resources to bear on inspection, classification, and emergency planning for dam safety. Public Law 104-303 provides for the assistance program described below.

For a state to be eligible for primary assistance under the National Dam Safety Program, the state dam safety program must be working toward meeting the following criteria, as listed in Public Law 104-303:

- The authority to review and approve plans and specifications to construct, enlarge, modify, remove, and abandon dams;
- The authority to perform periodic inspections during dam construction to ensure compliance with approved plans and specifications;
- A requirement that state approval be given on completion of dam construction and before operation of the dam;

- The authority to require or perform the inspection at least once every 5 years of all dams and reservoirs that would pose a significant threat to human life and property in case of failure to determine the continued safety of the dams and reservoirs, and a procedure for more detailed and frequent safety inspections;
- A requirement that all inspections be performed under the supervision of a state-registered professional engineer with experience in dam design and construction;
- The authority to issue notices, when appropriate, to require owners of dams to perform necessary maintenance or remedial work, revise operating procedures, or take other actions, including breaching dams when necessary;
- Regulations for carrying out the legislation of the state;
- The provision for funds to ensure timely repairs or other changes to or removal of a dam to protect human life and property, and if the owner of the dam does not take the action described above, to take appropriate action as expeditiously as possible;
- A system of emergency procedures to be used if a dam fails or if the failure of a dam is imminent; and
- An identification of each dam whose failure could be reasonably expected to endanger human life, the maximum area that could be flooded if the dam failed, and public facilities that would be affected by the flooding.

#### **6.10.2 Public Education and Awareness related to Dams**

In addition to the inspections and repair and maintenance, the county has participated in numerous outreach and public awareness since 2006 to ensure that communities living downstream of the dams are aware of their condition and monitor the flow, especially during heavy rainfall events. Based on the experience with the Ko Loko dam breach, residents are encouraged to evacuate to shelters during period of high rainfall if a breach is suspect.

## 6.11 Hazardous Materials Mitigation Actions

### 6.11.1 Mitigation Policies and Actions for Hazardous Materials

**Hazard Evaluation and Emergency Response** - The mission of the State of Hawaii Department of Health Office of Hazard Evaluation and Emergency Response (HEER) is to protect human health, public welfare, and the environment and provide state leadership, support and partnership in preventing, planning for, responding to, and enforcing environmental laws relating to releases or threats of releases of hazardous substances, pollutants or contaminants. HEER is responsible for implementing the Hawai'i Environmental Response Law (HRS 128D) and the State Contingency Plan (HAR 11-451), as well as the Hawai'i Emergency Planning and Community Right-to-Know Act (HRS 128E).

The Voluntary Response Program (VRP) began in October 1997 and is designed to encourage participants to address environmental contamination on a voluntary basis, as well as to facilitate the productive economic use of contaminated properties. The program allows prospective owners and tenants to avoid environmental liabilities which they have not caused if they voluntarily clean up contaminated properties.

The Superfund Amendments and Reauthorization Act or SARA became law in 1986 (PL 99-499). A major SARA provision is Title III, or SARA Title III, also referred to as Emergency Planning and Community Right-to-Know Act (EPCRA). EPCRA established guidelines for Federal, State and local governments, and industry regarding emergency planning and providing communities with information on hazardous chemicals within their jurisdiction. The Hawaii Emergency Planning and Community Right-to-Know Act became law in 1993 (HRS 128E), and promulgated SARA Title III in the State of Hawaii.

A Hawai'i State Emergency Response Commission (HSERC) was formed and Kaua'i County, along with the other counties, was designated as an emergency planning district. A Local Emergency Planning Committee (LEPC) was established in each county. Functions of the LEPC include preparing a hazardous material emergency response plan, reviewing the plan annually, evaluating resources to mitigate an emergency, receiving emergency response notifications, and receiving and processing requests for information from the general public.

### ***Local Emergency Planning Committee Organization***

**State:** UH Public Health Program, Department of Transportation, Department of Education, Department of Agriculture, Department of Health

**Federal:** USCINCPAC, US Coast Guard

**Private:** Brewer Environmental Chevron, Healthcare Association of Hawaii, Tesoro Hawaii, American Red Cross, Hawaiian Electric, Hawaii Agricultural Research Center

**Committees:** Planning, Legislative, Hazard/Vulnerability Analysis, Community Awareness/Right-to-Know

***Oil Spill Emergency Response*** - The Hawai'i Oil Spill Center (HSC) is dedicated to Oil Spill Emergency Response preparedness, and is wholly funded by the Member Companies of the Clean Islands Council and the Marine Spill Response Corporation. The HSC is a combination training and response facility. As a training facility it can serve multiple training programs simultaneously. Training is conducted by the CIC, MSRC, the United States Coast Guard and the State of Hawai'i. Normal training includes courses in 40, 24, and 8 hour HAZWOPER, emergency oil spill response, first aid, fork lift, CPR and ICS training. Special training has included courses in wildlife rescue and rehabilitation, aerial observation, JIC organization and function, public relations during an emergency response, management systems training, terminal operator in charge training and other special USCG Strike Team training. The harbors are critical infrastructure for bringing in goods and services that support the economy and fuel storage sites are located near harbors. It is critical that

## **6.12 Homeland Security & Human-Induced Hazards: Mitigation & Risk Reduction Actions**

### **6.12.1 Mitigation Policies and Actions for Homeland Security**

The County of Kaua'i has considered issues of terrorism and homeland security in drafting this document because protecting public safety is high priority. The extremely serious scenarios of combined, simultaneous threats, both natural and human-induced, have been considered in the development of response and mitigation plans. In addition, the location of the Pacific Missile Range Facility in Kaua'i elevates the importance of county in defending the state from terrorist threats.

It is recognized that vulnerabilities experienced during natural hazards often highlight the dependence on critical facilities and emphasize the need for heightened security. Critical facilities analyses and terrorism/bioterrorism response plans have been developed for each county. Agencies with critical responsibilities have been incorporated into the planning process. The public has been educated as to the security alert status, where to find information, and what precautions should be undertaken. The State Civil Defense website,

<http://www.scd.state.hi.us/>, posts information related to both homeland security and hazard mitigation. The scope of these plans is not limited to one hazard, but targeted at reducing risks to multiple hazards.

**KCDA**—The Critical Infrastructure Program (CIP) needs to be integrated with hazard mitigation programs in the county, hazardous materials management in the Department of Health, and localized for protection at the county level. Some of these actions have been done, including the assessment of critical infrastructure. The local emergency planning committee previously put vulnerabilities on their public website, but this is now confidential. Following course exposure and completion by Plans and Ops Officer in 2013, FEMA CIKR protection training (AWR213 and MGT414) were brought to Kauaʻi in 2014, with further training set to occur in 2015.

KCDA continues to engage in public education, outreach, and partnerships. With limited staff in local agencies, agencies must be ready to deal with every aspect of disaster management. Partnering includes developing relationships with non-traditional institutions, agencies, commissions, retail, etc., and also working through the volunteer agencies to ensure the citizens and businesses are integrated with the emergency management community.

## **6.13 Disaster Risk Reduction and Mitigation Policies**

### **6.13.1 Land Use**

Land use policies are one of the primary ways to mitigate the impacts of natural hazards. Proper use and maintenance of the land helps to minimize disasters. The land provides natural resources, value, and assets to the lives of the people and wildlife and to the economy. To best protect these lands, the State of Hawai'i has classified lands into four categories for types of use: Urban, Rural, Agricultural, and Conservation. The Department of Land and Natural Resources Land Division is responsible for managing State-owned lands in ways that will promote the social, environmental and economic well-being of Hawaii's people and for insuring that these lands are used in accordance with the goals, policies and plans of the State. Lands that are not set aside for use by other government agencies come within the direct purview of the division. These lands are made available to the public through fee sales, leases, licenses, grants of easement, rights-of-entry, month-to-month tenancies or kept as open space area. Where acquisitions of privately-owned lands or lands owned by other government entities are required by the State for public purposes, the division is responsible for acquiring these lands through negotiations, condemnations or land exchanges. Besides maintaining an inventory of State-owned lands, the division serves as an office of record and maintains a central repository of all government documents relating to land.

The Commission must take into account the Kaua'i General Plan, which is updated every decade. Where applicable, the objectives, policies and guidelines of the State Coastal Zone Management Law (Chapter 205A, Hawaii Revised Statutes) should be considered. Kaua'i maintains responsibility over land classified as urban land and determines zoning within the urban districts. In order to develop land, land use permits must be obtained from the planning

and permitting departments. It is critical to ensure that hazard mitigation is incorporated into the Kaua'i County General Plan (ten-year plan, 2011-2020). The General Plan 2011 was completed with integrated hazard mitigation components, and the 2015 General Plan is underway currently, with plans to integrate current Community Plans as well as hazard mitigation and climate change recommendations of the [Kaua'i Climate Change and Coastal Hazards Assessment Sea Grant publication](#).

The county must continue to develop plans and policies that integrate national goals and initiatives for disaster risk management, and to ensure synergy in programs with limited resources and maximization of benefits from disaster funding and required programmatic implementation. This is still ongoing, and efforts continue to ensure compliance with NIMS.

### **6.13.2 Ahupua'a and Watershed Management, Wildfire & Natural Resource Management Measures**

Water has long been recognized as the most important resource of Hawaii's forestlands. Forested watersheds reduce the rain's erosive effects, prevent soil from washing into the ocean, increase infiltration rates into the soil, strip moisture from the clouds, and deliver a consistent and dependable source of surface and artesian water.

The mission of the DOFAW Watershed Protection and Management Program is to ensure water yields by protecting and enhancing the condition of Hawaii's forested watersheds to retard rapid run-off of storm flows, prevent and reduce soil erosion, and improve filtration rates. The Territory of Hawaii established one of the first forestry agencies in the nation in 1903, which had the authority to establish forest reserves for the protection of springs, streams, and other water supply sources. The State's long standing policy of watershed protection has resulted in dramatic improvements from the degraded conditions which prevailed at the turn of the century.

In March 2015, Community Fire Protection Planning meetings were held for Kaua'i communities, in order to gain input on the Community Wildfire Protection Plans (CWPPs). The CWPPs are being developed by the Hawaii Wildfire Management Organization, a 501(c)(3) nonprofit dedicated to protecting communities and natural resources from wildfire, in coordination with DLNR Division of Forestry and Wildlife and Kaua'i Fire Department. The updated CWPP Plan and Fire Risk Maps will be available later in 2015 and thus are not included in this Plan Update.

Management activities such as protective zoning, fencing, removal or control of feral animals, reforestation, and fire protection have reduced excessive erosion and loss of vegetative cover.

Management Activities:

- Prevent and suppress forest and range fires
- Conduct public hunting seasons
- Control livestock trespass in forest and natural area reserves

- Survey and control noxious plants, forest insects and diseases
- Reforest deteriorating and /or disturbed state watersheds
- Produce and distribute tree seedlings for windbreaks, soil erosion control, and watershed enhancement
- Promote, encourage, and advocate for incentives to encourage the maintenance and enhancement of key watersheds on private lands.

In Kaua'i, many communities have returned to ahupua'a management systems. Similar to the watershed management conducted by the state, community non-governmental organizations have developed similar strategies. One example of this is the Hanalei Watershed Hui (HWH) that has developed a watershed action plan and worked with the community to develop a Hanalei to Hā'ena: Community Disaster Resilience Plan (see Chapter 6 Appendix E). When looking at the strategies, many of them include integrating science and traditional practices in actions to reduce flooding, increase food security with gardening, and improve the environment by using integrated management approaches. The HWH website provides updates on weather, tides, surf, water quality, and river flooding to ensure that community members are safe and informed about local conditions. Even though HWH has not thought about their activities in terms of hazard mitigation, many activities contribute to risk reduction and build resilience for the impacts of disasters and for longer term climate change.

The County continues to encourage the integration of agricultural planning and coordination into the disaster risk management community, in order to improve local food security, sustainability and community resilience to hazards. Food security is critical for coping with disasters, where it may be weeks to receive goods and services on-island, as Kaua'i experienced with Hurricane Iniki in 1992; such food security resources, networks and capacities must also be coordinated with mass care sheltering and feeding activities.

### **6.13.3 Energy Management**

The State of Hawai'i Energy Council has outlined emergency operations procedures in their *Energy Emergency Preparedness (EEP) Program and Plan*. Authority for administering these procedures comes from the Hawai'i Revised Statutes Chapters 128 and 125C and administrative directives 95-02, the Civil Defense Policy. Under this policy the Energy Council's mission is to support emergency operations by coordinating activities necessary to facilitate the affected energy utilities' safe, rapid restoration to the commercial energy grid and provide temporary emergency generators to safely and rapidly provide and sustain electricity for essential and emergency facilities and services until the commercial energy utility service can be restored. The Energy Council will also facilitate the availability and adequacy of fuel supplies, storage, and distribution (State of Hawaii Energy Council (EC) Energy Emergency Preparedness Operations Outline, 1). The EEP is undergoing revisions.

Kaua'i recognizes its dependency on imported fossil fuels for its primary energy resources. Should a natural hazard occur that closes the ports on each island, there will be a disaster. Alternative energy sources are especially important to be able to sustain power at critical facilities and to plan for an event where Hawai'i becomes cut off from the world due to natural

hazards or security issues. Kaua'i, along with the other counties, is exploring the development of renewable energy resources and conversion of vacated sugar lands for conversion to ethanol production. Building energy self-sufficiency will enable the county to develop resilience to the impacts from disasters.

In support of the hardening of the electrical distribution supply to Kaua'i Veterans Memorial Hospital, as the Wilcox Hospital currently has a generator, for which KIUC installed an automatic transfer switch for continued generator substation power. In addition, there is an emergency electrical backup supply to customers in Koke'e area. Some Federal funding was received from PMRF (year unknown) to provide general increased electrical service up to 7 miles of the 11.5mi. Koke'e area, providing service to half of Koke'e.

#### **6.13.4 Data and Information Management**

Data and information management for hazard information has been a priority concern in the County of Kaua'i and the State. Currently several working groups have formed to determine protocols for data sharing, transfer, and use. They have also tried to reduce redundancy and pursue collaborative projects where the cost burden for data acquisition, such as satellite imagery, can be shared. The Hawaii Integrated Geographic Information Systems Coordinating Council (HIGCC) has developed a strategy with input from federal, state, and county agencies for mapping coordination. The Kaua'i GIS and data coordinator participates in the state and regional committees.

Following the development of the 2003 Kaua'i Multi-Hazard Mitigation Strategy, NOAA Pacific Services Center assisted Kaua'i County in developing a web-based tool for sharing GIS data among county agencies and organizations. Funds from FEMA grants and from the County supported a full-time staff person for the County GIS Program. The tools and GIS program improved the ability of the planning department to check for potential hazards when issuing permits. These data gathering and storage efforts have contributed to the development of the hazard mitigation plans by providing good base information on which to assess risk and vulnerability. These efforts need to be continued and improved as new technologies emerge. The GIS databases are an essential element of the updated hazard mitigation plans. As part of the 2015 Plan Update, Kaua'i County GIS program updated and prepared maps for this plan.

#### **6.13.5 Partnerships**

Reducing the impact of hazards occurs at many different levels in many different categories, and therefore, needs to involve multiple sectors, organizations, government agencies, and communities in mitigation. The State Hazard Mitigation Forum was formed based on this concept and this has extended into the Kaua'i Disaster Management Committee (DMC). It is important to involve many perspectives and knowledge to better develop sustainable hazard mitigation strategies. Mitigation success stories usually involve partnerships of critical facilities and organizations. One of the examples of this occurred at the 2009 annual Building and Home Show conducted by the Contractors Association of Kaua'i (CAK). CAK arranged for free booth space for county agencies to demonstrate hazard mitigation activities. Hawaiian Telcom provided wireless internet access, which further enabled the Flood Coordinator to sit with

individual residents and discuss their flood risks using KOHA. Once people understood their flood risks, they inquired about ways to reduce the risk, such as buying flood insurance. CAK similarly provided such opportunities at the Home Show for the past decade, and in support of the 2015 Update. Participation in the Annual Home Show in April 2015 provided the opportunity for the new KCDA Managing Director to interact with the public while providing a DRAFT review of Kaua'i County's Multi-Hazard Mitigation and Resilience Plan, 2015 Update. The community asked questions about their risk and were given information on how to provide feedback for the plan.

**6.13.6 Public Awareness and Education**

Ensure widespread awareness for reducing disaster risks and mitigating impacts of hazards in policies, planning, and program implementation. Has continued. Additional staff for KCD. Encourages training of personnel and communities.

The Hawaii State Hazard Mitigation Forum recognizes that for mitigation to happen in Hawaii, the local residents must become responsible for their homes and surroundings and must know how to respond to disaster threats. Incentives must be created through insurance rate reductions to encourage mitigation. For the public to take action and responsibility, the public education and awareness must be instilled.

As demonstrated in the public meetings listed in Chapter 2, Kaua'i County understands the importance of public awareness. A website was launched in 2001 (since replaced with [http://www.kauai.gov/Portals/0/Civil\\_Defense/HazardMitigationPlan/KauaiPlan.html](http://www.kauai.gov/Portals/0/Civil_Defense/HazardMitigationPlan/KauaiPlan.html)) that enables people in each county to look at their hazard risks and consider mitigation actions for each hazard. The Kaua'i Online Hazard Assessment (KOHA) tool that NOAA helped develop for Kaua'i County provides another outreach tool. Additional reports and information have been placed in local public libraries, including maps for reviewing flood zones.

The following table describes education and capacity building mitigation actions, examples implemented in the state, and the results of mitigation actions. The examples and results described in this table demonstrate the county's commitment to education and awareness for hazard mitigation.

**Table 6-12. Education and Capacity Building Mitigation Actions.**

	Mitigation Action	Types of Activity	Examples of Activity in Hawaii	Results
1	Education/ Training	Offering workshops and seminars for public officials and employees, personnel of state agencies, and the general public	Presentations on the results of wind-speed up studies for changing building codes to county officials (July 2004). Hazard Mitigation Planning briefings for each county (2001 – 2004). Showing briefings and workshops on public television (all counties during planning processes)	Increased public awareness and support for mitigation planning and policies. A process has been established to conduct mitigation activities at all levels in the state. Capability has increased in the state and in all counties.

		Developing pamphlets, brochures, and other literature	The Statewide Public Awareness Campaign in Hawaii, as part of the Hawaii State Hazard Mitigation Forum, has involved federal, state, and county agencies and the private sector in developing public awareness materials, brochures, and a website ( <a href="http://www.kauai.gov/Portals/0/Civil_Defense/HazardMitigationPlan/KauaiPlan.html">http://www.kauai.gov/Portals/0/Civil_Defense/HazardMitigationPlan/KauaiPlan.html</a> ) and has distributed these extensively throughout the state at public events, through media, and other forums.	During a public survey about awareness conducted by a private firm, it was noted that high numbers had some awareness of the terminology and of mitigation actions that could be taken to reduce hazards.
II	<b>Commitment and Capacity Building</b>	Organizing community groups and conducting team-building exercises	The Red Cross organizes community preparedness teams. During the mitigation planning in Maui County, the community of East Maui organized a disaster preparedness fair in conjunction with their local planning efforts.	Community groups, especially isolated communities, have developed on-the-ground preparedness and response plans to address local needs and issues.

### 6.13.7 Communications

KFD’s Command Vehicle & Portable Headquarters provides a secure area to perform incident command functions in the event of a disaster or major incident. This vehicle may also be used to maintain functionality of Fire Headquarters in the event that the permanent Headquarters is damaged, in support of the COOP Plan. Critical public safety operations will be able to continue, allowing first responders and other public safety employees to assist the community and themselves during crises. Through KCD grant support, the KFD Mobile Command and Communications Vehicle (MCCV) was purchased. The 4-wheel drive van package contains an interoperable communications gateway device, along with a portable repeater package and satellite capability, both fixed and via Broadband Global Area Network (BGAN) units.

KFD also now has Handheld Portable Radio for Every First Responder, providing a handheld portable radio for each 1st Responder helps ensure their safety while responding to hazardous conditions. Everyone will immediately receive the evacuate notice or other types of warnings without having the delay of waiting for the person with the radio to notify them. This initiative has continued via both County General Fund and KCD-administered DHS grant funding.

### 6.13.8 Inclusive Disaster Risk Reduction, Comprehensive Disaster Resilience

Regarding next steps in support of more integrated disaster risk reduction across the disaster cycle of preparedness, mitigation, response and recovery, the County needs to develop a post-disaster recovery plan. Such a plan should incorporate mitigation and risk reduction considerations to better enable mitigation objectives in rehabilitation and reconstruction, and to prevent additional risk-generation and hazard exposure from improper development, land use, or further environmental degradation during the chaos of post-disaster recovery.

This will enable policies and programs to be identified ahead of time so that when a disaster occurs, time will not be wasted in determining the best course of action. This has been

developed in segments, with regulations in the planning department. The effort is ongoing with hope of the development of a comprehensive recovery plan following the General Plan update cycle. One of the UH Sea Grant technical studies recommends a Post-Disaster recovery plan, and the county will be looking to Maui County once their Recovery Plan (the first in the State) is finished.

Because the County of Kaua'i has been engaged in disaster risk reduction measures, the county has developed a strong capacity for mitigation planning and action. As described in the final table for this chapter, Table 6-13 Kaua'i County Capability and Capacity Assessment, the agencies and organizations in the county have considerable responsibility and knowledge that contributes to risk reduction. Mitigation is being incorporated into operations and daily activities of organizations.

**Table 6-13. Kaua'i County Capacity and Capability Assessment.**

Agency Name (Mission/Function)	Programs, Plans, Policies, Regulations, Funding or Practices	Point of Contact	Effect of Loss Reduction			Comments
			Support	Facilitate	Hinder	
<b>County of Kaua'i</b> <b>Office of the Mayor</b>	<b>Holo Holo 2020 Projects:</b> Includes improvements in transportation, access to transportation, park improvements, home construction, alternative energy, agriculture, irrigation systems, and cultural site restoration	Office of the Mayor 1-808-241-4900 <a href="http://www.kauai.gov/Government/OfficeoftheMayor/tabid/132/Default.aspx">http://www.kauai.gov/Government/OfficeoftheMayor/tabid/132/Default.aspx</a>	YES	YES		The Holo Holo 2020 projects support improvements toward building stronger communities, and ultimately increasing resilience.
<b>Department of Public Works – Division of Building</b>	<ul style="list-style-type: none"> <li>▪ Name of standard building code-UBC 1997 (with highway appendices), adopted-1999</li> <li>▪ Prescriptive provisions for dealing w/light wood frame and masonry construction in high wind areas-Yes</li> <li>▪ Minimum wind speed in code-80 mph</li> <li>▪ Compliance required for self-built structures-Yes</li> <li>▪ Required building plans for single &amp; multi-family structures needing permits-Yes</li> <li>▪ Permitted structures requiring no plans-None</li> <li>▪ Required stamp by architect or engineer on plans-Yes</li> <li>▪ Exceptions to stamp requirement-1 story: \$40K; 2 stories: \$435 K</li> <li>▪ Inspections performed by government employed building inspectors-Yes</li> <li>▪ Approved non-government building inspectors-Special inspections in 1997 UBC, but not rigidly applied.</li> <li>▪ Building permit fees required-Yes</li> <li>▪ Rate of permit fees-Scaled for residential from \$10 for ≤ \$500 up to \$516 for first \$100 K plus \$3 per \$1,000</li> <li>▪ Number of structural inspections for single family dwellings-6</li> <li>▪ Points in construction process for various inspections- foundation slab\flooring, framing, load path\up lift ties, gypsum board\bath, final</li> <li>▪ Version of codes adopted-2003 IBC in 2005</li> <li>▪ Adopted more recent versions of standard building codes – State Codes IBC 2006 –in 2010; conducting study to update wind risk into code, then will be able to adopt IBC 2012 (by 2017)</li> <li>▪ NFIP minimum standards as part of permit system-Yes</li> <li>▪ Administration of NFIP minimum standards-Building permit; Certificate of Occupancy; permit reviews; flood certification; penalties for non-compliance</li> </ul>	Doug Haigh, Chief of Building 241-4849	YES	YES		The Building Division has completed many hazard mitigation projects over the last 20+ years. The Wind Risk maps have been updated, and as soon as the final documents can be prepared, they will be able to upgrade the building code to IBC 2012. Work on improving
<b>Public Works - Division of</b>	<ul style="list-style-type: none"> <li>▪ NFIP standards (Ch.27, HI City Code)</li> <li>▪ Kaua'i Online Hazard Assessment tool (KOHA)</li> </ul>	Stanford Iwamoto,241-4896	YES	YES		The County is working on finalizing problems

<b>Engineering, Flood Coordinator</b>						with repetitive loss properties to enable CAV, and participation in the CRS by 2017
<b>Planning Department</b>	<ul style="list-style-type: none"> <li>▪ Coastal Zone Management</li> <li>▪ Shoreline Erosion and Setbacks</li> <li>▪ Rim Lot Setbacks</li> <li>▪ Permits for Development</li> </ul>	Mike Dahilig, Director, 241-6677 Dee Crowell, Deputy Director	YES	YES		One planner sits on the State Hazard Mitigation Forum and participates in the State Ocean Resources Management Plan Disaster and Climate Change Working Group
<b>Coastal Zone Management</b>	<ul style="list-style-type: none"> <li>▪ Kaua'i Shoreline Erosion Management Study</li> <li>▪ Aerial Photograph Analysis of Coastal Erosion</li> <li>▪ Shoreline Erosion Assessment</li> </ul>	Mike Dahilig, Director, 241-6677 Dee Crowell, Deputy Director	YES	YES		
<b>Civil Defense</b>	<ul style="list-style-type: none"> <li>▪ Hazard Mitigation Planning</li> <li>▪ Response and Evacuation Planning</li> <li>▪ Convenes Disaster Mitigation Committee and Utility Response and Coordination Committee</li> <li>▪ Recovery Planning</li> </ul>	Elton Ushio, Civil Defense Manager, 241-1800 Mark Marshall	YES	YES		
<b>Solid Waste/Division</b>	<ul style="list-style-type: none"> <li>▪ Disaster Degree Action manual being compiled</li> <li>▪ Debris management</li> </ul>	Solid Waste, Troy Tanigawa, 241-4838 <a href="mailto:ttanigawa@Kaua'i.gov">ttanigawa@Kaua'i.gov</a>	YES	YES		
<b>Wastewater/Division</b>	<ul style="list-style-type: none"> <li>▪ Drainage plans</li> <li>▪ Water treatment and reclamation</li> </ul>	Edward Tschupp Wastewater, 241-4084, <a href="mailto:etschupp@kauai.gov">etschupp@kauai.gov</a>	YES	YES		
<b>Water Department</b>	<ul style="list-style-type: none"> <li>▪ Ensure resource availability</li> <li>▪ Water Quality</li> <li>▪ Conservation</li> <li>▪ Drought Mitigation</li> <li>▪ Oversight by the Water Board</li> </ul>	Kirk Saiki, General Manager, (808) 245-5400	YES	YES		
<b>Housing Department</b>	Affordable public housing	Kamuela Cobb-Adams 241-6445	YES	YES		
<b>Information Services</b>	<ul style="list-style-type: none"> <li>• GIS database of county assets</li> <li>• Hazard Layers: flood, tsunami, wind risk, erosion</li> </ul>	Department of Finance, 241-6523	YES			
<b>Fire Department</b>	<ul style="list-style-type: none"> <li>▪ Wildfire Response</li> <li>▪ Emergency Response (all-hazards)</li> <li>▪ Public outreach and education on hazard mitigation</li> </ul>			YES		
<b>Police Department</b>	<ul style="list-style-type: none"> <li>▪ Emergency Response</li> <li>▪ Security</li> </ul>	Chief of Police (808) 241-1711		YES		
<b>Kaua'i Island Utilities Cooperative</b>	<ul style="list-style-type: none"> <li>▪ Services for the island</li> <li>▪ Exploration of hardening critical facilities and infrastructure</li> <li>▪ Redundant systems for critical facilities</li> </ul>	<b>Carey Koide</b> T&D Manager, Kaua'i Island Utility Cooperative		YES		

		4463 Pahee St., Suite 1 Līhu'e, Hawaii 96766 (808) 246-2349				
<b>Telecommunications</b>	<ul style="list-style-type: none"> <li>▪ Telephone communications via landline</li> <li>▪ Wireless communications</li> <li>▪ High-speed internet</li> <li>I-NET fiber optic connections</li> </ul>	Hawaiian Telcom, AT&T Wireless, 327-9300 Nextel, 331-1600 T-Mobile Oceanic Time Warner Cable		YES		
<b>State Department of Land and Natural Resources (DLNR)</b>	<ul style="list-style-type: none"> <li>• Ocean and Coastal Lands Program – erosion, shoreline protection, and sea level rise</li> <li>• Engineering Division – NFIP program, Dam Safety</li> <li>• State CZM – coordination with county CZM</li> <li>• Department of Forestry and Wildlife – protection from rockfalls, wildfire protection, drought mitigation and water development</li> </ul>		YES	YES		
<b>U.S. Army Corps of Engineers</b>	<ul style="list-style-type: none"> <li>▪ Kikiaola Harbor –completing construction documents</li> <li>▪ Nāwiliwili Harbor - feasibility start pending agreement with State</li> <li>▪ Hurricane Evacuation Study – coastal inundation and vulnerability components (with FEMA)</li> <li>▪ Hardening of the Kaua'i War memorial Convention Hall (emergency shelter) (MAP)</li> <li>▪ Survey of buildings and hotels for emergency shelters (MAP)</li> <li>▪ Project Ho'omalulu (HMGP)</li> <li>▪ Hardening essential facilities (HMGP)</li> <li>▪ Hardening Anahola Community Center (emergency shelter) (HMGP)</li> <li>▪ Hardening Pepe'ekeo Radio Relay Facility (HMGP)</li> <li>▪ Levee repairs – Hanapepe and Waimea</li> </ul>	USACOE, 438-8880	YES			

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