

**Hanalei Community Resilience Research & Planning Project**  
**Preliminary Report of Findings – Government Sector**  
**Prepared by: Sarah Henly-Shepard, Research Assistant, HCEP**  
**Prepared for: Neal D.J. Fujii, State of Hawaii Commission on Water Resources Management**  
**& Other Government Officials**  
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**Introduction to Research**

**Purpose of this Report:** To enhance multi-hazard and drought mitigation plans to strengthen resilience of communities and government to cope with impacts from drought and develop food security alternatives.

**Synopsis of NIDIS NOAA Research Goal:** Identify populations, communities, sectors and livelihoods at risk of climate change related hazards including drought, in order to inform long-term strategies through policy, planning and programs to increase food and water security and reduce social and economic vulnerability of Hawaii residents to such hazards.

**Introduction to Research Project**

**Purpose:** The State of Hawaii and its counties have well-developed drought mitigation plans that identify hazard risk, monitoring activities, and projects to mitigate natural hazards; however, plans could be improved by identifying communities and livelihoods at risk and by integrating results of socioeconomic risk analyses into mitigation activities, including response and sustainable long-term planning and land use options for decision makers.

**Synopsis of NIDIS NOAA Research Goal:** Identify populations, communities, sectors and livelihoods at risk of climate change related hazards including drought, in order to inform long-term strategies through policy, planning and programs to increase food and water security and reduce social and economic vulnerability of Hawaii residents to such hazards.

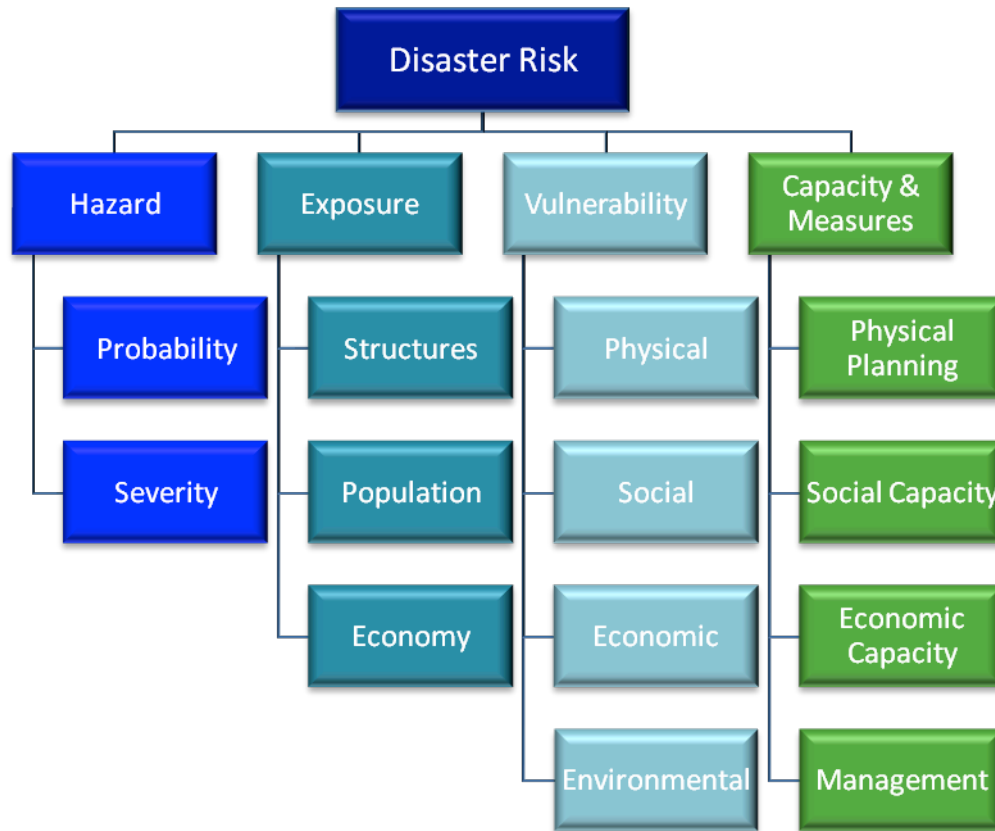
**Research Framework**

**Framework: *Drought Disaster Resilience: A Multi-Sectoral Participatory Approach.*** The World Conference on Disaster Reduction “Hyogo Framework for Action 2005—2015” defines disaster resilience in the following declaration: “the starting point for reducing disaster risk and promoting a culture of disaster resilience lies in the knowledge of the hazards and the physical, social, economic and environmental vulnerabilities to disasters that most societies face.”<sup>1</sup> Therefore, in addition to the fields of natural resource management, agro-ecology and hydrology, drought resilience research, plans and policy must carefully measure and develop the socio-economic, or social, cultural, livelihood and other related factors alongside the

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<sup>1</sup> UN, 2005. (pp 10) Davison, 1997; Bollin et al, 2001: 67. Taken from Measuring Vulnerability to Natural Hazards—Towards Disaster Resilient Societies. Edited by J. Birkmann. 2006

communities affected. The consideration, promotion and development of such assets of a community are critical to fostering sustainable development and disaster resilience<sup>2</sup>.



**Figure 1. Conceptual Framework to Identify Disaster Risk<sup>1</sup>**

This framework constitutes the basis of the study approach. In addition, several of the indicators mentioned will be employed in the community surveys, workshops and other tools to gain a broad and multi-disciplinary perspective of current community vulnerabilities to drought as indicators of critical gaps in hazard resilience.

**Approach**

Key gaps in current drought mitigation plans have been recognized in the areas of climate change risk and vulnerability (food and water security), socioeconomic risk and resiliency factors (demographics, poverty, livelihood alternatives, and health), as well as secondary impacts to sectors such as the tourism industry, including hotels and resorts. This project proposes to engage in community-based participatory research and planning to fill these information gaps, through collaborating with local drought mitigation and policy efforts, and ultimately fostering the development of sustainable, drought resilient communities.

<sup>2</sup> State of Hawai'i Multi-Hazard Mitigation Plan, 2007. State Assets 4-49.

Within this context, this research engaged in a community-based resilience research project in Hanalei, Kauai conducting household surveys and key informant interviews with the goal to **Understand, measure, and increase disaster resilience and adaptive capacity of people and the environment of Hanalei, through the following objectives:**

- 1) Identifying vulnerable and resilient populations & areas in Hanalei
- 2) Conducting a Gap Analysis between resources and needs, in order to create a community-based long-term Resilience/Recovery Plan to reduce social, economic & ecological vulnerabilities to hazards
- 3) Incorporating this information into governmental drought & multi-hazard plans as well as other community resilience plans

### **Data Collection**

Key informant interviews were conducted for community leaders from March to October 2010. Household surveys were conducted from August 2010 – October 2010 by Sarah Henly-Shepard (HCEP) & Gabrielle Sugar (Impact Assessment, Inc.), and took an average of 20 minutes to complete. Surveys were conducted for both vacationers (2 page survey) as well as long-term residents (full survey). A total of 279 houses were visited, and if no one was home or they were unable to do the survey when approached, those houses were visited a second time as well as were given a flyer to complete the survey online at their convenience. Of the 279 houses visited, only 82 houses had someone home, including 60 residents as well as 22 vacation rentals. The decline rate was relatively low, with nearly 62% (37/60) of long-term residents and 91% (20/22) of vacationers completing the survey. The majority of houses (70.6%) visited were unable to be surveyed, due to 28.3% (79/279) inaccessible and 42.3% (118/279) with no one home, which raises critical issues with adequate representation of the diverse community interests and needs.

### **Introduction to Hanalei**

Pacific Island communities have always been prone to many natural hazards, and are at heightened risk of hazards associated with climate change. In Hawai'i, for example, climate change is predicted to increase the frequency and intensity of natural disasters such as droughts, floods and possibly hurricanes. Hanalei is geographically isolated, sitting at sea level in a valley surrounded by sharp mountains where the only exits are one-lane bridges that are closed in event of flood, tsunami & hurricanes, making expeditious evacuation difficult if not impossible. Seasonal flooding is expected and is part of life in Hanalei. However, changes in the intensity and duration of rainfall have caused acute damaging floods and these events are being studied. There are stories of some local folks tell that speak of " being caught in the waters" because the flood came so fast and from a different direction.

Hurricane Iniki in 1992 was the most recent threat to hit Hanalei hard. While the island of Kauai was ill prepared for this storm, Hanalei residents adapted and coped well during and after the hurricane, showing strong resilience due to close familial and social support networks, self-organizing and self-sufficiency, material preparedness and experience and knowledge of past disasters. Therefore, much external disaster relief aid was turned away by community members

and social and economic recovery was quickly renewed. Since Iniki however, Hanalei has experienced many drastic demographic, social, environmental and economic changes that many community members fear have weakened its resilience & adaptive capacity. These shifts have lead long-time residents to question whether the traditional knowledge and practices that once preserved ecosystems and provided community resiliency, still remain. Much of the “development” and tourism in Hanalei has drastically altered the environmental, economic and demographic characteristics of the area, creating community fracture. Small family homes have been replaced by gated vacation rentals, reducing the number of permanent and long-term residents and replacing them with temporary vacationers or empty residences. There is much concern that while contributing in part to the local economy, these vacationers are ill prepared for natural hazard events and will thus be a burden on local people and resources in the event of a disaster or common flood.

### **Key Findings of Household Survey**

The household survey incorporates questions to gain quantitative & qualitative data around the disaster risk framework indicators mentioned to gain a broad and multi-disciplinary perspective of current community vulnerabilities as indicators of critical gaps in family & community-level hazard resilience. The following is a summary of the results.

### **Coping & Adaptive Capacity**

*This section is to understand coping & recovery capacity to climate-related impacts and natural hazards.*

**Vulnerable Sectors** *Identifying sectors most affected (e.g. ag) assessment of adaptive capacity and drought perception*

- Agriculture
- Subsistence Fishing

Nearly 41% (n=15) of residents surveyed fish, including 56.8% that fish in the bay, while the majority 86.7% (13) fish for subsistence means or personal consumption by immediate or extended ohana; and only 13.3% (2) sell their catch 92.9% of which stays in the community. Only 3 residents report being farmers as main livelihood (taro) 10 to over 20yrs experience; two do not think drought has affected their livelihood while one does, reporting crop death and loss, less availability of rainwater and loss of productive cropland.

### **Vulnerable Populations**

- Tourists
- Elderly and disabled
- Some long-term residents without experience/knowledge of disasters

Of the tourists surveyed (n=20), 90% are from the mainland U.S. and 10% are from other countries. Regarding length of stay, 25% stay less than a week, 30% stay 1 to 2 weeks, 30% stay 3 to 4 weeks, and 15% stay more than 4 weeks. Hanalei has both new and many long time repeat vacationers, with 37% reporting this is their first stay in Hanalei, 21% have visited 1 to 2 years; 5% 2 to 5 years, and 37% have been coming to Hanalei for over 5 years (many reporting

having come for decades). 85% of tourists consider Hanalei to be a tourist area, 45% consider themselves to be part of the community (mainly those who are long time repeat visitors).

### **Vacationers Disaster Preparedness**

Regarding disaster preparedness, 70% report they are not prepared in event of a natural disaster and 90% report they would not be able to support themselves and their family, and they would need to turn to the community for support. This indicates that this population is highly vulnerable to natural disasters. Comments from tourists on what they need to increase their disaster preparedness include needing information on evacuation routes and what to do in the event of a disaster as well as general information on Hanalei's geographic risk to hazards. Although homeowners of vacation rentals are supposed to provide binder of emergency information, none of the vacationers reported having been alerted to or seeing this information, indicating it is often not displayed or presented properly to visitors.

### **Resilient populations**

- Locals & long-term residents

**High levels of material preparedness and access to the following resources:** farmland (32.4%) & gardens (59.5%); livestock (24.3%); land ownership (21.6%); house ownership (54.1%); stocked food & water supplies (67.6%); generators (29.7%); emergency kits (73%); family emergency plan (70.3%), car, truck or ORV (81.1%), tractor (10.8%); and a safe place to evacuate to (83.8%).

**High coping capacity with:** high levels of disaster experience & knowledge (100% residents have experienced at least one disaster event in Hanalei) and a general acceptance of natural hazards as a part of life in Hanalei (self-reported); access to social support networks (73%); and community resource sharing (45.9%).

**High adaptive capacity with high knowledge levels of:** survival skills (self-reported), traditional ecological knowledge (45.9%), gardening/farming (64.9%), raising livestock (18.9%), hunting (45.9%), emergency preparedness (64.9%), traditional medicine (43.2%), construction (62.2%); diversity of livelihoods and general resourcefulness (self-reported).

### **Perceptions of Community & Disaster Preparedness**

*The purpose of this section is to understand communities' perceptions of "community," their expectations & willingness to help themselves each other, and to understand communities' awareness & perceptions of planning and preparedness for climate-related hazards (household, community & government/institutional)*

Of the residents surveyed (n=37), 21.6% (8) are originally from Hanalei, 2.7% from Kauai (1), 70.3% (26) are from the mainland U.S. and 2.7% (1) are from another country. Concerning **longevity of residence**, 56.8% have lived here for more than 20yrs, 13.5% for 10 to 20 years, 8.1% for 1-5yrs and 2.7% (1) less than 1 year. Of those not from Hanalei, 75% moved there

primarily for environmental reasons. Residents describe Hanalei as a rural, tourist area with some traditional/ahupua'a characteristics still in tact such as fishing and taro farming.

The influx of new residents & vacationers over the past few decades as a result of gentrification, with 73% of the population not from Hanalei or Kauai & 86% of the population is Anglo, and the transition of long-term housing to vacation rentals appears to have created a long-term effect of severing social-ecological linkages at the community level by diminishing the proportion of residents that have detailed knowledge of the region's ecosystems and resources as well as fracturing sense of community and social networks that prove critical during disasters.

### **Residential Disaster Preparedness**

In the event of a natural disaster, 77.1% of residents report they are prepared (e.g. having stocked supplies, a family plan, etc.), while 17.1% report they are not prepared and 5.7% report they don't know. Regarding whether residents feel knowledgeable enough about natural disasters in order to prepare and adapt, 91.9% do feel they are knowledgeable while 8.1% do not. Gauging preparedness and willingness to support others in the community in the event of a natural disaster, 2.7% report they will need to turn to the community for support, 27% report they can and will support themselves and their family, 24.3% report they can and will support themselves, their family as well as their neighbors, 21.6% report they can and will support themselves, their family and the community at large (including other residents), 21.6% report they can and will support themselves, their family and anyone in need of assistance (including other residents as well as vacationers), and 2.7% don't know.

These findings indicate that Hanalei residents have strong levels of knowledge and understanding of disasters to prepare and adapt, however some lack the material preparedness. In addition, despite some sense of community fracture, there is high ability and willingness to help neighbors, community members and tourists in time of disaster, which indicates high level of desire to support fellow community members in a time of need, an attribute critical to social cohesion, adaptation and recovery.

A little over half (54.1%) of residents feel Hanalei is prepared as a community, the following is a summary of the key elements residents feel build and compromise their community's resilience. Residents were asked why they felt Hanalei was or was not prepared, and the qualitative responses were categorized into themes in Appendix B along with other feedback.

Most residents (91.9%) know of community meeting areas or safe places to evacuate to in the event of a disaster, and of them 87.5% would use these routes or places (some preferring to shelter in place), whereas 8.1% do not know of such places, indicating that more community education and awareness is needed to increase knowledge of evacuation routes and locations and resources of evacuation and hurricane shelters.

In addition, 78.4% of residents know of community resources, groups or organizations that can assist in the event of a disaster, and 81% of them would use these resources; 19% would not as

they feel sufficiently prepared. Of the resources, groups or organizations mentioned that helped previously in disasters, residents listed: the American Red Cross, CERT teams; churches; government; the Fire Department; Hanalei Community Association; FEMA; schools; lifeguards; food banks; National Guard; Civil Defense; Lion's Club; Army; local restaurants; the community center; and neighbors.

Hanalei residents do not have much community or neighborhood representation (e.g. government, elders, community representatives, grassroots groups) that speaks on their behalf, with 73% reporting no representation. Residents did not seem to believe this was a negative thing but more of a personal preference of autonomy, which perhaps speaks to the fact that many Hanalei residents pride themselves on being independent and self-sufficient, although there is clearly a portion of the population that is actively involved in community activities.

### **Perceptions of Risk & Vulnerability**

*This purpose of this section is to understand communities' perceptions of and experience with risk/vulnerability to climate-related hazards.*

All residents reported they think Hanalei is affected by natural hazards, with the following hazard types identified as being of concern to residents (they selected all that apply) 8.3% Climate change; 16.7% Sea level rise; 5.6% Earthquake; 97.2% Tsunami; 77.8% Flooding; 11.1% Severe weather; 11.1% High wind events/tornados; 94.4% Hurricanes/Typhoons; 16.7% Drought; 2.8% Wildfires; 0.0% Volcanic eruptions/VOG. Of these hazards, tsunami, hurricane and flooding were those of greatest concern to residents.

### **Drought Impacts**

Of those that listed drought as a hazard of concern, 33.3% recall experiencing it once, 22.2% 2 to 3 times, 0% 4 to 5 times, 11.1% 6 to 7 times and 33.3% don't know; 43% remember hearing stories of drought, and 50% feel these stories and experiences better prepared them to respond or adapt to drought. The following are areas in which they feel drought has affected them and/or their community (they selected all applicable categories): 20.0% agriculture (crop loss); 20.0% wildfires; 20.0%; water scarcity/water rationing; 80.0% change in rainfall amount/patterns; 20.0% change in temperature; and 20.0% Jobs/livelihood. Qualitative feedback of how drought has impacted the community included the following: prolonged dry spells, less rain killed fruit trees; usually have garden but this year don't because too hot and dry; what does grow is growing faster; not as much fruit on trees; don't water lawn so turns brown if there's a drought (rain comes down through river); the north shore is still wet compared to the rest of the island; extreme drought is happening but residents don't know how it's affecting things; and poorer water quality due to less rain. The recommendation was made that planning and permitting procedures need to take into consideration water resource issues with regards to climate change and drought.

### **Other Hazard Impacts**

Of the other hazards listed, residents reported that the following aspects of family or community were affected: 6.9% agriculture (crop loss); 6.9% cattle (cattle death); 20.7% water

scarcity/water rationing; 13.8% change in rainfall amount/patterns; 41.4% loss of life; 69.0% loss of property; 69.0% jobs/livelihood; 62.1% school/community facilities; 20.7% public health; 13.8% Social; 6.9% Culture; 31.0% Environment; 10.3% Well-being; 44.8% Food/water insecurity, and; 3.4% Recreation. Additional aspects of community that residents reported are affected by hazards include: disasters bring people together; when kids don't go to school, it affects parents and their ability to work or rebuild; infrastructure concerns include access to evacuation routes & food/water hard to access; long term water scarcity is of concern; sea level rise can impact the water table affecting growing taro crops and if this happens and its not green anymore it wont attract tourists; isolation, road closures, transportation and evacuation issues; emotional/psychological issues; power; shelter; looting and crime; and garbage pickup. Experience recall of these hazards ranges from once (18.5%) for residents who are newer to Hanalei, to 2 to 3 times (25.9%), 4 to 5 times (14.8%), 18.5% more than 7 times and 22.2% unsure of how many times they have experienced these hazards. Residents report high level of hearing stories of these hazards (93.5%). Collective knowledge gained from hearing stories as well as direct experiences of these hazards better prepared residents (91.2%) to adapt. Many residents were in Hanalei or on Kauai for Hurrricanes Iniki & Iwa as well as many big floods, so residents are used to natural hazards and accept this risk as a tradeoff of living in a rural area with isolation and access issues. During floods and other hazards, most residents stay and shelter in place. After larger disasters such as Hurricane Iniki, people cook food from freezers and fridges collectively (before food can spoil), trade and share crops and livestock as well as water, shelter and electricity with neighbors. From Iniki, residents have learned to always have on-hand stocks of food, water and gas as well as a stove, generator, wood and other materials for boarding up homes. Floods are generally not seen as a threat but rather as a part of life in Hanalei; people often stay at home and have valued stuff ready to take in case of an evacuation. For tsunami scares, many residents often take these seriously and evacuate Hanalei for higher ground, but not all evacuate. Some residents still feel there is a core network long-term residents still in Hanalei that helps adaptation and recovery efforts.

### ***Organizations & Community Involvement***

*The purpose of this section is to identify community-led efforts/groups (volunteer, NGOs, not-for-profits, etc) to understand household planning and preparedness for climate-related hazards.*

Many (70.3%) residents are members of or participate in a range of community or volunteer groups, with 79.2% participating frequently and 12.5% participating often, indicating high levels of community involvement and investment, characteristics that are key to enhanced social cohesion and recovery.

### ***Government Involvement***

*The purpose of this section is to identify County/State/Federal government-based efforts with defined roles & responsibilities of planning & preparedness climate-related risk reduction.*

Regarding residential interaction with government institutions in the community, only 41.7% report having contact, with 50% having frequent contact, 14.3% reporting they often have



contact, and 28.6% somewhat involved. Similar to the previous results of the lack of community representation, this lack of interaction with government institutions may be an indication of many residents' preference for independence from government.

Regarding community expectations of government and other relief agencies in the time of drought or other disasters, residents reported the following (selecting all that applied): 32.4% have no expectations; 13.5% expect provision of basic services (evacuation, food, water, shelter) *only for those most in need*; 0.0% expect provision of basic services (evacuation, food, water, shelter) *for local community members but not vacationers*; 51.4% expect provision of basic services (evacuation, food, water, shelter) *for all residents including vacationers*; 21.6% expect job protection and/or financial support; 51.4% expect assistance with cleanup & reconstruction, and; 40.5% expect provision of emergency health services. Additional assistance expected by the community includes upholding safety and public order as well as protect public property. Many residents also discussed the need for their community members to come together, collaborate with one another and be self-sufficient in the recovery process.

Regarding awareness of public awareness programs such as community emergency plans, disaster/risk information, etc. from any governmental or non-governmental agencies, community members, families, radio, newspapers, internet, television or other sources, 73% of residents report exposure to some of these programs. Some programs mentioned include: emergency kit info; real-time notification of disasters (sirens and storm warnings); emergency preparedness education; CERT; American Red Cross; County disaster planning; Emergency preparedness task force; paper mail-outs on disaster preparedness; family emergency plans and the hurricane preparation show. Sources of this information include KKCR & Kong Radio, TV, newspaper, radio, Hawaii Electric Company, Kauai County, NOAA, word of mouth, schools, library, senior centers, KLUC utilities commission.

Residents were asked to rate the efficacy of the early warning systems in Hanalei. All residents were aware of the early warning systems, however 5.6% rated them Not Effective due to lack of audibility of sirens in some places, 27.8% rated them Somewhat Effective due to insufficient coverage of sirens as well as slow repair of broken sirens. The majority (66.7%) of residents rated the early warning system as Very Effective.

### **Key Recommendations**

*Key recommendations for hazard mitigation and community needs for disaster management to reduce vulnerability to drought, natural hazards and climate change impacts, for integration into drought and hazard mitigation plans*

A needs assessment was conducted by gathering qualitative feedback from residents on how to enhance local disaster preparedness and resilience around various issues included in the household survey. Results are listed in Appendix B, organized by category, need/concern and potential action items.

### *Local Best Practices Building Adaptive Capacity*

In addition to the potential action items for capacity building listed in Appendix B, collaborative support should be given to local initiatives and organizations already working in enhancing local resilience. Disaster preparedness and relief agencies like the Hawaii Red Cross and the CERT Program are positioned to offer trainings, education and resources for Hanalei, and such initiatives should be encouraged. Staging of resources, training of local residents to prepare for and respond to local disasters enhances local resilience and capacity to recover. In addition, rebuilding the sense of community is key to enhancing coping capacity, and organizations like the Hanalei to Ha'ena Community Association work to bring issues to resolve and build community consensus; attention must be paid to underrepresented populations and geographic areas. Enhancing natural resource management knowledge and practices as well as building a sense of community through disaster and resource knowledge sharing also enhances coping and adaptive capacity. As discussed, many long-term residents and the few remaining indigenous individuals have developed and maintained various drought, flood, and other hazard risk mitigation and adaptation techniques and may be more resilient to climate change and natural hazards. Linking cultural resources and passing down of traditional ecological and other knowledge systems helps build adaptation mechanisms and resilience within communities. As in the past, the accrued knowledge, practices, and social relationships within the community's long-time residents appear to be critical in maintaining resilience by provisioning basic community services in the event of a natural disaster. Enhanced food security can be achieved through supporting such initiatives as the farmer's markets, local food production and consumption, sustainable agriculture & fishing, and local food kitchens such as the proposed Waipa Foundation kitchen. Organizations and planning efforts potentially contributing to the sense of community as well as working to build adaptive capacity to disasters may include (but are not limited to): Waipa Foundation; Hawaii Community Stewardship Network and E Alu Pu; Hanalei Watershed Hui; Hanalei to Ha'ena Community Association; Watershed Based Plan; Mauka Makai Watch; Kauai County Parks Master Plan; USFWS Comprehensive Conservation Plan; County of Kauai Hazard Mitigation Plan; Hanalei Hawaiian Civic Canoe Club; Kauai North Shore Business Council; Hanalei businesses and meets; DLNR; USFWS Refuges; Kauai Complex; lifeguards; Police, Fire and EMS Departments; Red Cross; CERT; Civil Air Patrol; Hanalei School evacuation plans; vacation rentals that publicize emergency information; Hanalei Estuary Management Plan; North Shore Development Plan; Kauai County General Plan; UH Department of Urban and Rural Planning Practicum, Hanalei. Additional local best practices will be reviewed and included in the community resilience plan.

### **Next Steps**

This report offers an overview of certain aspects of the household survey data gathered; additional analyses will be conducted and presented to the community of Hanalei in public forums in order to continue this collaborative research to formulate a community-based resilience plan. This plan will employ an interdisciplinary multi-sector approach and contribute to disaster preparedness and natural hazard policy and planning process for the community, information that will draw from current County and State Drought and Hazard Mitigation Plans as well as contribute to future plans.

## Appendices

## Appendix A

### Terminology

The World Conference on Disaster Reduction “Hyogo Framework for Action 2005—2015” **Building the Resilience of Nations and Communities to Disasters—International platform for disaster risk reduction uses the following definitions:**

**Vulnerability:** "The conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards". United Nations International Strategy for Disaster Reduction UN/ISDR. Geneva 2004.

**Hazard:** "A potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. Hazards can include latent conditions that may represent future threats and can have different origins: natural (geological, hydro-meteorological and biological) or induced by human processes (environmental degradation and technological hazards)" UN/ISDR. Geneva 2004.

**Disaster Resilience:** “the starting point for reducing disaster risk and promoting a culture of disaster resilience lies in the **knowledge of the hazards and the physical, social, economic and environmental vulnerabilities to disasters** that most societies face.”

**Resilience:** "The capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure This is determined by the degree to which the social system is capable of organising itself to increase this capacity for learning from past disasters for better future protection and to improve risk reduction measures." UN/ISDR. Geneva 2004.

**Adaptation:** The adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

**Coping capacity:** The ability of people, organizations and systems, using available skills and resources, to face and manage adverse conditions, emergencies or disasters.

**Mitigation:** The lessening or limitation of the adverse impacts of hazards and related disasters.

Definition sources: <http://www.un-documents.net/hfa.htm> & **UNISDR Terminology on Disaster Risk Reduction (2009)** <http://www.unisdr.org/eng/library/lib-terminology-eng.htm>

## Appendix B

<b>NEEDS ASSESSMENT RESULTS FOR ENHANCING LOCAL RESILIENCE</b>		
<b>CATEGORY</b>	<b>CONCERNS/NEEDS</b>	<b>POTENTIAL ACTIONS</b>
<b>EVACUATION</b>	SOME RESIDENTS DO NOT KNOW WHERE/HOW TO EVACUATE	EVACUATION SIGNAGE, EDUCATION & INSTRUCTIONS ON PROCEDURES
	HANAIEI IS ISOLATED AND EVACUATION ROUTES ARE QUICKLY CLOGGED OR CLOSED	ALTERNATE/BETTER EVACUATION ROUTES ON STATE OR PRIVATE LANDS
	DON'T KNOW WHERE SAFE ZONES ARE	MORE EDUCATION & PUBLIC AWARENESS AROUND NEW INUNDATION ZONES, EVACUATION ROUTES AND EVACUATION CENTERS OR SAFE PLACES
	UNSURE OF EVACUATION ROUTES FOR STUDENTS IN SCHOOL	CLARIFY ROUTES WITH MAPS AND INSTRUCTIONS
	TOURISTS UNSURE OF EVACUATION ROUTES OR PROCEDURES	NEED TOURIST EVACUATION PLAN (ESPECIALLY FOR THOSE WITHOUT CARS)
<b>FOOD/WATER</b>	UNSURE OF AVAILABILITY AND LOCATION OF WATER/FOOD RESOURCES	MORE EDUCATION & PUBLIC AWARENESS ON REALITIES OF SUCH RESOURCES AS WELL AS EXPECTATIONS FOR LOCAL PREPAREDNESS (E.G. BRINGING OWN FOOD/WATER SUPPLIES FOR 3-5 DAYS IN EVACUATION SHELTERS)
	UNSURE OF CONTINGENCY PLAN FOR WATER RESOURCES	DEVELOPMENT OF A COMMUNITY-BASED WATER CATCHMENT SYSTEM FOR WATER SECURITY
<b>ENERGY</b>	NEED FOR ELECTRICITY FOR BASIC SERVICES (FEAR A REPEAT OF INIKI'S GENERATOR WARS)	POTENTIAL RESOURCE MAPPING OR STAGING OF COMMUNITY GENERATORS FOR SHARING BETWEEN NEIGHBORS
<b>COMMUNICATION/ INFORMATION</b>	COMMUNICATION IS QUICKLY LOST IN DISASTERS YET IS CRITICAL TO RECOVERY	BETTER COMMUNICATION SYSTEM IN PLACE (IF TELEPHONE CELL TOWERS ARE OUT) INCLUDING A DESIGNATED "INFORMATION" PLACE TO GO TO IN THE COMMUNITY THAT PEOPLE KNOW AHEAD OF TIME AND CAN USE TO POST AND SHARE INFORMATION
		TRAINING FOR LOCAL HAMM RADIO OPERATORS
<b>SPECIAL POPULATIONS</b>	PERSONS WITH DISABILITIES WILL HAVE EVACUATION CHALLENGES AND SPECIAL NEEDS	PUBLIC AWARENESS AND OUTREACH TO THESE POPULATIONS ON PLANNING CONSIDERATIONS FOR THEM INCLUDING TRANSPORTATION
	LOWER SOCIO-ECONOMIC POPULATIONS MAY NOT HAVE ACCESS TO AS MANY RESOURCES	ADDITIONAL SUPPORT AND CONSIDERATIONS FOR THESE POPULATIONS IN PLANS
<b>TOURIST POPULATION</b>	TOURISTS IN HANAIEI & HA'ENA HAVE SPECIAL NEEDS THAT NEED TO BE ADDRESSED	REQUIRE WELL DISPLAYED AND WELL COMMUNICATED DISASTER EDUCATION MATERIALS FOR TOURISTS IN HOTELS AND VACATION RENTALS
	TOURISTS DO NOT KNOW WHERE OR HOW TO EVACUATE	EDUCATION AND PUBLIC AWARENESS MATERIALS FOR TOURISTS ON EVACUATION ROUTES AND PROCEDURES

<b>TOURIST POPULATION</b>	TOURISTS ARE UNAWARE OF NATURAL HAZARDS IN AREA; HAVE LACK OF RESOURCES AND PREPAREDNESS	IF AT A VACATION RENTAL SHOULD HAVE EMERGENCY PREPAREDNESS INFORMATION
		INFO ABOUT VACATION RENTALS/MONITORED BETTER
		TOO MANY VACATIONERS AND EMPTY HOUSES PUSH UP PRICES SO THERE'S NOT ENOUGH AFFORDABLE HOUSING SO LONG TIME RESIDENTS CAN'T AFFORD TO STAY
	TOURISTS CREATE SOCIAL ISSUES	USE INFO TO REZONE HANALEI AND GET RID OF VACATION RENTALS AND MAKE IT A RESIDENTIAL COMMUNITY--NO MORE "RURAL WAIKIKI"
<b>INFRASTRUCTURE</b>	ONE-LANE BRIDGES AND LOW-LAYING ROADS VULNERABLE TO HAZARDS AND QUICKLY CUT OFF IN DISASTER	UPGRADE BRIDGES, RAISE ROADS; EDUCATE PUBLIC ON CONTINGENCY PLAN IF BRIDGES ARE LOST OR COMPROMISED
		EMERGENCY ACCESS ONLY ROAD (SHOULD BE ON) HIGHER GROUND TO PROHIBIT ISOLATION
<b>SHELTER</b>	NO LOCAL SHELTER THAT IS OUT OF INUNDATION ZONE	ALTERNATE EVACUATION SAFE PLACE IN HANALEI ON PRIVATE/STATE LANDS
	PEOPLE DON'T KNOW WHERE THE SHELTERS ARE	MORE EDUCATION & PUBLIC AWARENESS AROUND
<b>EDUCATION</b>	INCREASE LOCAL KNOWLEDGE OF DISASTER PREPAREDNESS	CREATE A DISASTER PREPAREDNESS EDUCATION VIDEO TO SHOW ON CHANNEL 6 OR CREATE A DISASTER HANDBOOK THAT IS PART OF HOUSE
		EDUCATION ON PREPAREDNESS (FOR HOMEOWNERS, AS THEY HAVE A RESPONSIBILITY TO MANAGE THEIR OWN PROPERTY)
		MORE CONTINUING EDUCATION ON EMERGENCY PREPAREDNESS TO KEEP SHORT-TERM MEMORY, COMMUNITY ASSUMES GOVERNMENT WILL HELP ESPECIALLY WITH FOOD/WATER SUPPLIES
		MORE DISASTER EDUCATION AND TRAININGS
<b>LEADERSHIP/ LOCAL CAPACITY BUILDING</b>	NEED STRONGER COPING PRE & POST-DISASTER SKILLS ON FAMILY AND COMMUNITY LEVELS	DO'S AND DON'TS OF WATER FILTRATION CHLORINE ETC., SOLVING PROBLEMS COLLECTIVELY WITH COMMUNITY LIKE IN PRESENTATION
		WANT ADVANCED TRAINING ON LOCAL DISASTER PREPAREDNESS
		CROSS TRAIN LIFEGUARDS UP AS EMTS/FIRST RESPONDERS (HAVE VEHICLES BUT NEED MORE TRAINING)
		MORE COMMUNITY PARTICIPATION
		PEOPLE FORGET PREPAREDNESS INFORMATION SO NEED TO KEEP REMINDING THEM (LIKE ONCE PER MONTH TELEVISION SHOW ON HOW TO DO CPR; NEED CPR AND DISASTER CLASSES IN HANALEI)
		SHOULD HAVE A DISASTER PLAN TO SEND TO COMMUNITY MEMBERS OR POST LOCALLY IN BUSINESSES AND TEACH EMERGENCY PREPAREDNESS SKILLS

<b>LEADERSHIP/ LOCAL CAPACITY BUILDING</b>		DO'S AND DON'TS OF WATER FILTRATION CHLORINE ETC., SOLVING PROBLEMS COLLECTIVELY WITH COMMUNITY LIKE IN PRESENTATION
		WANT ADVANCED TRAINING ON LOCAL DISASTER PREPAREDNESS
		CROSS TRAIN LIFEGUARDS UP AS EMTS/FIRST RESPONDERS (HAVE VEHICLES BUT NEED MORE TRAINING)
		MORE COMMUNITY PARTICIPATION
		PEOPLE FORGET PREPAREDNESS INFORMATION SO NEED TO KEEP REMINDING THEM (LIKE ONCE PER MONTH TELEVISION SHOW ON HOW TO DO CPR; NEED CPR AND DISASTER CLASSES IN HANAIEI)
		SHOULD HAVE A DISASTER PLAN TO SEND TO COMMUNITY MEMBERS OR POST LOCALLY IN BUSINESSES AND TEACH EMERGENCY PREPAREDNESS SKILLS
	NEED STRONGER COPING PRE & POST-DISASTER SKILLS ON FAMILY AND COMMUNITY LEVELS	MAKE PEOPLE AWARE OF PROBLEMS AND RISKS/VULNERABILITIES (PHYSICAL, PSYCHOLOGICAL, ETC) TO HOPEFULLY SPUR PEOPLE TO ACT ON THESE PROBLEMS (SHOULD MOTIVATE PEOPLE TO TAKE ACTION TO RESOLVE THEIR PROBLEMS)
		NEED LOCAL BACKUP PLANS FOR FOOD/WATER DELIVERY
		NEED A PORTFOLIO THAT IS PROFESSIONALLY DONE (SMALL MAIL-OUT/CLIPBOARD SIZE) INCLUDING: MAP OF EVACUATION ROUTES (ALL AND BACKUPS) COLOR CODED; UPDATED PHONE NUMBERS FOR EMERGENCY SERVICES; RESIDENTIAL EMERGENCY PHONE TREE TEMPLATE FOR RESIDENTS TO FILL OUT; SHELTER LIST (COURTHOUSE? KILAUEA GYM?); PAMPHLETS (SHORT CONCISE DIRECTIVES WITH LARGE PRINT); SHOULD BE STUCK NEXT TO PHONE/VISUALLY OBVIOUS PLACE
		CERTAIN (LONG-TIME RESIDENTS) ETHNIC GROUPS DON'T STEP UP AND LEAD, JUST KEEP TO THEMSELVES AND TAKE CARE OF THEMSELVES FIRST BASED ON THEIR HISTORY
	INCREASE IN EMERGENCY/DISASTER RESPONSE TRAINED LOCALS TO HAVE TEAMS	NEED A LOCAL (UPDATED) PLAN FOR DISASTER PREPAREDNESS WITH RESPONSIBLE CONTACTS AND LEADS
<b>EARLY WARNING SYSTEMS</b>	SOME PEOPLE DO NOT GET EARLY WARNINGS ON TV	ALTERNATIVE ALERTS LIKE ON THE COMPUTER (EMAIL, TEXTING) ARE BETTER FOR PEOPLE WHO DON'T WATCH TV
	SOME REMOTE AREAS DO NOT HEAR SIRENS	NEED BETTER COVERAGE FOR TSUNAMI SIRENS IN RURAL/REMOTE AREAS
<b>EMERGENCY SERVICES</b>	NO EMS STATION	NEED AN AMBULANCE/MEDICAL STATION IN HANAIEI LIKE A VOLUNTEER FIRE DEPARTMENT LIKE AT THE NEW

		NEIGHBORHOOD COMMUNITY CENTER
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## Appendix C