

HANALEI TO HĀ'ENA COMMUNITY DISASTER RESILIENCE and CLIMATE ADAPTATION ACTION PLAN



2023

PREPARED BY THE
HANALEI TO HĀ'ENA COMMUNITY
DISASTER RESILIENCE PROJECT
HANALEI WATERSHED HUI



Acknowledgements & Plan Update History

Plan Development & Amendment

This Plan was prepared initially in 2014, amended partially to include updated maps and action plans in 2016, with this current update in 2023.

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This Plan was prepared for:

The communities of Hanalei to Hā`ena, the Hanalei to Hā`ena Community Disaster Resilience Committee, the Hanalei Watershed Hui and other partners to guide ongoing community preparedness, response, relief and recovery work to promote sustained community resilience.

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	4
<u>SECTION 1. PLAN INTRODUCTION, RESILIENCE ASSESSMENT FINDINGS & RECOVERY RECOMMENDATIONS</u>	5
OVERVIEW	5
INTRODUCTION TO PLACE, RESOURCES AND RISKS	5
RATIONALE FOR THE PLAN	6
RESEARCH FRAMEWORK, METHODS, TOOLS & FINDINGS	7
PHASE 1 DATA COLLECTION AND ANALYSIS: <i>SURVEYS & INTERVIEWS</i>	8
PHASE 1 RESULTS	8
PHASE 2 DATA COLLECTION AND ANALYSIS: <i>COMMUNITY MODELING WORKSHOPS</i>	15
PHASE 2 RESULTS	16
PHASE 3 DATA COLLECTION AND ANALYSIS: <i>RESILIENT RECOVERY DEBRIEFING, WORKSHOPS & RECOMMENDATIONS</i>	17
PHASE 3 RESULTS & OUTPUTS	17
RESEARCH-INFORMED RECOMMENDATIONS ACROSS THE 3 PHASES	18
<u>SECTION 2. ACTION PLANS FOR PREPAREDNESS, RISK REDUCTION, RESPONSE, RELIEF AND RECOVERY</u>	20
COMMUNITY-BASED DEFINITIONS, PURPOSE, MISSION & VISION	20
TARGET AUDIENCE AND USERS, PUBLIC AWARENESS	22
IMPLEMENTATION, MONITORING & EVALUATION STRATEGY & SUSTAINABILITY	22
<u>HANAIEI TO HĀ`ENA COMMUNITY DISASTER RESILIENCE ACTION PLAN, PRINCIPLES & TOOLS</u>	23
HANAIEI TO HĀ`ENA COMMUNITY DISASTER RESILIENCE PLAN WORKING HUI ROLES & RESPONSIBILITIES	24
PRINCIPLES FOR COMMUNITY PREPAREDNESS, RESPONSE, RELIEF & RECOVERY	24
COMMUNITY RISK, RESOURCE AND RESPONSE MAPS FOR FLOOD/HURRICANE AND TSUNAMI	25
COMMUNITY DISASTER PREPAREDNESS, RESPONSE & RELIEF RESOURCES & TOOLS	26
ACTION PLAN 1. PREPAREDNESS & RISK REDUCTION	27
ACTION PLAN 2 EMERGENCY RESPONSE AND ACTION PLAN 3 RELIEF PLAN / CHECKLIST	36
ACTION PLAN 4. COMMUNITY-CENTERED NEEDS ASSESSMENT & RESILIENT RECOVERY RECOMMENDATIONS	42
SECTION 3. CLIMATE ADAPTATION ACTION PLAN.....	51

SECTION 1 APPENDIX. PAST RESEARCH RESULTS & MAP UPDATE GUIDANCE

- Appendix 1 Acronyms & Glossary
- Appendix 2a Research Framework (2014)
- Appendix 2b Community modeling workshops (2014)
- Appendix 3 Household survey (2008)
- Appendix 4 Household survey Indicators
- Appendix 5 Key informant interviews (2008)
- Appendix 6 Gap analysis (2010)
- Appendix 7a PGIS & ArcGIS instructions
- Appendix 7b PGIS Mapping Data Plan (2014)
- Appendix 7c PGIS Instructions for GIS Specialists
- Appendix 7d PGIS Notes
- Appendix 7e PGIS Workshop Facilitator Instructions
- Appendix 7f Teaching Workshop Participants the Technology
- Appendix 7g PGIS Setup
- Appendix 8 Post-flood Survey
- Appendix 9 References

SECTION 2 APPENDIX. COMMUNITY DISASTER RESPONSE GO-KIT RESOURCES

- Appendix A. Emergency Communications Plan
- Appendix B. Community Disaster Leadership Contact Roster by Response Zone & Working Hui
- Appendix C. Community Resource Mapping List
- Appendix D. Disaster Response Kit Lists
- Appendix E. North Shore Incident Report
- Appendix F. North Shore Intake Form-HHOOH
- Appendix G. Personal Disaster Go Kit List
- Appendix H. Family Communications Plan
- Appendix I. Radio Equipment Disaster Go Kit List
- Appendix J. Community Risk & Resource Maps
- Appendix K. Spontaneous Volunteer Registration Form
- Appendix L. DoH Resources

EXECUTIVE SUMMARY

Purpose

Hawai`i is the most isolated landmass in the world, is prone to a myriad of natural hazards from hurricane, extreme weather events, tsunami and others, and is at great risk to impacts from climate change like sea level rise, acidification and warming of ocean waters leading to coral bleaching and coral reef ecosystem collapse, increasing public health vector-borne diseases, and other threats.

The rationale for development of this plan since 2008 was to understand current demographics and dynamics of community and what they mean for local resilience to disasters, including identifying vulnerable and resilient populations and areas, and developing an Action Plan and Community Maps to promote local resilience. This plan represents a history of 11 years of research and planning efforts grounded in identifying gaps in preparedness community risks and vulnerabilities, resources, knowledge and visions for improving resilience for the communities of Hanalei to Hā`ena.

Given the last update to the plan was 2016, and the devastating impacts of the 2018 rain events and the changes it made on place and people, this plan update addresses new challenges, resources and opportunities relevant to community resilience.

In addition, the plan lays out principles, actions and policy recommendations for community members, government, non-government organizations, faith-based groups, private sectors and others to improve resilient recovery, and how to collaborate on ongoing community preparedness, response, relief and recovery efforts for future emergencies in ways that don't undermine community, the environment, the economy and future resilience.

Who

Research and planning were done jointly with project facilitators and the Hanalei to Hā`ena Community Disaster Resilience Planning Committee (Committee), consisting of community members and diverse stakeholders from government, non-governmental organizations, faith-based and community organizations, in order to promote cross-collaboration of disaster resilience planning efforts.

Audience & Users

Community disaster resilience is an ongoing process and requires continued attention and support. This plan is intended to both guide the current and sustained disaster preparedness, response, relief and recovery activities of the Committee and of the larger communities, and to inform and engage local residents, visitors, government and non-governmental organizations of the local plan through plan distribution, public awareness materials and events. In addition to verbal confirmations of solidarity, Memorandums of Understanding may be signed between the Committee and particular organizations, government departments and individuals to acknowledge local planning efforts and ensure access to resources and land needed to support local response and recovery efforts.

Sustainability

Opportunities for addressing gaps in resilience are highlighted in the proposed Action Plan programs, policies and community-building processes, which will serve as a guiding resource to document the planning process so it can be updated and sustained over time, and encourage capacity-building. The long-term sustainability of the plan convening will be led at the grassroots-level by the Hanalei to Hā`ena Community Association, with support by the Hanalei Watershed Hui and other committee stakeholders.

The community maps were developed to identify vulnerable populations and areas, and stage current and new resources, materials and supplies that can be leveraged after a disaster. Both the Action Plan and maps should be continually monitored and evaluated bi-monthly to support the continued Committee meetings and associated activities, and should be updated at least annually by the Committee and shared with the public. Detailed information on the project research and planning process, tools and methods used, and guidance for the Committee on how to update the Action Plan and Maps in the future is listed in Section 1 Appendix. Confidential information including Resource Mapping Databases and disaster kit locations with names and addresses will be available to Committee members only.

Section 1. Plan Introduction, Resilience Assessment Findings & Recovery Recommendations

Overview

Resilience in Hanalei to Hā`ena communities means the ability for community to come together to prepare, respond, and bounce back better through relief and recovery after a disaster. It means kuleana and kokua of all, to remember the past, recognize the present changes of climate, environment and society, developing peaceful pathways and having the foresight to restore and protect the ‘āina for current and future generations.

The community-driven Hanalei to Hā`ena Community Disaster Resilience effort began in 2008, and this Plan was originally developed in 2014 in partnership with the Hanalei to Hā`ena Community Disaster Resilience Committee, based on six years of community-engaged research, resilience assessment analyses, and resilience planning workshops, with map and Action Plan updates done in 2016. This Plan Update for 2019 follows the unprecedented destructive rain events of 2018, and is designed to drive resilient recovery and to strengthen ongoing community preparedness and future response, relief and recovery efforts.

The Plan is designed in three sections. The first section includes an Executive Summary, a community resilience assessment, and a resilient recovery recommendations report following the 2018 flood events. The second section includes the “living” plan tools that can be taken out as a packet for community zone captains and first responders to utilize and update as needed, including communications tools and lists, community resource lists and contact information, disaster supply go kit lists, guidance on mass care and spontaneous volunteer management, action plan “checklists” for zone captains and local responders to use for preparedness, response, relief and recovery, and community risk and resource maps for hurricane/flood and tsunami. The third section includes appendix to be used as references and resources to update the plan in the future.

Introduction to Place, Resources and Risks

Hanalei to Hā`ena communities are geographically isolated and vulnerable to many natural hazards, including sea level rise associated with climate change. Resting at sea level in valleys surrounded by steep mountains, the only exits from the communities are coastal roads and one-lane bridges; the main road exit, via the Hanalei Bridge, closes in the event of flood, tsunami and hurricane, causing issues with evacuation, search and rescue, and accessing the communities post-disaster. Seasonal flooding is a part of life, however land use changes and shifts in weather events have caused acute damaging floods leading to road closure and community isolation for many days at a time such as in 2012. The area is also at risk to landslides and rock fall, particularly during high rainfall and flooding events, as was evidenced in the 2012 floods, creating areas of isolation across the North Shore. The area is at risk to earthquakes and tsunami generated from earthquakes or massive landslides, originating anywhere in the Pacific Ring of Fire or the neighboring Big Island.

The last devastating tsunami occurred in 1957 with 47 feet maximum height run-up recorded on the North Shore of Kaua`i leaving 250 homeless but with no deaths due to improved tsunami warnings, and in 1946 from an Aleutian Islands-generated earthquake of 7.8 magnitude with 45 feet maximum height run-up, resulting in 15 deaths and 3 missing but presumed dead, many injuries and over 200 left homeless. Wildfires and drought are possible in the area as well, leading to water resource quality and scarcity issues impacting the environment and farming and fishing livelihoods, among factors. High wave events and coastal inundation are important hazards for coastal areas as well. Dam failure is also important to note for neighboring areas, as on March 14, 2006, extreme storms and rainfall led to the failure of the Ka Loko Dam, killing seven people (State of Hawaii Hazard Mitigation Plan 2010). Recently, the rain bomb event of April 2018 caused massive flooding, landslides, destruction of many homes and the coastal highway in several areas, and many close-

calls where people were rescued by their fellow community members within inches of their lives. The long-term impacts of the heavy footprint of visitors include damaging the sense of community connectedness and belonging, eroding the natural environment, and become an evacuation safety issue and a drain on local people and resources during an emergency as evidenced in both the March 2012 and April 2018 floods.

Hanalei to Hā`ena communities are also at risk to impacts from sea level rise which threaten the majority of the coastal communities' infrastructure and assets, including critical coastal ecosystems and public recreation areas, the coastal highway, homes, businesses, schools and livelihood areas like agriculture. Additional threats from climate change such as ocean warming, acidification, and coral reef bleaching will greatly impact the health and productivity of the coastal ecosystems and fishing stock as a result. As impacts from climate change continue, increased intensity and severity of storms like the April 2018 rain bomb and the March 2012 flood events will likely become more common, along with periods of prolonged drought and challenging climate variability, so recovery and ongoing development must take these considerations into account to ensure long-term risk reduction and adaptation measures are built-in to ensure these communities can have a sustainable, safe future in the face of these changes.

Rationale for the Plan

Hurricane Iniki, a Category 4 storm on the Saffir-Simpson scale that hit Kaua'i in 1992, was the most recent destructive disaster to impact Hanalei. Discussions with community leaders revealed that although Hanalei to Hā`ena communities had no formalized disaster resilience programs or policies in place at the time, residents report having coped and adapted well. They attributed this to close familial and social support networks, self-organization and self-sufficiency, material preparedness, and experience and knowledge of past disasters. Community members actually turned away much of the external disaster relief aid, showing the importance of local social resilience to ensuring protection of property, lives and livelihoods.

Since Iniki in 1992, Hanalei to Hā`ena have experienced changes that many residents feel have weakened the community's social capacity ([Coffman and Noy 2009](#)). Small family homes have been replaced by gated vacation rentals, cost of housing and land taxes has displaced permanent and long-term residents, giving way to short-term visitors (i.e. tourists) or empty second residences. Currently the daily average visitor count is 10,000 for the entire North Shore of Kaua'i, including the towns from Hanalei to Hā`ena, as compared to the resident count of 450, producing a visitor to resident ratio of 22:1 ([HTA 2010](#); [Vaughan and Ardoin 2013](#)) (Fig. 1). The high daily visitor count creates traffic congestion, utility and infrastructural overload while also degrading natural and cultural resources. Visitors are ill prepared for natural hazard events, presenting a burden on local residents and their resources even during common floods. The Plan research was initiated in response to a community-based request for assistance to engage in a process to understand current community demographics, resilience characteristics, risks and opportunities to increase resilience from 2008 to 2010, and workshops done in 2012-2014, with the following findings. The research framework can be found in the appendix for more information.

In the wake of the April 2018 historical flood event, people were left houseless, many without access to their homes or jobs, and unable to access markets and stores for basic goods for many weeks and months. Local response and relief work was led in large part by those community members involved in this disaster resilience planning effort along with new community leaders who stepped up, working alongside government and civil society actors that had mostly been a part of the disaster resilience committee prior. This Plan Update supports a refresh of the past Action Plans for Preparedness, Risk Reduction, Response, Relief and Recovery, an update of the risk and resource maps, and a re-energized commitment for community mobilization for ongoing disaster resilience planning and action.

The rationale for development of this plan since 2008 was to understand current demographics and dynamics of community and what they mean for local resilience to disasters, including identifying vulnerable and resilient populations and areas, and developing an Action Plan and Community Maps to promote local resilience. This plan represents a history of 11 years of research and planning efforts grounded in identifying gaps in preparedness for community risks, resources, knowledge and visions for improving resilience for the communities of Hanalei to Hā`ena.

Given the last update to the plan was in 2016, and the devastating impacts of the declared disaster 2018 rain event and the impacts on place and people, this plan update addresses new challenges, resources and opportunities relevant to community resilience. In addition, the plan (Section 2) lays out principles, actions and policy recommendations for community members, government, non-government organizations, faith-based groups, private sectors and others to improve resilient recovery, and how to collaborate on ongoing community preparedness, response, relief and recovery efforts for future emergencies in ways that don't undermine community, the environment, the economy and future resilience.

Research Framework, Methods, Tools & Findings

Planning approaches that carefully consider the social, economic and cultural dimensions of affected communities are more likely to be successful and are critical to fostering sustainable development and disaster resilience (Berkes et al. 1998, Crane 2010). In 2008-2010, the research team collaborated with community leaders on the disaster resilience planning effort, in order to identify the elements for (and culturally-appropriate delivery of) the household survey that reflect "What resilience looks like for us," through Key Informant Interviews (Appendix 5) as indicators are most successful when they are developed with those who make decisions and will implement the action plans (Chambers 1994, TRIAMS 2006). This work was then followed by a series of community resilience planning workshops from 2012-2014 (see Figure 12).

First, we developed a conceptual framework adapted from Bollin and Hidajat's (2006) *Conceptual framework to identify disaster risk* to create a place-based conceptual framework for quantifying resilience (Fig. 1) utilizing a household survey (Appendix 3) (Birkmann 2006, Bollin and Hidajat 2006, Wood et al. 2007, Rev. 2008). Through community collaboration, we designed the survey and discussion questions based on the conceptual framework's social vulnerability and social capacity components, consisting of qualitative and quantitative indicators (Appendix 4). The objectives were to: 1) identify populations with varying levels of social resilience in the community; 2) conduct a gap analysis (Appendix 6) between resources and needs, to inform a community-based long-term resilience and recovery plan to increase social, economic and ecological resilience to hazards and climate change; and, 3) understand what social vulnerability or social capacity components are determinants of a household's perceived preparedness, adaptive capacity and coping capacity.

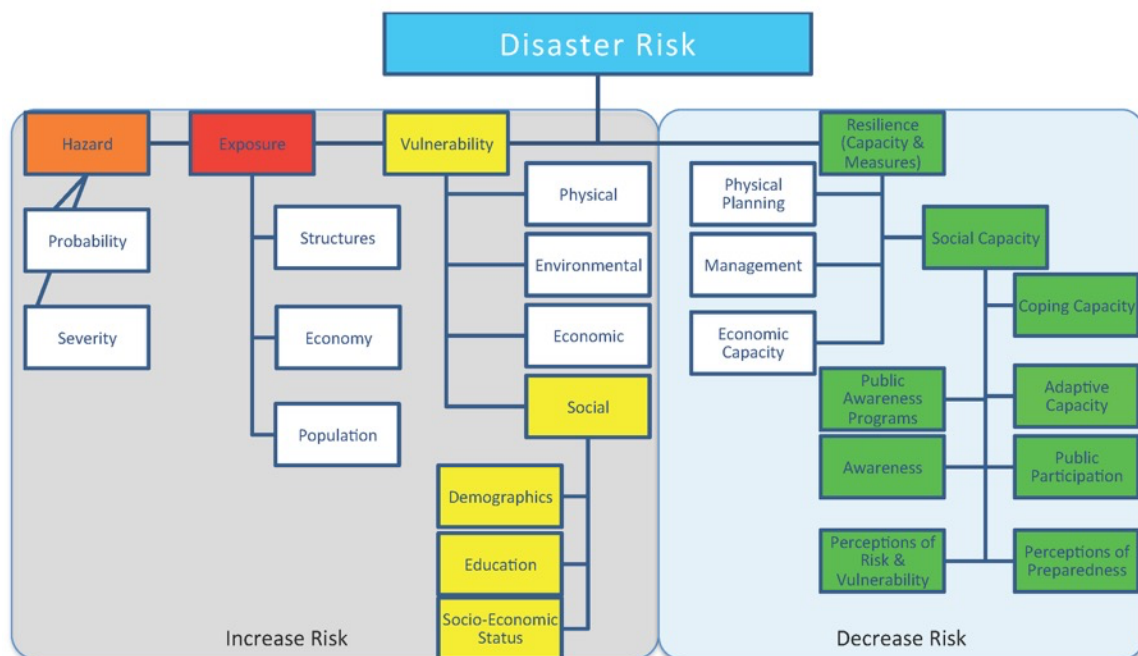


Figure 1 Conceptual framework of community-based household disaster risk. Adapted from Bollin et al. (2006).

The following explains the data collection and analysis, followed by the findings and recommendations, for the phased research: Phase 1) surveys and interviews; Phase 2) participatory scenario-based modeling; and, Phase 3) resilient recovery debriefing and planning.

Phase 1 Data collection and analysis: Surveys & Interviews

Initial key informant interviews along with talk-story sessions, provided the cultural and social context to develop the household survey. The conceptual framework indicators measured through the household survey facilitate a broad and multi-disciplinary perspective of current community vulnerabilities as indicators of critical gaps in household and community-level hazard resilience. We implemented a door-to-door household survey (Appendix 3) of long-term and part-time Hanalei residents and visitors from August to October 2010, to examine perceived household preparedness, coping and adaptive capacity. The survey enabled quantitative and qualitative data collection for particular components of the conceptual framework (Fig. 1). Within the vulnerability component, indicators (Appendix 4) were captured as categorical variables measured through questions regarding demographics, education and socio-economic status. The resilience component was measured through categorical variables and composite indices for various social capacity indicators, including public awareness programs, coping and adaptive capacity, public participation, awareness, and perceptions of preparedness, risk and vulnerability (Appendix 4).

All 279 households in the community were visited twice, and leaflets were left to offer an opportunity to take the survey online or be contacted for an in-person survey. The majority of houses (70.6%) visited were not surveyed, due to 28.3% (79/279) being inaccessible due to locked gates, guard dogs or no trespassing signs, and 42.3% (118/279) with no one home. The decline rate was relatively low, with nearly 62% (37/60) of long-term residents and 91% (20/22) of visitors completing the survey. An informal post-flood interview was conducted in March 2012 to gauge social memory of the flood, changes in perceived preparedness and open-ended feedback to inform resilience-planning efforts.

Phase 1 Results

Figure 2. Ratio of average daily visitor count to resident population



Community structure and demographic shifts

Of the visitors surveyed (n=20), 90% were from the mainland U.S. and 10% were from other countries. Most (75%) visitors stay over a week and are repeat visitors (63%), raising the concern that if a significant disaster affects the area, arranging logistics for visitor evacuation may prove difficult (Figure 2). As with other U.S. coastal areas (Colburn and Jepson 2012), the increasing influx of visitors and new residents over the past few decades has changed the demographic profile of Hanalei, such that 73% of the resident respondents are not from Hanalei or Kaua'i (Figure 3) and 86% of the population is Anglo, with 43% of residents having lived there less than twenty years (Figure 4), showing a loss of long-term residents and potentially their associated social networks, knowledge and resources. Despite demographic and socio-cultural changes, 64.7% of respondents say they receive fish as a gift from local fisherman or family members, a long-held tradition of sharing natural resources and foods with family and community in this region and in Hawai'i (Vaughan and Vitousek 2013; Kittinger 2013).

Figure 3. Origin of residents.

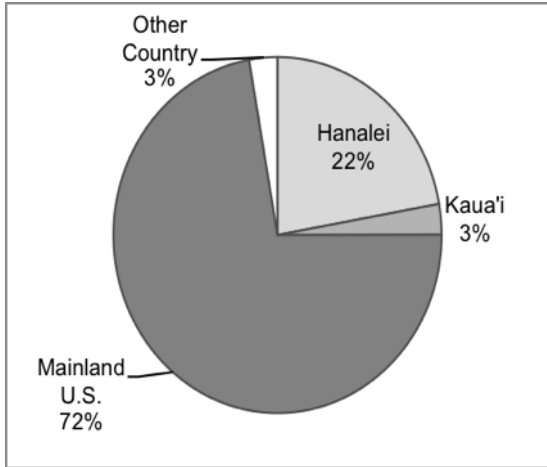
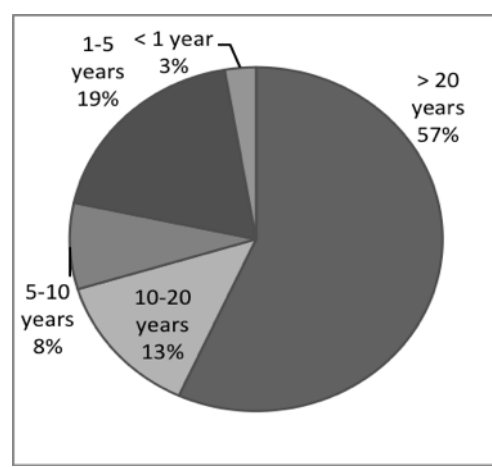


Figure 4. Longevity of residence.



Geographic Coverage & Population

The target population of the Plan includes all long-term and transient residents, employee and businesses (estimated at 1344 from the 2010 Census), and visitors (estimated at 10,000 on any given day) in the communities and areas of Hanalei, Wai'oli, Waipa, Waikoko, Lumaha'i, Wainiha and Hā`ena (Figure 5).

Figure 5. Hanalei to Hā`ena Community Disaster Resilience Plan Boundary Map

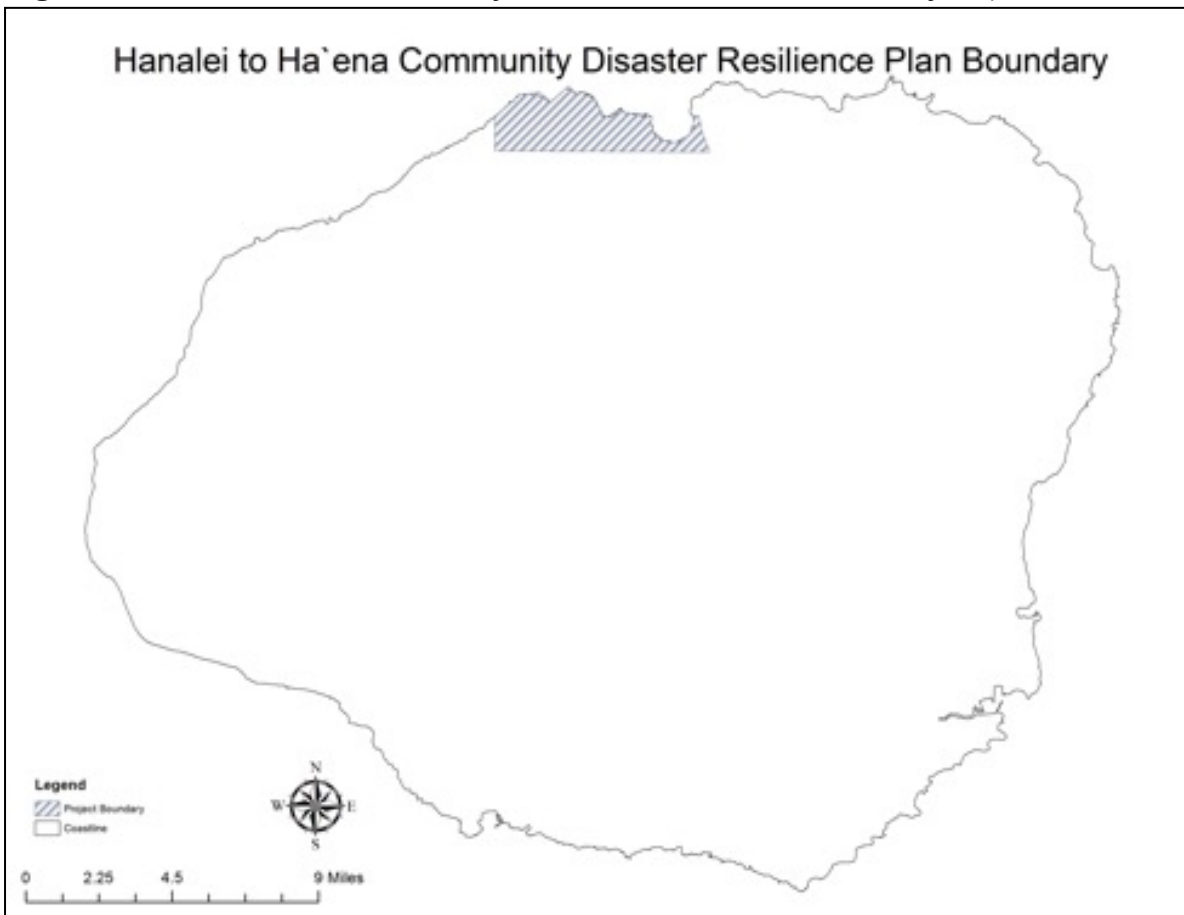


Figure 6. Perceived self and community-wide preparedness.

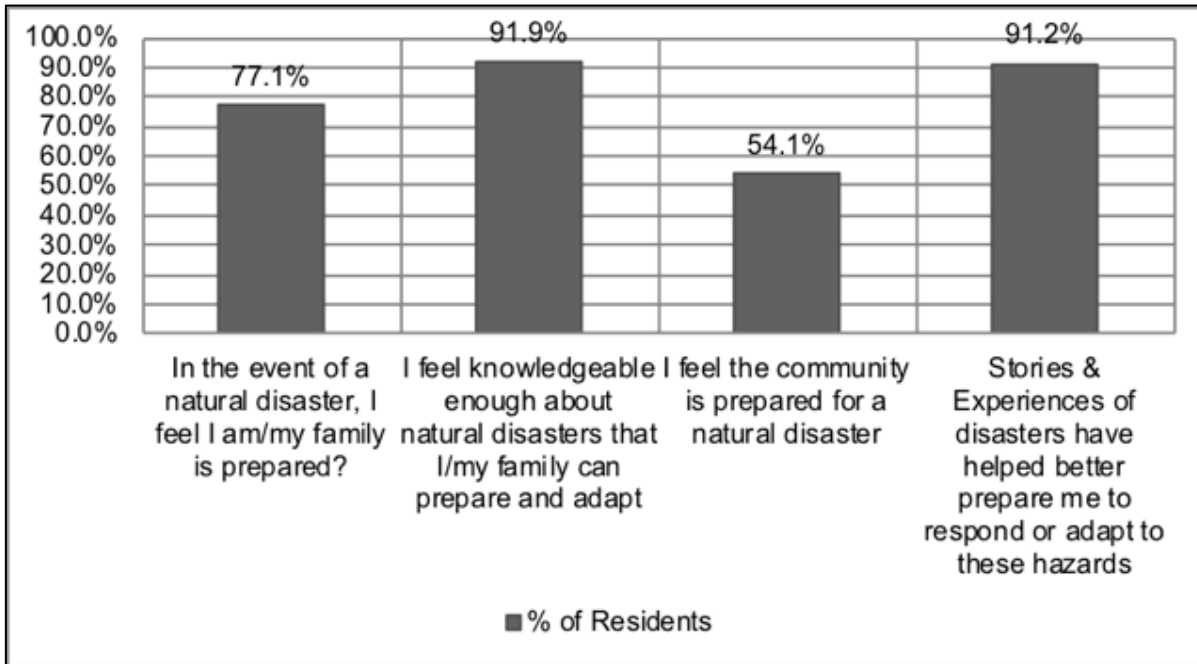


Figure 6 illustrates that many resident respondents (77.1%) feel prepared for a natural disaster, with 92.1% having heard stories or personal experiences in disasters and strong levels of disaster preparedness knowledge (91.9%). However, only 54.1% felt that the community, as a whole, is prepared for a disaster, due in large part to the strain that the unprepared (90%), vulnerable and dependent visitors may place on residents.

Figure 7. Visitor versus resident preparedness, ability and willingness to help others.

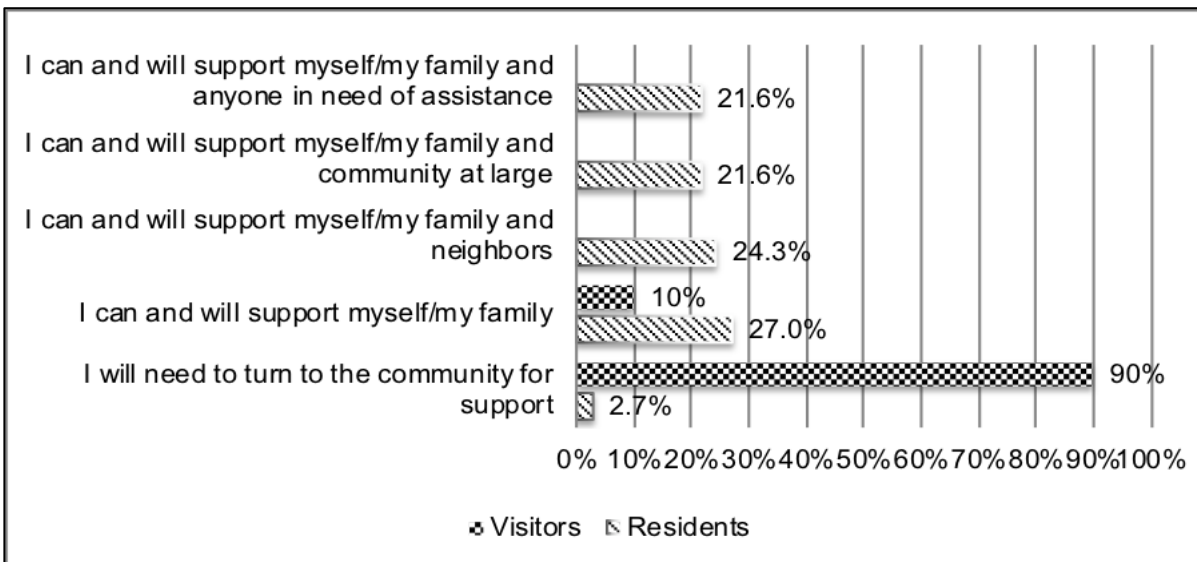
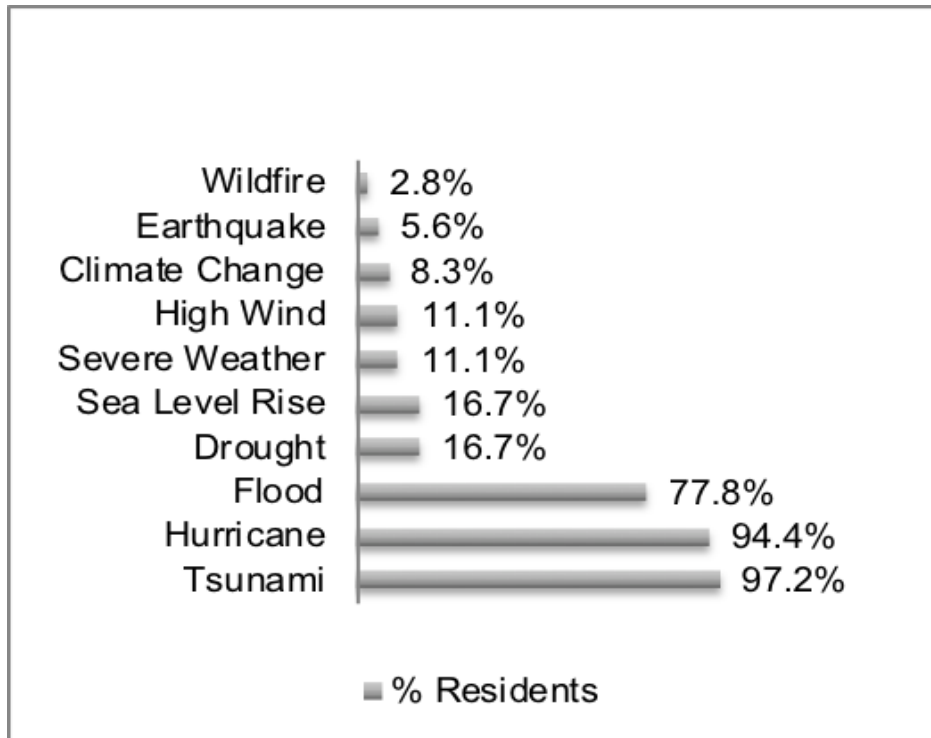


Figure 7 illustrates residents' and visitors' perceptions of their preparedness for disasters, along with their ability and willingness to assist others. Many resident respondents reported an ability and willingness to help neighbors (24.3%), community members (21.6%) and visitors or anyone in need (21.6%), though 21.6% are not willing or able to help tourists (21.6%) and feel they are not a part of community.

Perceptions of risk and vulnerability

The hazards of greatest concern to respondents included tsunami (97.2%) ranked as first by 52.8%, hurricane (94.4%) ranked first by 11% and flood (77.8%) ranked first by 30.6% (Fig. 7). Experience recall of these hazards ranged from once (18.5%) for new resident respondents, 2 to 3 times (25.9%), 4 to 5 times (14.8%), and more than 7 times (18.5%) with 22.2% unsure.

Figure 8. Hazards of concern among surveyed households in Hanalei, Kaua'i.



We found some evidence of asymmetry of knowledge and awareness of hazards among households. For example, while many residents informally mentioned that floods were not a threat to Hanalei, flooding was still one of the top hazards of concern. Only 16.7% of respondents felt drought was an issue, while at the time of the survey, all counties in the State of Hawai'i had been declared a disaster area by the U.S. Department of Agriculture due to drought from January 2008 to August 2010 ([NIDIS 2012](#); [CWRM 2012](#)).

Resident respondents reported the following impacts from natural disasters: agriculture or crop loss (6.9%); cattle health impacts and death (6.9%); water scarcity/water rationing (20.7%); change in rainfall amount/patterns (13.8%); loss of life (41.4%); loss of property (69.0%); loss of jobs/livelihood (69.0%); school/community facilities (62.1%); public health (20.7%); social (13.8%); culture (6.9%); environment (31.0%); well-being (10.3%); food/water insecurity (44.8%); and recreation (3.4%).

While 91.9% of resident respondents knew of community meeting areas or safe refuges to evacuate to, only 87.5% would evacuate in the event of hurricane or tsunami. Many stated that although they perceive this risk, they accept it, rather than evacuating only to not be able to get back to their homes if the road is closed. Participants also indicated a desire to receive more disaster information and education, particularly around plans and protocols to address the needs of the visitor population.

Lessons learned from March 2012 Floods

After the community-wide household survey was conducted in Hanalei in 2010, a major flood occurred over the course of 4 days in March 2012, closing the road to the single-lane bridge and causing multiple points of isolation due to landslides and flooded roads. Initial post-flood interviews determined that residents and business owners were more unprepared than they originally communicated. Local health emergencies

occurred and first responders had difficulty identifying and accessing those in need. Evacuation of tourists was inadequate and led to multiple tourists becoming trapped on store porches or in their rental cars for days without food, water, shelter or bathroom facilities. Some residents cared for them, offering shelter or provisions that as a result caused residents to run short.

Figure 9. Hanalei valley pre- and post-March 2012 floods (photo credit: Jane Vogel, 2012).



Changed perceptions in local preparedness and response capacity were expressed in informal post-flood interviews, and prompted continued research and planning efforts to identify and address ongoing vulnerabilities.

Community involvement, governmental roles and expectations

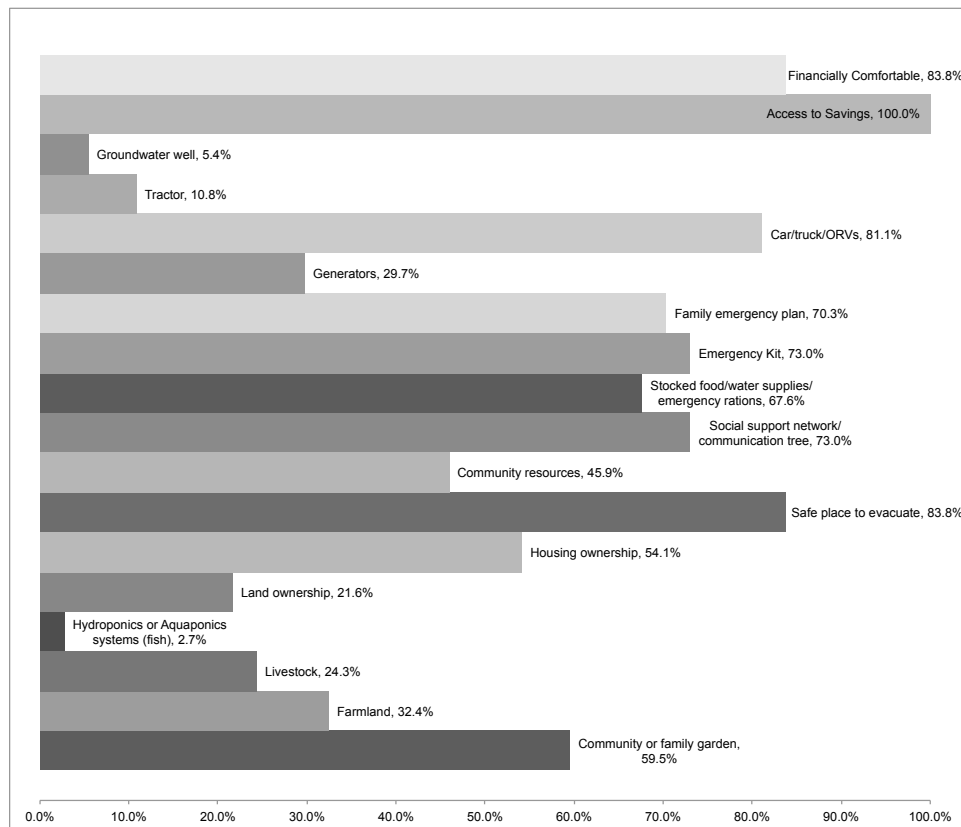
Many (70.3%) resident respondents participate in a range of community or volunteer groups, with 79.2% participating frequently and 12.5% participating often. Many resident respondents (32.4%) expect no assistance from government or relief agencies, while 13.5% expect provision of basic services (evacuation, food, water, shelter) only for those most in need, and 51.4% expect provision of basic services for all residents including visitors. In addition, 21.6% expect job protection and/or financial support, 51.4% expect assistance with cleanup and reconstruction and 40.5% expect provision of emergency health services, with others noting a need to uphold safety, public order and property protection. Many residents emphasized the need for their community members to rebuild connections and collaborate towards self-sufficiency.

Regarding awareness of public disaster communications sources, 73% of resident respondents report exposure to at least one, including governmental and non-governmental agencies, community members, families, radio, newspapers, internet, television and others. All residents were aware of the early warning systems with the majority (66.7%) rating them as “very effective,” however 5.6% rated them “not effective” and 27.8% rated them “somewhat effective” due to insufficient coverage of sirens, slow repair of broken sirens, and lack of warning information for visitors.

Coping and adaptive capacity¹

As illustrated in Figures 9 and 10, local residents exhibit comparatively medium to high coping capacity, as demonstrated by material preparedness, access to resources as well as social networks and financial assets, and also show strong adaptive capacity due to knowledge, expertise and skills sets in diverse fields.

Figure 10. Household coping capacity characteristics.



Our research shows how a transition from long-term affordable residential housing to high-cost homes, rentals and transient vacation rentals has changed the demography of Hanalei. These shifts appear to have severed social-ecological linkages at the community level by diminishing the proportion of residents that have detailed knowledge of the community's ecosystems, resources and hazards, as well as the coping and adaptation mechanisms for dealing with such disturbances. These shifts appear to have fractured the sense of community and social networks that prove critical during disasters. Despite these changes, our results illustrate a high level of social cohesion as seen in significant community involvement and a high ability and willingness of community members to support their neighbors, community, and visitors in disasters (Fig. 6).

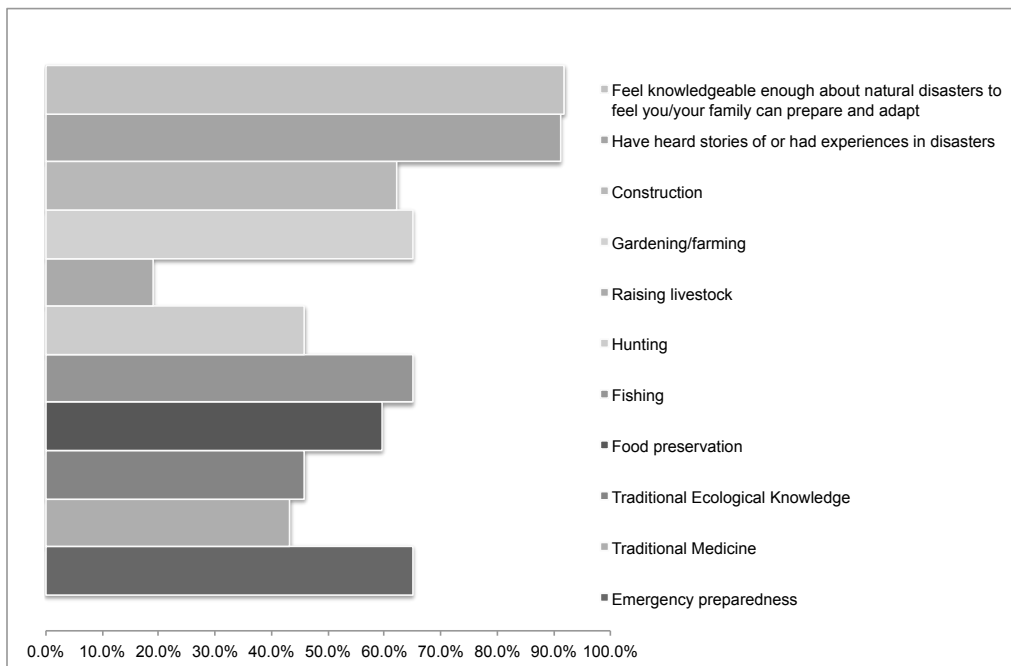
Coping capacity principally concerns the timeframe of pre-disaster, during and short-term post-disaster, as resources may become depleted or strained until normal services and productivity are restored (Yohe and Tol 2002). Access to resources during and post-disaster help households absorb the shock of the disaster and the resulting impacts of damage (Adrianto and Matsuda 2002; Mayunga 2007) offering targets for households with lower coping capacity due to particular characteristics. Access to savings and other liquid assets enables households to continue to pay for basic needs despite a lag or loss of employment income or inability to access banks (*ibid*). Ownership of, or access to, farms, gardens, livestock, hydroponic systems and

¹ Henly-Shepard, S. and Anderson, C., Burnett, K., Cox, L.J., Kittinger J.N., Ka'auomoana M. (2014). Quantifying household social resilience: a place-based approach in a rapidly transforming community. *Natural Hazards*. January 2015, Volume 75, Issue 1, pp 343-363 <http://link.springer.com/article/10.1007%2Fs11069-014-1328-8#> DOI 10.1007/s11069-014-1328-8.

stocked food and water supplies will facilitate provision of food and water to enable survival, with many residents having access to such resources (Fig. 10).

Social networks will enable households to shelter or seek other temporary resources or support until they are able to recover on their own, and home ownership and insurance facilitate repayment of losses and the ability to rebuild (Fig. 9 and 10). Resilient populations, defined as households with high adaptive and coping capacities, were found to be local residents. The resident origin results (Fig. 2) support the findings that familiarity with place, establishment of extended family and friend networks and resources due to origin in Hanalei and the State of Hawai'i, support increased coping and adaptive capacity, with the anomaly that the Kaua'i resident (n=1) had comparable index scores to that of mainland residents. However, results (Figures 10 and 11) also contradict the notion that with increased longevity in a place, coping and adaptive capacity would also increase ([Adger et al. 2004](#)), however bias due to small sample size is possible.

Figure 11. Household adaptive capacity characteristics.



Females exhibit a lower coping and adaptive capacity index than males, which may mean that inequities exist relative to access for resources and networks as well as differential knowledge sets and experiences. Targeting females to improve their coping capacity through increasing access to resources like emergency materials and supplies, improved social networking through recruiting them for engagement in the disaster resilience planning committee work, and improved adaptive capacity through increasing knowledge and training through disaster education, awareness and coursework may address this issue ([Anderson 2008](#); [UNISDR 2008](#)). The lack of desire to evacuate may increase loss of lives, injuries, health emergencies, and requires additional considerations discussed in the Gap Analysis (Appendix 6).

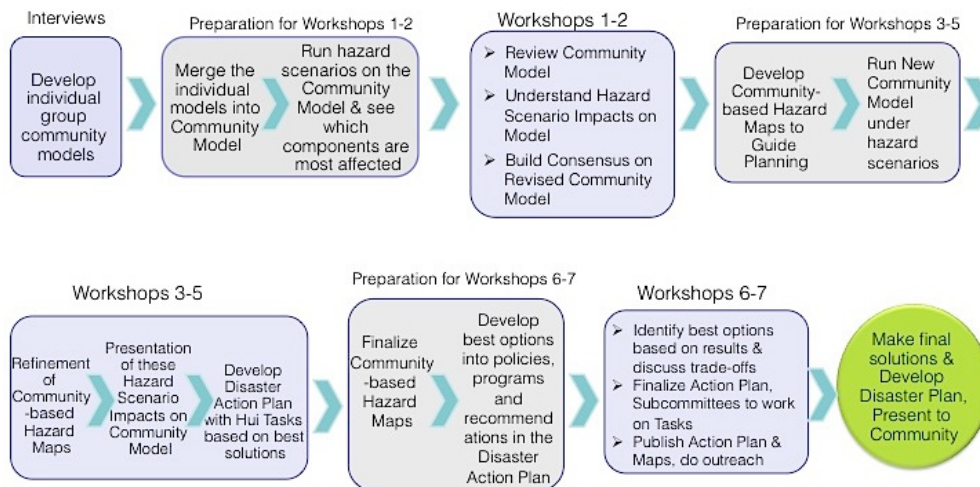
Enhancing natural resource management knowledge and practices also increases coping and adaptive capacity through resource knowledge sharing and environmental stewardship ([Tomkins and Adger 2003](#); [Tompkins and Adger 2004](#); [Armitage 2005](#)). Many long-term residents and the few remaining indigenous individuals have maintained various hazard risk mitigation and adaptation techniques. Linking cultural resources and passing down of traditional ecological and other knowledge systems helps build adaptation mechanisms and resilience within communities ([Bettencourt et al. 2006](#); [Magis 2010](#); [Tomkins and Adger 2003](#); [Vaughan and Ardoin 2013](#)). Diversity of knowledge, skills and livelihoods supports longer-term adaptive capacity of residents, such that disaster response and recovery will be supported by local preparedness and emergency medical care, debris removal and re-construction, and food and water security

through hunting, farming, fishing and water resource management. Reliance on fishing and farming still exists in Hanalei, which both increases social capacity and place-based resource management while also creating vulnerability from overdependence upon these resources which may be impacted by climate change and disasters (Tompkins and Adger 2004; Vaughan and Ardoin 2013; Armitage 2005). Enhanced food security can also be achieved through supporting such initiatives as the farmer’s markets, local food production and consumption, sustainable agriculture and fishing, and local food kitchens.

Phase 2 Data collection and analysis: Community Modeling Workshops

Building on this data gathered from key informant interviews and household surveys, community-based workshops were held with the planning committee using mental modeling under various hazard scenarios through the process indicated in Figure 12 (below).

Figure 12. Community Modeling Workshops



Community modeling addresses the micro (short-term), meso (short to midterm) and macro (long-term) scales of social learning, to achieve single-, double- and triple-loop learning utilizing a type of ‘mental modeling’ (Gray et al., 2013a) in order to construct measurable targets and benchmarks for resilience planning. A novel computer-based software tool called Mental Modeler (Gray et al., 2013a) was used during the planning process to: (1) iteratively construct and revise visual representations of stakeholders’ mental models to ultimately develop a consensus community model; (2) use these models to understand how communities anticipate being impacted by hazards; (3) define preferred targets for components of their community; and, (4) test potential mitigation strategies. This approach facilitates the exploration of the dynamics and learning features of mental model representations by collecting and standardizing individual and collective community knowledge using simple modeling tasks (Gray et al., 2012; Ozesmi and Ozesmi, 2004) in a real-time and participatory modeling environment (Gray et al., 2013a).

To facilitate disaster planning through social learning, we used a FCM-based software called Mental Modeler (Gray et al., 2013a) in every workshop, which allowed the committee to represent and revise their collective understanding over time. Using an FCM approach in a three-phase process, project facilitators standardized, aggregated and revised the committee’s understanding of the structure and dynamics of the community in relation to tsunami hazard, their top concern. Each phase was designed to guide the committee through progressively higher order learning loops, and increase expected adaptive capacity through social learning (Fig. 2). Phase I focused on project organization and a workshop targeting short-term single-loop learning of the committee, through the development of two small group shared models of their community. Phase II included merging the small group mental model representations, building consensus on the structure and dynamics of their community, and understanding the potential impacts of tsunami in order to target double-loop learning. Phase III focused on eliciting triple-loop longer-term

learning by iteratively modeling the expected impacts of a tsunami and the proposed mitigation strategies. The four most effective strategies for achieving disaster planning targets were examined more closely by the committee and developed into the implementable Action Plan including benchmarks for evaluation.

Phase 2 Results²

Hazards prioritized through this process, that were as a result the focus of the planning process, were tsunami, hurricane and flood. Building out a digital map or model of community including physical, social, cultural, environmental and economic assets of importance, we then ran scenarios under each hazard (tsunami, hurricane and flood) to visualize and quantify the impact on each aspect of community under each hazard. This process greatly improved awareness and understanding of where and how community was most at-risk to these hazards, and informed decision-making for the planning process of which aspects to prioritize for risk reduction and resilience-building.

Outputs: Community Vulnerability & Resource Analysis

The **Community Vulnerability and Resource Analysis** was based on two main components: 1) a **Gap Analysis** identifying current gaps in preparedness and response capacity of communities; and, 2) a **Community Modeling** process to model values, assets, resources and risks and inform decision-making.

1. Gap Analysis

The initial Gap Analysis (see Appendix 6) identified the perceived current gaps in resilience using a qualitative review of open-ended survey and interview questions, summarizing overarching themes by category (e.g. communications, evacuation, and food and water security), and listing the identified problems or gaps followed by potential mitigation and adaptation solutions.

The congruent categories of concern listed by resident respondents included gaps with evacuation, food and water security, energy and continuity of utilities, communication and information systems, special populations, the visitor population, infrastructure, sheltering and mass care, education, leadership and local capacity building, early warning systems and emergency services. The majority of gaps reflect the lack of community-wide awareness and education, asymmetry of information from governmental and community regarding disaster plans, protocols and expectations of assistance, and inadequate physical or infrastructural measures. The gaps and associated solutions proposed do not all represent the opinion of the majority of respondents, however there were many commonalities in both gaps and recommendations.

2. Community Modeling

Risks to coastal socio-ecological systems like coastal communities may be due to deeply rooted social issues, lack of awareness or information, misperceptions, or inadequate infrastructure and planning. In order to adequately identify, understand and address these risks, structured planning opportunities utilizing scenario-based modeling are needed to enable diverse community stakeholders to formulate cross-sector solutions together. Over a series of workshops, stakeholder-driven dynamic socio-ecological modeling was facilitated to inform decision-making around community disaster planning and adaptation across scales and time. Utilizing diverse stakeholder knowledge in the committee, the community model included things of importance in the community (social, physical, cultural, environmental, etc.) and how particular hazards (i.e. tsunami, hurricane, flood) affect these things of importance. The committee shared, explored and actively questioned their perspectives, beliefs and expertise, wherein they identified the root causes of community risks. Through running hazard scenarios on the model, the committee was able to quantify potential direct and indirect effects of hazards, develop and pilot-test mitigation strategies, resulting in the selection of the four most effective strategies. Modeling promoted social learning and facilitation of community disaster planning and improving adaptive capacity. More detailed information on this process is in Appendix 2B.

² Henly-Shepard S. and Gray, S., Cox, L.J. (2014). The use of participatory modeling to promote social learning and facilitate community disaster planning. *Regional Environmental Change*. Vol. 35 January 2015 pp. 109-122.
[doi:10.1016/j.envsci.2014.10.004](https://doi.org/10.1016/j.envsci.2014.10.004).

In addition to the household survey (Appendix 3) and post-flood surveys (Appendix 8), the Gap Analysis (Appendix 6) and community modeling informed the development of the Community Resource and Hazard Maps (Appendix J) and ultimately the Action Plans to address the identified gaps through proposed community-based solutions.

Phase 3 Data collection and analysis: Resilient Recovery Debriefing, Workshops & Recommendations

Given the flooding impacts of April 2018 of a record “rainbomb” event in which North Shore Kaua’i received 48 inches of rainfall within a 24-hour period, setting the US record, the focus is now to grow the Plan and Committee to support community-centered Resilient Recovery Planning. Based on a series of response, relief and recovery debriefs with community members and other stakeholders from July to November 2018, a storyline was constructed to document the diverse experiences, impacts, how people coped and adapted during and after the floods, the lessons learned, unmet needs, and community-centered recommendations for integrated resilient recovery. These recovery recommendations include actions and policies that improve future preparedness, response and relief efforts, as well as support social justice and cultural protection, sustainable education and economic opportunities, environmental restoration and climate change adaptation (see Section 2 Table for “Community-centered Needs Assessment & Resilient Recovery Recommendations”).

Phase 3 Results & Outputs

The following summarizes the flood storyline following the debrief activities, including successes and lessons learned, captured in the Action Plans.

What went well & needs protection:

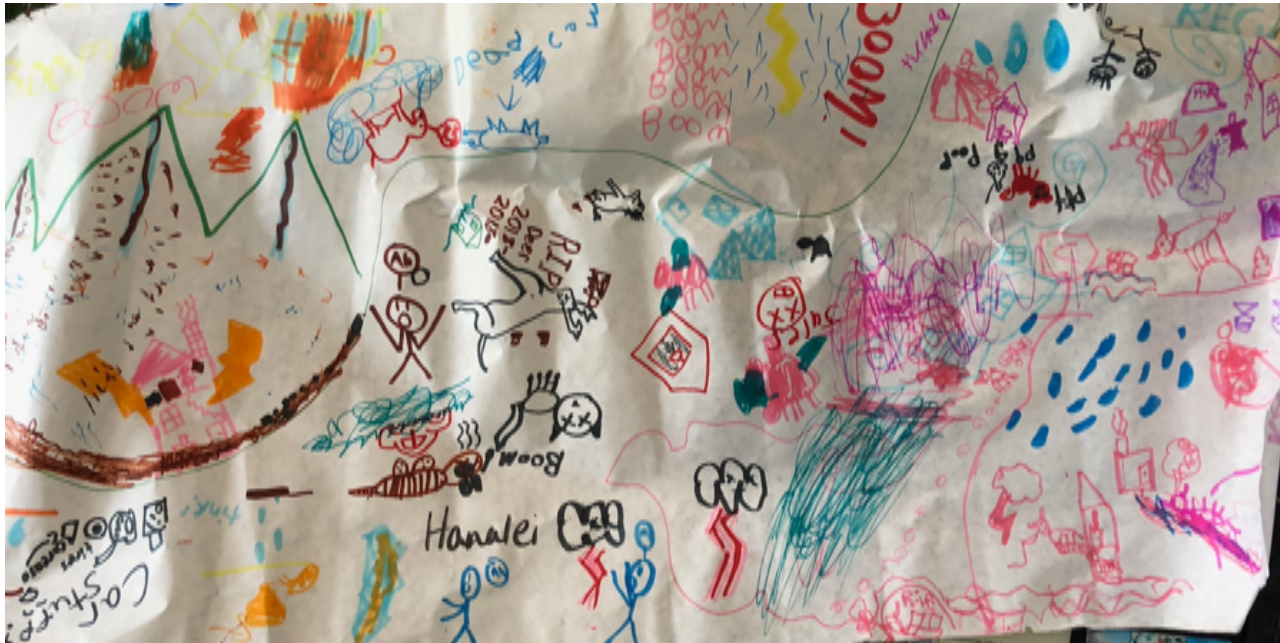
- **Natural community leaders stepped up** using their own skills, resources and know-how to support community response, rescues, evacuation, relief and recovery.
- **Having a disaster resilience plan & committee in place that knew their kuleana in a disaster, helped with disaster response & relief coordination.**
- Having external first responder, government and non-governmental organization connections within the disaster resilience committee improved logistics, accessing and sharing on-the-ground information with the Emergency Operations Center.
- **Resilient recovery policies and interventions must balance current and future economic, educational, social and environmental justice and restoration goals, while protecting the community rebirth and reconnection** from restricted visitor access.

Lessons learned and areas of growth:

- **Protecting and respecting community-centered planning** is critical to **ensuring a sustainable, equitable and resilient recovery process**, and not undermining local leadership, capacities and values; **all recovery entities and funds must respect this process and cultural protocols.**
- **Strengthen the disaster preparedness and response skills training and emergency kit resourcing** for the disaster resilience committee, to improve community-led preparedness, response and relief communications and coordination.
- **Improve trust and communications platforms and agreements between government and community;** enable response decision-making authority for vetted disaster resilience committee community leaders.

Outputs from this phase will include: 1) updated risk and resource maps; 2) updated action plans for preparedness, response/relief and recovery (Policy and action recommendations); 3) an updated communications plan & coordination resources; 4) updated community leadership contacts; and, 5) staged disaster go-kits and stationed kits around the community to support local response.

Figure 13. Children’s Activity: Experiences in the April 2018 Flood



Research-Informed Recommendations Across the 3 Phases

It is critical to engage diverse stakeholders from community, alongside collaborative partnering agencies, organizations and groups. Community-based resilience planning will have a higher probability of success if stakeholder-driven descriptions of their communities, inherent resources systems and the issues of concern (Abarquez and Murshed, 2004; Adger, 2003; TRIAMS, 2006; USAID, 2007) can be formalized into a set of scenarios that capture the major uncertainties in the system’s future dynamics (Walker et al., 2002). To adapt to change, communities must be able to anticipate a problem, collect and share knowledge about it, reflect, and together develop a shared vision for action (Tschakert and Dietrich, 2010). Tools and processes that promote such interaction in an organized and participatory manner are limited (Gray et al., 2013a; Walker et al., 2002).

Anticipatory learning that addresses adaptation is expected to increase community understanding and the ability to respond to system crises and shocks (Tschakert and Dietrich 2010). Community disaster planning should provide opportunities for stakeholders to communicate iteratively (Osbah, 2007), evaluate risks and mitigation options (Leary et al 2008), learn from mistakes (Adger, 2003) and innovate (Armitage, 2005) amidst uncertainty, emerging events, past, present and future conditions (Nelson et al., 2007) and new information (McGray et al., 2007).

To foster social-ecological resilience research and planning at the community level, collaborative support should be given to local initiatives and organizations already working to enhance local resilience. Recommendations identified in this research address differential social vulnerabilities, which center primarily on community-based coping and adaptive capacity-building and leadership development to support community-wide awareness, preparedness, response and recovery planning. Interview and survey results show that rebuilding a sense of community is key to enhancing coping capacity. Attention must be paid to underrepresented populations, persons with special needs and populations in high hazard exposure areas. These efforts have been targeted for collaboration and integration with parallel governmental, non-governmental and community group efforts, in order to address cross-sector gaps through place-based solutions. Disaster preparedness and relief agencies positioned to offer trainings, education and resources should be leveraged to increase coping and adaptive capacity. Staging of resources and training of local residents enhances self-sufficiency and the capacity to respond and recover with less dependence on external aid.

This framework (Fig. 1) illustrates the multiple sectors and targets included within this community-centered resilient recovery, natural resource management and climate adaptation planning process.

Through the resilient recovery planning process workshops, community events and meetings from November 2018 to April 2019 and beyond, the Hanalei to Ha`ena Community Resilience Committee, community members and partners will continue to advocate to address the identified needs for immediate, mid- and long-term recovery and adaptation. In the next round of community workshops in the spring, these results will be reviewed through participatory mapping and action planning activities, in order to facilitate discussion of nexus win-win resilient recovery strategies, including policies and activities or interventions that balance social, economic and environmental response, relief and recovery goals for which additional funding and advocacy will be solicited.

“Resiliency in the context of disaster recovery strives to balance expediting reconstruction and rapid return to normalcy with building back safer, healthier, and more equitable communities that are better able to absorb, recover from, and successfully adapt to future adverse events”

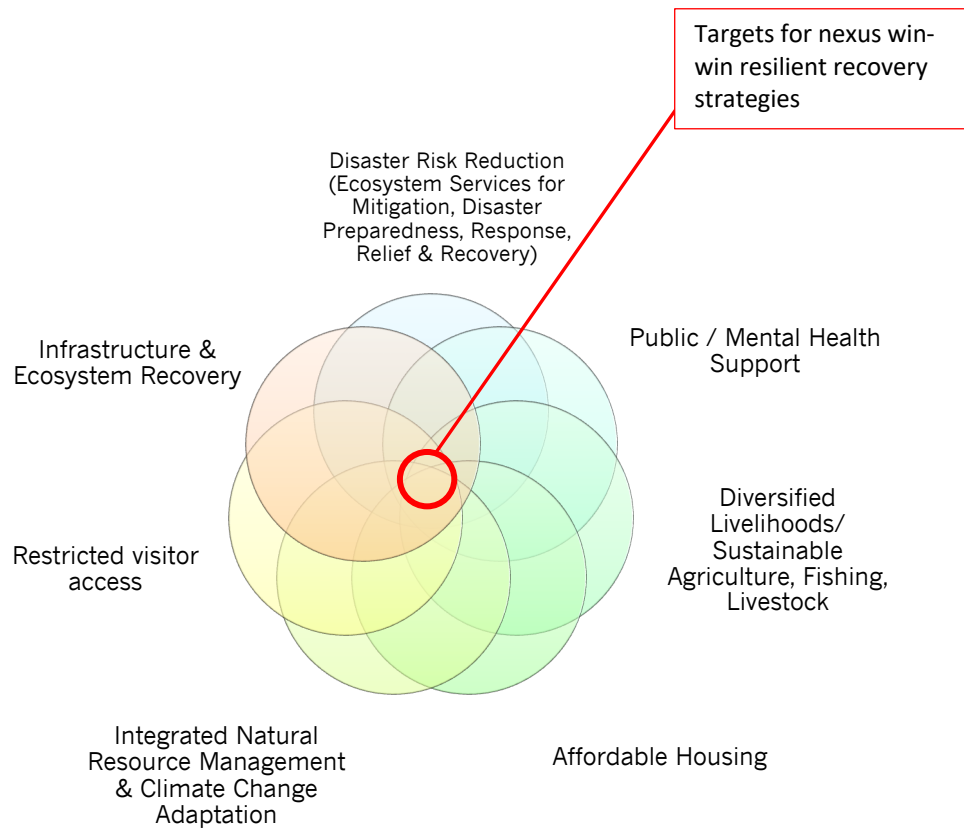


Figure 14. Community-centered Resilient Recovery and Adaptation Framework

Section 2. Action Plans for Preparedness, Risk Reduction, Response, Relief and Recovery

Based on the results above and the participatory planning process, through a series of participatory workshops with the committee, committee members developed a collaborative setting to establish resilience planning goals and objectives. Within the Disaster Resilience Team (formerly an Advisory Committee), smaller working hui were formed to address particular issues based on findings from the Community Vulnerability & Resource Analysis (Outcome 1) and directly informing the Community Hazard & Resource Maps (Outcome 2) and the Action Plan (Outcome 3), as discussed in Part III.

Community-based Definitions, Purpose, Mission & Vision

Disaster resilience can be understood as the ability of a system, such as a community, to cope and adapt to severe stressors like disasters and severe environmental shifts and degradation such as impacts from climate change, using their own resources, skills, knowledge and networks. It is critical that resilience-building be developed through an integrated bottom-to-top and lateral approach, to engage citizenry and multiple stakeholders, establish cross-boundary relationships and networks, and leverage resources in disaster and climate change adaptation planning. Community-based disaster resilience and climate change adaptation planning facilitates local identification of vulnerabilities to hazards and climate change, as well as enables establishment of local values, assets, resources, skills and knowledge which will support a community's coping and adaptive capacity.

Defining Resilience

The committee worked to define what resilience meant to them and how to work towards becoming more resilient to disasters:

What is resilience?

The ability to recover, bounce back or adapt after a disaster or big change.

To be Resilient:

Involves people, government, place; is an ongoing process; is locally defined & planning for the future.

In addition to a local definition of resilience, the following purpose, mission and vision were developed with the Disaster Resilience Committee.

PURPOSE: The rationale for development of the Action Plan was to understand current demographics and dynamics of community and what they mean for local resilience to disasters, including identifying vulnerable and resilient populations and areas, and developing an Action Plan and Community Risk & Resource Maps to promote local resilience.

MISSION: Implement & sustain the Hanalei to Hā`ena community-based disaster resilience plan & committee.

VISION: The isolated, rural coastal communities of Hanalei to Hā`ena are safe and resilient to natural hazards, the impacts of climate change and social, cultural, economic, developmental and environmental threats.

Approach

The approach used was Community-based Participatory Research & Learning, which draws from many disciplines, engages stakeholders from community and government, non-government and community-based organizations, in order to develop sustainable collaborative goals and outcomes.

The Hanalei to Hā`ena Community Disaster Resilience Advisory Committee previously included the following stakeholders:

- Community members from Hanalei to Ha`ena
- Hanalei Watershed Hui
- Hanalei to Ha`ena Community Association

- Governor State of Hawai'i
- Kauai County Mayor Kawakami
- State of Hawai'i Department of Land & Natural Resources, State of Hawai'i
- State of Hawai'i Department of Transportation
- State of Hawai'i Department of Health
- University of Hawai'i @ Mānoa, Department of Natural Resources & Environmental Management, College of Tropical Agriculture & Human Resources
- County of Kaua'i Police & Fire Department, Civil Defense, Council
- E Alu Pū (Move Forward Together), Kua (kua 'āina ulu 'auamo)
- National Oceanic & Atmospheric Administration (NOAA)

The Hanalei to Hā`ena Community Disaster Resilience Team

Since 2008, community members and the Hanalei Watershed Hui have collaborated with local organizations, businesses and government stakeholders to support community-based disaster resilience, or the ability to be prepared for, reduce risks to and overcome disasters better together. We are continuing this work and looking to recruit and train more volunteers to strengthen community resilience to disasters and climate change.

Community volunteer leadership for the Hanalei to Hā`ena Community Disaster Resilience Team includes two types of smaller teams that work closely together (**see figure Emergency Communications Structure**).

The first team is at the community-wide disaster coordination level, and includes 1-2 alternating/back-up positions for six positions which are in charge of their respective teams (if applicable): 1) the Community Disaster Coordinator; 2) an Emergency Operations Center (EoC) Liaison; 3) a Public Information, Outreach and Safety Team Captain; 4) a Spontaneous Volunteer and Donations Management Team Captain; 5) an Operations, Communications and Logistics Team Captain; and, 6) a Finance/Fundraising and Administrative Team Captain.

The second team includes neighborhood or “zone” disaster resilience teams for each of the 9 zones or community areas that get cut off during landslides and flooding, and these teams include five positions with 1-2 alternating/back-up people, including: 1) a Zone Captain coordinating the Zone Disaster Resilience Team; 2) Emergency Communications and Logistics hui; 3) Evacuation, Early Warning and Transportation hui; 4) Mass Care (Shelter/Feeding) hui; and, 5) Public Health (Emergency Medical Services/First Responders) hui. Communications happens between zone captains across zones, and between zone captains and up to the Disaster Coordinator through in-person, cell phone and/or 2-way FRS radio communications.

The role of a Zone Captain is to support and lead community disaster resilience efforts before, during and after a disaster, by coordinating your Zone Disaster Resilience Team, coordinating across all Zone Teams and with other partners, and using the Disaster Action Plan, Maps and Go-Kits, and your networks and skills.

Zone Disaster Resilience Team Volunteers engage in the following roles and responsibilities before (planning) and during/after (response) a disaster:

Sheltering & Feeding (Mass Care) Hui: PLAN: Identify & secure potential shelter & feeding venues;
RESPOND: Shelter & feeding site management

Emergency Medical Services/First Responders Hui: PLAN: Support identification of potential emergency landing zones, areas for mass care/triage & medical volunteers, **RESPOND:** Coordinate with other hui to respond to medical emergencies (and evacuation) during disaster

Emergency Communications & Logistics Hui: PLAN: Improve & practice communications plan and radios.
RESPOND: Provide communications and logistics support for community disaster response, particularly for shelters, feeding sites, emergency medical responses & staging areas

Evacuation (including checking on vulnerable households), Transportation & Early Warning Systems

(EWS) Hui: PLAN: Coordinate with Transportation & Civil Defense to plan locally-effective early warning and evacuation; **RESPOND:** Support with early warning (through social media, verbal messages, among others) to alert and support evacuation of visitors and residents.

Fundraising, Financial Oversight & Administration Officer or Hui: PLAN: Support fundraising for ongoing plan implementation, funding of staging area supplies, for public events. **RESPOND:** Support disaster response by organizing donations (receiving & distributing).

What is in a Zone Captain Go-kit?

Emergency Supplies will be provided in a backpack, to be used by Zone Captains and other respective leadership to ensure your survival and ability to serve as Zone Captain during and after a disaster. This should not supplement any personal supplies the Zone Captains need for yourself during a disaster, nor your household preparedness kit. These are owned by community and must be maintained and cared for as such, after signing a Memorandum of Understanding.

Target Audience and Users, Public Awareness

This plan is intended to guide the Planning Committee's disaster resilience efforts over time, as well as to inform the public and collaborating stakeholders. It may also offer guidance and best practices for other communities to adapt and utilize for their disaster resilience planning. Through outreach and public awareness of the developed Plan and associated outcomes (e.g. community hazard and resource maps, action plan policies and programs, etc.), community members and partnering agencies will be engaged in continued disaster planning. Public outreach will occur through public educational events, disaster training education through partnering agencies, television (i.e. on the visitor information channel "we care about our visitors" info on hazards & safety), public meetings and Mayor's talks, and maintenance of the Plan social media outlets and communications strategies, public workshops and educational materials distribution.

Implementation, Monitoring & Evaluation Strategy & Sustainability

Continued implementation, monitoring and evaluative updating of the Community Hazard & Resource Maps and the Action Plan is supported by the How-To guidance in the Appendix and continued capacity-building, and will be informed by continued bi-monthly Committee meetings and participatory workshops, culminating in an annual Plan update. Recommendations may be policy, programmatic or institutional-level, and will be reflected in the Action Plan and any other outcome documents that are generated. The long-term sustainability of the plan convening will be led at the grassroots-level by the Hanalei to Hā`ena Community Association, with support by the Hanalei Watershed Hui.

HANAIEI TO HĀ'ENA COMMUNITY DISASTER RESILIENCE ACTION PLAN, PRINCIPLES & TOOLS

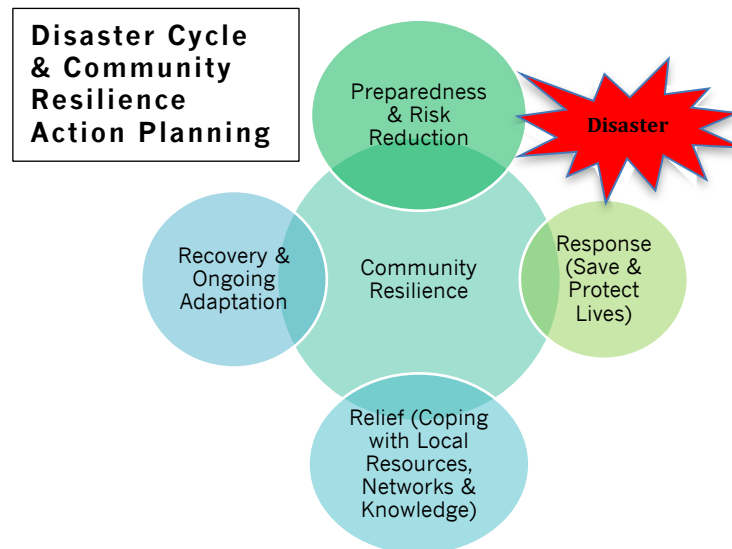
Purpose & Background

This Action Plan forms the basis of the larger Hanalei to Hā'ena Disaster Resilience Plan, in order to guide community-based disaster preparedness, response, relief and recovery activities and address identified risks and vulnerabilities, utilizing and building upon stakeholder knowledge and resources through activities, programs and other recommendations. The Action Plan is driven by community-based research and planning processes and with guidance from the Hanalei to Hā'ena Disaster Resilience Committee and its Working Hui, which address particular topical issues. The Action plan should be monitored and evaluated quarterly to revisit activities and goals, identify the status of accomplishment of particular action items, retire completed items, and establish new priorities.

Structure

- Specific problems were identified, focusing on the gaps in preparedness and the underlying root causes of vulnerability
- Goals to address the root causes of these gaps and problems are in italics at the top of each issue
- Actions taken by the Working Hui to achieve the goals include policy or programmatic recommendations, call for funding, and others
- Many issues are cross-cutting and require participation and cooperation of more than one hui, and the status of the action item is indicated
- The Action Plans are divided by Phases: 1) Ongoing Preparedness & Risk Reduction; 2) Response/Emergency Management & Relief; 3) Relief
- The Hui responsible for working on the action items are indicated in the Appendix and may include: 1) Fundraising, Finance & Admin Hui; 2) Disaster Volunteer Management (spontaneous & regular); 3) Emergency Communications & Logistics; 4) Mass Care (Shelter & Feeding); 5) Early Warning System, Evacuation & Transportation; 6) Public Outreach & Awareness Hui; 7) EMS/Search & Rescue/First Responder; and, 8) Disaster Planning.

Action Plan 1: Preparedness & Risk Reduction
Sharing the Plan with all community members, encouraging them to review and implement the plan; mobilize resources needed; conduct disaster preparedness training and raise awareness; monitor disaster threats, conduct drills and draw lessons to improve plan; network and coordinate with government mgt. and other communities; engage in advocacy and lobby work regarding disaster mgt. and development-related issues; expand membership and involvement in community.
Action Plan 2: Response/Emergency Management & Phase 3: Relief
Depending upon the hazard event or particular emergency, activate the Community-based Disaster Management Structure through the designated communications plan; Issue Warnings; Support Evacuation, sheltering & feeding; support Search and Rescue with FD, CERT and community participation; Provide First Aid & support subsequent medical assistance; conduct damage assessments and report for assistance. Coordinate, plan and implement relief delivery operations with aid agencies, donations and spontaneous volunteers.
Action Plan 4: Recovery
Facilitate social, economic & physical rehabilitation of community (livelihoods, trauma counseling, reconstruction); coordinate receiving assistance; evaluate performance of plan & committee/group and identify areas for improvement



Hanalei to Hā`ena Community Disaster Resilience Plan Working Hui Roles & Responsibilities

Sheltering & Feeding (Mass Care) Hui

- **PLAN:** Identify & secure potential shelter & feeding venues
- **RESPOND:** Support shelter & feeding site management during disaster

Emergency Medical Services/First Responders Hui

- **PLAN:** Support identification of potential emergency landing zones, areas for mass care/triage & medical volunteers
- **RESPOND:** Coordinate with other hui to respond to medical emergencies (and evacuation) during disaster

Emergency Communications & Logistics Hui

- **PLAN:** Improve & practice communications plan and radios
- **RESPOND:** Provide communications and logistics support for community disaster response, particularly for shelters, feeding sites, emergency medical responses and staging areas

Evacuation, Transportation & Early Warning Systems (EWS) Hui

- **PLAN:** Coordinate with Transportation & Civil Defense to plan locally-effective early warning and evacuation of residents and visitors (potentially 1 captain/household responsible for warning 10 neighboring households)
- **RESPOND:** Support with early warning (through social media, verbal messages, among others) to alert and support evacuation of visitors and residents (priority for _____???)

Fundraising, Financial Oversight & Administration Hui

- **PLAN:** Support fundraising for ongoing plan implementation, funding of staging area supplies, for public events, etc.
- **RESPOND:** Support disaster response by organizing donations (receiving & distributing).

Principles for Community Preparedness, Response, Relief & Recovery

The following principles are to be understood and agreed to by community responders, government agencies, non-profit organizations, faith-based groups, private sector and any others involved in this work.

These principles frame the following Disaster Resilience Action Plans, and are informed by emergency management protocols, community engagement ethics and environmental protection guidance.

Principle 1. Emergency response efforts **prioritize the safeguarding of life**, first and foremost, as well as the protection of public health, the environment, social, cultural and economic resources, and public and private property.

Principle 2. Emergency/Disaster **response is done in a way that reinforces the importance of household and community-wide preparedness and self-sufficiency** for at least 72 hours;

- Principle 3.** Emergency **preparedness, response and relief work utilize these Action Plans, resources and tools** to support local preparedness, minimization of potential effects of the emergency on people through early warning, evacuation and emergency communications and coordination.
- Principle 4.** Emergency efforts **leverage use of all available resources** (local, non-local, public, private)
- Principle 5.** Ensure that the **response and relief work is community-driven** and done in partnership with this plan, committee and leadership in ways **that don't undermine community, the environment, the economy and future resilience**
- Principle 6.** Disaster **assistance is prioritized for the most vulnerable, affected and in-need, and ensures community accountability** that prohibits hoarding, stealing and other unethical behaviors that aren't pono.
- Principle 7.** Community-based, Eco-Solutions for **Resilient "Green" Recovery** will:
- **Ensure "Do-no-harm" to people and communities** recovering from disaster by addressing environmental sustainability
 - Recognize that **addressing the environment has multiple benefits** for livelihoods, risk reduction, wellbeing
 - Support **community ownership, diverse partnerships**
 - **Build back safer** to future hazards/climate change
 - Be **solution-oriented, and think long-term, promoting climate change adaptation measures** as part of recovery
 - Emphasize the **use of local knowledge**
 - **Reduce current & future vulnerabilities, and**
 - **Implement protective policies and actions**

Community Risk, Resource and Response Maps for Flood/Hurricane and Tsunami

Through committee participatory workshops and individual interviews, Community Hazard and Vulnerability Maps were developed to inform identification of community hazards and potential exposure of people and places to the impacts, along with community assets (i.e. facilities, materials and supplies, land, etc.), environmental resources and persons with knowledge. This facilitated a more comprehensive perspective on a community's strengths, weaknesses and opportunities for reducing risk and enhancing capacity, and informed the Action Plan disaster preparedness, response, and relief and recovery activities.

Detailed instructions on the participatory mapping process are in the Appendix 7a-g. In summary, first a basemap was created for all maps, to include basic features (e.g. roads and bridges, rivers, infrastructure, houses, census tracts, etc.), followed by the addition of hazard layers (i.e. flood, tsunami and hurricane) and identify areas at-risk to isolation due to landslide, rock fall, flooding and closed roads. And finally, utilizing a tool called e-beam, additional layers were created to

map staged resources including evacuation routes and staging areas, sheltering and feeding venues, among other resources. Utilizing maps facilitated discussion with land and business owners, organizations and residents in securing agreements for use during and after a disaster.

All maps are located in Appendix J.

Community Disaster Preparedness, Response & Relief Resources & Tools


In addition to the maps, the following Action Plans are meant to be utilized in conjunction with the following tools as part of a broader community disaster response go-kit resource, including:


- Appendix A. Emergency Communications Plan
- Appendix B. Community Disaster Leadership Contact Roster by Response Zone & Working Hui
- Appendix C. Community Resource Mapping List
- Appendix D. Disaster Response Kit Lists
- Appendix E. North Shore Incident Report
- Appendix F. North Shore Intake Form-HHOOH
- Appendix G. Personal Disaster Go Kit List
- Appendix H. Family Communications Plan
- Appendix I. Radio Equipment Disaster Go Kit List
- Appendix J. Community Risk & Resource Full Maps: Tsunami & Hurricane/Flooding


Action Plan 1. Preparedness & Risk Reduction


Disaster cycles are not linear, and preparedness and risk reduction require ongoing community kuleana and kokua. Based on over ten years of participatory community workshops and research, this first plan focuses on addressing the most important preparedness and risk reduction measures in Hanalei to Hā`ena communities. This includes laying out action items and policies (📄) for sustaining the plan, the Committee and the working hui to foster ongoing community mobilization around this Plan, and increase the resources and capacity for local response, relief and recovery.


The preparedness and risk reduction action plan also includes: raising awareness of the Plan; increasing individual and household preparedness support disaster preparedness, response training and raising awareness, knowledge and skills; monitor disaster threats, conduct drills and draw lessons to improve plan; network and coordinate with government management, civil society organizations and other communities; engage in policy and advocacy actions indicated in the Plan or as new issues arise for reducing risk; and expand membership and involvement in community.




Issue	Actions/Steps	Hui (Lead)	Status
 <p>Disaster Resilience Plan Sustainability & Coordination</p>	<p><i>Goal: Update & maintain the Disaster Resilience Plan through participatory workshops, meetings and public disaster fairs</i></p> <ul style="list-style-type: none"> - Strengthen volunteer community-based Disaster Resilience Committee as unified and coordinating voice of community before/during/after disaster - Establish disaster response “zone captains” for each isolated community, identify point people/teams at distribution points, update & practice response action plan - Identify & coordinate planning with other local plans that relate to this process; notify/engage representative community members, agencies, organizations & stakeholders in the process - Join county VOAD—be Community Committee’s Liaison to VOAD—will give us more access to VOAD activities we can leverage & give us visibility - Publicize disaster plan to community, organizations and businesses, government officials: <ul style="list-style-type: none"> • Facebook, twitter & committee website (include info on meanings of terms (what do advisory, watch and warning mean?), types of shelters (evacuation vs. congregate care vs. refuge area, etc.), • Community Resilience Fair • Ho’ike broadcast • Create a disaster preparedness education video to show on Channels 54 and 6 (e.g. “Get Ready Hawaii” YouTube video (Kaua`i-wide) • Provide emergency & disaster information: evacuation map, on visitor website, county website, other high-traffic venues (Focus on technology (smart phones) and online resources) phone alert and materials in TVR’s, hotels, and in visitor shops, bars and restaurants 	<p>Disaster Plan Development Hui with Public Outreach & Awareness Hui</p>	<p>Complete June 2019</p> <p>Ongoing to maintain plan</p> <p>Ongoing</p> <p>Ongoing</p> <p>Complete, ongoing</p> <p>Complete, ongoing</p> <p>Complete TBD TBD</p> <p>Planned</p> <p>Planned</p>


	<ul style="list-style-type: none"> • Improve communication via VOAD, 211 or directly with Red Cross to advise if people will use shelters so they have time to remain open • Develop online internal/confidential repository for data/document sharing amongst Disaster Resilience Committee • Transition Disaster Planning to HHCA for long-term sustainability and maintenance build capacity to update plan and maps (utilizing Appendix) 		Planned Complete Planned
	Actions/Steps	Hui (Lead)	Status
 <p>Early Warning System & Evacuation</p>	<p><i>Goal: Evacuate visitors from North Shore hazard zones through targeted Early Warning & Evacuation measures.</i></p> <p>Develop a system of accountability for ensuring Early Warning & Evacuation:</p> <ul style="list-style-type: none"> • Identify & Confirm Evacuation Alert Points: places to inform visitors to evacuate (e.g. check points at hiking areas and parks, beaches, stores and restaurants/bars, sign at lookout/Princeville advising not to proceed down road if it may close • Improve public and Committee subscription to apps, local news, radio, all alerts that can receive through text, cell • Work with County Parks/Rec, KVB to identify best strategy to alert/evacuate hikers • Develop evacuation map and routes and protocols (dependent on County evacuation plan) through workshops: • Develop evacuation plan through partners • Test & refine evacuation plan through committee and community • Coordinate evacuation routes and plans with Hanalei School (4-level procedures) & pre-schools • Once routes established, need evacuation signage, more education & public awareness around new evacuation zones, routes, etc. • Work with local businesses, restaurants, hotels, etc. to communicate evacuation warnings • Ensure evacuation plan prioritizes visitors to be blocked from coming in, and to be routed to airport • Need to understand KKCR/FEMA/Skywarn spotters/SirenNet policy (local liaison protocol?) for early warning alerts <p>TVRs (legal) & VRBO & TVRs (unregistered):</p> <ol style="list-style-type: none"> 1. Identify TVR's with land line phones &/or cell phone contacts 2. TVR Managers to find out more information on getting all TVR home phones access to State Civil Defense Emergency Alert System; 3. TVR managers to get a uniform updated list of rental units (includes VRBO? campsites?) (utilize HTA website Visitor Industry Plant Inventory) 4. Create a call-down alert system: TVR owners or property managers? 	<p>Evacuation, Transportation Hui & EWS Hui</p> <p>Emergency Communications, Logistics Hui & Public Outreach & Awareness Hui, Disaster Coordinator</p> <p>Evacuation, Transportation & EWS Hui</p> <p>Public Awareness & Outreach <i>working with</i> Communications & Logistics Hui</p>	<p>Planned</p> <p>Complete, ongoing Planned Planned</p> <p>Planned Planned Planned</p> <p>Planned</p> <p>Ongoing</p> <p>Ongoing</p> <p>Planned</p> <p>Ongoing, Planned</p>

	<p>5. Support compliance with the TVR Amendment to the Interpretive Administrative Rules of the Planning Commission (2017) “For those Transient Vacation Rentals located in the tsunami evacuation zone, advertising must include information that the transient vacation rental is located in the tsunami evacuation zone and of the corresponding procedures (and) a dated, updated copy of the "For Your Safety and Comfort" information document provided to vacation rental tenants”.</p> <p>Propose protocols/policies for:</p> <ol style="list-style-type: none"> 1. Expedited Evacuation out of Hanalei to Hā’ena areas (i.e. one-way traffic only) (Raise awareness on State Legislation from 2014 that enables public egress on private property during emergency declarations (to free up land for evacuation, sheltering, waterways/debris management) 2. Restricting re-entry into hazard zones pre and post-disaster (i.e. into Hanalei from bridge during potential road closure and post-disaster to ensure local safety and recovery 3. Establish helicopter evacuation disaster rates per seat (with prioritization for persons not luggage unless essential medical or other supplies) to prohibit/discourage price gouging (check current gouging law) <ol style="list-style-type: none"> a. Need variance for landing on North Shore (need planning commission approval) b. Get visitors to war memorial, KCC or other designated refuge area/hurricane shelter, etc. depending on hazard; eventually evacuate visitors to airport c. Divide island by sections, each has a responsible evacuation plan? d. Need more accurate counts of visitors (daily/weekly/monthly) over different seasons to estimate # people at risk e. Need advanced pre-approved procurement process/vetting list of vendors with preference for local companies, including trash hauling, debris removal f. Need quick RFPs to allow for faster spending of government emergency funds by community groups 		<p>Complete, Ongoing</p> <p>TBD</p> <p>TBD</p>
	Actions/Steps	Hui (Lead)	Status
 <p>Visitor Awareness & Education</p>	<p><i>Goal: Increase Visitor Awareness & Education on Local Hazards</i></p> <p>Address the challenge that visitors pose, as they lack awareness and knowledge of the natural hazards in the area, are disconnected from early warning systems and are unaware of how and where to evacuate to, and, are unprepared and lack local networks and resources, presenting a burden on community members and resources [Check new TVR County Law for required measures]</p> <ul style="list-style-type: none"> • Establish designated people counters to record evacuees by air and boat. <p>Put in place policy and implementation measures for the following:</p>	<p>Public Awareness & Outreach Hui</p>	<p>Complete, Ongoing</p> <p>TBD</p>

	<ul style="list-style-type: none"> ○ Mandatory posting of disaster flyers inside all TVRs and hotels including hazard, preparedness information and resources, emergency contacts, etc. ○ Multi-hazard map with evacuation routes & protocols (including KCD estimates of 3.5hrs to evacuate 4500 people across Hanalei bridge) ○ Amendments to County of Kauai TVR Ordinance ○ Required clause in all TVR/VRBO rental contracts notifying renters of risk to multiple hazards (specifics on “Acts of God”) ○ Emergency notification from property owners go-kit including basic supplies in all TVRs and hotels to ensure visitors are able to be 		Complete, Ongoing
	Actions/Steps	Hui (Lead)	Status
 <p>Community Awareness, Knowledge & Skills</p>	<p><i>Goal: Increase community awareness, knowledge, skills and practices of individual, household and community disaster preparedness, response, relief and recovery.</i></p> <p>Develop a Disaster Information Handout or Portfolio that is professionally done (small mail-out/clipboard size) including:</p> <ul style="list-style-type: none"> —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; —shelters/feeding/other resources —emergency preparedness pamphlets (short concise directives with large print); should be stuck next to phone/visually obvious place <p>Create a diversified public outreach & awareness campaign:</p> <ul style="list-style-type: none"> • Maintain the Disaster Resilience Facebook page • Create a Committee Website <ul style="list-style-type: none"> ▪ 1-3 persons posting/identify other administrators ▪ Post/stream official warnings/alerts and other information ▪ Increase education & public awareness on expectations for local preparedness (e.g. minimum of 3-7 days supplies for shelters) ▪ Post our Disaster Plan and/or Action Plan (need to determine what information is public and what should be kept within the committee) <ul style="list-style-type: none"> —Hold Annual Disaster Resilience Fair & Educational Events —Increase household preparedness and response awareness (community fairs, meet-the-scientists events, materials, trainings, videos, child-friendly educational events, checklists) —Host partner disaster education and training classes (American Red Cross, CERT, First Aid & CPR) —Television show on how to do CPR/first aid; Have locals with experience in disasters talk story and share their lessons learned 	Public Awareness & Outreach Hui and Disaster Volunteers Education & Training Hui	TBD
			Ongoing
			Ongoing
			Complete
		Complete, Ongoing	
		Complete, Ongoing	
		TBD	

	<ul style="list-style-type: none"> • Establish Staging & Communications sites & Zone Captain Disaster Go-Kits: - Identify Staging & Communications SITES (& POC) to stage resources (Go-Kits) & people to coordinate committee disaster response - Equip Zone Captains with Go-Kits including identification to support local disaster response - Equip staged kits (containers or bins) across secure, strategic sites for local disaster response - Obtain, supply two portable trailers for staged equipment and supplies. - Have bi-annual go-kit and staged kit inventory reviews as part of standing HHCRP Committee / hui activities - Coordinate with Princeville for evacuated boats and vehicle storage. 	Emergency Communications, Logistics Hui & Public Outreach & Awareness Hui	Complete Ongoing
	Actions/Steps	Hui (Lead)	Status
 <p>Local Health Emergencies Preparedness</p>	<p><i>Goal: Identify resource lists for Local Health Emergencies if the road is closed or is inaccessible</i></p> <ul style="list-style-type: none"> • Identify a community coordination center / site for an ambulance/medical station in Hanalei & Hā'ena (for Floods) like a volunteer fire department (Need a durable/hazard resistant site for disaster response coordination--County could acquire the lots near Naue (Property at Kepuhi Point) for stand-up of temporary emergency services and shelters &/or establish a new disaster coordination building) (Done—Wainiha Community Resilience Center TBD 2021) • Consider staging medical triage centers at: <ul style="list-style-type: none"> ○ Hanalei School ○ Hanalei Colony Resort ○ Courthouse, West side of bridge, etc. including: <ul style="list-style-type: none"> ▪ helicopter landing areas for medevac (need to f/u) ▪ boat/jet ski landing areas (need to f/u) • Identify and recruit local health workers (doctors, nurses, first responders, first aid and CPR certified individuals) who can help respond to health emergencies in a disaster (Makana Clinic Training) • Formalize community Search & Rescue group • Utilize the Communications Plan to call-down medically-trained locals utilizing the local resources in the Resource Mapping database or others: <ul style="list-style-type: none"> ○ Medical Emergency Resources: Identify, network and have a call-down for local doctors, firefighters/search and rescue, EMS workers, lifeguards, and those with counseling, first aid, child care or other skills, etc. to have local medical services available and deployable in a disaster (Need to understand legal issues with non-Hawaii medical practitioners assisting during a disaster) • Increase # people trained in First Aid, CPR & AED/defibrillator use 	Emergency Medical Services/ First Responder Hui <i>with</i> Communications & Logistics Hui Disaster Volunteers Education & Training Hui	Complete, Ongoing Ongoing Planned Planned Planned Planned

	<ul style="list-style-type: none"> - Need to engage lifeguards as they are first aid/CPR trained and good at extricating folks - AMR representative offered to train committee on First Aid/CPR/AED operation? 		
	Actions/Steps	Hui (Lead)	Status
 Sheltering	<p><i>Goal: Raise awareness of hurricane shelter/s (outside of Hanalei to Hā`ena) and local non-hurricane gathering areas (for tsunami) and post-impact shelter/gathering areas for residents of Hanalei to Hā`ena.</i></p> <ul style="list-style-type: none"> o Raise awareness of residents of nearest hurricane shelters o Get access to Hanalei School (new point of contact and keys) to use as staging center and/or shelter (for non-hurricane events) o Identify temporary structures that may be used as shelters o Identify large fields and tents for shelter during longer-term tsunami or flood evacuations (coordinate with Civil Defense) o Pre-stage tarps & tents, storage locations, how many people we have to house, and what structures will remain in specific scenarios o Raise awareness on locations of shelters under different hazards 	<p>Sheltering & Feeding (Mass Care) Hui & Public Outreach & Awareness Hui</p> <p>Public Outreach & Awareness Hui</p>	<p>Ongoing Planned</p> <p>Ongoing Complete</p> <p>Ongoing</p> <p>Ongoing</p>
 Feeding & Water, Sanitation & Hygiene	<p>Identify potential feeding venues, potential sources of catering service & food supplies, food storage, food distribution centers & networks:</p> <ul style="list-style-type: none"> • Pursue catering surveys/agreements (as needed) via Red Cross and/or hui members for (formal and informal) feeding venues • Once identify feeding venues, need estimate of # meals/day for # days • Include local restaurants' resources (generator, ice machine, freezers, gas grills, etc.)—capacity and willingness to feed people? 	<p>Sheltering & Feeding (Mass Care) & Disaster Plan Development</p>	<p>Ongoing</p> <p>Planned Complete</p>
	Actions/Steps	Hui (Lead)	Status
 Communications & Logistics for Local Disaster Coordination	<p><i>Goal: Build local capacity for communications & logistics critical for effective disaster preparedness and response.</i></p> <ul style="list-style-type: none"> • Set up Internal communications for the committee's disaster planning • Identify method of internal planning & communication: —Email & phone c/ Working Hui • Online interface: for internal information storage (sharing and updating documents): Basecamp, Webpage (Wordpress, Square Space, GoogleDocs, Huddle) <p>Formalize emergency communications plan:</p> <ul style="list-style-type: none"> • Support community-led disaster communications and coordination through the Plan's Working Hui, pre-establishing and practicing on different platforms (including non-digital) 	<p>Public Awareness & Outreach Hui & Fundraising/Finance/ Admin Hui</p> <p>Evacuation, Transportation & EWS Hui</p>	<p>Complete, ongoing</p> <p>Complete, Ongoing</p>

	<ul style="list-style-type: none"> • Establish platforms and training in coordination with community leaders & VOAD • Support disaster resilience team volunteers to get trainings on CERT, CPR, First Aid & Supply Chain Management, emergency communications • Leverage social media & texting to coordinate emergency response in the future • Equip go-kits with appropriate emergency communication tools (e.g. radios, transmitters & BGANs for WIFI connection hotspots, HAMM radios and charging stations and gateway devices) • Increase redundant communication methods, resources and training needed for disasters - Create multiple strategies and sites for emergency & disaster communications to coordinate local disaster response <p>Maintain the Disaster Communications Plan (Protocol & Hierarchy)</p> <ul style="list-style-type: none"> • Identify committee’s disaster response lead/s who will be responsible for coordinating committee’s disaster response communications, shelter & feeding (e.g. need to live/work locally if possible, alternating 12hr shifts) have on-call list every two weeks such as using Doodle, have everyone’s contact info • Need to understand protocol for communicating information between communities & from community-level to County/State (RACES/ARES) using ICS as a model <ul style="list-style-type: none"> - Bulletin boards/community meeting sites at various locations - Get access to community safe and sound database • Train Committee on Communications Equipment Use & Protocol <ul style="list-style-type: none"> - Connect with local HAM radio operators (Contact Bob Anderson/Tad for more HAM info); Update HAMM radio list (some folks on it are deceased); Identify CERT & other folks that may have HAM license - Train & stage HAM radio & SatPhone operators, FRS radio operations - Leverage committee’s external communications • Run Tabletop Exercise (TTX) testing communications plan 	<p>Emergency Communications, Logistics Hui, Zone Captains, Disaster Coordinator</p> <p>Emergency Communications & Logistics Hui (/KFD)</p>	<p>Complete, Ongoing</p> <p>Planned, Ongoing</p> <p>Planned, ongoing</p> <p>Planned, ongoing</p> <p>Complete</p> <p>Ongoing</p> <p>Complete, ongoing</p> <p>Planned</p> <p>TBD</p> <p>Planned</p> <p>Complete & planned</p>
	Actions/Steps	Hui (Lead)	Status
 <p>Community Risk & Resource Maps</p>	<p><i>Goal: Update participatory risk & resource maps of for hurricane/flood and tsunami to guide disaster planning</i></p> <ul style="list-style-type: none"> • Identify landowners of tsunami refuge areas • Develop flood/hurricane maps • Link community resource & hazard maps with resource mapping databases • Identify & map tsunami evacuation routes & refuge areas • Formalize helicopter/aerial evacuation plan/sites • Formalize aid distribution points (boat & helicopter) • Establish tsunami evacuation routes & refuge areas: 	<p>Public Awareness & Outreach Hui</p> <p>Work with Evacuation &</p>	<p>Ongoing</p> <p>Planned</p> <p>Planned</p> <p>Complete</p> <p>Complete</p> <p>Complete</p>

	<ul style="list-style-type: none"> • Make planning considerations & do public awareness and outreach to persons with disabilities, special needs, including transportation • Have pre-determined assembly points, cache stash locations (Staging locations), shelters, special needs areas—for Hanalei School, work with Red Cross &/or school to have arrangements to utilize as shelter/staging site under different hazard scenarios • Support for critical relief distribution & evacuation points on public lands and waterways and lands (e.g. Wainiha river park) • Map ports of entry, distribution sites, evacuation sites by land, air and water (including Wichman and Robeson property access to stream) 	Transportation Hui	Planned Complete Ongoing Complete
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Action Plan 2 Emergency Response *and* Action Plan 3 Relief Plan / Checklist

Depending upon the hazard event or particular emergency, this Response & Relief Action Plan serves as a checklist to activate the Community-based Disaster Management Structure (See **Appendix A: Emergency Communications Plan**) and enact and adapt this Plan given local needs, resources and conditions. These emergency preparedness and response actions may include the following: Issue Warnings; Support Evacuation, Sheltering & Feeding; support Search and Rescue with FD, CERT and community participation; Provide First Aid & support subsequent medical assistance; conduct damage assessments and report for assistance.

Hazard & Timeline	EMERGENCY TASKS/DUTIES	Person/s Responsible
<p>TSUNAMI WATCH/ADVISORY</p> <p>Distant (8-22 hours)</p>	<p>Tsunami WATCH/ADVISORY Issued (or bulletin says “Civil Defense is Evaluating the situation”)</p> <p>Resource for tsunami travel times: https://www.ngdc.noaa.gov/hazard/tsu_travel_time_events.shtml</p> <p><i>Estimated travel times of tsunami to arrive in Hawaii based on origin, are: Honshu, Japan 8-9 hours, Hokkaido, Japan 7-8hrs, Russia 5-6 hours, Aleutian Islands Alaska 4-5 hours, Chile 14-15 hours, local earthquake/landslide-generated tsunami would arrive in an estimated +/-30 minutes</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Take care of personal/household emergency preparedness measures <input type="checkbox"/> Activate Emergency Communications Plan (Contact List + Hierarchy Chart) <input type="checkbox"/> Check go-kit (or staged kit if applicable) to make sure it’s good to go (charged, working comms, etc.) <input type="checkbox"/> DC to call down or mass text to Zone Captains and Working Hui to put volunteers on-alert <input type="checkbox"/> DC, Working Hui Leads check radio & official channels for emergency messages <input type="checkbox"/> Public Outreach & Awareness Lead monitor and update Facebook and Website pages with official DEM/SCD/NWS warnings as feasible, including warning visitors ASAP 	<p>Disaster Coordinator (DC)</p> <p>Working Hui Leads</p> <p>Zone Captains</p>
Hazard & Timeline	EMERGENCY RESPONSE TASKS/DUTIES	Person/s Responsible
<p>Tsunami WARNING</p>	<p>Tsunami WARNING Issued and/or as soon as Tsunami Sirens Sound (max 3 hours pre-landfall)</p> <ul style="list-style-type: none"> <input type="checkbox"/> DC to call down or mass text to Zone Captains/Working Hui to update status to warning & ensure zone captains are evacuating with their Go-Kits and have alerted their zone volunteers <input type="checkbox"/> DC to call down to Working Hui Leads to call-down their Working Hui members to be on-alert <input type="checkbox"/> Zone captains responsible for trailers have them moved to outside of the tsunami zone <input type="checkbox"/> KEMA & DOT to ensure the light at the bridge is greenlit for evacuation out of Hanalei <input type="checkbox"/> Get staged kits out of tsunami zone (trailer/bins) <input type="checkbox"/> Working Hui Leads, Zone Captains to grab evacuation go-kits (and personal kits) and deploy to tsunami staging/refuge areas <input type="checkbox"/> Emergency Warning, Evacuation & Transportation Working Hui to coordinate with CERT/Reserve Corps and other volunteers to direct local traffic to evacuation staging areas and to direct visitors out of the area <input type="checkbox"/> Zone Captains to coordinate with landowners to unlock gates for accessing tsunami refuge areas 	<p>Disaster Coordinator</p> <p>Emergency Communications & Logistics Hui</p> <p>Zone Captains</p> <p>Emergency Warning, Evacuation & Transportation Hui</p>

	<input type="checkbox"/> DC & Emergency Comms/Logs, all Working Hui Leads and 1-2 member/s deploy with go-kit to a Relocated (out of Tsunami Zone) <i>Local Emergency Operations Center</i> (normally the Courthouse) to stage with Fire/Police and coordinate communications <input type="checkbox"/> Public Outreach & Awareness Lead monitor and update Facebook and Website pages with official DEM/SCD/NWS warnings as feasible.	Public Information/Safety/Outreach Hui
Hazard & Timeline	EMERGENCY RESPONSE TASKS/DUTIES	Person/s Responsible
TSUNAMI is Imminent/happening (same for **Nearshore Tsunami (10-30 minutes))	<input type="checkbox"/> **All Working Hui Leads & teams, and Zone Captains & teams, shelter in place in tsunami refuge/staging sites <input type="checkbox"/> Tsunami refuge area/staging sites Centers/Go-Kit Site Neighborhood Captains, provide emergency communications <input type="checkbox"/> Zone captains & working hui assist with managing evacuation refuge/staging site , including establishment of sanitary areas if needed, traffic control , communication of official emergency messages <input type="checkbox"/> Public Outreach & Awareness Lead monitor and update Facebook and Website pages with official DEM/SCD/NWS warnings as feasible.	Zone Hui Leads Disaster Coordinator Mass Care, Comms/Logistics EOC Community Liaison
Post Tsunami (All-Clear Issued) 1 day—6 weeks post-event	<p><i>If a NO TO MINIMAL DAMAGE, ROADS NOT WASHED OUT</i></p> <input type="checkbox"/> Working Hui Leads/tsunami evacuation refuge responders assist with return traffic control, waste cleanup and exit of property. <input type="checkbox"/> Ongoing coordination and comms between Lihue EOC and DC &/or Local EOC on needs, damages, resources <p><i>If LOCAL IMPACTS ARE SIGNIFICANT, ROADS WASHED OUT (True-Disaster)</i></p> <input type="checkbox"/> For any life-threatening issues or deceased individuals identified, call 911 <input type="checkbox"/> Conduct daily briefings (Led by DC, for Zone teams, Working Hui and Community EOC) <input type="checkbox"/> For any life-threatening issues or deceased individuals identified, call 911 <input type="checkbox"/> Support with rapid damage assessment (on foot, using drones, boats, etc.) and conduct Search and Rescue and call 911 as needed for injured and deceased; support with first aid as feasible <input type="checkbox"/> Support with ongoing damage assessment, needs assessment and other data collection and entry <input type="checkbox"/> Make Incident Reports as needed	Disaster Coordinator EOC Liaison, Zone Captains, Working Hui, DC First Responder Hui Zone Captains & Fundraising, Financial Oversight & Admin Team All

	<input type="checkbox"/> Manage refuge area shelters are opened/stood up <input type="checkbox"/> Facilitate evacuation and/or bulk supply distribution of food, water, etc. if needed <input type="checkbox"/> Facilitate emergency communications until no longer needed <input type="checkbox"/> Provide updates (need standardized Refuge Site Report) to DC/Local Communications Center of status of refuge site, needs , etc. (TBD standardized Refuge form to report # cars, people, sanitation issues, food/water issues, health emergency issues, accessibility, if assistance needed) <input type="checkbox"/> Utilize emergency communications to open private shelters for congregate care and for community members at various local coordination sites <input type="checkbox"/> Post resource and other updates to community bulletins <input type="checkbox"/> Manage basic health emergencies with first aid <input type="checkbox"/> Manage spontaneous volunteers & donations (appendix)—coordinate with Hawaii VOAD and spontaneous aid organizations for coordination of donations requests and distribution <input type="checkbox"/> Use community resource list & maps to facilitate coordination of food, water, shelter, health , etc. <input type="checkbox"/> Ongoing coordination and comms between Lihue EOC and DC &/or Local EOC on needs, damages, resources <input type="checkbox"/> Conduct daily debriefings (between community team captains, DC, EOC Liaison and Zone Captains) <input type="checkbox"/> Zone Captains pass along critical information to Zone Teams	<p>Mass Care Hui, Zone Captains</p> <p>Emergency Comms/Logs Hui, DC</p> <p>Zone Captains, Emergency Comms/Logs Hui, DC & EOC Liaison</p> <p>Emergency Comms/Logs Hui, Zone Captains, DC</p> <p>Public Outreach & Awareness Hui</p> <p>DC, EOC Liaison, Zone Captains</p>
	<p>Once response is stabilized, if there is ongoing relief work:</p> <input type="checkbox"/> Coordinate, plan and implement ongoing relief operations with aid agencies, donations, and spontaneous volunteers utilizing the Action Plan, the Disaster Communications Plan, Go-Kits, Committee volunteers, Community Resource & Hazard Maps and Resource Mapping Databases <input type="checkbox"/> Conduct Final Debrief & After Action Report within 1-2 weeks post-event or as feasible once response has evolved into relief, incorporate lessons into Action Plan (All including fuller Hanalei to Hā`ena Community Resilience Committee-incl. government & NGO reps) <input type="checkbox"/> Document unmet needs, requests for funding, public service provision and recovery recommendations (policies, programs, etc.)	<p>Public Awareness Hui</p> <p>EOC Liaison, Zone Captains, DC</p> <p>Zone teams, Working Hui and Local EOC</p>




Hazard & Timeline	EMERGENCY RESPONSE & RELIEF TASKS/DUTIES	Working Hui & Person/s Responsible
<p>Hurricane Flash Flood, Landslides</p> <p>Preparation (if possible)</p> <p>During-event</p> <p>Post-event</p>	<p>WATCH Issued (i.e. for hurricane or flash flood)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Activate <i>Emergency Communications Plan (Appendix A)</i> <input type="checkbox"/> <u>Disaster Coordinator</u> and all <u>Working Group Leads</u> put on-alert, check radio, news and online (and flood early warning system once built, for official emergency messages) <input type="checkbox"/> <u>Public Info/Safety/Outreach Team Captain</u> monitor and update Facebook and Website pages with official DEM/SCD/NWS warnings as is feasible <input type="checkbox"/> <u>DC</u> to call down to <u>Zone Captains</u> to call-down <u>Zone Team members</u> to be on-alert <input type="checkbox"/> <u>Zone Hui Leads</u> to check their go-kits, shelter volunteers to check their shelter kits Convene a Zone Captain Briefing to Review Hurricane Response Plan <p>WARNING Issued for Hurricane or flood</p> <ul style="list-style-type: none"> <input type="checkbox"/> 3-12hrs flood WARNING: DC & Emergency Comms. DC & Emergency Comms. Working Group Lead and 1-2 member/s deploy with go-kit to Local Communications Center (Hanalei School) to stage with Fire/Police and coordinate HAM radio and FRS radio operations <input type="checkbox"/> All <u>Working Group Leads, members</u> seek emergency shelters utilizing maps and shelter updates via media <input type="checkbox"/> For those in emergency shelters, assist Red Cross shelter volunteers with managing shelter <p>If a Non-Event (Non-Disaster, minimal damages)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Call down Zone Captains and notify of updated downgraded status; stand down emergency communications <input type="checkbox"/> Assist Red Cross with breakdown of shelters <input type="checkbox"/> Update Committee website/Facebook pages with final weather updates, damages <input type="checkbox"/> Conduct Committee debrief within one week post-event or when feasible, incorporate lessons learned into Action Plan for improvement <p>If an Event (True-Disaster)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Facilitate transition of emergency shelters to congregate care shelters 	<p>Disaster Coordinator (DC),</p> <p>Emergency Communications Team Captain</p> <p>Working Hui Leads</p> <p>DC, Zone Captains, Working Hui</p> <p>Disaster Coordinator</p> <p>DC, Emergency Comms.Logs Lead Team Captain</p> <p>Mass Care Team Captain</p> <p>Public Info/Safety/Outre</p>

	<p>facilitate evacuation and/or bulk supply distribution of food, water, etc. via other non-coastal roads if needed (i.e. drum road);</p> <p><input type="checkbox"/> Utilize emergency communications to open private shelters for congregate care post resource and other updates to community bulletins</p> <p><input type="checkbox"/> Offer emergency communications for community at various coordination sites manage basic health emergencies with first aid, etc.</p> <p><input type="checkbox"/> Facilitate emergency communications until no longer needed; provide updates to IC/Local Communications Center of status of refuge site, needs, etc. (may want to get standardized form for HAMs to report i.e. # cars, people, sanitation issues, food/water issues, health emergency issues, accessibility, if assistance is needed, etc.)</p> <p><input type="checkbox"/> Manage spontaneous volunteers & donations (Appendix K)—coordinate with Hawaii VOAD for coordination of donations requests and distribution</p> <p><input type="checkbox"/> Utilize resource mapping matrix to facilitate coordination of food, water, shelter, medical resources</p> <p>Once response is stabilized, if there is ongoing relief work:</p> <p><input type="checkbox"/> Coordinate, plan and implement ongoing relief operations with aid agencies, donations, and spontaneous volunteers utilizing the Action Plan, the Disaster Communications Plan, Go-Kits, Committee volunteers, Community Resource & Hazard Maps and Resource Mapping Databases</p> <p><input type="checkbox"/> As needed, conduct debrief / after action report within 1-2 weeks of post-downgraded event or when feasible, incorporate lessons learned into Action Plan for improvement</p>	<p>ach Team Captain</p> <p>DC, Emergency Comms/Logs Lead</p> <p>Mass Care Hui, Comms/Logistics Hui</p> <p>Disaster Coordinator</p>
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Action Plan 4. Community-centered Needs Assessment & Resilient Recovery Recommendations

This final Action Plan focuses on resilient recovery recommendations following the April 2018 rain bomb and subsequent emergency events, covering several identified needs or themes, and specific actions or policy recommendations (indicated by the 📄 icon) to address that issue under varying timelines and sense of urgency, including : 1) Immediate and urgent actions to finalize the relief work and ongoing mitigation; 2) Mid-term/semi-urgent actions to support ongoing recovery and adaptation; and, 3) Long-term or systemic changes needed for adaptation and transformation to reduce risk and promote resilient recovery over several years.

Please note that several sections previously in the Recovery Recommendations report (including Community Leadership & Preparedness for Future Emergencies, Response, Evacuation, Early Warning, Communications, Search and Rescue, and Communications/Access to Information are now integrated in the Action Plan 2 Preparedness & Response Action Plan.




<i>Identified Needs</i>	<i>Immediate & URGENT</i> <i>(Relief transition, Mitigation)</i> JANUARY – APRIL 2019	<i>Mid-term / SEMI-URGENT</i> <i>(Recovery, Adaptation)</i> JANUARY - DECEMBER 2019	<i>Long-term / SYSTEMIC CHANGES (Adaptation/ Transformation)</i> <i>(1-3 years)</i> JANUARY 2019 – DECEMBER 2021
 Recovery Planning	<ul style="list-style-type: none"> - Increase local food production, establish community gardens (nutritional food + social bonding) in reclaimed & open spaces, including water resources / filters/ containers and energy access in emergencies - Identify culverts still needing cleaning, understand rules/regulations for clearing culverts/upstream causes of flooding on private property - Support to respectfully, sustainably transition people off of assistance dependency 	<ul style="list-style-type: none">  Maintain limited visitor access at all times; prohibited visitor access during emergencies and warnings (moratoriums); as road opens up, have phased and capped entry of visitors - Establish plan to remove abandoned rental cars out of emergency zone - Update the Plan maps and action plans to include recent impacts from the floods, resources and staging sites used, and helicopter/barge/boat landing zones, including long-term flood management planning - Identify and fund Community Impact Grants/Quick Impact Projects for unmet needs in households/properties and community resources and for ongoing community-centered recovery initiatives (find ways to compensate community-financed recovery and cleanup), supporting social bonding 	<ul style="list-style-type: none">  Enforce illegal TVRs - Increase emergency awareness for visitors going to N. Shore (including TVRs to have emergency awareness information, early warning system, contact #s, evacuation maps & instructions, and emergency supply kits for visitors) - Share N. Shore response, relief and recovery experiences with other communities/statewide - Recovery efforts must support nexus/synergistic strategies that support multiple wins for sustainable economic growth, environmental recovery and protection, and social justice and healing - Acknowledge what lands/homes cannot continue to be saved (repeat-losses in hazard zones, areas that will be prone to sea level rise, etc.) and work with community/government to resettle

Identified Needs

Immediate & URGENT
(Relief transition, Mitigation)
JANUARY –
APRIL 2019

Mid-term / SEMI-URGENT
(Recovery, Adaptation)
JANUARY - DECEMBER 2019

Long-term / SYSTEMIC CHANGES (Adaptation/
Transformation)
(1-3 years)
JANUARY 2019 – DECEMBER 2021

			households out of hazard zones into affordable, just housing (see housing)
 <p>Community Governance</p>	<ul style="list-style-type: none"> - Improve understanding of how to direct, match (and localize) donation requests and sources, and cash-for-disaster response/recovery work / reimbursement services -Need a disaster finance committee (HCF rep/government CBOs) to review missions, ensure people understand rules/regulations of receiving and using disaster funds, etc.--could include a 1-pager for how to govern and manage donation funds -Need to raise awareness on how to raise \$ e.g. workforce emergency grant, unconditional cash grant support need to take into consideration cultural nuances -Have trust-building activity for committee members 	<ul style="list-style-type: none"> - Improve community awareness on future hubs for disaster services (rules and regulations for raising funds for Aid/Services/Donations/Disaster Recovery Centers) - Formalize relationships with financial institutions or entities to support with oversight of financial assistance to (and reporting required of) individuals/homeowners, small businesses and non-profits - Need an accountability map/list of how post-disaster funds were used and the resources remaining, including a cost-analysis of what has been spent on the road vs. environmental management, jobs and resilience benefits - In Plan table top exercise workshop, explore adding an island-wide flood element to understand how local dynamics, governance and resources might change - Have an annual Community Event/Public Awareness Fair to showcase the HHCRP and Committee, government, NPO and other partners 	<ul style="list-style-type: none"> - Have better ways to count evacuees/returnees to improve aid estimates - There should be a local organization or committee committed to collecting, organizing, and distributing donations, funds, and volunteer groups in future disasters (HHCA or VOAD type Community-based Organization/NPO) -Need to share lessons learned with/through KUA to support intergenerational leadership and knowledge transfer, and so other communities statewide can learn about community resilience/Can-Do - Need long-term community engagement (including youth) in the plan update process and future work & to be a catalyst to fill current gaps and to respond to new population dynamics
 <p>Government & CSO Relations & Coordination</p>	<ul style="list-style-type: none"> - Establish clear, trusted EOC-community liaisons (2-3 for backup) for more centralized communications between EOC liaisons, between NPOs, and from NPOs to Government, etc. (especially if VOAD doesn't stand up); consider relationship "floaters" to support with resolving/mitigating issues 	<ul style="list-style-type: none"> -Improve VOAD representation by community leaders -Ensure VOAD stands up to support community disaster response (regardless if county stands-up VOAD) - Strengthen Committee relationships through disaster response mentorship partners and processes (e.g. IDs, forms) between government, VOAD and community for secured supply chain 	 <p>Long-term government and external support for the Hanalei to Ha`ena Community Resilience Plan, committee and process is given, and respected through all Government (e.g. Development & Emergency) Plans, in alignment with the National Recovery Framework guidance that recovery be community-led</p>


Identified Needs


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(Relief transition, Mitigation)
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Long-term / SYSTEMIC CHANGES (Adaptation/
Transformation)
(1-3 years)
JANUARY 2019 – DECEMBER 2021

- Need to improve understanding of the role of government agencies and NPOs before/during/after a disaster

 Acknowledge and fund community-led services replacing or supplementing insufficient government services like transportation (walkability & shuttle), parking, basic maintenance like mowing fields (parks) and water quality in bay/ cesspools (needing incentives to convert or update to updated systems, financial support, etc.) for all communities (not just Hanalei) and improved public health protections

 Explore a % of taxes to be set aside for disaster response funds

management and efficient disaster response coordination and communications

- Need one standardized damage assessment and needs assessment data form, collection process and case management referral system (HIPAA compliant)


- Need stakeholder list of who knows what, including forms, reporting, needs assessments & needs-based aid, etc.


- Improve needs-based vetting processes and support structures including FEMA, insurance representatives and others at disaster coordination sites;

-Pre-made questionnaires for disaster recovery information, including door hangers with communication information (where to find resources, survey, etc.)

- Improve/Update GIS Maps, use of Google Earth

- Ongoing emergency training including for county employees

 in future disasters, FEMA needs to come more quickly, before people have cleaned up substantially, to ensure timely and equitable assistance amounts are allocated

 Need for suspension of certain minor rules (like parking tickets) during disasters

-Disaster-related streamline permitting to prevent repeat-losses

-Improved infrastructure for cell service in Ha'ena to support emergency communications



Climate Change Adaptation


- Understand the role of climate change in the April flood events and the following hurricanes, and what it means for future disaster risk (community educational events/fairs)


- Understand DLNR, DAR, State Parks, KEMA's role/plan for climate change adaptation (community liaison?)

- Integrate climate scenarios & models into recovery planning workshops, to understand impacts from (and develop adaptation plans for) sea level rise, increasing severity and frequency of storms, increasing air and oceanic temperatures, reef bleaching, etc.

-Community outreach on SLR tools (TAT fund) specific for disasters

-Do an EIS for Weke Road project that includes Sea Level Rise models

 Integrate long-term climate change adaptation considerations into the resilient recovery planning process, policies and interventions

 Implement a surcharge on houses, tourism, etc. in disaster areas

- Government should evaluate areas that they will be able to service with climate change and areas for relocation

Identified Needs

Immediate & URGENT
(Relief transition, Mitigation)
JANUARY –
APRIL 2019

Mid-term / SEMI-URGENT
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Long-term / SYSTEMIC CHANGES (Adaptation/
Transformation)
(1-3 years)
JANUARY 2019 – DECEMBER 2021



Social Services, Social Justice, Sense of Place

- Support shuttle system to reduce # visitors/cars on N. Shore (see Transportation)
- Protect what has gone well, like reclaiming and re-establishing ownership of community spaces—when road opens up again, need to protect this
- Need government social services to have increased surge capacity to deal with case load and needs, paired up with community leaders

- Improve awareness of visitors on respecting cultural / environmental protocols; balance tourism and the livelihoods dependent on it, with social/environmental health and sustainability
- Increase community access to public spaces (like Naue, restaurant and colony) for community convening activities
- Need to improve access to medication, daily healthcare, dialysis, etc. during emergencies (either bringing in medicines/medical care, or facilitating medical evacuation)



- Support policies and actions that restrict access and improve attitudes and behaviors of visitors
- Preschools have waitlists, clearly need for more preschools and for safe playgrounds
- Install a natural, safe walk and bike trail along the highway



Health

- Increase access to psychosocial support services for those in need (including children)
- Improve disaster mental health and psychosocial support service access (KEO model of community services?) and training for public health professionals and lay persons, for during and after disasters (for those impacted and external responders)
- Department of Health needs to be engaged in emergency food distribution

- Need long-term support for drug treatment, suicide and inability to access regular mental health services
- During disasters, need support for drug & alcohol detox therapy
- During disasters need better support from National Guard/PD & local leaders to monitor and secure ports of entry
- Identify & engage in the Plan all local public health professionals and first responders, and add them to the Plan resources mapping/list (see previous note in Response)
- Station (out of hazard zones) an AMR vehicle (and potentially a boat) and train local first responders near Ha`ena to support with search and rescue (day and night, land and ocean) and emergency medical services

- Support local medical/public health responders
- Supply first aid kits, medicines and vaccines (tetanus, cholera, lepto, etc.) in emergency go-kits (move med supplies from storage bank to courthouse)
- KFD temporary substation out Ha`ena, co-located with multiple modular public services: police, DLNR, EMS, FD, Community Center (suggested acquisition of Canela Lots 5-8-12-6 for needed space)
- North Shore needs community health center to have dialysis services



Water & Sanitation,

- Add cleanup crew trainings and local leaders as a Working Hui to support with quickly addressing water contamination, debris removal, water treatment and

- Support households to pre-position/stock (and receive as soon after disaster as possible) cleanup kits to control mold remediation, and








- Fix all cesspools, including all TVR's should be required to upgrade cesspools in order to maintain their license (Firm

Identified Needs

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APRIL 2019

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Transformation)
(1-3 years)
JANUARY 2019 – DECEMBER 2021

Waste Management	cleanup support to minimize hazard exposure and illnesses	medicines to control water-related infections and diseases	benchmarks for sewage including government assistance)
 <p>Housing, Safety</p>	<p>- There are two problems and a common solution: homelessness, crowded housing and lack of affordable housing, matched with empty TVRs needing regular maintenance that are currently inaccessible to visitors.</p> <p>- For temporary housing options, allow displaced people to be safely housed, with reduced rent and responsibility to maintain the properties in the interim</p>	<p>- Find out if the water tank up Wainiha-is potable? And can access for disasters? Or for pumping for wildfires/housefires?</p> <p>- Provide community with water filters even if just for individual use in disasters</p> <p>- Need long-term permanent affordable housing outside of flood/tsunami zones, near the North Shore</p> <p>- Finish rehabilitation of damaged structures</p> <p>- Support homeless residents with semi-permanent tent structures (many already have, support reimbursement compensation of local leaders who have paid for this)</p> <p>- Needs to be a public safety presence police, fire EMS, potentially neighborhood watch program</p>	<p>- Create a better system for trash collection, sorting, and disposal after a disaster</p> <p>- Water catchment set up for water reservoir of local spring/for emergency use</p> <p>- Knowing where clean water is available in our area/water filling stations + foodbank provide water now</p> <p> Support an ordinance (and enforcement) to make it illegal for vacation rentals to exist past the road closure for health, safety and welfare of residents, need policy change interpreted, particularly if they aren't using the structure (use it or lose it)</p> <p>- End transient vacation uses in the hazard zones in Wainiha & Ha`ena / all north shore</p> <p> Need to find policies to discourage flipping homes and encourage responsibility in those who move in</p>
 <p>Electricity / Access to Energy</p>	<p>- For disasters, need access to charging stations at disaster coordination sites, shared generators (with rules on how long you can run them, and for what) to support safe lighting and running of community kitchens and relief services</p>	<p>- Solar hubs and generators at a base yard/safe shelter in each disaster-prone area</p> <p>- Diesel generators; diesel and gas storage tanks at safe spots</p>	<p>-Long-term explore sustainable energy access ventures that are environmentally sustainable and resistant to hazards</p>
 <p>Transportation / Parking</p>	<p>- Convoy hindering job access, economic challenges—support ongoing community social media platforms and communications to work through this until roads are open</p>	<p>- In future emergencies, important to keep placards & to identify who are residents vs. non-residents/staying in TVRs through placards), and need easier access to get placards (near community, not in Lihue);</p>	<p>- Shuttle and no-visitor-entry regulations to aid with emergency evacuation of tourists/visitors</p>

Identified Needs

Immediate & URGENT
(Relief transition, Mitigation)
JANUARY –
APRIL 2019

Mid-term / SEMI-URGENT
(Recovery, Adaptation)
JANUARY - DECEMBER 2019

Long-term / SYSTEMIC CHANGES (Adaptation/
Transformation)
(1-3 years)
JANUARY 2019 – DECEMBER 2021

- Better road signage on evacuation routes/zones

-Need clear DoT point person for emergency evacuation/transport issues and to facilitate emergency decision-making with community committee

-Need traffic lights and sensors for Hanalei bridge so that when traffic is backed up (in an emergency or not) past a certain point, the green light stays lit for those exiting Hanalei until traffic congestion is down; in an emergency, the light at Princeville would stay red, and only cars exiting Hanalei would be allowed out

- Waipa convoy parking as Emergency staging site; need \$ to upkeep

- Identify and address households with food and nutritional insecurity by referring them to food bank and other services (needs-based process needed)

- Identify which livelihoods were most impacted, how and why, what the unmet needs are, and how to integrate these lessons into the planning process



Keep flexible, fast-tracking of permitting during emergencies as it helped with continuing economic (however, balance with not compromising social justice and environmental safeguarding and policies)

- Need to formalize Shuttle for visitors and restrict access/egress past the Hanalei bridge to residents only

- Shuttle service needs to be community-engaged and driven to support residential restoration and responsible tourism to change how they treat community and what should/shouldn't be done and where

- I.D. safe areas to park in during a flood/tsunami (create areas)

- Support long-term funds for the N. Shore food bank (ongoing and emergency food stocks for a stockpile of at least 7-14 days)

- Establish Food hubs/community kitchens, food prep, food distribution and storage centers/pantries for disaster response/relief, with trainings on food preservation

- Support Waipa Foundation to get a backup generator that is flood-proof/raised to support community kitchen; and increase the # of mobile coolers for distributors of produce, to support community-wide food security in time of disaster

- Offer a quick training on human resources to help people identify paid or unpaid/volunteer jobs and their roles and requirements



Better advertisement enforcement in all visitor lodging, at airports, ads, etc. if they are staying in a hazard/s zone/s, and to have a plan for their tenants (some vacation rental businesses have apps for emergency notification, individual TVRs should do this)

- Long-term support for resident-only parking stickers, and need to decide as community what to do with roads and parking/public property off of the roads

- Support community kitchen staging sites with needed resources and training (Waipa, Food Bank, Colony) + another in Hanalei

-Support access to community gardens in public or unused spaces to grow and access more food in times of disasters

- Identify and engage farmers and restaurants to support with provision of crops/livestock and potential retroactive reimbursement/compensation

-Need local (disaster-resistant) seed storage & farmer cuttings bank for post-disaster replenishment of crop

- Identify & develop markets & training opportunities for improving sustainable, adaptive, living wage jobs



Nutrition/
Food
Security



Identified Needs

Immediate & URGENT
(Relief transition, Mitigation)
JANUARY –
APRIL 2019

Mid-term / SEMI-URGENT
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Long-term / SYSTEMIC CHANGES (Adaptation/
Transformation)
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**Livelihoods /
Jobs
(Economic
Security)**

- Improve communications to/from hotels and other resources to support them being more amenable to observing pre/post disaster protocols, and being more welcoming to offer safe harbor for residents seeking evacuation shelter

- Immediate disaster employment fund to pay for work, easy system
- Support with agencies for unemployment, insurance, FEMA and other work program
- Understand through the planning process, the economic impacts of the disaster, and concerns/opportunities for shifting livelihoods
-Long-Term Recovery considerations – tourism for Hanalei, job loss for residents, cost to re-build, how to create jobs that promote and protect place and enable living wages despite commercial restrictions and high cost of living

- Identify and foster support in development plans and vocational training programs to enable new/adapted livelihoods that are amenable to impacts from future emergencies and climate change/sea level rise, climate variability
- Less restrictive access to trades, helpers, develop funding for agriculture economy, Support local worker skillsets
- Develop a list for craft fair, food fair, barter, community directory
- Better distribution reconciling reality of resident life with red tape of seeking recovery funds (state/fed/county, unequal distribution, requirements insufficient)
- Develop social-eco-sustainable tourism options that match community values and give back (volunteer, cleanup, plant trees)



**Financial
Security &
Services**

- Identify reimbursement needs and possibilities for community members who supported with community-wide disaster response/relief work and paid for resources (e.g. gas, boats, food, etc.) including community members who have done what should be state park services (cleaning) for years

-Understand whether home mortgages, business loans, credit card agreements need to be modified by the financial institutions to allow for payment deferment/forbearance/late fee waivers/etc.

- For future disaster, set up cash disbursement systems and donors for emergency unconditional cash transfers as well as cash-for-disaster work programs



- Support for funding final environmental cleanup projects / QIPs is needed for disaster recovery and for future disasters
- Figure out how to avoid/deal with donated plastic water bottle challenge (potential for recycling and using the funds for response supplies? Or using them as flotation devices)

- Identify through the Plan workshops and mapping, the landscape scale of the environmental impacts, and the changes in hydrology post-flood, to inform future flood/landside hydro-meteorological events and impacts (environmental, livelihoods-like on taro farmers, etc.) and the resilience recovery plan

- Resilient Recovery Plan must integrate resource management strategies that improve environmental protection, restoration, sustainable land use (reduce infrastructural design decisions that increase hazard exposure and vulnerability) and community resilience planning (better use of ecosystem services for natural hazard mitigation, habitat protection) [see framework]

Identified Needs

Immediate & URGENT
(Relief transition, Mitigation)
JANUARY –
APRIL 2019



Mid-term / SEMI-URGENT
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Transformation)
(1-3 years)
JANUARY 2019 – DECEMBER 2021

Respecting the 'Āina Environmental Management/ Safeguarding

- For disaster go-kits, recommended to have bucket filters and people bring their empty clean containers to fill
- Rock walls are causing flooding, impeding waterflow, needs to be addressed
- Need to clean and manage private property by individual land owners
- Debris mapping and recovery
- Waipā + others to take part in leading education, training and support of environmental management
- Tie jobs to environmental management for risk reduction and recovery/restoration, more scholarships and pathways to getting environmental degrees and jobs here in Hawaii
- Better wetland management (buffalo farm Hanalei, Waipā pasture)

- Integrate into the Planning workshops, a Mauka to makai understanding (linked with the above) of impacts and changes to the reef/ecosystem health from impacts from climate change and future disasters
- The water made new paths, need to map them and identify waterways that need reinforcement or redirection
- Support ongoing long-term coral reef/coastal ecosystem health studies to understand impacts over time
- Need new & improved NFIP regulations & new flood plain studies for Wainiha & Ha'ena
- Need better shoreline setbacks
- Potential tax for tourism during disaster recovery (fee)
- Begin community-managed environmental review/assessment of recovery operations after 3-6 months
- Watershed groups among renters/landowners in each valley to agree on their own land management plans

-  Comprehensive land use planning in light of damage, SLR, flood plain & other studies (look into Hilo model post-tsunami)
- Seek funding for integrated resource management plan
- Look into setting up local recycling centers/local jobs, that have better green waste than Princeville river
- Hanalei historically full of water, and in use production, management, but now just shooting out to ocean, and how do we get that dirt back
- Somewhere to report and log observations now when it rains. Learn the paths of the water, the new places where it is going
- All the waterways were clogged, public and private – need to understand how to deal with the ones on private lands, putting money back into land, reinvesting in land etc.
-  End disaster exemptions to legal and coastal zone residents; no waivers for environmental regulations during emergency declarations, maintain CZM, NEPA, etc.)

HANALEI TO HĀ`ENA COMMUNITY CLIMATE ADAPTATION ACTION PLAN

2023

PREPARED FOR
THE HANALEI TO HĀ`ENA
COMMUNITY DISASTER
RESILIENCE PROJECT
and the
HANALEI WATERSHED HUI



Contents

1	Background	3
	Introduction, History and Wayfinding	3
	Figure 1. Wayfinder	4
	Climate Hotspots	6
	Figure 2. Problem / Solution Tree	7
2	Climate Impacts	8
	Sea level rise, coastal erosion	8
	Acidification, warming sea temperatures, bleaching	9
	Severe storms: flooding, high winds, landslides, rockfall	10
	Drought, wildfire, warming temperatures, reduced trades, loss of water resources	11
3	Community Visioning for Climate Adaptation	12
	<i>Figure 3. Community Visioning for Climate Adaptation</i>	13
4	Climate Adaptation Action Plan	14
	Transportation, Critical Infrastructure	15
	Wellbeing, Public Safety, Public Health	16
	Water Security	17
	Social, Cultural, Intergenerational	18
	Environment	19
	Waste Management	20
	Housing	20
	Farming, Food and Nutritional Security	21
	Governance	22
	Economic / Livelihoods	23
	Energy Access	23
5	Resource Guide: Climate Data, Maps, Models, Plans, Guides & Toolkits, Funding	24

1. Background

Introduction, History and Wayfinding

This Climate Adaptation Action Plan serves as an addendum to the [Hanalei to Hā`ena Community Disaster Resilience Plan](#), initiated in 2008 by the [Hanalei Watershed Hui](#), community members, government agencies, small business owners, faith-based organizations, civil society organizations, and other stakeholders.

[Figure 1, Wayfinder](#), illustrates the community-based disaster resilience and climate adaptation planning processes from 2008 to 2023, including notes on the stakeholders, activities, tools, strategies, planning documents, resources and hazard events pertinent at each phase.

This Climate Adaptation Action Plan was developed under a similar mixed methods approach as was used in the [Hanalei to Hā`ena Community Disaster Resilience Plan](#) process. This approach includes combining qualitative data from participatory talk and walk story sessions, interviews, workshops, small group discussions, meetings and visioning activities, with data from an analysis of relevant government plans and policies, scientific reports, maps and models, which are cited throughout.

Unless otherwise cited to a written resource (e.g. a County plan, research paper or report), the impacts, and projections of impacts from climate change in Section 2, as well as the recommendations for climate adaptation solutions in Sections 3-4, were provided by community voices, and other stakeholders (e.g., government representatives, subject matter experts, small businesses, private sector and civil society organizations).

This Climate Adaptation Action Plan includes:

- [Background on this community-based disaster resilience and climate adaptation action planning process, and an introduction to “Climate Hotspots” in Section 1.](#)
- [Observed climate change impacts to-date, and projections of future impacts from climate change, in Section 2.](#)
- [Recommendations and visioning for community-based adaptation, in Section 3.](#)
- [A Community-based Climate Adaptation Action Plan in Section 4](#), to support community members, civil society, private sector, government and other stakeholders to identify, understand, prioritize and cooperatively address current and future climate issues.
- A [Resource Guide in Section 5](#) that provides links to climate data, maps, models, adaptation guides, toolkits, relevant local policies, plans and other resources.

WAYFINDER

CLIMATE ADAPTATION ACTION PLANNING
BY AND FOR THE COMMUNITIES OF
HANALEI TO HĀ`ENA, KAUA`I



STARTING POINT

2012-2017

2012: The Hanalei Watershed Hui formalized the Hanalei to Hā`ena Community Disaster Resilience Committee, including community members, government representatives, civil society organizations and other stakeholders.

2012-2017: The Committee embarked on a learning journey of participatory risk and resource mapping and several multi-hazard, drought and coastal resilience projects, to identify community vulnerabilities, capacities, and strategies to support community resilience.

Tools:

2014: The State of Hawai`i's first-ever **Hanalei to Hā`ena Community-based Disaster Resilience Plan** is published, including participatory risk and resource maps, Preparedness, Response and Recovery Action Plans, tools and templates.

Resources: NOAA CRest Coastal Resilience Networks Grant, volunteers.

Hazard events:

- 2012 Floods and landslides
- 2013 Chile Tsunami warning



CONVENING

1



COLLABORATING

2

2022-2023

2022-2023: Ongoing Disaster Resilience Plan refresher trainings for volunteers, acquiring and establishing mobile resilience trailers and inventory.

Tools:

- Co-designed participatory walk story climate change sessions, interviews, workshops and meetings with community members, and other Committee stakeholders, to identify, understand and soundboard solutions for climate adaptation and justice issues within and across sectors and watersheds.
- Development of the Hanalei to Hā`ena Community Climate Adaptation Action Plan to build upon the Disaster Resilience Plan.

Resources: County of Kaua`i Flood Hazard Mitigation grant, volunteers.

4

2008-2011

2008 - 2010: The Hanalei Watershed Hui convened community members and other stakeholders to understand community risks to natural hazards, demographic shifts and development threats to community wellbeing.

Tools: Community meetings, co-designed household surveys, disaster risk analysis and recommendations.

Resources: NOAA NIDIS SARP Drought grant, volunteers.

Hazard events: 2010 Flood; 2011 Japan tsunami.

2018-2021

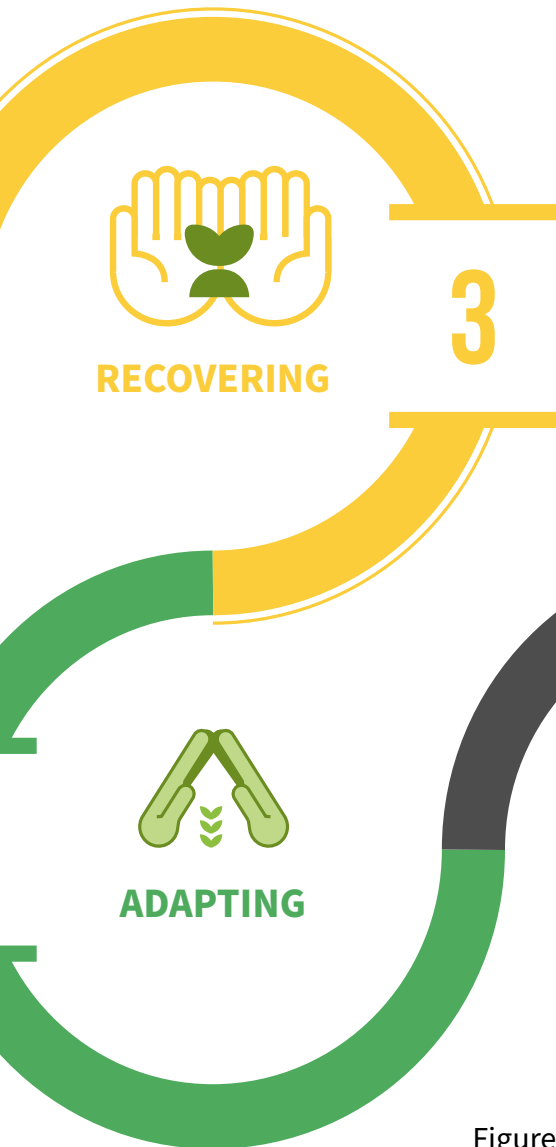
Hazard events: April 2018 Declared Disaster: historic floods, landslides, with community disaster resilience volunteers leading the response.

2018-2019: Post-flood debriefs, After Action Reports, community walk-stories, updates of Risk and Resource Maps and the Preparedness, Response and Recovery Action Plans; Recommendations report and lessons learned submitted to government officials.

March 2021: Hanalei hillside/landslide, further reflections and updates to the plan, disaster kits and trailer.

2019-2021: Disaster Resilience Plan refresher trainings for volunteers, acquiring and establishing mobile resilience trailers, updates to the maps and Action Plans.

Resources: Hawaii Community Foundation Flood Recovery grant, County of Kaua`i Flood Hazard Mitigation grant, volunteers.



TRANSFORMATION

CLIMATE ADAPTATION ACTION PLAN

2023: Published and collectively shared the Hanalei to Hā`ena Community Climate Adaptation Action Plan, building upon the Preparedness, Response and Recovery Disaster Resilience Action Plans.

Next steps:

Community members can collectively or independently leverage this Plan and its resources, to understand, prioritize, design, seek funding and partnerships for programs centering equity and justice in climate adaptation planning to action.

Figure 1. Wayfinder

The Process of Hanalei to Hā`ena Community Disaster Resilience and Climate Adaptation Action Planning, 2008 to 2023

1. Background

Climate hotspots

The geographically and infrastructurally isolated communities of Hanalei to Hā`ena experience dynamic and overlapping risks to climate hazards, such as coastal areas prone to erosion, inland flooding, storm surge, sea level rise, and landslides. These overlapping hazards create “climate hotspots,” which have cascading impacts on the services and resources affected by those hazards, such as reducing access to water, food, transportation, schools, livelihoods, healthcare, recreation, and cultural areas.

Many of the short-term shocks (e.g., flash floods, high tide events) and long-term stressors (e.g., drought, sea level rise) do not exist in isolation, and will overlap and interact over time. Shocks will become more frequent and severe, and can layer on top of or compound other natural hazards, such as tsunami events, and ongoing stressors. For example, high tide, high surf events will layer onto increasing sea levels, compounding coastal flooding, and can occur at the same time as rainfall flood events.

[Overlapping climate hotspots of social vulnerability, climate, natural and infrastructural hazards exacerbate climate risks \(County of Kaua'i 2023\)](#). Based on census blocks, for which all of Hanalei, Waipa, Wainiha and Hā`ena are included in one census block, the social vulnerability is ranked moderate-high, at 0.73 (70-80th percentile) out of a possible 1.0. High landslide risk is present in nearly all mauka areas as well. [Critical infrastructure that may be impacted by coastal storm surge, sea level rise, landslides, rockfall, and riparian flooding, or a combination of one or more of these hazards](#), include:

- All bridges, roads and the Kuhio Highway, particularly those along the streams and coastline
- Hanalei Elementary School, the Aloha School
- Wainiha hydropower station / water pumps, powerlines, telephone lines
- The Hanalei Baseyard and Firehouse, Courthouse, Neighborhood Center, Post Office
- County and State parks
- Private Property, Private businesses
- Community resources: fish ponds, kalo fields, fields, community center, churches, food pantries, markets
- Community disaster resilience resources (Naue/YMCA, Hanalei Colony Resort, others)

As climate hazards vary in the intensity, frequency and longevity of how, where, who and how much they expose people and places, they also overlap with development-related hazards, such as cesspools, fragile infrastructure like roads, bridges and housing. Inequitable development trends, like the lack of affordable, safe housing, livable wages, and intergenerational land tenure, are influenced by historical legacies of colonization and inequity ([Climate Xchange, 2020](#); [State of Hawai'i, 2020](#)). These systems impact inequities of social vulnerability and exposure to natural hazards, climate change impacts and development threats, across generations ([Riley, et al, 2022](#)).

The State of Hawai`i “identifies equity as one of three primary considerations for all climate action” and urges “all government entities to integrate equity considerations into their planning, policy development and implementation for climate change mitigation, adaptation and resilience” (2019). This is echoed by [NOAA and National Marine Sanctuaries](#), which commit to “address environmental justice, equity, diversity, inclusion and accessibility issues” as a guiding principle to address climate change (2024).

[Section 3](#), the [Community Visioning for Climate Adaptation \(Figure 6\)](#) illustrates community-based values and recommendations for climate adaptation and risk-informed equitable development, which align with the State’s commitments to climate equity. Climate adaptation strategies, like those proposed in this [Action Plan \(Section 4\)](#), must integrate into long-range, risk-informed development processes and policies, and should be feasible and accessible to all community members, addressing the root causes of, impacts from, and solutions to, natural hazards and climate change while promoting equity ([see Figure 2](#)).

Problem Tree

(Sections 1-2)

EFFECTS OR IMPACTS

IDENTIFY AND PRIORITIZE THE IMPACTS OF CLIMATE CHANGE (INTENSITY, FREQUENCY AND SEVERITY), WHO IS AFFECTED, WHERE, HOW AND HOW MUCH, THROUGH LOCALLY-LED CLIMATE RISK AND RESILIENCE ASSESSMENTS USING PARTICIPATORY ACTION AND LEARNING TOOLS.

For example: sea level rise, coastal erosion, drought.

CHALLENGE/PROBLEM

CULTIVATE A COMMUNITY-BASED DEFINITION OF THE PROBLEM/S HIGHLIGHTING "WHY WE CARE ABOUT THE ISSUE."

For example: "Hanalei to Ha`ena communities, their wellbeing, safety, security, livelihoods and culture are at-risk to impacts from climate change, hazards, risk-blind development, and intergenerational injustices and inequity."

ROOT CAUSES OF CLIMATE RISKS

IDENTIFY AND PRIORITIZE THE ROOT CAUSES OF CLIMATE CHANGE AND DISASTER RISKS AND DEVELOPMENT TRENDS THAT INCREASE THESE RISKS.

For example: systemic inequities in the distribution of financial, land and other resources, poverty, lack of livelihood opportunities, and building homes in hazard zones.

Solution Tree

(Sections 3-4)

SOLUTIONS TO THE IMPACTS

ADDRESS THE IMPACTS OF THESE RISKS THROUGH ANTICIPATION, PREVENTION, MITIGATION, RESPONSE, RECOVERY, AND CLIMATE ADAPTATION ACTIVITIES THAT PROMOTE SHORT-, MEDIUM- AND LONG-TERM RISK INFORMED DEVELOPMENT AND CLIMATE RESILIENCE ADAPTATION STRATEGIES.

For example: community-based disaster resilience assessments, planning, programs and policies.

GOAL, VISION

CULTIVATE A COMMUNITY-BASED VISION FOR CLIMATE ADAPTATION AND DISASTER RESILIENCE.

For Example: The isolated, rural coastal communities of Hanalei to Hā`ena are safe and resilient to natural hazards, the impacts of climate change, and social, cultural, economic, developmental and environmental threats" (Hanalei to Ha`ena Community Disaster Resilience Committee's "Vision for Resilience" 2014).

ROOT CAUSES SOLUTIONS

Address and transform the systemic and systematic root causes of risks

For Example: focus on systems-level transformation to address climate injustice and inequity in political, economic, social, cultural and environmental systems, through locally-led risk informed development and climate adaptation.

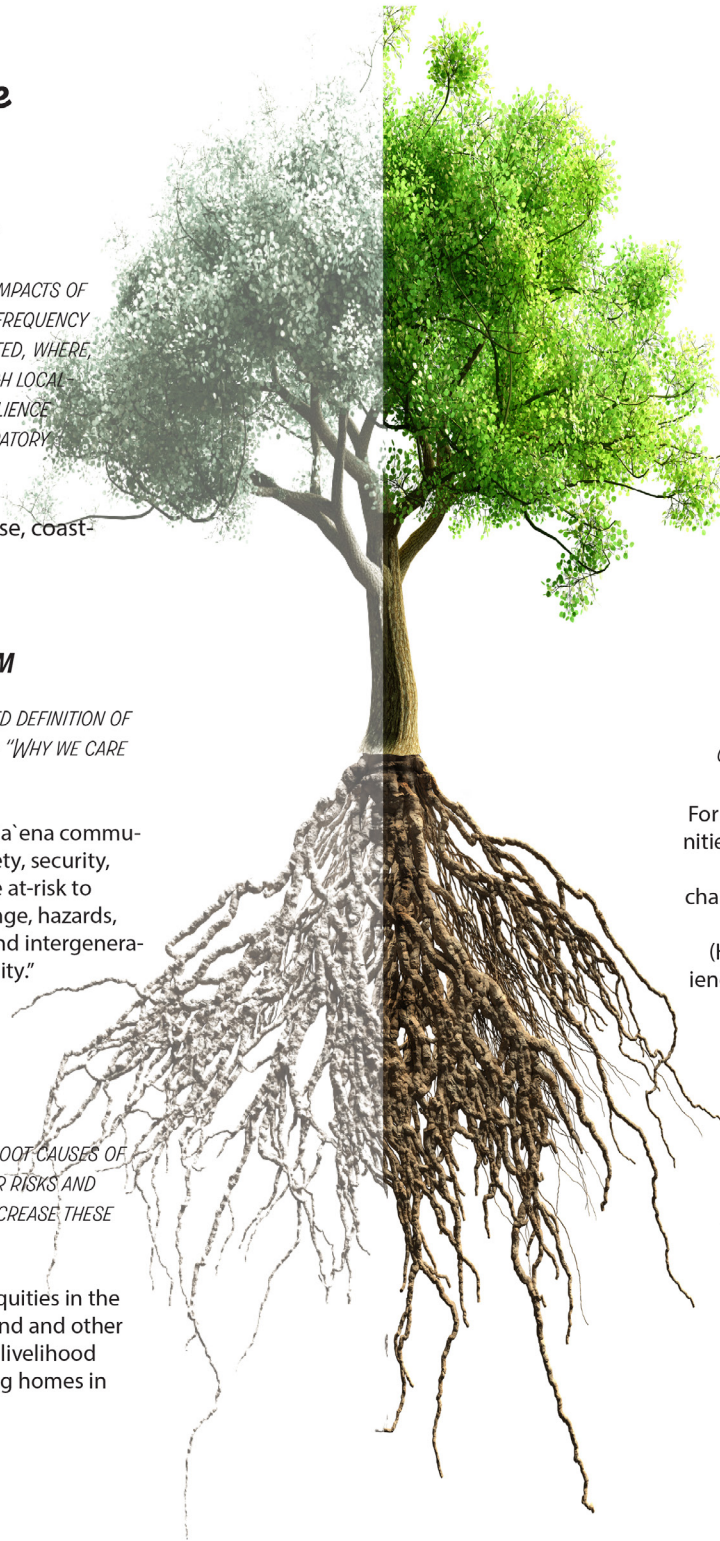


Figure 2. Problem-Solution Tree for the Climate Adaptation Action Planning Process

2. Climate Impacts

Sea level rise, extreme tides, coastal erosion

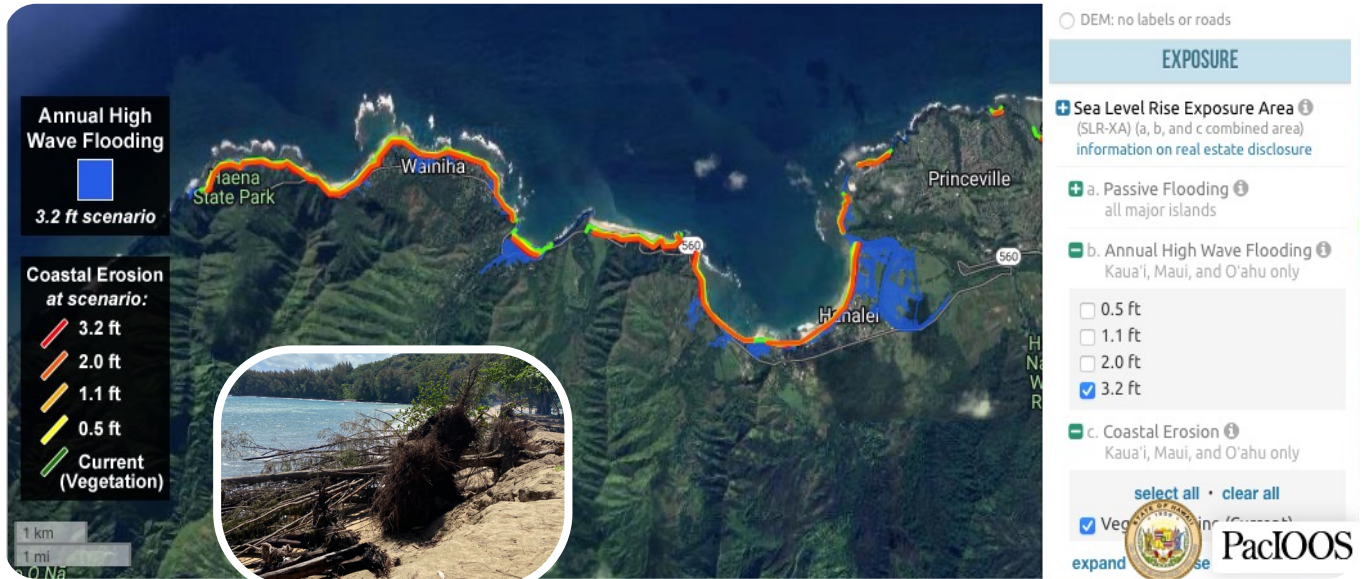


Image 1. Sea Level Rise and Coastal Erosion Projections, North Shore, Kauai (Sea Level Rise Viewer, PacIOOS, 2023)

Impacts

- » Coastal erosion is seasonal, fronting the Oneone cottages, the beach and sandbar/ sand spit area at Kepuhi, and causing flanking erosion at Waipā (community voices).
- » Over 75% of North Shore beaches are experiencing erosion, averaging 36 feet of retreat (KCAP, 2022).
- » The County historically mined sand from Anini to nourish beaches from Hanalei to Hā'ena, affecting natural movement of the sand long-term (community voices).

Projections

- » Reduced biomass, biodiversity and habitat suitability for aquatic and terrestrial native species, potential increase in invasive species land cover (stakeholder interviews).
- » Sea level rise projections will accelerate shoreline recession significantly (KCAP, 2022), especially amidst extreme tides and wave overtopping (HSCC, 2023).
- » Loss of public goods like critical infrastructure, parks, beaches, displacement of houseless individuals to sea level rise and coastal erosion (KCAP, 2022).
- » Accessing certain areas of recreational, cultural, economic, livelihood and other aquatic activities will be increasingly difficult due to loss of beaches, and increased frequency and severity of flooding (KCAP, 2022).
- » Amidst sea level rise, coastal erosion may be more rapid and severe, and recovery may take longer for beaches, dunes and other biohabitat, reducing the natural coastal hazard mitigation capacity and increasing exposure of the coastline.

Projections

- » Sea level rise will push the groundwater table up and inwards, causing salt water intrusion, increasing groundwater and surface water salinity, made worse during coastal flooding (IPCC, 2019), resulting in:
 - » Reduced freshwater quantity and quality for agricultural, household, business, school and public use, including wildfire suppression (KCAP, 2022; IPCC, 2019).
 - » Adversely impacted disposal of effluent from cesspools and septic wastewater systems, causing leaching, overflows and contamination of groundwater, wells, streams, rivers and the ocean with bacteria and toxins, causing environmental and public health issues (stakeholder interviews, KCAP, 2022).
 - » Low-lying, agricultural areas (e.g. kalo lo'i) experiencing increased salinity in freshwater and brackish coastal wetlands waters and soil, may result in reduced taro productivity, increased pests and disease, and impacts to social, economic and cultural impacts (stakeholder interviews, KCAP, 2022).
 - » Reduced availability of habitat for resting, nesting and pupping areas for sea birds, sea turtles, monk seals and other wildlife (stakeholder interviews, IPCC, 2019).
 - » 206 out of the 363 non-conforming Transient Vacation Rentals (TVRs) in the North Shore are in the 1% chance annual floodplain, putting visitors at risk, and increasing the burden on local resources and residents during disasters.
 - » There will be increased tension and conflict due to loss of natural resources from sea level rise and coastal erosion (community voices).

2. Climate Impacts

Acidification, warming sea temperatures

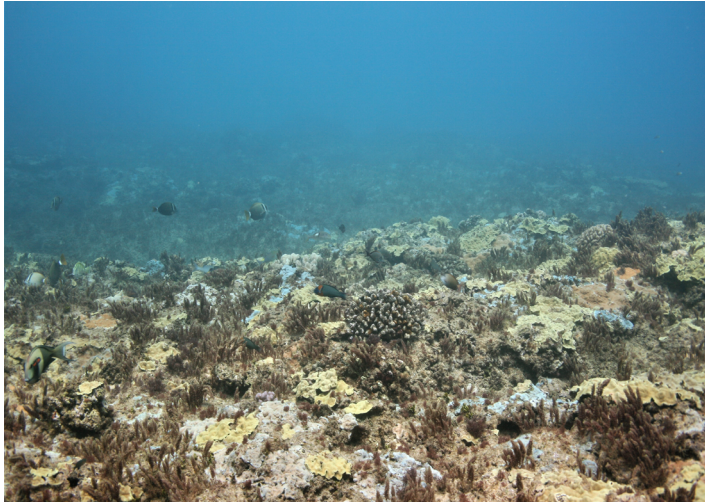


Image 2. Hideaways reef, Hanalei, Kaua'i in 2009 (Eric Brown, PhD, Marine Ecologist, National Park of American Samoa).

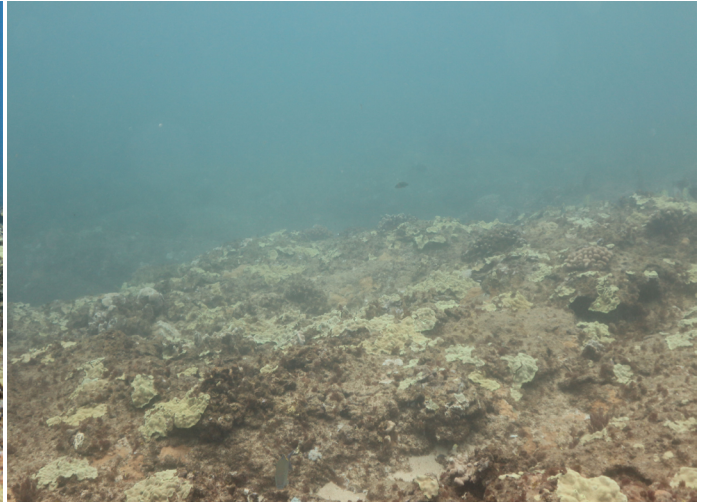


Image 3. Hideaways reef, Hanalei, Kaua'i in 2019 (Eric Brown, *ibid*) observed coral cover is not as vibrant.

Impacts

- » North Shore bays are very dynamic; what comes in gets washed out very quickly, including wave action and turbulence of the bay, so the corals are very resilient (stakeholder interviews).
- » Fishery biomass appears healthy in Hanalei, including: more Kole, invasive Taapi and Toau still present, many Manini, less Roi (which creates space for other reef fish,) and still have Kole, the latter two being the more common carriers of Ciguatera; this succession of fish is indicative of post-flood impacts (stakeholder interviews).
- » In the past, these reefs have been relatively resistant and resilient due to extremely high coral recruitment levels that sustained the dynamic reef environment. After the 2018 flood, however, the reefs declined throughout the bay; there is an ongoing study to see if the reefs are able to recover to pre-flood levels (stakeholder interviews).
- » Observations of more oysters than coral can be an indication of dirty water quality, however there was also preliminarily good coral on the plates pulled in 2023 by Dr. Brown.

Projections

- » North Shore reefs are projected to experience coral bleaching impacts due to acidification and warming, before other communities on Kaua'i, under the scenario of 0.5°F oceanic warming per decade, as early as the mid-2030's ([KCAP, 2022](#)).
- » Reefs are projected to decline statewide to 11% coverage in 2050 and down to 1% by 2100 ([KCAP, 2022](#)), leading to:
 - » Loss of reef structure and reduced natural coastal protection from storms and tsunamis.
 - » Reduced biodiversity, increased invasive species in marine habitats including seaweed, which increase calcification and further bleaching.
 - » Impacts to nearshore estuaries and species reliant on them as nurseries.
 - » Reduced fishery and invertebrate yields, smaller and less fish.
 - » Declining mixing of deep nutrients into the surface zone, reducing diversity and abundance of large fish, shifting habitats.
 - » Change in biodiversity and habitat suitability for native species, increase in invasive species.
- » Increased tension and conflict over degradation and loss of aquatic and interconnected natural resources may arise, and impacts to fish and invertebrate stocks, coral reefs and beaches may also decrease tourism and the livelihoods dependent upon it.

2. Climate Impacts

Severe storms, flooding, high winds, landslides, rockfall

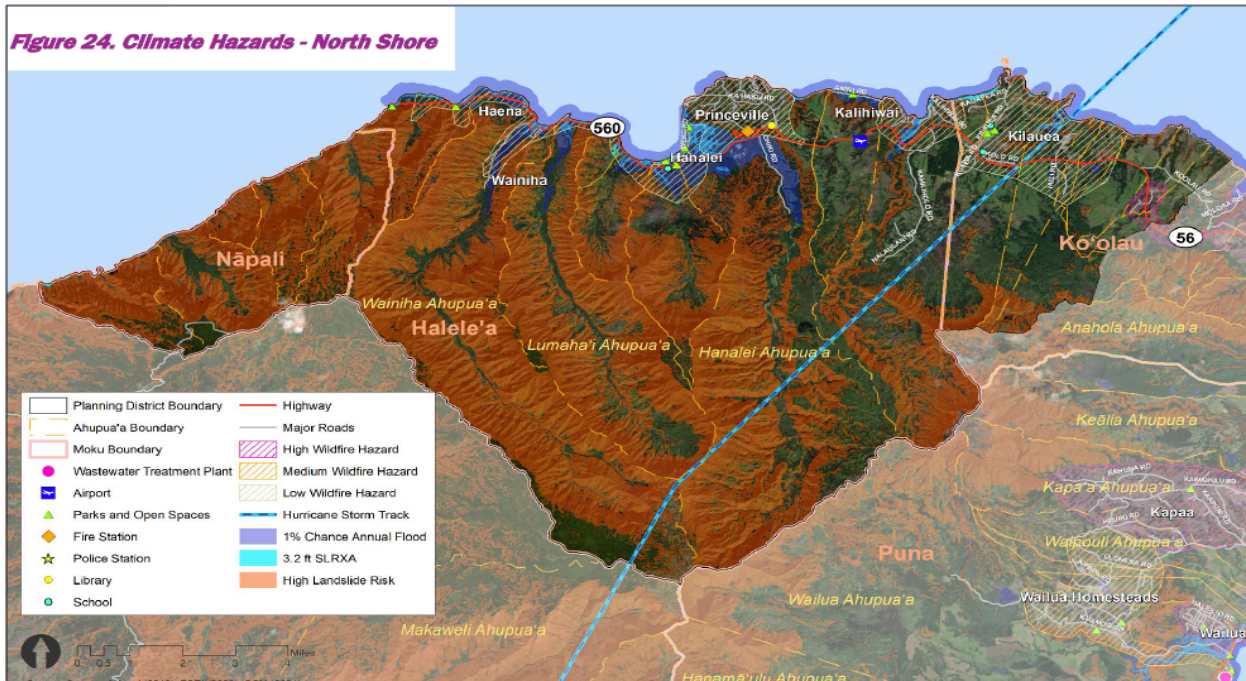


Image 4. [Multi-hazard flood, storm surge and landslide risks, North Shore, Kaua'i](#) (County of Kaua'i, 2023)

Impacts

- * There is greater than normal rainfall during the La Niña wet season, increasing flash flooding risks ([KCAP, 2022](#)).
- * Freshwater floods led to freshwater kills of reefs and biodiversity loss, particularly during low tide when freshwater sits on top of reefs for longer (stakeholders).
- * High wave energy stresses corals, particularly in shallows (stakeholders).
- * High winds, rockfalls, treefalls, floods and landslides (2012, 2018, 2021) and debris blocking waterways, can create flashier floods with debris, increasing threats to homes, infrastructure, livelihoods, and people ([KCAP, 2022](#), community, stakeholders, [HWH, 2023](#))
- * Flooding and erosion dump nitrogen from fertilizers and silt deposits in topsoil into waterways, leading to harmful algal blooms and heat stress to corals, blocking sunlight, reducing coral diversity and increasing their vulnerability to bleaching ([KCAP, 2022, stakeholders, community](#)).

Projections

- * Higher sea levels will increase the volume of water in the rivers and streams, leading to more expansive, rapid and frequent flooding ([SRGII, HWH, 2023; KCAP, 2022](#)).
- * Projections for precipitation vary, from less to more frequent severe storms; there is some agreement that impacts from storms may be more hyperfocused on small areas ([KCAP, 2022; IPCC, 2019](#)).
- * There will be longer and more severe hurricane seasons, especially during [El Niño](#) periods, due to warming waters.
- * During drought and severe storms, there will be more instances of power outages for households and businesses, particularly those dependent upon the Wainiha hydro-power plant (stakeholders).
- * Vector-borne, water-borne and respiratory infection and disease for humans and animals will increase and spread ([KCAP, 2022](#)).

2. Climate Impacts

Drought, wildfires, heat waves, reduced trades

The U.S. Geological Survey (USGS) produces maps of real-time streamflow conditions compared to historical conditions. The map depicts streamflow conditions as computed at USGS streamgages. The colors represent real-time streamflow compared to percentiles of historical daily streamflow for the day of the year. Click on a streamgage to view more data for that location. [Learn more.](#)

Streamflow Conditions



U.S. Drought Monitor

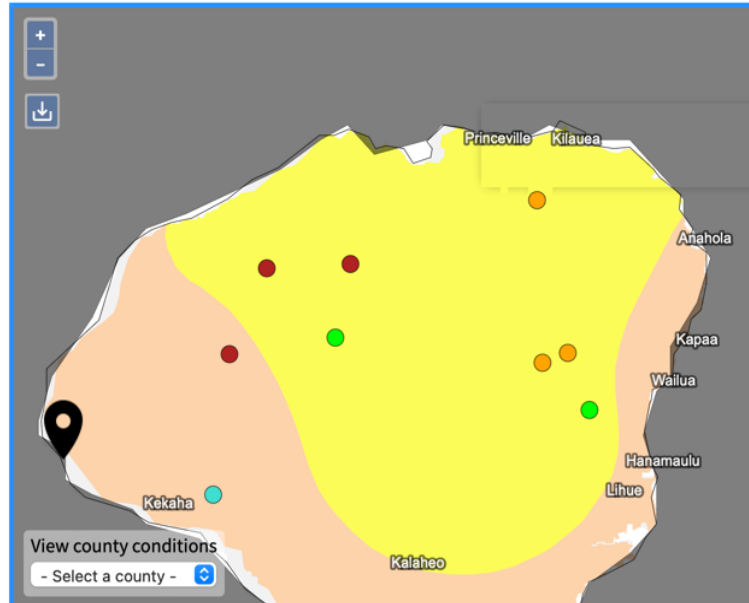


Image 5. [Drought and streamflow conditions Map, North Shore, Kaua'i](#) (USGS, 2023)

Impacts

- * Drought conditions vary depending on [El Niño Southern Oscillation \(ENSO\)](#) conditions. In December 2023, North Shore was not in a drought, yet streamflow conditions were much below normal ([USGS, 2023](#)).
- * Since 1950, temperatures have increased 2°F, with significant warming in the last decade ([NCICS, 2022](#)), leading to declining tradewinds since the 1970s,
- * Long-term reduction in seasonal predictability of rainfall, reduced streamflow and aquifer recharge ([NCICS, 2022](#), stakeholders, community).
- * Tensions are increasing between households and farmers, due to differing environmental management practices, impacts on interconnected ecosystem services and livelihoods, and water and land rights disputes (community, stakeholders).
- * Total precipitation decreased statewide from more intense El Niño periods ([NCICS, 2022](#); [KCAP, 2022](#)).
- * Soil moisture content and fertility are reduced, with residents reporting needing to water gardens more.
- * Avian botulism and bacteria proliferation are increasing due to higher temperatures, more nutrients and shallower water (stakeholders, [KCAP, 2022](#)).
- * Wildfires in Hanalei followed by seeding of non-natives has worsened water quality and increased proliferation of invasive species (stakeholders, community).
- * Reduced groundwater recharge and flow is impacting all systems and resources interdependent upon freshwater resources, including water rights, farming, fishing, reservoirs, wildfire management, cultural practices, among others (stakeholders, community).

Projections

- * Air/atmospheric, terrestrial and oceanic temperatures will continue increasing under unprecedented, higher emissions scenarios ([KCAP, 2022](#); [IPCC, 2019](#)).
- * Reduction in trade winds and increased air pollution will exacerbate public health impacts from extreme heat events and respiratory illnesses ([KCAP, 2022](#); [IPCC, 2019](#)).
- * Reduced soil moisture and fertility and increased salinity will impact agriculture, gardens, and ecosystem services (stakeholders, [KCAP, 2022](#)).
- * North Shore is in a low fire risk area; this risk may increase from reduced precipitation, drier soils and vegetation, high winds and lack of fire suppression capacity due to limited water resources (stakeholders, [KCAP, 2022](#)).
- * Increases in vector-borne, water-borne and respiratory diseases due to warming air and shallow pools of water with reduced flow and volume ([KCAP, 2022](#)).
- * Changes in biodiversity and habitat suitability for native species will lead to increases in invasives, that may increase the fuel load and risk of wildfires (stakeholders).
- * With drought, there will be soil compaction, reduced root stabilization and infiltration capacity, and increased flood and landslide risks as a result ([KCAP, 2022](#)).
- * Increased tensions and conflict over water and interconnected cultural natural resources (stakeholders).
- * Reduced access to electricity for households dependent upon the Wainiha hydroplant (stakeholders).

3. Community Visioning for Climate Adaptation



Image 6. Keiki visioning activity in July 2022, of what local keiki care about in their communities, what they worry about will be impacted by climate change, and how they envision or dream their community will be resilient to climate change.

Recommendation 1. Projects have clear climate champions, culturally inclusive processes, activities, indicators and outcomes:

- Ensure that all interconnected systems (e.g. social, ecological, economic) are considered when analyzing the costs and benefits of different interventions.
- Encourage project activities that identify supportive risk-reducing vocational training and livelihood strategies that will self-sustain and expand beyond project-based funding; creating new / alternate/ disaster-resistant/ resilient livelihoods.
- Develop an Integrated **Hanalei to Hā`ena Disaster Resilience, Natural Resource Management and Climate Adaptation Master Plan**, with collective, transparent, and equitable community governance, across watersheds.

Recommendation 2. Accountable, transparent, conflict-sensitive, landscape approach for social and environmental safeguarding:

- Foster social and environmental safeguarding for mauka to makai ahupua`a community landscapes, ensuring power dynamics, tensions and conflict have been adequately analyzed and considered in the proposal, and/or are able to be incorporated into the proposed project's inception.
- Ensure project(s) do not cause upstream, downstream, cross-watershed or other negative environmental, social, cultural, economic and other impacts, like increased tensions or conflict, during or after the project ([IUCN, 2020](#)).
- If any negative impacts occur, ensure they are documented and transparently mitigated and accounted for, and reduced as much as possible, during the project.
- Integration of conflict-sensitive, nature-based solutions for climate resilience ([Sphere, 2023](#)).

Recommendation 3. Equalize climate literacy, offer an inclusive, collective citizen science and information-sharing process through:

Transparent community engagement process:

- Engage in climate literacy to support improved access to, understanding or interpretation of, and decision-making around climate change science of maps, models, data and observations.
- Integrate technical findings including, and not limited to, the Hanalei to Hā`ena Community Disaster Resilience Plan, and hydrological risk studies and watershed or place-based risk, resilience and environmental projects.
- Equitable consideration for, and engagement of, smaller or lesser-known, newer and/or less-established community-based organizations and leaders.

Recommendation 4. Projects should be technically and strategically coordinated within a consortia / cooperative:

- Local ownership in and across project teams.
- Ensures projects are non-competitive, or inadvertently increasing climate risks for other areas/projects. Develop shared indicators and outcomes (e.g. climate resilience specific outcomes for adaptation, improved socio-cultural measures, intergenerational equity-driven engagement and benefits [CoK MHMRP, 2020, Section 1.5](#)).
- Support collective learning, adaptive management, partnerships across projects and watersheds.

Recommendation 5. Diversity, Equity and Inclusion-centered:

- Have community guidelines for ensuring diversity, equity and inclusion of local indigenous peoples, youth, women, LGBTQI+, persons with disabilities, among other marginalized groups, in the solicitation, allocation and oversight process of disaster resilience, climate adaptation and related projects ([Kaua'i Kākou—Kaua'i County General Plan, 2018 Equity Goals](#); and, [CoK MHMRP, 2020, Section 1.5](#)).

3. Community Visioning for Climate Adaptation

Climate change adaptation recommendations (proposed here in Section 3), and activities (proposed in Section 4), must include an analysis of who is most affected by climate risks, how, where and why, to ensure programs and policies address the root causes of, and impacts from, climate change, environmental degradation, development and intergenerational inequity.

Planning for and implementing climate adaptation strategies must not focus solely on hazard-specific, siloed solutions, and must take a multi-hazard approach to understanding and addressing the root causes of these overlapping risks to climate change, and mitigating or reducing the current ongoing impacts of those risks, while adapting and preparing for future risks (e.g., sea level rise, warming oceanic and atmospheric temperatures, and increased drought).

As needed, hazard-specific impacts and recommendations are made, such as particular challenges from, and setback strategies to address, long-term irreparable sea level rise or drought. Figure 6 illustrates a process for engaging in Climate Adaptation planning, honoring the community visioning recommendations.



FIGURE 3. Community Visioning for Climate Adaptation

4. Climate Adaptation Action Plan

Section 4 lays out community and multi-stakeholder recommendations for cross-cutting solutions to one or more climate change impacts.

This Action Plan acknowledges the interconnected nature of all community systems and the need to identify and design flexible adaptation strategies to address current and future impacts from climate change and natural hazards, that address intergenerational equity, and conflict-resolution over time, through addressing root causes of risks, as well as impacts from those risks (Figure 2). This Action Plan builds upon the [Community Visioning for Climate Adaptation \(Section 3\)](#).

The Action Plan is **organized by the community systems of importance, including social, cultural and intergenerational, environmental, economic, farming, energy, wellbeing, public health and safety, transportation and critical infrastructure systems**, wastewater, water security and food security.

These systems and their associated benefits, like temperature regulation and air purification and biodiversity, are critical for community survival, wellbeing and resilience in the face of climate change and other threats.

The plan identifies risks of climate change to these important ecosystem services, and proposes adaptation actions to address those risks.

Each community system is organized as follows:

- **Prioritized IMPACTS from climate change on that community system**, and
- **Climate Adaptation ACTIONS** (programs, policies, plans) to **address the root causes of climate risks** and the **effects of those impacts** recharge and reduce ponding of water, may be more appropriate. As stakeholders develop climate adaptation actions, strategies may be smaller-scale and short-term, and others may require accelerated or transformative adaptation, such as landscape transformation.

This Action Plan, the broader [Community-based Disaster Resilience Plan](#), and the [Resources in Section 5](#) are *public goods*, that community and other supportive stakeholders can leverage as needed to adapt current efforts, or design new programs, policies, plans, and strategies for climate adaptation, that may have benefits for many climate hazards, across one or more community systems.

The Action Plan is **not divided by specific hazards, as many hazards have similar impacts to the systems people care about**, and **often hazards do not happen as one-offs, but as cascading events** (e.g. flooding leading to landslides) that affect multiple systems at a time.

Climate adaptation strategies should aim to match the sense of urgency, and the scale of impacts of the issue being adapted to.

For example, for a long-term timeline and the massive scale of impacts anticipated from sea level rise, adaptation strategies may require longer-term, large scale investments, such as coral reef restoration, dune enhancements, infrastructure hardening and coastal retreat programs and policies.

For more time-sensitive, urgent impacts from climate change, such as frequent recurring flash floods, short-term mitigation measures such as using natural solutions to increase rainwater catchment, groundwater



4. Climate Adaptation Action Plan

Transportation, Critical Infrastructure

<i>Impacts from Climate Change</i>	<i>Climate Adaptation Actions</i>
<ul style="list-style-type: none"> • Due to the complex geography, topography, hydrology, and the limited capacity of many one-lane bridges and two-lane roads, the transportation infrastructure of Hanalei to Hā`ena is extremely at risk of all major natural hazards and other impacts from climate change. • Transportation infrastructure is already strained due to over-tourism and too many vehicles on the roads, which exacerbates risks during emergencies when evacuation is already significantly challenged by bottlenecks of traffic, particularly during peak tourism seasons. • There is no accessible alternate evacuation road accessible by cars for acute tsunami events, nor for long-term setback to account for sea level rise. These disruptions to transportation have had, and will continue to have, immediate cascading negative impacts to all services that are dependent upon the transportation infrastructure, including: <ul style="list-style-type: none"> • First responder resources and services, including the Fire Department, Emergency Medical Services, the Police Department and Water Safety. • Access to goods and services such as markets, schools, livelihoods, energy, health-care, medicines and medical supplies, social support networks, parks and natural spaces, among others. • The following summarizes the current and projected impacts to transportation infrastructure and services from Section 2: <ul style="list-style-type: none"> • The Kuhio Highway, local roads and bridges have already (in 2012, 2018, 2021) experienced disruption, damage and destruction from natural hazard events like floods and landslides. Kuhio Highway is exposed to landslide, sea level rise, and flooding between Wainiha Beach Park. Reference the Community Disaster Resilience Maps for Flood/Hurricane/Landslide, where community members indicated areas of landslides that have occurred since 2012. • The Hanalei Bridge is exposed to multiple hazards: low wildfire risk, 1% chance annual flood, landslide, sea level rise (SLR) SLRXA-1.1 (passive flooding), SLRXA 3.2 (passive flooding), and passive flooding with 6' SLR. • The entire town (developed with residential, commercial, and agricultural uses) and all facilities of Hanalei are exposed to flooding between the Wai'oli Stream and Hanalei River. The areas of flooding also have high landslide risk, particularly along Kuhio Highway. Development along Hanalei Bay and the Hanalei River will be exposed to 3.2ft of sea level rise and beyond. • Kuhio Highway is exposed to landslide, sea level rise, and flooding between Wainiha Bay Park and the Beach Park. All low-lying coastal areas of Hanalei to Hā`ena are exposed to coastal hazards of storm surge, high waves, high tides, coastal flooding combined with inland flooding when flooding rivers and streams meet the ocean, and sea level rise. Reference the County of Kaua'i's interactive hazard map to zoom into the areas of interest that will be impacted by these hazards. 	<ul style="list-style-type: none"> • Consider expanding regulations to include public infrastructure as part of the County and Statewide commitments to supporting continuity of public services long-term to adapt to climate change. (Public infrastructure including roads are not included in the 2022 County of Kaua'i Sea Level Rise Constraint District regulation (Comprehensive Zoning Ordinance Bill No. 2879), as public utilities were exempt from review). • Build upon the Hanalei Initiative's Mobility Plan and the Hanalei Watershed Flood Mitigation Study, leveraging scientific data, including maps and scenario-base modeling of flooding, high tide and sea level rise, to understand the feasibility of investing in alternative or adapted transportation. • Locations for such transport are dependent upon the season (e.g. winter has high waves and more rainfall making certain areas inaccessible by certain watercraft). Future planning of water transportation can leverage learnings from community leaders' experience coordinating water transport of disaster aid and shuttling people, as indicated in the Community Disaster Resilience Maps for Flood/Hurricane/Landslide. • Implement an integrated multi-hazard early warning system (radio, television, SMS text alerts, email, sirens, etc.) for flood, storm surge, wildfire, landslide and other acute hazards, leveraging and building upon the Emergency Alert System by installing local landslide, flood and wildfire monitors across Hanalei to Hā`ena. • Develop an accompanying evacuation study, evacuation plan and community awareness campaign for all hazards under varying climate change scenarios, with and for North Shore residents, the Kauai Emergency Management Agency, Department of Transportation, the Police Department, the Hanalei Initiative and other relevant stakeholders.

Wellbeing, Public Health and Safety

<i>Impacts from Climate Change</i>	<i>Climate Adaptation Actions</i>
<ul style="list-style-type: none"> • There will be an increase in the incidence and severity of communicable diseases, waterborne diseases, and vector-borne diseases. • Disasters, climate change, over-tourism and other issues are stressing the physical and mental health of community members. • Health facilities will be further stressed with immediate and follow-on impacts from climate change to transportation, energy and water resources. • Increased risks of injury, death and damages from short (e.g., wildfires) and long-term (e.g., sea level rise) natural hazard impacts related to climate change. 	<ul style="list-style-type: none"> • Develop early warning indicators and training for local monitors to report into the Department of Health, for localized observations of outbreaks of water-borne, vector-borne and communicable diseases before, during and after disasters. This will improve understanding of the nature of the increasing risks to disease due to increasing temperatures and other factors, with a focus on leptospirosis, toxoplasmosis, dengue and malaria. • Analyze risks to heat waves / extreme heat, and inequities and needs for underserved persons, particularly the elderly, children, pregnant and lactating people, and those with chronic health conditions, considering potential subsidies for air cooling and conditioning for those persons, cooling stations, monitoring of temperatures across various North Shore sites, among other solutions • The Hawai'i State legislative process is relatively open to increasing taxation on tourists which could be explored as an option to pay this non-quantified costs on peoples' mental health, physical and environmental health, to re-invest in projects the community wants to offset these inequities, such as mental health services, community-only beach access days, or other community ideas. • Lessons learned from the Maui 2023 wildfire disaster are critical to integrate into North Shore Kaua'i's wildfire risk planning, through: <ul style="list-style-type: none"> • Building onto the existing Hanalei to Hā`ena Community Disaster Resilience Plan to incorporate an analysis and action plan to address risks to drought, wind, soil moisture content, land use and land cover, water insecurity and wildfires, with a focus on long-range climate adaptation planning. • Implementing a wildfire or integrated multi-hazard early warning system (radio, TV, SMS alerts, sirens, etc.) and evacuation plan developed with and for North Shore residents, Kauai Emergency Management Agency, and other government and non-governmental stakeholders. • Providing households, businesses, governmental and community-wide resources for wildfire risk awareness, risk reduction strategies and fire suppression, as part of the broader Social and Behavior Change strategy for climate literacy, mentioned in the Social, Cultural and Intergenerational Action Plan section.

Water Security

Impacts from Climate Change

Climate Adaptation Actions

- Sea level rise will impact public infrastructure such as waterlines.
- Sea level rise, especially with coastal storm surge, will cause movement and salt water intrusion into the groundwater table.
- Reduced consistent rainfall and subsequent drought will reduce groundwater recharge and surface water resources critical for agriculture, social, cultural, residential and recreational use.
- Severe storms, flooding and landslide events will contribute to the inundation of streams, rivers and the ocean with contaminants, animal remains, overflowing cesspool waste, trash and large fallen trees
- Reduced groundwater and piped water resources will lead to reduced fire suppression and agricultural water resource needs.

- Institute water catchment policies and subsidized systems to capture excess rainfall during the rainy season, and support water and household gardens/nutritional security during the dry season and periods of prolonged drought.
- Integrate a government supported, community engaged “water systems investment plan” for the next iterations of the General Plan ([Kaua’i Kākou—Kaua’i County General Plan, 2018 Equity Goals](#)) the next iteration of the Kaua’i Multi-hazard Mitigation and Resilience Plan 2025 ([CoK MHMRP, 2020, Section 1.5](#)) and the North Shore Community Development Plan, prioritizing work based on where communities want to be more densely populated, and considering adjustment of the extensive permitting processes to ease the efficiency of expanding household and agricultural access to water.
- Conduct groundwater modeling under different climate and land use scenarios to support long-range planning.
- Engage in community awareness campaigns to support social and behavior change long-term, amidst increasing water insecurity.
- The Department of Water continues to monitor the water tables and support continuous conservation methods to ensure sufficient water for household consumption and fire suppression.
- Improve water infrastructure to be more efficient, with better source flow quantity, quality and movement, which is also good for disease management of avian botulism and plant diseases and pests affecting farming.

Social, Cultural, Intergenerational

Impacts from Climate Change

- All hazards and impacts from climate change exacerbate the historical systemic legacies of colonization ([State of Hawai'i, 2020](#)), including underlying vulnerabilities of: intergenerational inequity, wealth, access to secure housing, loss of land rights, water rights, among many other rights and resources related to Hawaiian inheritance and regulations ([Riley, et al, 2022](#)).
- Natural and cultural Resources at risk from flooding and passive flooding, particularly under the 6' sea level rise scenario:
 - Hanalei: historic sites, cultural features, many lo'i and a fishpond surrounding the bay, and almost all of them are exposed to flooding, critical habitat areas mauka including wetlands are exposed to High Landslide Risk
 - Wainiha: the entire coastline is exposed to sea level rise of 3.2ft, especially Wainiha Beach Park. The traditional cultivation area on the banks of the Wainiha River are also exposed to inland and coastal flooding.
 - Hā`ena: five cultural features in Hā`ena are exposed to flooding, and three of those are exposed to sea level rise at just 1.1ft and 3.2ft. The YMCA or Naue, a community resource for disaster resilience, is extremely exposed to flooding and sea level rise ([KCAP, 2022](#)).
- How people interact with one another and the environment.
- Significant "Social and Behavior Change" challenges with:
 - Accepting responsibility to reduce household environmental footprints ([IPCC AR6, 2022](#)).
 - Addressing underlying "climate eco-anxiety" -- such as climate denial, fatalism, bartering, rationalizing, feelings of overwhelm, information fatigue, difficulty making decisions under uncertainty, anxiety around the significant consequences of climate change on all aspects of life, or passing it off as the next generation's problem ([Nature, 2022](#); [stakeholder interviews and community voices](#))
 - Exacerbating tensions and conflict over water, land, access to natural resources, and the interconnected livelihoods and cultural benefits that these resources provide.

Climate Adaptation Actions

- Apply a framework for accountable, transparent and equitable climate adaptation programs, policies and strategies:
 - Culturally-grounded understanding, and feeling informed and equipped to make climate-resilient decisions ([Nature, 2022](#)),
 - Redistribute and prioritize government and private funds to grassroots local organizations and communities on the frontlines of climate change and disaster risks, particularly culturally-rooted stewardship.
 - Bolster technical, operational and technological capacity of community members and smaller or nascent civil society organizations / non-profits, to apply for grants, run operations and design, implement and scale-out programs for climate adaptation. prioritizing public good/spaces above or in harmony with individual ownership.
 - Fund flexible program budgets to enable innovative piloting of different adaptation tools and strategies, with frequent monitoring and shorter learning and program adaptation cycles, including funds for addressing any hazard shocks or stresses that may occur during the projects, to take it one day at a time and test and scale-up effective adaptation strategies.
 - Develop a process for reclamation and restoration of indigenous lands to descendants to increase capacity for local adaptation long-term.
 - Support a local, centralized networking platform resource for connecting communities, organizations and individuals, and sharing learnings, tools and peoples' expertise, for cross-watershed climate adaptation and resilience coordination and partnership.
- Invest in a Social and Behavior Change Strategy to understand social norms, opportunities and barriers at the root of adapting to climate change, and enabling climate adaptation and disaster resilience, such as:
 - Develop a community awareness campaign (such as a Social and Behavior change campaign) to support households to understand climate risks, improve climate literacy and awareness, increase access to climate information and resources, and bolster decision-making to cope and adapt to impacts from climate change.
 - Develop equity-focused, risk-informed development plans and policies that address socio-economic differences of gentrification, economic displacement of locals to hazard-prone areas, and long-term impacts on intergenerational wealth, equity and stewardship (e.g. external people buying up very expensive homes, and the impacts on the loss of locals, fracture of social cohesion, lack of new residents inputting into the local economy and sense of community resilience) ([ClimateXchange, 2020](#)).
 - Explore how community continues to be fractured, and what this means for individual vs. collective risks, and which climate and [environmental justice](#) issues are exacerbated by such socio-economic differences.
- Broaden networks and engage in joint policy, advocacy, campaigning, fundraising, learning and action activities with other communities and civil society organizations on the frontlines of disaster risks, climate change and underlying development drivers of risk, such as by joining the [GNDR \(Global Network of Civil Society Organisations in Disaster Risk Reduction\)](#), the [CJA \(Climate Justice Alliance\)](#), [It Takes Roots](#), among others.

Environmental

Impacts from Climate Change

- Warming air and surface water temperatures are contributing to increases in avian botulism, negatively impacting native bird species, with follow-on impacts to biodiversity.
- Post-flood and post-landslides, there has been much clearing of hau, without adequate knowledge, resources and training to re-vegetate riparian and landslide areas with native species that could reduce risks to landslides, flooding and erosion; revegetation was done primarily with non-natives including invasive grasses, which may decrease climate-resilience to floods, drought, fire and erosion, and decreases native species habitat.
- With increases in non-native invasive grasses, there is increased wildfire risk, which then makes the environment unsuitable for native species to compete. Bring in other environmental impacts from [Section 2](#).
- Climate change scenarios indicate that all climate change impacts, particularly change in oceanic and atmospheric temperatures, oceanic acidification and changes in rainfall, will threaten various ecosystems and their functions, potentially irreparably past tipping points.

Climate Adaptation Actions

- Restore mauka to makai practices, research and learning coordination and collaboration, through a cross-watershed Hanalei to Hā`ena Master Plan for Disaster Resilience, Natural Resource Management and Climate Adaptation Plan, led by a community committee, representing relevant watersheds, civil society organizations and other stakeholders.
 - Prioritize nature-based, community-led solutions and monitoring systems of thresholds and tipping points for ecosystem functions that support multiple benefits for the environment, climate adaptation, disaster resilience and livelihoods.
 - Start tracking kapu activities like dumping, pollutants, etc. and their impacts on relevant watershed indicators (19 like impermeable surfaces, etc.) mauka to makai; without this information, there cannot be accountability mechanisms.
 - Monitor changes in waterways and biodiversity after land cover changes, before, during and after floods, drought and other conditions, to support adaptive management practices and their impacts on environmental indicators.
 - Increase cultural riparian restoration of fishponds, auwai, streams, dunes, Imu stacked fish houses, wetlands: local organizations and researchers aim to expand the lo'i to act as sediment retention basins, and to protect the ecological integrity of the reef, providing habitat for endangered waterbirds through enhancing the nesting islands, fish, invertebrates, and food security; measures are being taken to fund the restoration of one Hā`ena fish pond, as the intermediary section between mauka and makai, restoring biological and historical connections and functions.
 - Support testing of outplanting of native algae in lo'i to improve water quality, flood mitigation and the effects of climate change because ocean acidification can be countered by using limu to balance / lower the pH and absorb carbon dioxide, nutrient pollution that happens during flood events; this involves not just planting native limu, but also removing invasive weeds, and restoring what native habitat might have looked like, to counter some of these effects of climate change.
 - Utilize the color health assessment card for local monitoring of impacts of adaptation and other projects on biodiversity indicators, to inform adaptive management and ensure projects are not detrimenting ecosystem functions and biodiversity.
 - Relocate water intake stations and updating of water lines at various locations, to be more flood- and landslide-resilient and efficient, in tandem with riparian cultural-ecological restoration.
 - Enable long-term testing of salinity and soil moisture probes, hobo weather stations, to support early warning systems and climate monitoring stations accessible to the public to inform local climate adaptation activities.
 - Conduct modeling of various scenarios of precipitation events, stream and river levels, storm surge and sea level rise, to account for climate adaptation planning for the most common and extreme scenarios in the short, mid and long-term.
- Policy and permitting expediting:
 - Ensure that emergency proclamation permitting is allowed for community to expedite the clearing of hau pre and post-disaster, and that post-disaster recovery funding gets support for the Army Corps of Engineers permitting process. Explore setback rules and opportunities for reclaiming or repurposing beachfront and riparian hazard areas post-disaster to be able to become public goods
- For wildfire risk reduction, there should be long-term funding for communities and respective landholders or agencies to:
 - Develop and adhere to standards for wildfire risk reduction that have climate resilience co-benefits.
 - Prevent and remove weeds particularly post-flood or post-removal of hau or other plants, planting native trees.
 - Secure funds, partnerships and deployment mechanisms for planting of climate resilient native plants along areas that have recently experienced landslides and flooding, including partnering with ranchers and large landholders who have capacity to engage in large landscape projects that impact the climate risks to other lands in the respective watersheds.

4. Climate Adaptation Action Plan

Waste Management	
<i>Impacts from Climate Change</i>	<i>Climate Adaptation Actions</i>
<ul style="list-style-type: none"> Waste management includes: (1) wastewater, cesspools and septic tanks; and, (2) trash and bulky trash disposal, and post-disaster waste cleanup. Specifically in Hanalei, of the 270 documented cesspools (State of Hawai'i DoH, 2017): <ul style="list-style-type: none"> 207 (81%) are exposed to flooding 4 (10%) will be exposed to sea level rise of 1.1ft+ 67 (28%) will be exposed to sea level rise of 2.3 ft+ The remaining 21 (9%) will be exposed to passive flooding at sea level rise of 6' Cars, felled trees and other large debris and waste often flood into the river during flooding events, causing multiple health risks. Cesspools and septic tanks in Hā`ena, Wainiha and Hanalei are exposed to flooding and will be exposed to sea level rise, leading to overflow, leeching and contamination of groundwater, wells, streams, rivers, and the ocean, distributing dangerous bacteria and toxins, causing human and environmental health threats. See the first two impacts to Housing relevant to waste management. 	<ul style="list-style-type: none"> Identify opportunities for funding for cesspool conversions in coordination with the ongoing Department of Water Master Plan and Kaua'i Adaptation Plan and other long-range planning. If a wastewater system is possible in Hanalei, it will be highly dependent upon the interactions of the water table being pushed up by sea level rise, and how many septic systems and cesspools are in the zone of passive flooding, which the Department of Water is currently evaluating. If a wastewater system is not feasible, an above-ground/sea level rise system will be required. Ideally such a system will be climate resilient to multiple hazards and environmentally safe. Per community feedback in the Wainiha Flood Vulnerability Report and the Wainiha Flood Awareness Campaign, residents support government provision of periodic (such as quarterly or as-needed for hazardous waste issue), bulky item trash pickup, removal of derelict cars, and emergency removal of post-disaster debris, to reduce risks from flooding and other hazards. Such programs and services must be accompanied by supporting policies and community watch or government supported watch mechanisms to enforce said policies to prohibit dumping of such materials in the environment.
Housing	
<i>Impacts from Climate Change</i>	<i>Climate Adaptation Actions</i>
<ul style="list-style-type: none"> Housing can be limited by how many water meters residents are able to get, because these meters impact fire suppression capacity which is dependent upon the same water supply as residential users. It is challenging to upgrade infrastructure for water and wastewater drainage systems to support increased housing density demands amidst impacts from climate change. 72% of residential and agricultural lands from Black Pot Beach to Kuhio Highway are at risk of impacts from sea level rise (KAP, 2023). The entire town of Hanalei, and all residences within it, are at risk of flooding to varying degrees. 	<ul style="list-style-type: none"> Strengthen real estate disclosures and awareness of residences in hazard zones. Follow the West Kaua'i model of government acquisition of large acreage of public land vulnerable to coastal hazards to support climate resilient development; the challenge on the North Shore is that access to land that is out of hazard zones to allow for relocation / migration / land swaps. Affordable, accessible, secure intergenerational housing and land tenure is needed outside of hazard zones, and when that is not possible, there should be resources for hazard resistance. Support policy, financing and development strategies for long-range planning with private and public property holders in high climate-risk areas, to enable a just transition away from (or re-design of properties to be more climate resilient) these hazardous areas, including: 1) managed retreat, 2) buy-outs, 3) transfer of development rights, and 4) reclamation of public property like parks to be natural easements or buffers for natural hazards and sea level rise.

4. Climate Adaptation Action Plan

Farming, Food & Nutritional Security	
<i>Impacts from Climate Change</i>	<i>Climate Adaptation Actions</i>
<ul style="list-style-type: none"> 75 % of the State’s kalo comes from Hanalei (KCAP, 2022), and kalo farming will be greatly impacted by climate change, yet currently there are no known guidelines or support mechanisms for long-range kalo farming adaptation. Sedimentation rates, dry periods and weather patterns are affecting farming, but many farmers aren’t talking about it and no one is measuring it. <p><i>Other Related Challenges</i></p> <ul style="list-style-type: none"> Some farmers report not seeing the value native birds and biodiversity bring to their kalo. Climate change is not a priority for many farmers so they are not adapting their practices to account for impacts from climate change in the short or long-term. Some think that climate change is a problem for the next generation to solve Contrary to the mauka to makai approach to resource management, many kalo farms of kalo farmers use chemical fertilizers and pesticides, which are serious threats to freshwater resources, coral reefs, public health and ecosystem biodiversity, making these systems less resilient to impacts from climate change. 	<ul style="list-style-type: none"> Develop clear climate-smart, sustainable farming recommendations and technical support for kalo farmers: <ul style="list-style-type: none"> Increase incentives for farmers, hunters and other residents, to reduce or eliminate the use of unnatural pesticides and fertilizers, stop dumping waste in the streams, and engage in more pono activities, including active monitoring of water temperatures, water quality, the presence of avian botulism, pH, salinity and other indicators of upstream mauka activities and their downstream impacts, with accountability mechanisms. Conduct an analysis of short, mid- and long-term impacts of climate change on kalo farming, to understand impacts of salinity and sand/changes in soil content will affect kalo, and follow-on economic, social, cultural and environmental impacts, in order to understand and enable mitigation and adaptation measures. Bolster mauka to makai commitments, education and connections from kalo farming to fisheries (poi to fish, fertilizer to salinity and botulism); understand social, behavioral and economic barriers and incentives for farmers to adapt practices to be sustainable and climate resilient, while growing productivity and income-generation. Protect the factors that drive ecosystem functioning of biodiversity including juvenile fishes, which can be expanded using traditional knowledge and practices, cooperative agreements, and NRCS sustainable agricultural plans. Develop and implement a culturally-grounded, climate smart agricultural training program including regeneration with socio-economic incentives. Finance regular maintenance of auwai and all outtakes of freshwater resources for kalo farming, including cleaning outtakes, monitoring the flow of water, temperature, levels, salinity, turbidity, nutrient loads, presence of microorganisms, plants and animals, and seasonal and out of season changes, to iteratively inform adaptation measures and sharing lessons learned across farmers. Improve the farming water infrastructure to be more efficient, reducing losses and leakages, shoring up the outlet from becoming inundated by saltwater during high tide events, ensuring good head and water movement, which is also good for disease management. Bolster capacity for farmers and gardeners to engage in nature-based solutions that improve food and nutritional security, community cohesion, and hazard risk reduction: <ul style="list-style-type: none"> Investing in locally-led trainings in tropical agroforestry, permaculture/permagardens and interseasonal food and nutritional security programs, through household and community or victory gardens, planting of more native fruiting trees, ulu, medicinal and edible plants, and engaging in a broader watershed cultural landscape design plan to incorporate mauka to makai principles in harmony across all projects. Ensuring these measures provide co-benefits such as: water infiltration and recharge, flood risk reduction, cooling air and water temperatures, increasing soil fertility and moisture, reducing sedimentation and erosion, reducing effluent and environmental contamination, and bolstering biodiversity, among others. Fund practical, locally-engaged research to explore other uses for kalo, like fibers, medicinal and other ways to prepare and eat it, to make its market value more diverse. Support farmers and gardeners to utilize early warning systems and traditional knowledge, to inform adaptive, responsive seeding, planting and harvesting of crops, to avoid losses due to hazard events, such as is done at Waipā. Expand sustained funding and incentives for food hubs, food banks, community gardens, farm-to-plate or farm-to-school programs, community supported agriculture programs, and an interconnected island-wide food security network. Support seed banks, seed orchards for community storage, and storage for drought-tolerant species for mass outplantings at a landscape scale.

4. Climate Adaptation Action Plan

Governance and Planning	
<i>Impacts from Climate Change</i>	<i>Climate Adaptation Actions</i>
<ul style="list-style-type: none"> • Increasing tensions and conflict over transboundary public goods (e.g. streams that traverse multiple landowners' properties) intersecting with private, State, County lands. • Complex bureaucracy and government regulations and approaches may hinder cohesive community governance. • Smaller or nascent civil society organizations and community leaders may be disproportionately affected by disasters, and may have more systemic difficulties accessing grants, donations and other funds to address frontline climate change and disaster impacts. 	<ul style="list-style-type: none"> • The Community Visioning for Climate Adaptation (Section 3, Figure 6), informed by “Recommendation 2. Conflict-sensitive, landscape approach for social and environmental safeguarding,” sets out the foundation of Collective Governance: Engage team members within and across the project support area, watershed/s, and organizations, ensuring diversity, equity and inclusion of decision-makers (CoK MHMRP, 2020, Section 1.5), to encompass these attributes: <ul style="list-style-type: none"> • Learn from community / government partnerships and experiences with the Hā`ena State Park Master Plan, to develop a well-funded, long-term, community-led, government-supported Master Plan for Hanalei to Hā`ena, encompassing cross-watershed Natural Resource Management, Disaster Resilience, Climate Adaptation strategies and committee. • Consider connecting this Master Plan with a new iteration of the County’s General Plan, North Shore Community Plan Update (1985), as it could be used as a tool for communities to implement policies and respond more proactively to climate change impacts. • Fund long-term projects to integrate disaster resilience, flood mitigation and climate adaptation into and across project watersheds from Hanalei to Hā`ena. • Synchronize and build upon, and inform the future iterations of County of Kaua’i Climate Adaptation Plan (KCAP, 2023), the County of Kaua’i Multi-Hazard Mitigation and Resilience Plan, and relevant Federal, State and County plans and policies. • Establish community governance and water rights of rivers and streams across watersheds. • Secure funding through cross-discipline proposals to connect terrestrial and coastal ecosystem expertise within and across teams. • Establish a community-based water rights framework that is climate- and hazard-smart, with sustainable funding and policy mechanisms to ensure maintenance of water rights in perpetuity. • Support organizational capacity strengthening for nascent or growing civil society organizations, through training workshops fundraising, grant writing, team management, budget management, software platforms, among others.

4. Climate Adaptation Action Plan

Economic / Livelihoods	
<i>Impacts from Climate Change</i>	<i>Climate Adaptation Actions</i>
<ul style="list-style-type: none"> Livelihoods like farming, fishing, tourism all dependent upon the ‘aina, and vulnerable to impacts from disasters and climate change. The visitor industry will be significantly impacted by climate change and natural hazard events, threatening all livelihoods and public services dependent upon the visitor industry revenues and taxes. 	<ul style="list-style-type: none"> As part of the new Master Plan for Hanalei to Hā`ena, develop a community-led economic equity plan, to transition the livelihood structure away from over-tourism, with locally-driven, climate resilient jobs and housing that support ecosystem restoration, livable wages and sustainable intergenerational wealth-building through enhancing connection of people and place. Develop sustainable socio-economic models for designing, implementing and maintaining ecosystem restoration and nature-based solutions for disaster risk reduction and climate adaptation: <ul style="list-style-type: none"> Non-profits being equipped to train and employ community members to maintain healthy watersheds. Leveraging flexible grants, donations and/or loans to support a post-disaster recovery economy that invests in jobs and programs benefiting local residents. Supporting eco-tourism learning from global success stories, linking learning, food security and environmental sovereignty. Fund, in perpetuity, ongoing adaptive maintenance and sustainable livelihoods as a core integrated function of operations and programming, not as a separate activity, to support monitoring, environmental surveys including traditional knowledge indicators with long-term funding trajectory to support adaptive management. Conduct trainings for local arborists and “stream teams” to care for the auwai and mitigate flooding impacts.

Energy Access	
<i>Impacts from Climate Change</i>	<i>Climate Adaptation Actions</i>
<ul style="list-style-type: none"> Sea level rise, coastal erosion, landslides, floods, storm surge, wildfires and severe storms (high winds, lightning) can damage and destroy electricity poles and lines. All services that are dependent upon energy access are at risk of power outages, affecting food and water security, access to critical information, refrigeration of medicines and breastmilk or formula, household and business safety, and access to water particularly for Wainiha residents who are dependent upon the Wainiha hydropower plant for electricity. 	<ul style="list-style-type: none"> Long-term, the entire electrical grid from Hanalei to Hā`ena will need to be adapted and/or migrated above the maximum estimates of 6ft of sea level rise and to be resistant to high winds, floods and other hazards and reduce the susceptibility of wildfire risks (CoK Adaptation Plan). For Hā`ena and Wainiha, DoW and KIUC are looking at emergency energy alternatives, such as installing a Tesla battery and getting a backup generator at the Wainiha powerhouse so that if the transmission goes out, KIUC can still cover the distribution load and start up the hydropower plant to run during outages. Coordinate emergency energy access planning and connect community disaster leadership to KIUC, to have focal points for disaster response in coordination with this Hanalei to Hā`ena Disaster Resilience and Climate Action Plan. Enhance incentives for customers to install PV panels, or get batteries (need that even if have solar panels because they use the grid as the battery) or power wall, generator particularly for energy-vulnerable areas.

5. Resource Guide

Section 5 offers various climate adaptation tools, guides and resources to support modifying current programs, or designing new programs, that can integrate climate adaptation strategies that address climate hazards, root causes of risks, and long-term climate resilient development.

Guides, Toolkits, Case Studies
Sphere Unpacked Guide: Nature-based Solutions for Climate Resilience in Humanitarian Action, 2023
The Blue Guide to Coastal Resilience: Protecting Coastal Communities through Nature-based Solutions, 2021
World Wildlife Fund Flood Green Guide, 2016
University of Hawaii Sea Grant College Program, 2023
IUCN Global Standard for Nature-based Solutions, IUCN, 2020
U.S. Environmental Protection Agency Justice Screening and Mapping Tool, 2023
NAACP Climate Justice Project Toolkit, 2023
Climate Justice Alliance Advocacy Toolkit, 2023
Hanalei to Hā`ena Community Disaster Resilience and Climate Adaptation Action Plan, HWH, 2023
Reef Resilience Network Community-based Climate Adaptation Toolkit, 2023
GNDR Risk Informed Development Guide, 2023
Hā`ena State Park Master Plan, 2018
Community based Adaptation Network Toolkits and Resources, 2023
U.S. Climate Resilience Toolkit Nature Navigator, IFRC, USAID, 2022

Climate Models, Maps, Data, Reports, Policies, Plans
Interactive Multi-hazard mapping, County of Kauaʻi Climate Adaptation Plan, KCAP, 2023
County of Kauaʻi Multi-Hazard Mitigation and Resilience Plan, 2020
State of Hawaii Climate Change Portal, 2023
US Global Change Research Program. “Chapter 27: Hawaii and US-Affiliated Pacific Islands.” 4th National Climate Assessment, 2018
Kauaʻi Kākou—Kauaʻi County General Plan, 2018 Equity Goals, 2018
IPCC Special Report on the Ocean and Cryosphere in a Changing Climate, 2019
NOAA Climate Portal, 2023
US Global Change Research Program. “Chapter 27: Hawaii and US-Affiliated Pacific Islands.” 4th National Climate Assessment, 2018
Sea Level Rise Viewer, PacIOOS, 2023
Relevant North Shore river and stream gages, USGS, 2023
Hanalei Watershed Flood Mitigation Study, SRGII, HWH, 2023
Wainiha Flood Vulnerability Report, Mālama Kua ʻAina, 2024
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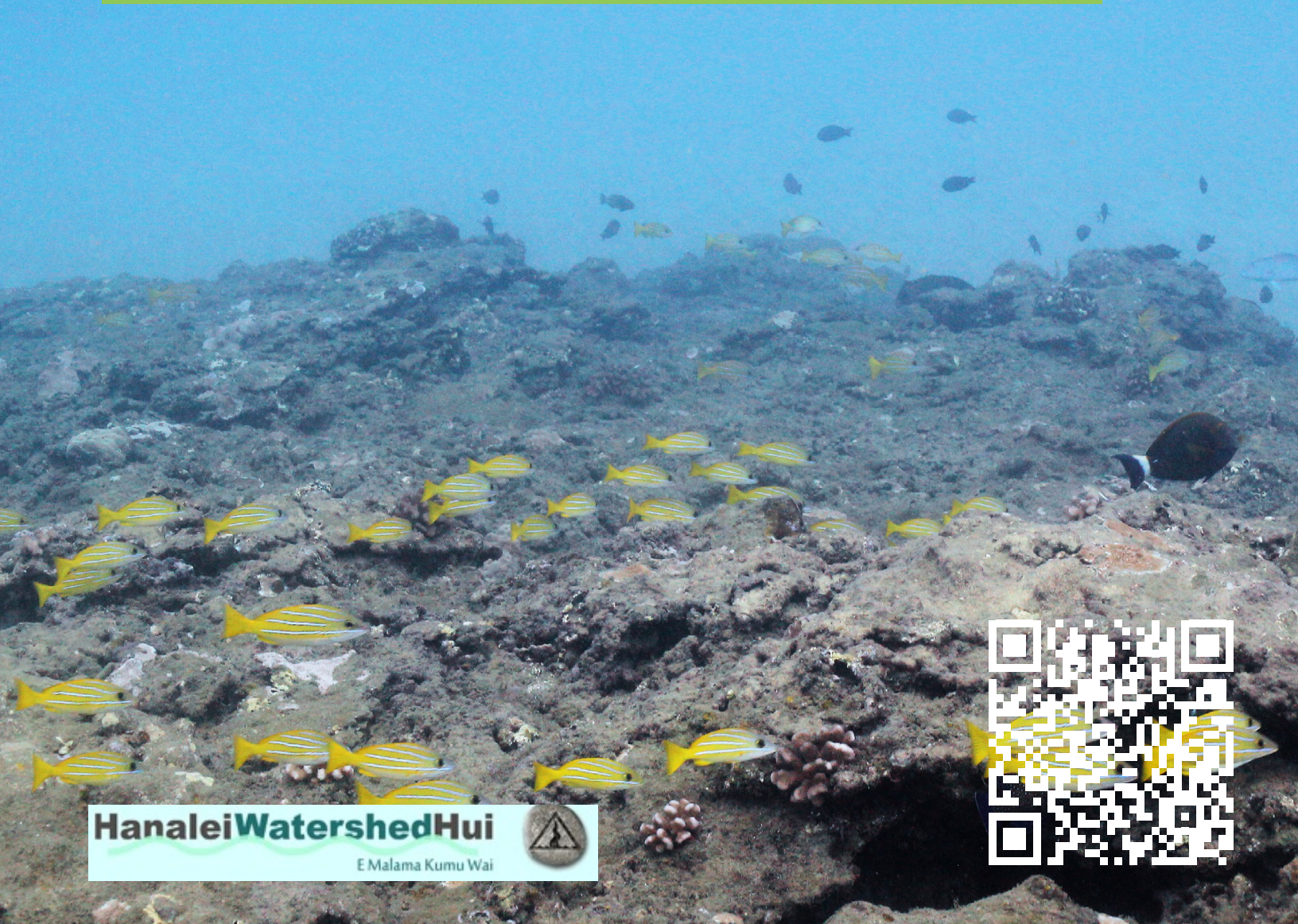


Photo of Pu'upoa, 2016, Dr. Eric Brown, National Park Service American Samoa

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