

EHUEHU I KA PONO

THRIVE IN BALANCE

Kailapa Community Resilience Plan

JANUARY 2019

Kailapa Community Association

Developed as a part of the
Resilient Hawaiian Communities Initiative



TABLE OF CONTENTS

1	About Kailapa's Resilience and Plan
2	A Path Towards Resiliency: Our Priorities and Actions
6	Why Resiliency Matters
8	RHC Planning Process
10	Ho'omaopopo: Understanding Climate Impacts
15	Wai (Fresh Water)
20	'Āina (Land Use)
24	Kanaka (People)
27	Mau A Mau (Onward)

KAILAPA

HAWAIIAN HOMESTEAD



Our community's vision is: "**Ehuehu I Ka Pono**", to "**Thrive in Balance.**" This is the bedrock aspiration of our community and our central vision as we approach any planning effort.

This vision is expressed through the six values laid out in the kalo leaf image. These values represent the foundation of our community's planning efforts. These values were first articulated during a series of two-day collaborative planning sessions facilitated by the University of Hawaii's Department of Urban & Regional Planning in early 2012, which led to the building of a community pavillion in the Kailapa homestead (see plan). The pavillion is the piko or center of our community planning efforts and provides a space to hold community meetings and celebrations open to all residents of the homestead.

The community has adopted these values and they have guided all subsequent planning efforts.

This plan is a more visual summary of a longer resiliency plan that the Kailapa community has worked for nearly a year on writing. In addition to a more robust discussion of the goals for Kailapa going forward, that plan also includes a resource library containing a legal memo, many maps of the area, climate science syntheses, and other documents that the community found valuable throughout the planning process. The longer resiliency plan also includes more of the resources with citations that were used to research and write the information contained in this document. The longer resiliency plan coupled with the resource library will be a depository of important information the community can utilize as they begin the implementation process in 2019 and beyond.

About Kailapa's Resilience and Plan

Pūpūkahi I Holomua Kākou (United We Grow)

In January 2018, the Kailapa Community Association (KCA) was selected as one of two Native Hawaiian communities to participate in the inaugural Resilient Hawaiian Communities (RHC) initiative, which was designed to support community resilience planning through a collaborative process informed by a working group of organizations and individuals who are leaders in natural and cultural resource management, climate change science, Native Hawaiian law, and planning in Hawai'i. The RHC initiative had three objectives:

OBJECTIVE 1

Build capacity for Native Hawaiian communities and organizations to engage in resiliency planning.

OBJECTIVE 2

Develop two community resilience plans to serve as models for other Hawaiian communities.

OBJECTIVE 3

Develop greater efficiency between Federal, State, Native Hawaiian, and local partners in understanding and responding to changing environmental conditions.

The purpose of the Kailapa Community Resilience Plan (KCRP) is to create a roadmap for future land use development, promote the community's ability to thrive, and become a truly Resilient Hawaiian Community. Thriving includes the ability to adapt to and manage environmental threats as the climate changes, and be prepared and aware of potential economic, social, and physical vulnerabilities. The KCRP identifies optimal land uses to support a healthy community that manages all the resources available to it. The Plan identifies a pathway leading to how a resilient Kailapa could look like in the future, and most importantly what steps it would take to get there.

Of the six core values statements that our community has adopted, three were highlighted for this RHC project as a way to help frame the process and guide our planning efforts:

Mālama 'Āina - Resource Management

Focused on land use, freshwater access, and stewardship of our ocean resources

Mālama 'Āina means to care for and nurture the land so it can provide what we need to sustain ourselves and future generations. KCA is stewarding the lands in our ahupua'a to honor our ancestors and practice beneficial methods of land management. Native Hawaiians always had an intimate relationship with the land, understanding that if we take care of it, the land will take care of us. The Hawaiian Islands consist of great ecological diversity and its isolation in the middle of the Pacific Ocean has made it unique. With over 3,000 native species of plants and animals, many of which are endangered or near extinction, the concept of Malama 'Āina is more critical today than ever before. This serves as the guiding principle for any 'āina-based plan to be successful.

Noho Kū'oko'a - Self- Sufficiency

Focused on water, land use, and economic development

The Kailapa community aspires to be self-sufficient within our own homelands by taking steps to learn and create the capacity to manage the potential sources of power, water and other natural resources (fresh water, land and ocean), and create economic opportunities within our community by doing so.

Laulima - Community Cohesiveness

Focused on leadership, relational support, growth, and community interaction

The KCA Board represents the beneficiaries on the homestead land with the kuleana of building successorship and encouraging community engagement and participation in the planning efforts. Bringing the community together at various events helps to celebrate, share, mourn, and grow as one large 'ohana. All 'ohana will have disagreements, but as we ho'oponopono, and resolve our differences, we can then continue to work together for the greater good.



A PATH TOWARDS RESILIENCY:

At the outset of the RHC project, KCA members considered how best to address these value statements in the KCRP and beyond. The community participated in setting out its vision for a resilient future and assess which actions would take us there. While more than a dozen areas of concern were considered, three priority areas consistently emerged through both formal and informal discussions: wai, 'āina, and kanaka.

WAI

First is wai, our fresh water, both potable and non-potable. If our freshwater supply is ever negatively impacted the result would be devastating. We must ensure that our wai is secure to have any hope for resiliency in our community.

GOALS

Secure freshwater Source(s) for the community of Kailapa.

Establish Water Infrastructure

Affordable Freshwater

Beneficiary-led and Managed Water System

Sustainable Water Stewardship

PROCESS

We extensively researched our groundwater and surface water resources and considered all of our options for moving away from the high costs associated with our current water system. We created critical pathways for each resource and are gathering the necessary data to pursue these options so our community as a whole feels ownership in the pursuit of a new water delivery system.



Our Priorities and Actions

These three priorities have been the driving force for the entire ten months of the planning, including community engagement, stakeholder consultation, and research with resource partners.

Each area will be explored in greater depth throughout this plan.

'ĀINA

Secondly, is 'āina, our land. We recognize that when we take care of the land the land takes care of us. Proper thinking, acting, and interacting with our land provides a place and a base to build a foundation of resiliency. Proper land use can provide an abundance of food and economic opportunity.

Re-connecting to the 'āina

Protecting the 'āina

Adaptive Reuse of the 'āina

We evaluated what we knew about the use and potential of these lands, met with key stakeholders for their 'ike, and overlaid the community interest to different sections of the 10,000 plus acres.

KĀNAKA

Our third priority area is kānaka, our people, our community members. There can be no resilient community if there is no community. As our people grow and develop, as our relationships are strengthened, our capacity for resiliency increases. When there is harmony within each person and between each person, the 'āina, and the wai, we believe there is harmony in the community, and there exists true thriving in balance.

Community Capacity Building

Improved Quality of Life

We ensure all decisions are community-driven, value-based, and aligned with our vision. Capacity building is an important step for the community to achieve its goals throughout the development and implementation of this plan.

Facilitate opportunities to learn, practice and share Hawaiian knowledge of history, culture, values and traditional practices.

A PATH TOWARDS RESILIENCY:

WAI

First is wai, our fresh water, both potable and non-potable. If our freshwater supply is ever negatively impacted the result would be devastating. We must ensure that our wai is secure to have any hope for resiliency in our community.

NEXT STEPS

Exercise Native Hawaiian rights by petitioning for a Surface Water Reservation in the Kohala Aquifer for above ground resources.

Commission a groundwater assessment in the Māhukona Aquifer to determine the quality and quantity of the available resource underground.

Assess the condition of the streams and diversions mauka of Kailapa, especially in the Kehena Ditch System and the 16" pipe built to transmit surface water to Hawaiian Homestead land.

Install water gauges in the Kehena Ditch to analyze the amount of water flowing in the system.

Develop a plan for the storage and transmission of water to the residences.

Train Kailapa residents to operate a future home-stead-owned water system, effectively returning to the old system of a kahu wai (water steward) or a konohiki who was in charge of controlling the water in an ahupua'a.

Implement water saving technologies by installing residential low flow regulators and grey water conversions for irrigation.



Our Priorities and Actions

'ĀINA

Secondly, is 'āina, our land. We recognize that when we take care of the land the land takes care of us. Proper thinking, acting, and interacting with our land provides a place and a base to build a foundation of resiliency. Proper land use can provide an abundance of food and economic opportunity.

Establish multiple "campuses" to facilitate different focus areas for the rehabilitation and rejuvenation of our ahupua'a.

Continue the Nā Kilo 'Āina program which is focused on building observational skills to empower community members to manage and protect our natural resources

Learn from our ancestors by preserving the historical and cultural resources in our ahupua'a.

Control ungulates (especially goats) and other invasive species through fencing and other eradication efforts.

Plant native dryland conducive plants to reduce the erosion and runoff to the makai areas.

Establish roads in the mauka parcel for ingress / egress to access the lands of the ahupua'a as well as provide alternative disaster routes.

Establish community agriculture and food security

Manage the makai resources as a primary source of protein.

KĀNAKA

Our third priority area is kākāna, our people, our community members. There can be no resilient community if there is no community. As our people grow and develop, as our relationships are strengthened, our capacity for resiliency increases.

When there is harmony within each person and between each person, the 'āina, and the wai, we believe there is harmony in the community, and there exists true thriving in balance.

Develop an apprentice program to encourage younger members of our community to take leadership roles and advance our goals in ways that are inclusive of all members.

Train and educate leaders to build capacity through board training, fundraising, and administrative skills.

Expand Friday "talk stories" to encourage other opportunities for casual, inclusive problem solving and planning.

Build off the momentum of the huaka'i to Molo-ka'i, where we witnessed the community driven resource management work being done all over the islands.

Implement and manage renewable energy projects to create self-sufficiency and economic opportunities for KCA members.

Work with partners like Pacific Growth Associates to build leadership and raise funds.

Host workshops for cultural practices, history, and values.

Why Resilience Matters

Background and guiding principles

On Oct. 15, 2006, an earthquake of 6.7 magnitude occurred off the shores of Kīholo Bay. This earthquake caused damage to Piers 1 and 2A at Kawaihae Harbor, an essential port, causing them to be temporarily unusable. The earthquake also damaged the two bridges that connect the Kailapa Homestead to the rest of the island. The bridges were unsafe for vehicles to drive over and left the Kailapa Homestead isolated for approximately two weeks. The impact increased community interest in becoming self-sufficient and better prepared for similar types of disasters. It was a very real window into the kind of **future impacts expected from climate related events**. As the ecology around us experiences major shifts, and the climate impacts become more extreme, **these kinds of isolating events will become increasingly common**.

As Native Hawaiians, our ancestors strived for balance guided by the principles of:

Hā (breath of life)

'Ohana (family)

Lōkahi (unification) unified in vision and purpose

Kūpa'a (steadfast, stand together) united for the purpose.

Aloha (love, compassion, mercy, sympathy).

Laulima (work together) to mālama 'āina from mauka to makai

Mālama 'āina (caring for all that sustains us)

These principles coupled with traditional knowledge gave our kūpuna a pathway to provide for their 'ohana and community. They understood the seasons and knew when to plant, when to harvest, and when to celebrate their abundance. They participated in Makahiki, a time set aside annually for sports, religious festivities and celebration, when all weapons were put aside to ensure peace and an opportunity to give thanks for all things – living and spiritual.

"Indigenous cultures are resilient, and their resilience has empowered Pacific island communities to survive several millennia on islands. These communities have survived extreme events and responded to change through adaptive mechanisms based on traditional knowledge that has evolved over many generations."

- National Climate Assessment



What does Kailapa need to be Resilient?

**Resiliency (re-sil-i-ence | \ri-'zil-yen(t)s \):
An ability to recover from or adjust easily to misfortune or change.**

What is resiliency?

While the dictionary defines resiliency one way, we felt it was more important as a community to identify characteristics of resilience that would answer the question,

“What does Kailapa need to be resilient?”

Water Drinking & Agricultural	Strategic Land Use Planning	Economic Development
Educational Resources (Schools)	Health & Safety	Communication
Standing Together	Funding	Renewable Energy
Affordable Housing & Expansion of the HHC	Support from Youth in the Community	Kūpuna Resources
Food Security	Topsoil	Self-Reliance at Individual Homes
Incentivize Participation in the Planning Process	Strong Leadership that includes Youth & Diverse Viewpoints	Stronger Sense of Responsibility Towards Neighbors

As our community gathered in 2018, we had many discussions about what resiliency means for us and our families. Our discussions brought us back to two important symbols: the 'ōhi'a lehua, which is often the first plant species to emerge after a lava flow, and the 'a'ali'i. An 'ōlelo no'eau says of the 'a'ali'i:

“He 'a'ali'i ku makani mai au; 'a'ohe makani nana e kula'i”

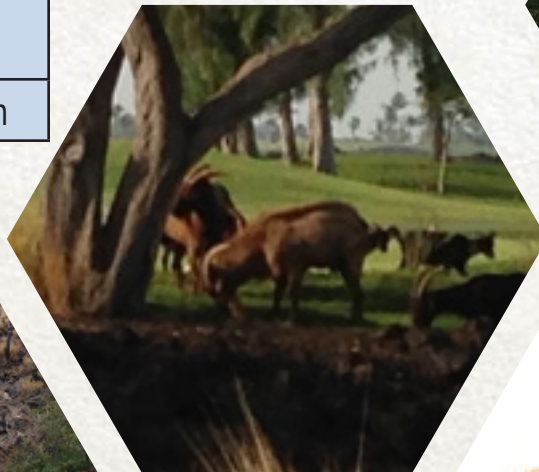
Literally translated as, **“I am a wind-resisting 'a'ali'i; no gale can push me over”**, this beautiful phrase speaks of the native shrub that resists and stands strong against many environmental impacts. This simple but powerful phrase exemplifies resilient systems able to absorb, adapt, and overcome stressors. Like the 'a'ali'i, our community can build towards resiliency, ready for any challenge – environmental or otherwise.

Planning Process

The RHC planning process was built on community members' experiences, connections, and 'ike. **This community planning process is meant to grow and evolve in line with the work and priorities of the community.** As a homestead community, working together with DHHL is crucial for the success of this plan. The goals laid out in the KCRP are in alignment with the Hawaiian Homes Commission Act that made homesteading for Native Hawaiians possible with the goal of supporting self-sufficiency and self-determination within our community.

In our community planning, community members identified some of the following future stressors including both: **Shocks (acute)** and **Gradual (chronic)** stressors. Participants especially reacted to the potential for fire, heat, and the strong, volatile winds of Kawaihae known as Mumuku.

Shocks (Acute)	Gradual (Chronic)
Fire	Fire
Volatile Wind	Kohala Winds Ho'omumuku Mo'olelo
Tsunami	Geographic Isolation
Hurricanes	Heat
Earthquakes	Mosquitos
Coral Death (Bleaching)	Goats
Heavy Rain Events	Poor Soil/Erosion



Kūkākūkā Community Meetings

Several meetings were held to kūkākūkā around the theme of resilience for Kailapa. In April 2018 members of the community gathered to discuss the vision for the homestead. Strengths and weaknesses were identified as well as a general vision and direction for the planning process. Seeking to expand and enrich the knowledge of our community leaders a huaka'i to Moloka'i was organized.

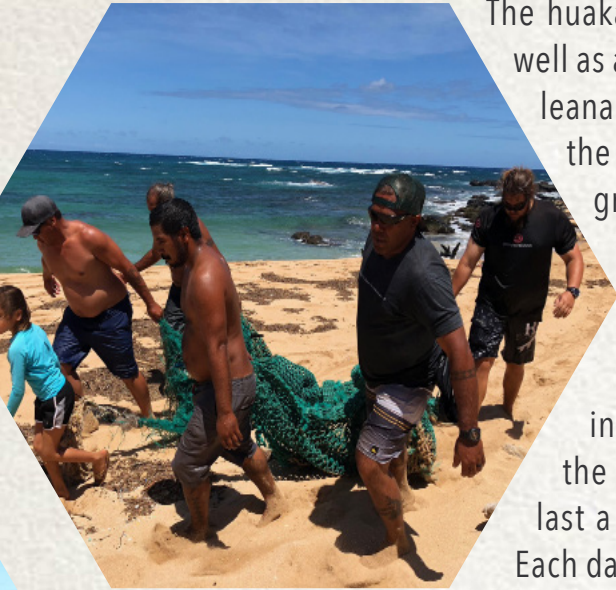
Huaka'i to Moloka'i

The huaka'i included current and potential future leaders from Kailapa, as well as a representatives from every coastal organization within the Kai Kuleana Network, a group of representatives from each community along the Kohala Coast. The participants came from a wide variety of backgrounds and experiences with the common thread being their deep desire to care for their resources in their different geographic areas.

The overall goal of the huaka'i was to expose the participants to multiple environmental threats and the mitigation efforts being used to mitigate the threats. By bringing people together with the common goal of caring for their resources created a bond that will last a lifetime. **What happens mauka impacts what happens makai.** Each day, a different site was visited and hana was done by all participants; dredging out invasive gorilla ogo (seaweed) in thigh-deep mud, pulling weeds from a native plant preserve, and removing trash along the shoreline from a proposed community managed fishing area. Everyone worked together to get the job done.

Since returning from Moloka'i, the South Kohala Coastal Partnership, Kai Kuleana Network and Kailapa teams participated in the final debrief at Kīholo Bay and committed to planning the next steps. The group continues to meet every month to plan, build relationships, solicit support for managing the Kawaihae ahupua'a, and step into leadership roles for the various campuses outlined later in this plan.

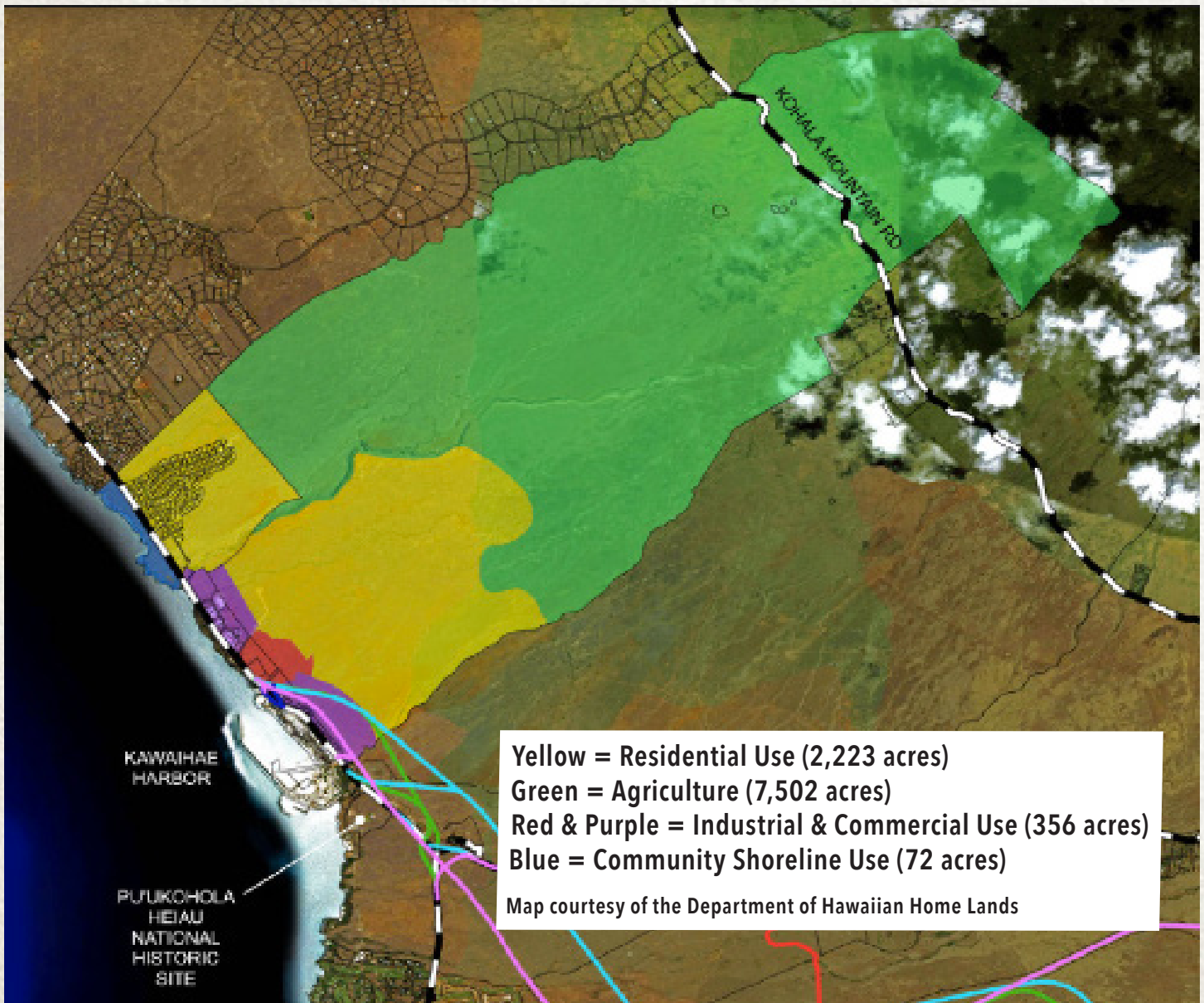
The future leaders of Kailapa need to work together to ensure plans are in place to be prepared for future ecological events. **Time and again we have learned that the connectivity and social fabric of the community serves as our greatest asset in times of trauma.**



Understanding Climate Impacts

Kailapa is a community rich with talents, passion, and diversity among the approximately 150 'ohana and almost 600 people that call this 'āina home. Opened as a DHHL homestead community in 1996, the families that have since come to Kailapa have largely built their own homes and properties with their own hands. They have experienced various challenges, but our community remains strong, resilient, and committed to a thriving future for our 'ohana.

Kawaihae Area Lands



Kawaihae is located on the western side of the Island of Hawai'i, spanning over 10,153 acres from mauka to makai. There are two neighboring ahupua'a: Kawaihae I and Kawaihae II. The Kailapa Community is located in Kawaihae I, which is owned by the Department of Hawaiian Homelands. The majority landowner of Kawaihae II is The Queen Emma Foundation, who leases the land out to local ranches.

Rainfall in Kawaihae

A lack of rainfall and freshwater resources present major issues for further development in the low-elevation areas of Kawaihae that include the residential subdivision. This steep gradient of rainfall within a relatively short distance makes Kawaihae a unique environment that offers a wide range of habitat including as high as 5,000 ft. in elevation at Pu'u Lapalapa, Pu'u Honu, and Pu'u Iki.



Kāhuli Aniau - Climate Change

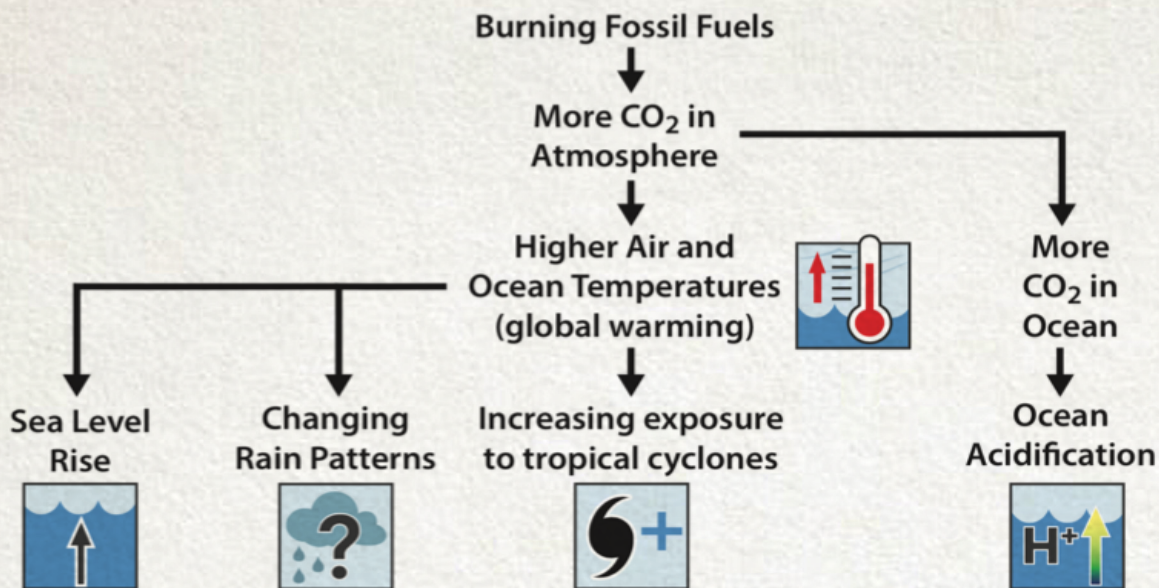
Being the Kilo (watchers of the environment) and understanding the connection between what is going on in the environment and how it impacted their resources allowed our ancestors to feed their people for generations without outside help or importing goods.

Climate change is a reality impacting many communities. KCA set out to get a handle on what climate change impacts may look like for families here in Kailapa, and how to prepare. During our visioning meetings, Kailapa community members identified a number of possible climate risks, some of which we are already seeing:

1. **Rising ocean temperatures** resulting in coral bleaching and coral death, which negatively impacts the food supply for 'ohana.
2. **Drought conditions** impact the community's ability to grow food and increase the demand for freshwater.
3. **Flooding from extreme rainfall events** has impacted soil, growing conditions & community safety; resulting in sediment run-off which damages water quality and coral health.

The Science of Climate Change

We decided to take a deeper look at the causes and impacts of climate change, shown in the figure below. The impacts are far-reaching – from mauka to makai.



Climate change impacts in Hawai'i. Global greenhouse gas emissions are resulting in higher air and ocean temperatures, a more acidic ocean, sea level rise, changing rainfall patterns, and the potential for more intense hurricanes and tropical storms in Hawai'i. *Figure source: PREL, PCEP, and Fletcher 2016*¹

Mauka Changes

Kawaihae has been getting warmer and drier for the last century.² By 2100, Hawai'i's average annual temperature is anticipated to increase to 3.6°F to 6.3°F, with greater temperature increases at higher levels.³ Precipitation patterns are also changing. The Hawaiian Islands receive approximately 1 foot less annual rainfall today than we did one hundred years ago.⁴ Future projections for Hawai'i anticipate a drier South Kohala coast with less precipitation in Kailapa.⁵ On the sacred summit of Mauna Kea, snowfall was far more common in the 1700s-1800s than it is today.⁶ By 2100, the near-disappearance of snowfall is anticipated.

What do these changes mean for the lands of Kawaihae?

1. Agricultural practices will need to adapt to keep up with warming temperatures, changing rainfall patterns, and more intense droughts.
2. Heat-sensitive species will need to migrate to cooler temperatures at higher elevations, and some will not survive if they are unable to find suitable habitat.
3. More heat and less rain means greater chances of drought, which in turn increases the chances of wildfires and severe dust storms (see photos). However, **wise land management practices can provide a buffer** against both wildfires and dust storms – even in a changing climate.

Mauka to Makai Effects



Dust storm in Kailapa (taken on December 8, 2018). Even minor events such as wind storms can have an impact on the community and the ecology. This demonstrates how the tree cover can keep soil from running off during flooding. On the right, the wind is carrying the dirt out to sea causing low visibility, where normally one can see Hualalai Mountain on the horizon.

Makai Changes

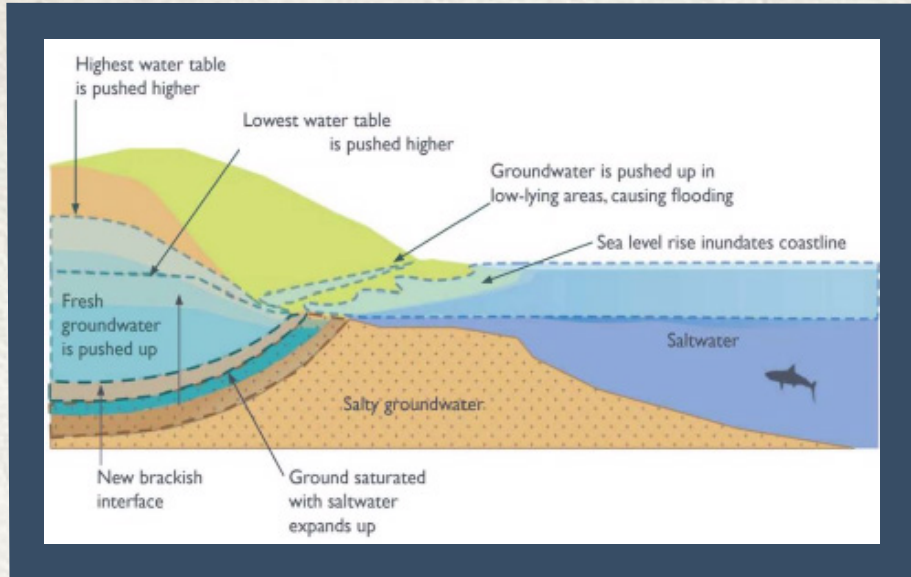
Sea surface temperatures have been warming every decade from 1970 to 2010.⁷ **Even small changes in water temperature can impact the feeding, reproductive behavior, growth, and habitat ranges of marine species.** With warming sea surface temperatures, Pacific fisheries will likely move towards cooler waters. This could initially improve fish catches around Hawai'i, but by the end of the century we will likely have less ahi, a'u, and other billfish in the central and western Pacific.⁸

From 2014-2017, the world experienced a massive coral bleaching event, during which 70% of the world's coral was damaged.⁹ **In the western Hawaiian Islands, 50% of coral cover died.** The cause of this bleaching event was unusually warm ocean waters. Sea surface temperatures are projected to warm ~0.5°F per decade this century. **At this rate, in the year 2040 bleaching events will start occurring annually in Hawai'i.**¹⁰

Because the oceans have helped to soak up the excess CO₂ that society has emitted, the composition of ocean water has been changing. These changes in ocean chemistry are reducing the ability of corals and other shell-forming organisms (e.g., 'opihi, clams, urchins, and various plankton) to build their skeletons and shells.¹¹ If the ocean becomes too acidic for small animals that are food for fish to grow and reproduce, this will have serious and far-reaching effects across the ocean food web.

Increases in temperature are melting ice sheets and glaciers on the continents. As the ocean water warms, it expands – also leading to sea level rise.¹² Since 1927, the NOAA station in Hilo has measured ~1 ft in sea level rise. Future sea level rise projections for Hawai'i range from another 1.1ft to 10.8 ft by the end of the century.¹³

Impact of Rising Sea Level on Groundwater



The above figure shows the impact of rising saltwater on groundwater, including flooding and inundated coastline. Figure adapted from Abby Mohan (2018) Presentation on Emergent Groundwater and Sea Level Rise, the Silent and Largely Unknown Underground Threat.

How might sea level rise impact Kailapa?

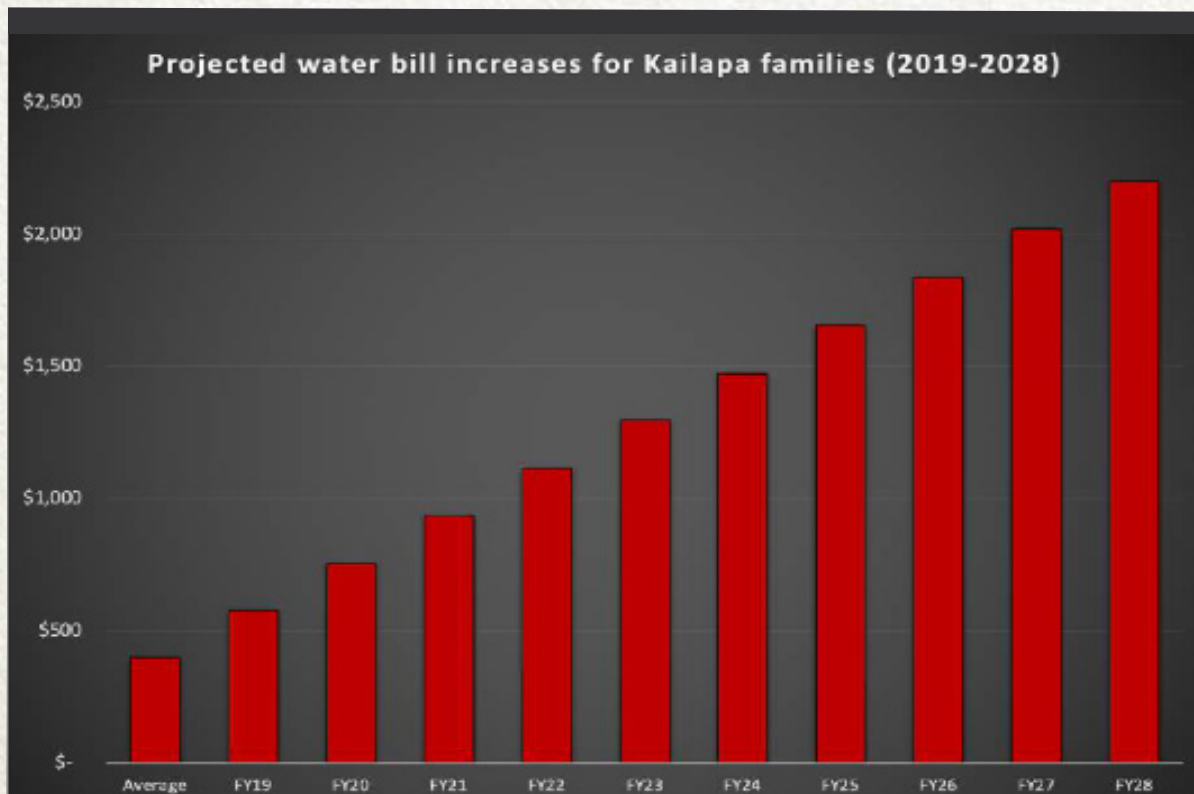
1. There will be a greater chance of coastal roadways and infrastructure being flooded due to a combination of sea level rise, stronger storms, and more intense rainfall during storms. This could flood parts of the highway (cutting off access), Kawaihae Harbor (cutting off shipments), and result in increasing coastal erosion (making ocean access more difficult).
2. Underground freshwater aquifer systems will be impacted as the salt water pushes the fresh water, decreasing the freshwater lens, increasing the salinity of local wells and freshwater resources along the coast- including in Kailapa.
3. Large waves and rising sea level will erode away the rocky cliffs, impact fishing grounds, and eventually flood parts of the trail system.
4. Species that nest along the coasts will also be endangered due to the loss of nesting grounds (e.g. albatross, sea turtles, Hawaiian monk seals).

The question, "how do we build resilience to climate change?" is a question about **who we are and who we want to be as a community**. Ancestral knowledge connects us with alternatives to the present-day model of society, as we move forward into a future filled with both uncertainty and potential.

Fresh Water is Critical to Kailapa's Future

Background

Water is the foundation of all life, without water there is no life. For Kailapa to mālama 'āina we must first have fresh water, therefore, KCA's main priority is to get the water from mauka (the mountains) to our homestead some five or six miles downhill. This pursuit was at the core of our vision and planning process with our community. Access to water undergirds the other pillars of our priorities. Without water 7,500 acres of designated agricultural land in our ahupua'a is not viable. The current potable water source from neighboring Kohala Ranch will only provide for about 50 more residential lots before reaching the contractual water use limit of 117,000 gallons per day (GPD). As a community we don't want to contemplate what Kailapa's future without another potable water source would mean for generations to come. We must seek alternatives.

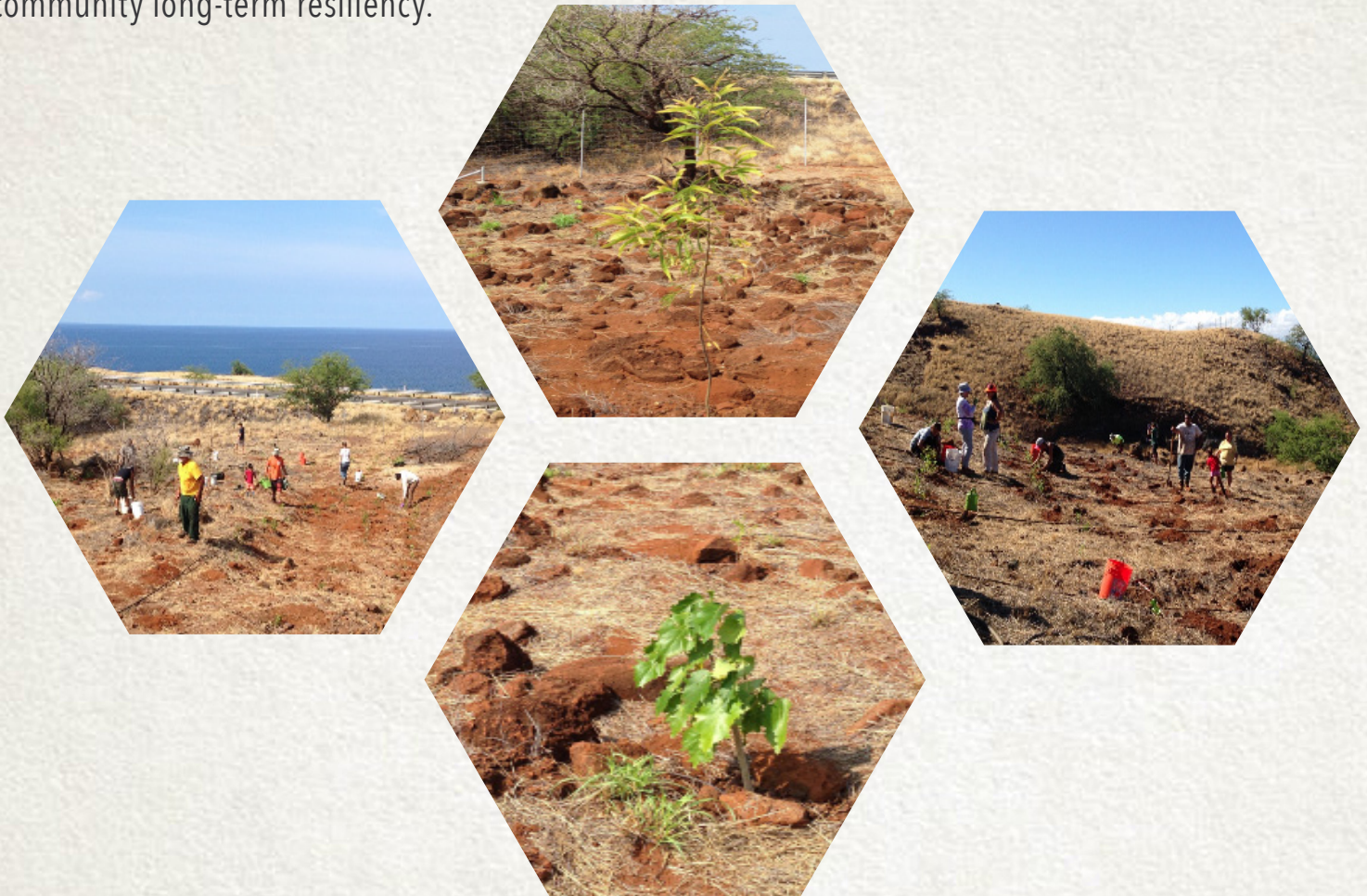


Rising Water Costs Will Hinder Our Resiliency

On August 1, 2018, new water rates went into effect for the community, ranging from \$3.67 - \$8.30/1000 gallons of use. This means Kailapa is paying some of the highest rates for water in the state. The tenuous nature of Kailapa's water supply is a major concern in the community and within DHHL. Rising costs (a 400 percent increase over the next 10 years), unreliable access (potential loss of access with just two years notice), and limited access (water for residential purposes only, no agricultural use) are all motivating the search for alternative water sources.

WAI

Especially in light of these exorbitant rate increases, freshwater is the foundation required to successfully build Kailapa's self-reliance, independence, and resiliency. Kailapa is located in one of the driest areas of the main Hawaiian Islands and secure access to fresh water is required for community long-term resiliency.

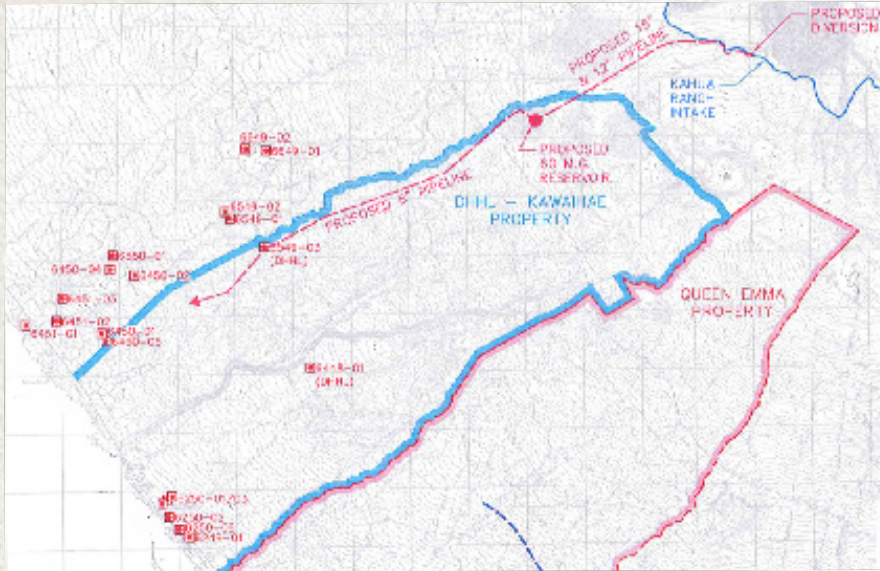


In 2014, KCA, with the support of the Waikoloa Dry Forest Reserve, **gathered the seeds, propagated, and planted over 2,000 native Hawaiian plants below our pavilion site** and on the steep hill above the gully as a part of our land stewardship project to mitigate the erosion and prevent the runoff from entering the ocean. Unfortunately, there was an undetected water line break resulting in 94,000 gallons of water lost. **The community was forced to turn off the water to the plants and let them to die** as it was pointed out to KCA that DHHL's contract with the Kohala Ranch Water Company was for residential use ONLY and NO Agricultural use is allowed.

Seeking workable alternatives to the current water situation, community members have discussed the challenge internally as well as engaging in ongoing dialogue with DHHL staff, state and county agencies, neighboring ranchers, water resource specialists, politicians, the Rural Water Association, and others.

The Pursuit of Bringing Water Down the Mountain to Kailapa

In the 1960's, when preparations were being made for the development of the Kawaihae Hawaiian Homestead, ranching was central to this region's economy, and securing water for this developing area was a priority. State infrastructure was developed during this time to supply the future Kawaihae Hawaiian Homestead with a source of fresh water, including the installation of a large 16-inch pipe from the Kehena Ditch to the upper portions of the Kawaihae parcel (see diagram).

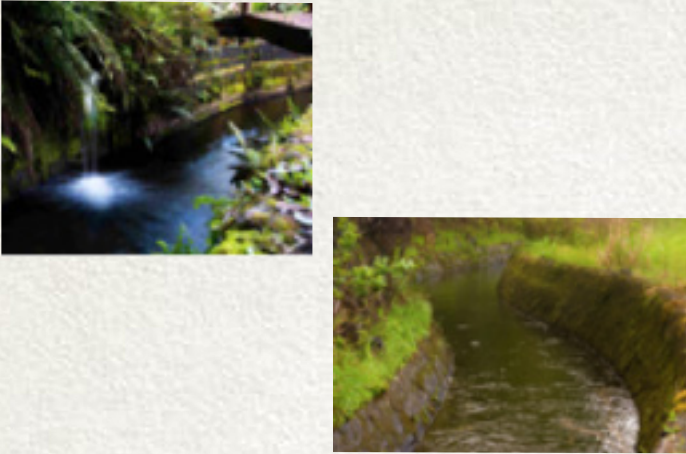
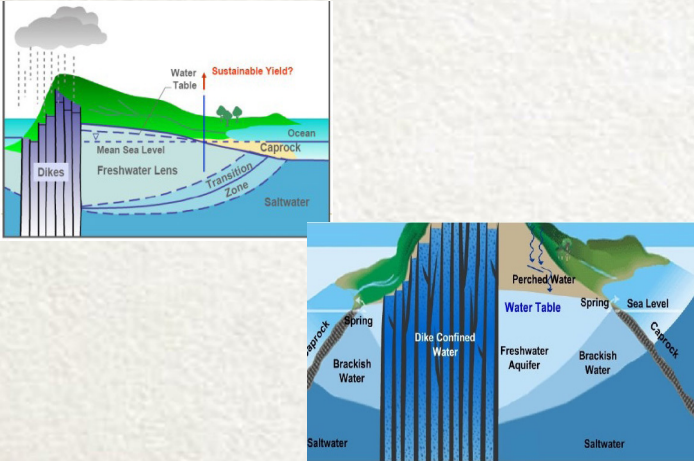


Unfortunately, this project was stopped when the Federal Clean Water Act was passed in 1972, creating new regulations requiring a water treatment facility, making it too expensive to provide potable water to Hawaiian Homelands. This postponed development in Kawaihae for more than twenty years until the residential area of Kailapa was built in 1996 on a much smaller scale than initially planned.

Knowing this history, we were curious if we could access the water that is still flowing through the 16" pipe and is currently being stored for agricultural use by neighboring Ranches. That curiosity led us to the search for various Critical Pathways that will allow us to seek several routes for the pursuit of fresh water.

Critical Pathways to Securing Clean, Affordable Fresh Water

We must consider a possible future with less potable and non-potable water resources in Kawaihae. Given the climate stressors on freshwater resources – both in the present and near future – our community has begun researching all available geological and legal tools to ensure that Kailapa's water needs are secured for today, and even more importantly, for future generations to come. These three pathways described in the chart present concrete steps for moving away from our reliance on Kohala Ranch for our freshwater needs and **seeking self-sufficiency**. As Kailapa continues on this resilience journey, especially in light of our water needs, we feel blessed to have incredible resources available to us, including the residents of Kailapa, family interconnections, multiple supporting partners in the Kohala area such as the Rural Water Association and their members, all who have provided Kailapa with support, a wealth of knowledge, and experience in developing access to fresh water and the management of these systems.

Source	Description
<p data-bbox="326 302 604 342" style="text-align: center;">The Kehena Ditch</p> 	<p data-bbox="862 302 1500 825"> Surface water Potable or non-potable Diversion from Honokāne Nui Stream 16" pipe on DHHL land (currently leased by Kahua Ranch) Ditch flow data shows an average 6-7 MGD (with a high of 54MGD and a low of 0) But also lots of dry days of no/low flow Storage a necessity </p>
<p data-bbox="285 873 646 913" style="text-align: center;">The Māhukona Aquifer</p> 	<p data-bbox="862 915 1560 1304"> Groundwater Potable 17 Million Gallons Day (MGD) Sustainable Yield 2 Existing wells on DHHL non-commercial land (6549-03 & 6448-01) Expect less saline water as we move up the mountain. </p>
<p data-bbox="168 1440 766 1480" style="text-align: center;">Kohala Ranch Water Company (KRWC)</p>  	<p data-bbox="862 1503 1552 1829"> Current status Contract meant to be temporary but has lasted more than 20 years Limited to residential use Use capped at 117, 600 MGD (current use averages 75-80,000 MGD) </p>

WAI

Next Steps	Viability
<p>Petition for a Surface Water Reservation</p> <p>DHHL will take the lead</p> <p>Describe purpose of water need ("what is it for?")</p> <p>Calculate water needs for parcel 485 (~7600 acres)</p> <p>New ditch flow data collection (place new gages in ditch)</p> <p>Infrastructure assessment (how much is left to rehabilitate?)</p> <p>Calculate how to and much would it cost to make potable</p> <p>Assess how much transmission to KCA would cost.</p>	<p>Large resource potential (lots of water available for future use)</p> <p>Strong support for exercising Native Hawaiian water rights in source</p> <p>Expensive rehabilitation & transmission costs</p> <p>Quality of resource is unclear (current users say it is adequate for drinking but need some more data)</p>
<p>Assessment of groundwater potential for potable freshwater</p> <p>UH geophysicist is interested in leading this assessment and could scout land with Jordan in early 2019</p> <p>Passive Seismic Geophysics could begin early 2019</p> <p>Calculate authorized planned use for aquifer (what is already planned/permitted)</p>	<p>DHHL groundwater reservation secured on 9/18 for 3.014 MGD</p> <p>Potential potable source not requiring filtration</p> <p>Costs to drill well could be prohibitive depending on depth of well.</p> <p>The 2 already - drilled wells have high chlorides, so other wells could be same.</p> <p>Current and future development could impact viability of resource</p> <p>COH land use projections exceed sustainable yield</p>
	<p>Current costs are high</p> <p>DHHL to raise cost by 400% over the next ten years</p> <p>KRWC can stop providing to DHHL with only 2-year notice</p> <p>Low potential for growth</p> <p>Cannot use for agricultural</p> <p>Kohala Ranch prioritizing residential growth on its land which could impact Kailapa's relationship with KRWC</p>

'ĀINA

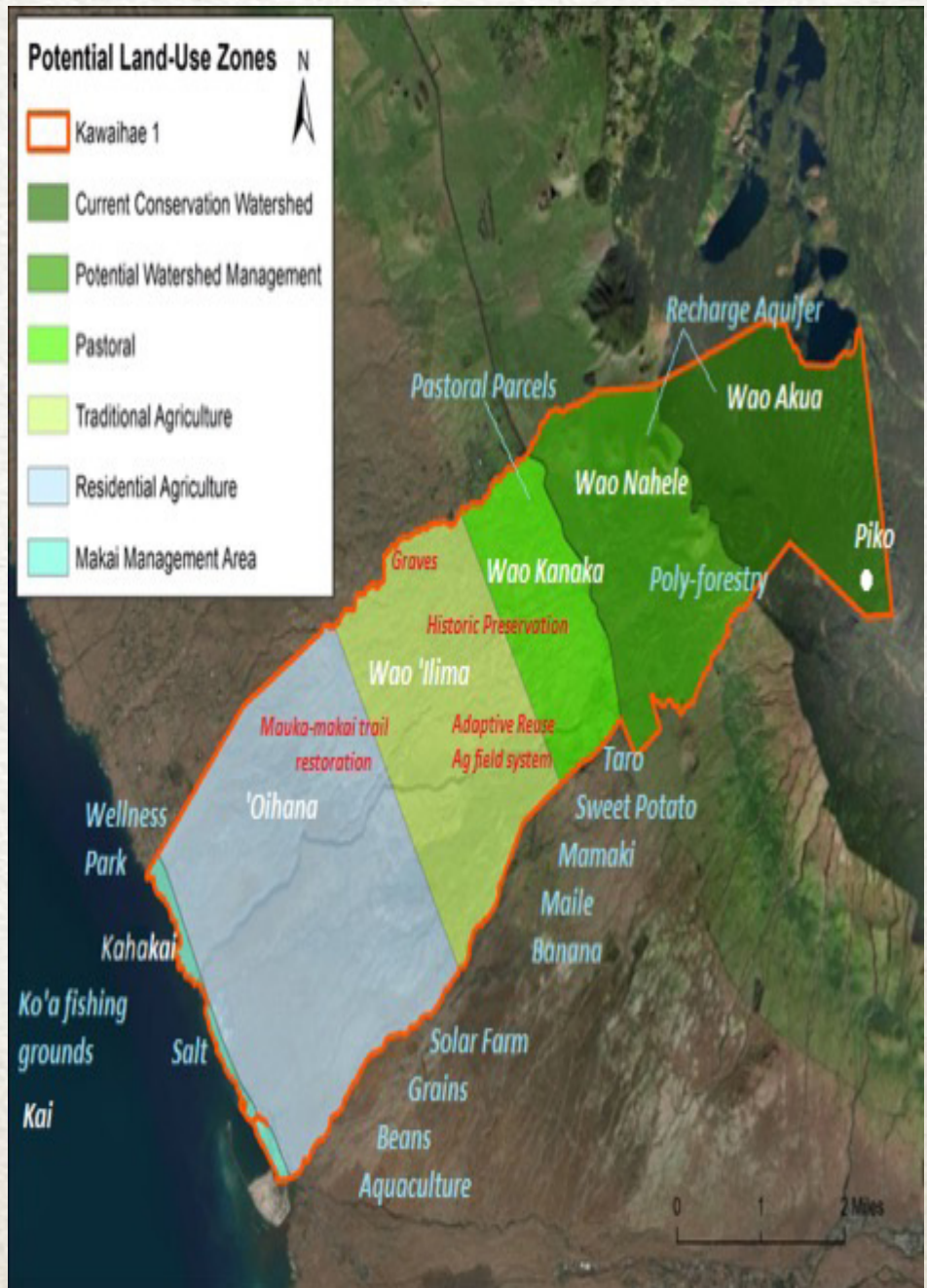
21st Century Ahupua'a

'Āina Momona—A lush, rich, abundant land and ocean that will nourish Body, Mind, and Soul

To facilitate a more resilient future for Kailapa, KCA is building a vision for the entire ahupua'a through what are being called "Campuses". **The goal is to reconnect the ahupua'a system – restoring forests where there were forests, replanting agriculture where there had been agriculture, and building a thriving community.**

Historically, Hawaiians treated their ahupua'a as their life support systems that were based on three to five biological resource zones. These were the upland/inland forest zone, or the *wao nāhele*, the agricultural zone, or the *wao kanaka*, and the coastal zone, or the *kahakai*. The ocean (*kai*), near the shore can be considered another biological resource zone.

Looking at each zone we see the knowledge and understanding they all have to offer. Therefore each section of the ahupua'a is framed as a campus and each campus is related to inherent parts of the Hawaiian culture. We are a "community of learning" as we strive for self-sufficiency and community sustainability. These are opportunities for schools and people to participate in workshops as we learn together. Through the different campuses, we can create many educational opportunities for people to learn about their environmental surroundings and how they can be part of the solution.



Map courtesy of Kamuela Plunkett

'ĀINA

To carry out this campus concept we have divided the ahupua'a into 6 sections from mauka to makai:

Wao Akua- A distant mountain region, believed to be inhabited only by gods and spirits (akua). This Conservation Watershed campus, inclusive of the Kohala mountain peak, offers opportunities to learn about the Kohala Aquifer System and the key role that moss and other vegetative life play to recharge the aquifer.

Wao Nahele- An inland forest region with the goal of reviving Native Hawaiian indigenous trees using modern day tools and technology. The purpose in this campus is to contribute to a healthy watershed and create a habitat for native wildlife. Here lies the opportunity to study orographic patterns on the leeward side, consider reforestation with carbon credits, the importance of pu'u, upland farming, and increased aquifer recharge.

Wao Kanaka- An inland region, where people may live or occasionally frequent. Currently, there are cattle roaming this area, with a unique potential opportunity for KCA to take on a lease and build the community's capacity to sustainably ranch these lands. Here, we can learn about the rotation of cattle herds with agricultural crops; a system to increase the potential of recycling nutrients as well as the history of the Paniolo (cowboy) and the impacts the cattle ranching industry has had on the land.

Wao 'Ilima- An area where the native shrub 'ilima, *Sida fallax*, thrive. A dry land forest may be ideal in certain areas of this campus. There are many existing cultural sites on this parcel. The beautifully preserved traditional mala (irrigated field) is evidence that it once sustained the people living here. We can learn how the system was used, how water was diverted from the gulches to feed the mala with traditional practices, plant native hardwood trees, as well as preserve historical sites. Adaptive re-use of this system can cultivate native plants grown for food and other uses.

'Oihana- 'Oihana is defined as occupation, trade, profession. This Campus is devoted towards economic development. What can we grow to reap the most benefit with multiple purposes? For example, corn is used for food and fuel, and hemp can create medicine, food, and fiber. Here we can also incorporate aquaculture with fish, prawns, and algae. Through agriculture and innovation, this campus could potentially provide a setting for value-added product development such as biofuel production, fiber composites, eco-friendly plastics, and more. At this lower elevation, a solar farm could provide energy for the community as well as community economic development by selling power back to the electric company, further moving us away from burning fossil fuels while building self-sufficiency as a community.

Kahakai & Kai- The Nā Kilo 'Āina program has an existing presence teaching the next generation of leaders to be the observers and monitors of our environment. Studies, like intertidal surveys, promote sustainable fishing practices and improve cultural relationships to the ocean. Research on the health and sustainable yields of our aquifers below us would be beneficial for the community to understand the health of our water resources. We know that water and air temperatures are warming and the ocean is becoming more acidic. We will use this knowledge to research the different options available to us to monitor these changes locally, and research the impacts they are having on our marine resources and coastal ecosystems. A few years ago DHHL designated a 72-acre parcel along the shore for community use, and KCA is in the process of developing plans to create a wellness park with walking and jogging paths, native plant revegetation, a community-managed fishing area, and a few campsites. People can enjoy this campus as a recreational area to reconnect, mālama 'āina, and enjoy the makana (gifts) it provides. By working with the Ala Kahakai National Historic Trail Association and the National Park Service to develop a plan for the trail system along the Kailapa shoreline, we can restore the connectivity of the ancient trail system.



'ĀINA

The 'Āina Momona Action Plan

KCA plans to manage the shoreline resources that includes up to three miles out into federal waters. This is typically under the State's jurisdiction, however the community would like to take the kuleana to carry out the already written 'āina momona action plan. **The 'Āina Momona Action Plan** is contained in our Resource Library and it describes our desire to create and support a community of abundance and prosperity where we understand and embrace the connectivity, relationships, and dependency we have with our lands, oceans, and each other. A resilient community engaged and empowered to address the productivity of our community on all levels (physical, mental, emotional, spiritual) shifting our behaviors to be ever present, conscious, and responsive to the needs of our diverse and unique South Kohala landscapes. **We envision a community moving past a want to survive to a place where we THRIVE.**

Our intention is to continue to perpetuate traditional practices of mālama makai along with mālama 'āina. After the harvest from the ocean comes a time to mālama. The traditional techniques of caring for and feeding the fishing ko'a grounds must be practiced and perpetuated before that knowledge is lost. This knowledge reinstated can help to sustain the fish population while feeding the people with traditional harvesting practices.



'ĀINA

Activities that will help Kawaihae achieve the goal of land rehabilitation in the ahupua'a include:

Work with DHHL, initially, to gain Right of Entry (ROE) during the detailed planning process. The end goal is to secure a long term license for community use.

Identify the best access routes to and from the six campuses to current residential lands.

Learning together: participatory action research to better understand the freshwater system. Go on huaka'i to re-connect with the 'āina.

Engage current DHHL lessees above Kohala Mountain Rd in conversations around land use.

Conduct land surveys to understand the ecosystem and identify the current status of the fauna and flora impacts from non-native species of plants and animals (feral and domestic) and to document historical and archeological sites.

Complete a detailed plan for each campus as a separate but integrated part of the entire plan.

Reforestation: replenishing of the aquifer, reducing erosion, and capturing CO₂.

Flowing water: letting streams run to the ocean with no diversions.

Field systems: restoring and reconnecting to the traditional agricultural systems found in Kawaihae.

Fire mitigation: Kailapa is a Fire Wise Certified Community, with the potential to access federal FEMA grants for large-scale fire mitigation efforts.



KĀNAKA

Creating A Better Life for Our People

Our objective for this third and final priority area for the Kailapa Community Resilience Plan is to contribute to the resilience of our community in ways that help to create “living conditions that are good” for our kānaka, our people. We will accomplish this through active and involved leadership, a strong cultural foundation for our thoughts and actions, and sustainable economic development.

Our Leadership Past, Present and Future

Traditionally, Hawaiians had a form of government with a King, a Prime Minister, Governors, and District Chiefs. Today, boards have an elected President, Vice President, Treasurer, Secretary, and Directors to manage the business of the organization. **The KCA Board represents the beneficiaries on the homestead land with the responsibility of building successorship and to encourage the community to get involved and be a part of the solution.** Over the years, KCA developed a network of relationships and partnerships that support multiple projects and programs for the community. KCA wants to work with DHHL to provide assistance in manage lands of the ahupua’a and create community learning campuses to mālama ‘āina through community stewardship.

As we begin to institute **this beneficiary-led plan for the ahupua’a**, all need to be united in vision and spirit. Choosing the right leaders is imperative. KCA leaders must possess the desire to be part of the solution, understand the physical, social, and mental commitment required to be successful, and above all be pono.

Our leadership team is committed to the continued growth and development of the present and the future leadership of the community. Activities to do this include leadership training to build capacity, apprenticeship and mentoring programs, along with continued work with partner communities and organizations.



KĀNAKA

Our Cultural Foundation

I ka wā kahiko, in the old days, **our ancestors were resilient.** Our belief is that as we reconnect to the old ways of thinking that those ways can impact our present and future ways of living.

Nā Kilo 'Āina is a **way of thinking, a lifestyle, and it is the foundation to this plan.** It refers to the watchers and observers of our sustenance. The Nā Kilo 'Āina approach "integrates and embodies multiple knowledge systems and perspectives to support communities in building a holistic understanding of biological, cultural, and social well-being. **Utilizing the tools of western science, indigenous science, and the community relationships ... can improve resource management while also giving a strong voice to community health and well-being.**" Like Pelika Andrade, we believe that "this is the foundation of the relationship our ancestors had with 'āina and guided the choices they made to manage Hawai'i in a sustainable way." The activities "look through the lens of our ancestors and through "ma ka hana ka 'ike," make an effort to support participants to walk in the footsteps of our ancestors".

At an October 12, 2018 meeting, the Kailapa community resolved to institute cultural protocol into future gatherings, and for **everyone to learn their mo'okū'auhau** (genealogy). The purpose of this is to be able to introduce oneself to place and ask guidance from Akua and the Ancestors who have passed before us. **A traditional cultural approach will be the foundation of our community's interactions with one another and with the land and world around us.**

Sustainable Economic Development

One of the biggest challenges for individuals in Hawai'i today is the high cost of living. Becoming resilient as a community means providing direction and opportunities for individuals to realize economic stability in their households. The phrase 'āina momona describes land that is abundant and bountiful and can provide for our needs. **This provision from the āina can be financial, material, and even agricultural.**

Kailapa is taking a traditional Hawaiian approach adapted to the 21st Century to implement the community's 'āina momona action plan. We agree with Morishige, Andrade, et al. (2018) that **"resource-management strategies must account for equitable outcomes rooted in an understanding that biological and social-ecological systems are one."** Renewable energy projects, agricultural parks, and community managed fishing areas are all possible activities that can provide positive economic outcomes while preserving our biological and social-ecological systems.



Actions that will grow our community resiliency:

Leadership:

Share community resiliency plan with DHHL and get input.

Apply for Right of Entry to mauka parcel in 2019

Adopt the Kailapa Community Resiliency Plan by resolution from KCA board in 2019.

Select the appropriate project coordinator or lead for each campus.

Identify funding opportunities, grant writers, and partner with other like minded, mission-based organizations.

Cultural Foundation:

Team will select an appropriate Oli (chant) and learn it together.

Oli will be used at each entry onto property.

Team leads will be selected for all areas (based on land division or expertise needed).

Document the historical use and mo'olelo (stories) to get to know place and honor that space.

Economic Development:

Raise animals for food production on one campus to provide beef, lamb, or poultry to feed resident families.

Install reservoirs for agricultural use, fire mitigation, and potential energy production (i.e. pumped-hydro storage).

Implement 4-H and Future Farmers of America Youth programs to teach and support animal raising, grazing, and the food chain.

Establish agricultural parks for adaptive use for farming, food production.

Establish a community managed fishing area.

Sell locally grown produce & meats (beef, lamb, chicken, eggs, honey).

Encourage Ecotourism through archeological & historic trail hikes, bike paths, energy demonstration projects.

Establish carbon credits from reforestation of the mauka lands.

Explore renewable energy projects like photovoltaics and pumped-storage hydroelectricity using reservoir and dip tanks located on our ahupua'a for energy production.

Sell Native plant seedlings to neighbors and wider community.

Explore Beekeeping opportunities.



MAU A MAU

Continuing Onward

The Kailapa Community Resilience Plan sets forth a vision of how we will move forward as we build this ahupua'a for the generations to come. But we know our work is far from over, in fact it is really just beginning. This plan is designed to keep evolving through time. Adaptation is a continuous process that is evident in the world around us. Thus, this plan will also adapt through time, but always with the goal of future generations reaping the benefit of our efforts and achieving a truly resilient and self-sustaining Hawaiian community.



This plan focuses on creating campuses within the Wahi Pana to begin the work of restoring life to the land and to the people of this place. This is an effort to **empower our community** to ensure a healthy and sustainable lifestyle and induce a shift in the characteristics of our lifestyles to foster a sustainable, healthy relationship to our 'āina, our source of sustenance and life that also "nurtures the social, cultural, and spiritual senses of the Hawaiian People."



Through activities targeting agriculture and native dry forest restoration, we will assist our community in claiming a "space in which to develop a sense of authentic humanity"... a place in which, to "recover ourselves".



This is the **first step** in empowering communities with beneficiary-led land management, and **enabling the community to directly take responsibility for the 'āina to provide opportunities for future generations. It will take every person living here, sharing a common vision, and stepping up to take a portion of the kuleana.**

**"A'ohe hana nui ke alu 'ia"
No task is too big when done together by all**



References for Kāhuli Aniau – Climate Change

- ¹ Fletcher, C. 2016. Climate Change in Hawai'i. PREL. Honolulu, HI.
- ² Frazier, A., & T. Giambelluca. 2017. Spatial trend analysis of Hawaiian rainfall from 1920 to 2012. *Intl. Jour. of Climatology*, 37(5): 2522-2531.
- ³ Zhang, C., K. Hamilton, & Y. Wang. 2017. Monitoring and projecting snow on Hawai'i Island. *Earth's Future*, 5: 436-448.
- ⁴ PICSC. 2017. Ecological Drought in the Hawaiian Islands: Unique tropical systems are vulnerable to drought. Pacific Islands Climate Science Center. Honolulu, Hawai'i.
- ⁵ Zhang, C., Y. Wang, K. Hamilton, & A. Lauer. 2016. Dynamical downscaling of the climate for the Hawaiian Islands. Part II: Projection for the late twenty-first century. *Journal of Climate*, 29: 8333-8354.
- ⁶ Schörghofer, N., E. Kantar, & M.P. Nogelmeier. 2014. Snow on the summits of Hawai'i Island: Historical sources from 1778 to 1870. *The Hawaiian Journal of History*, 48: 89-113.
- ⁷ Parker, B., & S.E. Miller. 2012. Marine, Freshwater, and Terrestrial Ecosystems on Pacific Islands. In Keener, V.W., J.J. Marra, M.L. Finucane, D. Spooner, & M.H. Smith (eds.). *Climate change and Pacific Islands: Indicators and Impacts*. Washington, DC: Island Press.
- ⁸ Pershing, A.J., R.B. Griffis, E.B. Jewett, C.T. Armstrong, J.F. Bruno, D.S. Busch, A.C. Haynie, S.A. Siedlecki, & D. Tommasi. 2018: Oceans and Marine Resources. In the Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, & B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC.
- ⁹ Albright, R. 2017. Can we save the corals? *Scientific American*, 318(1): 42-49.
- ¹⁰ Keener, V., D. Helweg, S. Asam, S. Balwani, M. Burkett, C. Fletcher, T. Giambelluca, Z. Grecni, M. Nobrega-Olivera, J. Polovina, & G. Tribble. 2018. "Hawai'i and U.S.-Affiliated Pacific Islands." In Fourth National Climate Assessment, Volume II. [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC.
- ¹¹ Pörtner, H.-O., et al. 2014. Ocean Systems. In Field, C.B, et al. (eds). *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of the Working Group III to AR5 of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, UK. pp. 411-484.
- ¹² NOAA. 2017. NOAA Tides and Currents: Sea Level Trends. URL: <http://tidesandcurrents.noaa.gov/sltrends/sltrends.html>
- ¹³ Hawai'i Climate Change Mitigation and Adaptation Commission. 2017. Hawai'i Sea Level Rise Vulnerability and Adaptation Report. Prepared by Tetra Tech and the State of Hawai'i DLNR Office of Conservation and Coastal Lands.

References for Wai Section

- Comm'n on Water Resource Mgmt. 2008. Water Resource Protection Plan, sec. 6-19.
- County of Hawai'i. 2010. Water Use and Dev. Plan Update.
- Craighill, E.S. and Elizabeth Green Handy. 1972. Native Planter in Old Hawaii, with the collaboration of Mary Kawena Pukui, p. 59.
- Dep't. of Hawaiian Homelands. 2016. State Water Projects Plan Update - Hawai'i Water Plan.
- Haw. Rev. Stat. Ann. § 174C-31 (Westlaw through 2018, Act 220).
- Haw. Rev. Stat. Ann. § 174C-3 (Westlaw through 2018, Act 220).
- Haw. Rev. Stat. Ann. § 174C-101 (Westlaw through 2018, Act 220).
- Haw. Admin. R. § 13-168-7 (Westlaw through 2018, Act 220).
- Haw. Admin. R. 13-171-60 (b) (Westlaw through 2018, Act 220).
- Langer, Jay. June 12,1996. Letter from Chairman of Kohala Ranch Water Co. to Kali Watson, Comm'r for Dep't of Hawaiian Home Lands.
- Oki, Delwyn, Oct. 9, 2018. Meeting with a hydrologist from USGS Pacific Islands Water Science Center, Honolulu, Haw.
- Schweitzer, Sophia. 2003. Kohala Aina, p. 76
- Sproat, D. Kapua'ala. 2008. Ola I Ka Wai: A Legal Primer for Water Use And Management in Hawai'i.
- State of Hawai'i Dep't of Land and Natural Res., Div. of Water and Land Dev. 1969. Interim Report on Kehena Ditch Water Study, Island of Hawai'i.
- Towill, R. M. Corporation. 2015. Dep't of Hawaiian Home Lands Kawaihae Water Assessment Study - DHHL Job Number: PS-13-LDD-008, p. 21.
- Wilcox, Carol. 1996. Sugar Water: Hawaii's Plantation Ditches, p. 147.



Mahalo for your interest in the
Kailapa Community Resilience Plan

We want your mana'o!
Please contact:

Jordan Hollister

PROJECT MANAGER

808-960-2656

hollisterjordan@gmail.com

Diane Kanealii

EXECUTIVE DIRECTOR

808-640-3195

dkanealii02@gmail.com

www.kailapa.org/plan



ABOUT KCA

The Kailapa Community Association (KCA) represents the 150 families living in the Kawaihae Hawaiian Homestead in Honokoa. Honokoa is located on lands owned by the Department of Hawaiian Homelands (DHHL) on the South Kohala coastline of Hawai'i Island. The DHHL lands extend from the shoreline to the base of Kohala Mountain, covering 10,153 acres (DHHL 2010). We formed as a 501(c)(3) non-profit organization in 2010 in order to work towards our community mission to empower Native Hawaiians living in Kohala by supporting the physical, mental, spiritual, and cultural health of people and place.

Our community vision, as shared on the cover is: "Ehuehu I Ka Pono", to "Thrive in Balance."

ABOUT RHC

The Resilient Hawaiian Communities (RHC) initiative was designed to support community resilience planning through a collaborative process supported by a working group of organizations and individuals, who are leaders in natural and cultural resource management, Native Hawaiian law, climate change science, and planning in Hawai'i. The project was administered by the U.S. Fish and Wildlife Service and co-led by the Department of Interior's Office of Native Hawaiian Relations, National Park Service's Pacific Islands Office, and the University of Hawai'i at Mānoa's William S. Richardson School of Law Ka Huli Ao Center for Excellence in Native Hawaiian Law.

This plan is a more visual summary of a longer resiliency plan that the Kailapa community has worked for nearly a year on writing. In addition to a more robust discussion of the goals for Kailapa going forward, that plan also includes a resource library containing a legal memo, many maps of the area, climate science syntheses, and other documents that the community found valuable throughout the planning process. The longer resiliency plan also includes more of the resources with citations that were used to research and write the information contained in this document. The longer resiliency plan coupled with the resource library will be a depository of important information the community can utilize as they begin the implementation process in 2019 and beyond.

Written by JORDAN HOLLISTER with support from DIANE KANEALI'I (Kailapa Community Association)
and ARIC ARAKAKI (National Park Service, Historic Trails)

RHC CO-LEADS

STANTON ENOMOTO Department of the Interior, Office of Native Hawaiian Relations MELIA LANE-KAMAHELE National Park Services
DEANNA SPOONER U.S. Fish & Wildlife
KAPUA SPROAT Ka Huli Ao Center for Excellence in Native Hawaiian Law, William S. Richardson School of Law

RHC PROJECT STAFF

PAULA MACCUTCHEON, REBECCA SOON, KA'ALA SOUZA Project Manager, Solutions Pacific
SEAN ARONSON RHC Legal Fellow WENDY MILES RHC Community Resilience Planner and Environmental Scientist

PUBLICATION DESIGN

MELE McPHERSON

This report was produced in pursuant to the Service First Agreement FRSC48840110080 between the U.S. Department of the Interior and the U.S. Fish and Wildlife Service.