Hālana Ka Manaʻo

Stories from Kauaʻi of the 2018 floods
This work is dedicated to all Kaua‘i ‘ohana affected by the 2018 Floods,

those who worked tirelessly afterwards,

and those who are still going.

Me ke aloha pumehana no...

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Introduction

In April of 2018, the island of Kaua‘i broke national 24-hour rainfall records, experiencing several days of intense rain and flooding that destroyed property, threatened lives, and reshaped the land. Yet out of the turmoil came stories of survival, resilience, community, and strength. This report is a synthesis of accounts from over 80 individuals - community members, first responders, government officials, non-profit organizers - who graciously shared their experiences living through the floods.

One highlight of the collective experience was the community response. Island wide, volunteers worked together to care for impacted families, clean up, and collaborate with local and outside organizations to ensure the health and safety of Kaua‘i’s communities in the aftermath of the devastating event. Embedded in these stories are lessons for the future as the changing climate continues to create more frequent unpredictable weather conditions.

The report begins with descriptions of the flood. Meteorological data and quantitative summaries explain the objective severity of the weather, followed by stories of ʻohana experiences, how this flood differed from past events, and impacts on resident health and wellbeing. The next sections elaborate on prevalent themes that came from the interviews: environmental connections, community response, multi-sector collaboration, inequalities, impacts of unregulated tourism, and recommendations for resilience in the “new normal.” The report closes with a list of recommendations for the future. These recommendations are drawn directly from the interview themes, so each thematic section is assigned a letter that connects with a specific section of recommendations at the end of the report. We are thankful for the opportunity to gather, learn from, and share these stories and for the caring strength of Kaua‘i’s people.

Maika‘i Kaua‘i, hemolele i ka mālie...
Kaua‘i is good, complete and flawless in the calm.
(Lines for a well known mele hula ʻolapa composed for Kaumualiʻi)

Methods

This report is the work of students from classes in the University of Hawai‘i at Manoa’s Department of Natural Resources and Environmental Management. In the spring of 2019, ten students taking Social Science Methods for Environmental Research traveled to Kauai from March 4-8, 2019. Throughout the week we worked in small groups to meet with residents from Hāʻena, Wainiha, Lumahaʻi, Waikoko, Waipā, Waiʻoli, Hanalei, Kalihiwai, Anahola, Keapana and Kōloa. We also spoke with state and county officials, most interviewed in Līhuʻe.
Interviews were open-ended, allowing participants to “talk-story” about their experiences and mana’o about the 2018 floods. Some interviews took place while walking or driving, with maps, photos and aerial images also used to connect events to place. This open-ended and geographically based approach incorporates established methods for qualitative participatory action research.

Students spoke to more than 80 individuals including impacted families, emergency responders, nonprofit leaders, volunteers, farmers, community organizers, and government agency personnel. This same group of students returned in May of 2019 to share preliminary results and findings in three separate sharing events for participants, also conducting ten additional interviews with groups that were not well represented in the first round of interviews such as elected officials. Because some individuals were more informal in their sharing and because some were part of group interviews, we conducted our formal analysis of findings based on 70 interviewees.

These interviews were analyzed to identify common themes and recommendations. Quotes in this report come from individual interviewees but they were selected because they represent a feeling, experience, or perspective that was echoed by many people. Some quotes represent a difference of opinion or a unique perspective, and these are noted. Titles and identifiers for quotes represent the role or affiliation of an interviewee at the time of the flood.

The students synthesized initial findings, then created a YouTube video (https://www.youtube.com/watch?v=-GASw02SYA4) and Story maps (https://www.arcgis.com/apps/Cascade/index.html?appid=e6767068f285450382edc6159787ad2c) sharing events by area and around key themes. A year later, a second graduate class finished transcription of all of the interviews and continued analysis, specifically focusing on planning and policy related themes. These themes were refined and quantified, then connected to illustrate relationships and processes that defined the response and recovery of the floods.

This report details our final findings and recommendations for increasing preparedness and resilience in future disaster management policies. All work was supported by Hawai‘i Community Foundation’s Kaua‘i Relief and Recovery fund. Mahalo to all who participated in our interviews, including everyone listed below as well as three individuals who chose to remain anonymous:
Kauaʻi’s Environment & the Flood

Kauaʻi has faced many different types of natural disasters. In the fifty five years between World War II and the beginning of the twenty-first century, the island experienced two tsunamis and seven hurricanes. The past two decades from 2000-2020 have brought frequent strong wind and rain storms, with flooding and landslides becoming a regular occurrence. In Oʻahu, some of the most severe floods occurred in the 1990s, but 2018 and 2021 also brought damaging rains to the north shore and east side of the island.
Leading up to the April 2018 floods, there had been heavy rains on Kauaʻi for over a month. Landslides in March had blocked the 2-lane highway for hours at a time. On April 12, what began as heavy rain on Oʻahu moved to Kauaʻi and produced flash flooding along the north shore and eastern parts of the island. Between Friday, April 13 and Sunday, April 15, 2018, Kauai was inundated with rain. Heavy rain began by midday Saturday and continued through the night with intense thunder and lightning. The storm eased and the skies cleared over some areas of the island Sunday morning, but it started to storm heavily again on Sunday afternoon. A rain gauge near Waipā on the North Shore recorded 49.69 inches of rain between April 14-15, the most rainfall recorded in a 24-hr period in U.S. history. Kōloa, on the south shore, witnessed flooding on the final day of rain. Across Oahu and Kauai, 532 homes were impacted. According to one local natural resource manager quoted in the Los Angeles Times, “this is the most severe rain event that we know about since records started being kept in 1905.”

Typically, the most rainfall occurs at higher elevations. As moist air from Hawaii’s normally prevalent northeast trade winds moves up along mountainsides, it condenses and becomes precipitation. This storm was different from such local-level weather systems driven by orographic rainfall. According to NOAA, the highest rainfall measurements were along lower elevations, an indication that larger weather patterns were shaping the torrential rain. Some meteorologists described this as a rain bomb. The Anahola Stream, Hanalei River, Kalihiwai River, Kapaʻa Stream, Waikomo Stream, Wailua River, and Wainiha River all flash flooded. Two United States Geological Survey (USGS) gauges on the North Shore, one on Wainiha and one on Hanalei river both broke during the storm. The Hanalei gauge broke after registering a height of 15 feet. Normally, the river floods when the gauge reads eight feet.

As the rains pressed on, people became increasingly aware that this was not a typical storm. Interviewees who went out to check on rising water levels and secure personal property reported hazardous conditions. Trees over 100 feet tall hurtled downstream, crashing into homes and blocking roadways. Bridges were overcome with water, trapping debris and forcing rivers to expand outward. In Hanalei, 5-6 feet of flooding on the roads prevented people from driving to higher ground, and a few homes near the shore were damaged by sinkholes. The emergency shelter in Hanalei school also flooded and the emergency responders had to navigate flood waters to evacuate people. In Wainiha, two vacant homes were swept down a hillside. Many other homes filled with rushing water, brown and thick with mud, leaving lasting high water marks along the walls.

One of the most significant impacts took place on the north shore; where at least a dozen landslides closed 8 miles of Kūhiō Highway between Waikoko (just after Hanalei) and Wainiha, cutting off all vehicle access to Hāʻena and Wainiha. In total, 26 sites along the two line highway were flagged for emergency repairs. This included 17 areas where landslides had covered the road with dirt rocks and fallen trees, in places as high as the powerlines. Repairs to the two-lane
highway cost $40 million, and the road was not fully open without restrictions until June 17, 2019. Three bridges needed repair, each listed on the Hawai‘i Register of Historic Places and not built to support the heavy machinery required to work on the landslides and roadway beyond. The Wai‘oli bridge was restored while the Waikoko and Waipā bridges had to be entirely rebuilt - with historic facades and increased weight limits - to accommodate passage of heavy equipment. Road repairs continued for over a year, precluding tourist access and limiting residents to entry and exit at certain hours each day with vehicle placards issued by the county planning department.

Utilities and communications were also impacted by the storm. Twelve power outages were reported along the north shore, but electricity was restored shortly after Kaua‘i Island Utility Cooperative (KIUC) began work on the Monday following the rains. A KIUC truck and personnel were airlifted by helicopter to assist areas cut off by landslides. Lightning strikes also cut power throughout Anini, Wailua Homesteads, Kapahi, Kapa‘a, and Hanamā‘ulu, and KIUC worked in dangerous weather conditions to repair and replace damaged transformers. A mainline break temporarily cut running water for several areas, such as Hanalei, Wainiha, and Hā’ena, so a top priority was restoring power to the Department of Water pump station. There was no cell phone service for at least 24 hours after the flood, leaving many unsure if their families were alright. Helicopters were unable to fly to assess damages and evacuate people during the same period due to overcast weather.

“There was a certain amount of time we were just cut off. You couldn't get people to a hospital. Helicopters couldn't fly, and all our normal routes of evacuating people were closed off.” (Kaua‘i fireman, Hanalei)

‘Ohana Experiences

“The noise coming down the mountain was just outrageous. Trees were snapping, it sounded like...you're standing next to a railway, and a giant train just goes blazing by.” (Wainiha community member)

“It wasn’t like a slow surge or anything like that, it was like a raging beast. It was just...it was deadly. It was dangerous...It was the scariest thing I think I’ve ever seen.” (Wainiha resident)

Some residents moved their cars to higher ground once the storm started to hit and prepared to evacuate their homes. However, the storm came in during the night, making it challenging to leave an unsafe situation in search of security and shelter. For some, the risk of staying put became too great. Waters spilled into yards and rose steadily in some of the quickest flooding interviewees had seen, destabilizing the foundations of their homes and forcing some to evacuate in the middle of the night.
One mother in Kalihiwai shared her experience of leaving her home with her mother, to carry her twin toddlers across rising chest-high floods to escape their house:

“I was looking out the picture window...then all of a sudden the other house on the property was being swept down the river....and then the next lightning came and that house started to swing towards our house and I looked at my mom and said ‘We need to go now’.... I went out of the house and stepped down...onto the step of our back porch and the stairs are just floating....Then I stepped down off of the stairs and the water was chest high...this river that moved my 6,000 pound SUV and took my house off of its foundation. We walked through that, which was just crazy...The water had only ever been maybe thigh high...but this was almost my entire body....”

Earlier in the night, Uncle Jack Gushiken, who worked managing the reservoir and ditch system for Kilauea Sugar Plantation since he was eighteen years old, woke to the sound of the rain. He left his cozy home on high ground in Kīlauea town and drove through the deluge to check the dam wall at the reservoir on the rim of Kalihiwai valley. Uncle Jack, his son, and one other man worked through the night to clear the reservoir spillway, blocked by debris including a boat, and release water to keep the compromised dam wall from breaking. The family of the mother sharing her story above and others in Kalihiwai valley were likely saved from disaster by Uncle Jack’s knowledge of area waterways and his quick action.

Lack of stream maintenance became hazardous as invasive species blocked channels, creating dams that directed water into homes and the emergency evacuation center at Hanalei School. Frantic 911 calls poured in, one caller saying, “We are on the second story of our home and the water is three feet below the door.” Then calling back, “The water is coming in the house.”

“It got so intense where dispatch couldn't handle the 911 call volumes...for us, we almost never take direct calls from the public...something's really wrong when that's happening. But...dispatch was so overwhelmed. Families in the house saying water's coming in, what do we do?” (Kaua‘i Emergency Management Agency (KEMA) official).

Firemen reported that they could not reach Hanalei school to evacuate those seeking shelter there due to ten feet of water on the highway. Another mother in Wai‘oli floated her children on surfboards in their living room to stay above water, worrying about the electrical sockets. She watched as her husband was swept out the door and into the raging stream, just as firemen on jet skis arrived to pluck him out of the water.

In Wainiha valley, landslides along the river blocked the water rushing out of the valley.

“We had two landslides up in the valley...from the Powerhouse [Road] side...When that happened...that's when the water just rose from 6 feet to 12 feet. Just literally, I took the chainsaws before I lost them, cut my walls off to let the water run right through my house and that's what saved us, I think.” (Wainiha resident)
“So that whole mountainside slid, and one of the ironwood trees up on the mountain slid and fell towards my parents' house. The very tips of that tree brushed the gutters of my folks' house, and it landed in a Kamani tree and just exploded.” (Wainiha community member)

One resident reported that after the above landslide (which closed Wainiha river mouth), the water suddenly stopped flowing through her home and started rising rapidly, sloshing back and forth like a washing machine. She became frightened as she realized the river was dammed and backing up, rising higher than she had ever experienced. Another resident shared what it was like to be on the highway, trying to walk home to get back to his family, when a landslide hit.

“I’m walking on this trail...and the whole mountain starts to come down. So I basically turn and run for my life and I get back on the road...I retrace my steps... I was so concerned about the whole mountain side shifting and sliding in. I jumped in the water and I swam inside the surf line but way out and around, and then climbed up by broken bridge. And then I got back to my truck....” (Wainiha resident and Hanalei lifeguard)

Kōloa town, like Kalihiwai, is situated below an old plantation reservoir, Waita. In Kōloa it rains less frequently, so residents were shocked to see water pooling from the storm. The hard rain all day long on Saturday caused ditches and rivers to overflow. Cars were unable to cross bridges and families became separated as the waters rose. One interviewee explained how her father’s house began to flood while she struggled to cross over surging rivers:

“My dad said...he saw the water started coming into the yard. So he ran out and then moved one of the cars back here. By the time he got back, the water - was less than five minutes - it was just in the house already...My dad was stuck in the house and he is eighty years old...So we had the firemen out there...And we had people that live on this next road here, which they got flooded too. So they helped. They came with kayaks and surfboards, and help everybody to get out that was in here. It was really really bad.”

(Kōloa community member)

One lifelong resident of Kōloa shared,

“Someone told me that Kōloa flooded, I kind of laughed... I came up there, I was surprised water was up to...3 feet high in the houses...All my life, it has never been like that. They've had floods, but just you know, manini (small) kind.”

In Anahola, huge trees funneled into the stream and collected in front of bridges, forcing the water to create new paths. One interviewee explained that the water rose at least 10 feet and flooded lower Anahola. The water washed out vehicles, appliances, and furniture. One family lost two 20-feet long shipping containers, taken right from their yard by the rushing water. It took more than two days for the water to begin receding.
First responders navigated hazardous and strenuous conditions to make rescues. Some firefighters along the north shore worked nonstop for the first part of the flood, focusing on Hanalei where the initial calls came from, and planning how to get around the landslides that closed Kūhiō Highway. The Kaua‘i Fire Department Battalion Chief leading incident command the night of the floods shared:

“Rescues were going from their surfboards. Grab the people. Ferry them back out to the ski, and the ski would shuttle people back and forth because there were just so many calls coming in at that time. So I give the firemen credit because they originally came on duty at 7 o’clock, the previous morning and then worked all the way until 4pm almost 5pm the next day. So almost 36 hours, 34 hours straight without sleep.”

Impacts on Health and Well-being

“After going through the flood, I feel like a lot of people are holding onto a lot of PTSD...every time it rains, I'm sure they're terrified....the first few times that it dumped after that...All of a sudden my chest would feel tight and my heart would start racing...Not even thinking, like a total body reaction to just, I think the rain.” (Kalihiwai resident)

Interviewees who lived through the 2018 floods emphasized that it was a miracle and blessing that there was no loss of life. However, the fear and uncertainty left lasting marks even as the flood waters receded. Many have had to choose whether to rebuild or relocate, stay or move to residences on higher ground. Some chose to move motivated by traumatic memories of their homes falling apart and out of fear for their children. Those who lost their dwellings have been forced to move multiple times and were still seeking permanent housing a year after the floods. For many interviewees, the onset of rain is now accompanied by anxiety, their children waking fearful in the night. One community member explained that some residents "can't keep a job because [they] have PTSD.” The Department of Education provided therapists for local schools to support kids who were working through trauma. One interviewee, a school teacher, noted that some of her students would “play” through scenarios of the flash flood and convoy to process the experience. Some moved away from their homes or sent part of their family away temporarily then returned months or a year later, while others struggled through subsequent floods and storm events.

“And so he, my father-in-law picked us up, and I got off the boat and he just gave me a hug and I had just lost it. I just started bawling crying. And he's a Vietnam war vet, so he is kind of like, I don't know how to describe it, but like PTSD, right?” (Wainiha resident)
“This third time, she said, I didn’t cry when the flood happened, not even the second time. But when the wind just took the yurt down, the third time this year, she was like, I definitely am at the breaking point already.” (Hanalei community member)

The flood conditions also impacted people’s health. Landslides and road closures made it difficult for some to get medications they depended on for daily life. Bacteria from older plumbing, overflowing cesspools and septic tanks, stagnated in yards and puddles, spreading through low lying areas into the ocean. At least one septic tank washed into Hanalei Bay, where waters remained brown and smelled for months. Surf lessons and tourists returned within just weeks, with no official Department of Health warning signs posted. The elementary school yard remained closed for an extended period of time because of high bacteria levels in the grass, and once the school opened students had to wear closed-toe shoes for safety.

Community members cleaning homes in flood water contracted staph infections, MRSA, and were exposed to toxic mold. These health consequences became an additional burden for families and volunteers working to clean up and rebuild their communities. Emergency responders experienced bacterial infections after spending extended periods of time in the water to assist with evacuations. One lifeguard explained:

"So I’m out there and I got staph, pretty bad. The water right? A lot of guys were getting staph. [One emergency responder] actually got staph in his throat. He ended up in the hospital." (Wainiha resident and Hanalei lifeguard)

“We were standing in filth, sewage water, standing water, on stilts just being surrounded in it, being forced to live under those conditions and my health has suffered greatly because of it and then just the mold...the mold.” (Wainiha resident)

The floods illuminated a vulnerability that most residents were already aware of, waste water management in low lying, coastal and riverside areas. Most houses on Kaua‘i still rely on cesspools prone to overflowing in floods. There is a commitment to upgrade all cesspools in the state by 2050, with the 270 located in Hanalei prioritized for their potential impacts to sensitive waters. However, rising groundwater levels around Hawai‘i will continue to exacerbate problems of human waste management in coastal areas. Bacteria from animals was also considered a threat, as on Wainiha resident described:

“The cow pasture turned into a river, and then the river that went by it came up. So that house got flooded in a very dangerous way because of the E. coli from the cows.” (Wainiha community member)

Despite concerted efforts to address health and safety, instability of food and shelter immediately following the flood, some aspects of recovery were not addressed. During interviews, several residents reflected on the emotional and psychological burdens they carried
as a result of the trauma they experienced. Adjusting to the “new normal” encompassed changing weather risks and local capacity to withstand extreme rain, but also the more personal and invisible aspects of navigating these changes.

“I feel like the bigger effect is the long term effect. We're still dealing with it. It's not like it just was four months and we clean up and everything's good again. It's daily! It's every day, the convoy. When are we going? When are we coming? What are we doing? ...it hasn't stopped. It's like we're still dealing with the flood even though we're not dealing with the flood but we are still dealing with the flood.” (Waikoko community member)

**Impacts to Agriculture and Natural Resources**

The flooding impacted local agriculture; washing away topsoil in community gardens, exposing roots, and flooding lo‘i. Even as the floodwaters drained, several feet of mud was left caking the ground floor of houses. Lo‘i served as catchment basins, containing water and allowing it to spread out safely without impacting homes. Many taro farmers lost their entire crop of kalo, which takes a year to mature as stagnant water, nutrient deposits and moving debris damaged the plants. Farmers also lost equipment and livestock. The manowai (traditional dam to feed irrigation ditches) that has sourced water for lo‘i kalo in Waiʻoli valley for centuries was washed out, its huge boulders driven hundreds of feet downstream, leaving area kalo farmers with little water to irrigate crops.

“Now we have to get legal and get permits...the place where we get our water...off of Waiʻoli is conservation land...So you need all these permits that go through DLNR and water commission and all that...things that we never had to deal with before...Then the other thing is...we would need heavy equipment to go in the river itself to carefully move and place these big boulders to help to make our manowai. You would need [a US Army] Corps of Engineers permit to do that. And that’s another thing that we don’t know how to navigate.” (Waiʻoli taro farmer)

“We work a lot in agriculture and with farmers. The taro industry statewide was super impacted, prices skyrocketed, there were shortages. Even here, half our (non-profit vegetable) farm was destroyed just because we couldn’t mow for so long.” (Kaua‘i nonprofit leader)

In several locations, the flooding lasted for days. The land was so saturated that no more water could be absorbed. Island bays and beaches remained brown for weeks, with large loads of sediment deposited on area reefs. The ocean mixed with the flood waters, bringing sea life into community spaces, and fish were left on roads once the water receded. The water in Hanalei river overflowed into a buffalo pasture and swept some of the animals out to sea. Area cowboys used horses and boats to rescue bison swimming in the bay and river. Another was taken to
shore from a sand peninsula reshaped by storm runoff. Bison also made their way ma uka into surrounding valleys. One even walked uphill to a nearby commercial center where it was found standing near a bank ATM. During interviews, those impacted by the floods explained how previous flooding experiences were influential in the ways they managed resources, such as recognizing that fertile farmlands are also floodplains. For residents whose livelihoods came from farming, fishing, and ranching, it was important to learn from this flood and use that environmental knowledge as they rebuilt and replanted their lands.

Findings: Key Themes Emerging from the Interviews

A) Environmental Connections

The most prevalent themes across all interviews centered on connections to the environment: ways in which it is changing, the importance of knowing one’s natural surroundings in supporting resilience, and the reciprocal importance of caring for the places in which we live, particularly waterways, to prevent future flooding. Interviewees who personally experienced the storms and flooding, emphasized how different this was from past events.

“This flood was different”

“The rain is steady and it takes maybe four hours...you guarantee it's going flood. But this one was just so rapid. It was flooding before they could say flood. ....Maybe two hours. Everything was under water. That's how quick it was.” (Wainiha kupuna)

Though the 2018 floods were precipitated by a record-breaking rainfall event, flooding has been a regular occurrence for many Kaua‘i residents, especially in low lying areas and along streams. Interviewees shared that many had developed a system of preparedness for floods, knowing when to elevate certain items in their garage, how much time they had to evacuate before the highway closed, or knowing where to move their cars to higher ground.

“We got a little method to our mayhem when you’re living down in that flood area. You gotta be able to elevate all your stuff, washers and dryers gotta be upstairs, your water heaters are elevated, all that stuff’s elevated to a certain level from the high water line based on the last 20, 50 years.” (Wainiha resident and paramedic)

“No one’s ever seen anything like that...and we've marked every flood since...right after I built the boat house in 1990...... We've seen a lot of floods down here, but it was always 3 feet, 42 inches, 18 inches you know and this...so it was insane, 12 feet deep here.” (Kaliihiwai resident)
Past flood experiences coupled with regular observations of weather patterns help people study key dynamics contributing to flood conditions. Many people tracked the height of rising waters, making comparisons to previous high water marks on their homes or in their garages, while others paid attention to the waters’ speed, the sound and strength of the rain, and other characteristics of the storm itself.

“There wasn't any sign that we was going to have this kind of rain...Usually we know when we going get flood. We can tell by the rain, the sky, we know by the elements...This time was different...It was really scary the way the rain came, the skies, the lightning, the thunder ... Everything was different.” (Wainiha community member)

“I knew it was going to flood that evening because we had rain for a solid day and a half. And then about 11 o'clock that evening the water started rising and the rain started coming down hard. I ended up going back to sleep because I had checked it every hour and then I woke up to my bed being pinned against the wall and I was underwater... and in pitch black because we had already lost electricity and everything.” (Wainiha resident)

The speed of the flooding, the way the water fell from the sky and moved over the land was markedly different from regular storms. Firsthand accounts detailed giant raindrops like “cylinders” and water that came pouring down from the mountains rather than collecting in rivers and streams. Thunder and lightning were a constant backdrop. The light magnified as it reflected off the rising waters. One interviewee said that it mimicked the flash photography of the red carpet. In some ways, the thunder and lightning were a blessing, keeping people awake and alert to the weather.

“I'm telling you. It's like nothing we've ever seen...Imagine someone standing over you dumping a bucket on you that never ends, it was just that much water.” (Wainiha resident)

“That’s a new term, rain bombs, and it really was rain bombs...we were sitting out there watching the back field puddle. We’d had a lot of rain that year. So the back field was very very saturated, it started puddling right away...Last time we had a hundred-year flood, the water came all the way to the deck. It took 24 hours to do that. And so we're watching, it started raining harder and harder and harder and harder and then, within three hours, the water was to my deck and I was like, okay you guys plan B. We’ve just gotta move.” (Wainiha community member)

Interviewees agreed that the flooding was both more intense and faster than normal, creating dangerous conditions for many. The 2018 floods disrupted residents’ sense of preparedness. Past adaptations proved to be inadequate, resulting in broader awareness and concern regarding environmental change.
Broader environmental change

“The water rises fast now. So, it’s really different. I’ve seen it all my life and my whole recollection and everything is just blown...I can’t predict it anymore, because it’s different.”
(Wainiha resident)

Broader environmental change was a prevalent theme in the interviews. Almost half of interviewees (30 individuals) spoke of changes that were either negative or neutral, and 8 interviewees mentioned positive changes, highlighting the extent of environmental shifts along with people’s attentiveness to ecological conditions.

More rain fell than the land could hold. Oversaturated slopes gave way in dozens of landslides, scarring mountainsides and closing off roads. Wainiha experienced the most extreme inundation when a landslide closed off the river mouth, forcing the water to back up, filling in the valley and washing over Ala Eke Road. Interviewees pointed out that native vegetation, which is more effective at holding soils, has steadily been replaced by invasives over the past few decades. Ironwood trees, which are top heavy with shallow root systems, and albizia trees with massive branches that break easily, toppled over and dislodged saturated soil, taking entire hillsides with them. Albizia and other invasive species such as bamboo also ended up in waterways, damming up areas of rivers already blocked and choked by other vegetation such as hau, forcing flood waters to spread out and find new routes downhill. Dams of vegetation sometimes broke during the floods causing floods within the flood, or caught on bridges creating dams that directed water into homes. The loose sediment and shallow root systems that create landslide conditions also dislodged huge boulders, which ended up in stream beds, contributing to blockages and the formation of new pathways for flood waters. Rushing rivers pushed boulders and debris steadily downstream.

“I never seen water move that fast. It just had so much backed up in the valley, and when opened up... [Everything went] just right down….We went to the little opening where the stream was, you see those big boulders, wasn’t in there before, was above. All that was pushed down.” (Hā‘ena community member)

“I lost about 40x300 feet of river-front property, just gone, because all of the trees just collapsed in….Big banyan trees would just take everything out, it was frightening.”
(Wainiha resident)

People we spoke with connected the flooding to climate change at both a global and local scale, describing changing weather patterns, longer dry spells and more intense rain events. Interviewees stated that they expect flooding to increase with global warming and to be exacerbated by sea level rise. In this storm, flood waters dissipated by flowing downhill and out to the ocean. Higher seas and surf would push the water back onto land. Interviewees described
flooding, unpredictable and extreme weather as the “new normal,” bringing new challenges of living in and adapting to this changing environment.

**Caring for the environment**

“If you know the moon, you know your tides.” (Wainiha community member)

“The flood was a blessing because they were given the opportunity to clean up the river.”
(Waikoko community member)

Interviewees described connections with ‘āina as a fundamental aspect of life, identity and resilience. These are active relationships cultivated through daily activities, paying attention to environmental rhythms and identifying indicators from previous weather events. Twenty-six people mentioned how environmental observations and knowledge of the history of their home, and of local conditions helped community members to prepare and respond to the storm. Fifteen individuals also talked about the importance of environmental stewardship, articulating ways in which community responses tended to ‘āina.

“First, was making sure all the families and everybody's okay. Everybody's getting food, water, shelter. The people are okay, now the environment, the rivers, the reef, the ocean. How do we preserve and take care of the damage that happened to our area?” (Halele‘a resident active in flood response, March 2021)

Debris removal was an important task in the aftermath of the flood. Nearly one fifth of interviewees identified the need for active management of streams and waterways, including regular clearing of invasive species, as a vital lesson from the floods. Hawaiian Ahupua‘a management systems relied upon careful oversight of water and the maintenance of ‘auwai (ditches) and stream systems to ensure water was available and shared with all. Hawaiian irrigation accounted for the variability of water flow and flooding, with manowai or dams that diverted water intentionally built to wash out in large floods. Many of the flooded areas are former lo‘i that are no longer actively farmed. One interviewee pointed out that in Wainiha valley some of the worst flooding was caused by old ditch systems that are no longer used and maintained, choked by hau bush that directed flood water right into homes. He recalled having to clean these same ‘auwai before and after school every day as a child, to provide water for his family’s taro patches. In many communities, newer residents were unaware that they had built houses on old lo‘i or filled in old ‘auwai. However, as one long time Hanalei resident stated,

“Once you have a ditch, it will always gather water and continue to run.” (Hanalei community member)
Trees, mud, rocks, and trash were removed from people’s homes and yards. Residents also recognized the dangers of stream blockages and went to work clearing out waterways. Lack of maintenance of waterways has been exacerbated by proliferation of introduced species. Hau, for example, is a Polynesian introduction once harvested for cordage, dye, and canoe parts made from its buoyant wood, now left to grow unchecked across streams. Hau lines river banks and chokes channels, catching debris which can build up into dams which are treacherous when they burst. Other introduced species such as albizia break easily, their huge trunks blocking rivers or traveling down like battering rams.

“All of the broken trees and boulders came up against this bridge, piled up, caused more flooding, therefore these houses over here had way more damage than it would have been had it been maintained.” (Anahola community member and leader in flood response)

“We need to take the rubbish out of this stream so that we have flow, that's essential. If your flood channels aren't open, the flooding is just more severe.” (Kalihiwai community member)

Some restoration projects have been going on for more than 10 years. In the community managed ahupua‘a of Waipā, stream restoration efforts have included clearing hau bush and rerouting tributaries back to the stream to prevent erosion and facilitate the flow of water. Invasive species are being replaced with native out plantings along stream banks. Area home owners expressed gratitude that they felt safer and experienced less flooding because of Waipā Foundation’s restoration efforts. Waipā staff who work on stream restoration reported that the 2018 storm washed out newly planted trees, cut deeper into river banks, and made stretches shallower with deposits of pebbles. Reducing erosion from crumbling river banks was critical before stream restoration projects could continue. As one of the Waipā Foundation workers stated, “We didn’t lose our homes, we lost a little portion of blood, sweat, and tears.”

Flood waters also changed river ecosystems and in some cases the composition of stream biodiversity. Waipā had a few well-established invasive species that slowly began to reappear a year after the floods, though in much smaller numbers than before.

“I’ve seen a lot less invasive fish in the stream and a lot more of some of the rare o’opu (native gobies) that I never used to see before the flood. They might have just been...further up the stream or something...Maybe the habitat changed in a way that’s allowing them to flourish a little bit, I’m not sure. But I have been seeing them a lot and that’s kind of encouraging.” (Waipā Foundation stream restoration leader)

Another positive impact of the floods was the formation of a work crew of ten area young people in the most devastated area, Wainiha valley, to clean the river, including years of trash and debris, not only items deposited by the floods. The group first conducted snorkel and scuba
surveys of Wainiha bay and the lengths of its river and tributaries using a GPS to mark the location of debris. Then they worked for one month to retrieve and remove over 60 cubic tons of debris, including plant matter and wood, appliances, oil drums, dead animals, vehicles, plastic, and other items. It was disgusting and difficult work, often conducted up to their waists in muck, and they were unable to retrieve the items in the bay. After their work, over the summer of 2018, Hurricane Lane hit in August, bringing nearly as much rainfall to Wainiha valley. Residents reported that due to the crews work, the water moved through the valley much more quickly, causing less damage. Kūpuna said they had not seen the river so clean in a quarter century.

Observations of the changing environment and knowledge of local conditions helped community members to both prepare for the storm and to deal with its aftermath. Interviewees described relationships with ʻāina as fundamental to long-term resilience, including maintenance of land and waterways and environmental caretaking to ensure continued coexistence.

“Most people here, it's all encompassing visceral and passionate connection to place that’s in everything that we do… with work choices, and I think lifestyle choices as well, but it’s more a love of a family member as opposed to something separate.” (Hāʻena community member active in flood response)

“How key it is to have people on the ground that understand not just by looking at a map, but understand the complex nature of the entire system and how one decision affects other places and the consequences of all that. I can't imagine managing it if we didn’t have them, those guys. How key that is, the longtime knowledge of this place, in the whole system.” (Kīlauea area kupuna)

B) Effectiveness of Community Response

Community as first line of response

“I think the people got together down here. One thing about Kaua‘i - something happens and everybody comes together, no matter where ever, this side, that side…still like one family island, right?” (Hanalei Road Crew member)

“A lot of love and care came with this flood. Yeah, we couldn't go out. Yeah, we didn't have this, we didn't have that. But, that natural instinct just kicked in, and everybody's heart and soul that could think of doing something was doing whatever they could to make it better. And that was the force that carried everybody.” (Wainiha kupuna)

The second most prominent theme mentioned across all interviews was appreciation for the collective community response, totaling 205 codes from 30 respondents. Communities in the flood-affected areas provided the first line of response. The landslides forced road closures along
the north shore, preventing outside support from reaching those in need. For a week, the only way to travel to Waikoko, Lumahaʻi, Wainiha, and Hāʻena was by boat or helicopter.

“From the first hour the local community were First Responders, you know, they pulled out their tractors and their chainsaws.” (Wainiha community member)

“A lot of people rescued themselves.” (Kauaʻi fireman)

Across Kauaʻi, people went into action checking on neighbors, reuniting families separated during the floods, and making sure everyone was safe and had food and water. Companies and individuals with boats and jet skis motored back and forth along the coast of the north shore, shuttling residents and tourists who were stranded to access points where they could be picked up by vehicle. Lines of volunteers passed boxes of food and supplies from trucks to boats, while others stood in water up to their knees for hours unloading these boats at impromptu docking and distribution sites. Care packages were assembled for impacted families with specific medications, Home Depot orders, and children’s boots in the right sizes. These packages were also delivered through the boat supply chains, then directly to the families that needed them. Those with chainsaws, bobcats, bulldozers or excavators dug them out and went to work clearing debris and road ways. Families began cooking meals and offering their yards as gathering places for neighbors. Initial collective community response took shape without a formal call to action. Shared experiences in past hurricanes, floods, and tsunamis forged community ability to pull together and act quickly. As one interviewee noted:

“It was kind of easy (coordinating jobs), because we've had three bad hurricanes here, so you kind of learn how to get it done.” (Kōloa community leader)

Knowing your neighbor and assessing needs

Strong social ties and neighbor to neighbor response were critical in reaching those impacted by the floods as well as assessing their ongoing needs.

“Everybody, no matter how much they lost, they help their neighbors.” (ʻAliomanu community member)

From the early hours of the first rainfall and throughout the emergency response, residents relied on each other to check on neighbors, family members, and area elders to make sure they were safe. After the flooding, if a loved one could not be reached by phone, the community worked together to find someone who could knock on their door to see how they were holding up. Neighbor to neighbor response was facilitated by a shared sense of community identity built on trust. It sometimes meant meeting someone
new or knocking on the front door of a stranger, creating new opportunities for
neighbors to connect.

“Once everyone assessed their home and damages, neighbors showed up to help
everyone with whatever [they] needed. I mean, I had people coming to my door saying
‘Auntie are you okay? Do you need anything?’ And it’s beautiful new friends.” (Wainiha
community member)

Another facet of life in remote communities is self-sufficiency. Some impacted
families found it hard to admit that they needed help. As one taro farmer explained,
“Families around here, they're proud. You ask how they are doing, and even if they’re
struggling, they’ll say, ‘We’re OK. Go check on our neighbors, they have it much worse
than us.’” A local first responder elaborated:

“I feel like in events like this you have within our culture...people that...don't
wanna ask for anything, so we have to think about those people. Just because
they're not asking for something doesn't mean they don't need. And then we do
have people that reach and take a little more than they need. It's hard to find that
balance.” (Wainiha community member)

Through neighbor to neighbor response, community members found multiple creative
ways to preserve people’s dignity while making sure everyone’s needs were met. A
Wainiha resident shared the story of her friend who started a meal service:

“She started asking people if you know of anybody who's really vulnerable, any
neighbors and ‘ohana that need help with food. We're going to make food and
deliver it and that was her genius, that was her generous heart and her genius and
so people in the community just wrote down other people's names...nobody
applied. We didn’t go searching. We just said, ‘Please let us know if you know of
anybody.’ That's why it was so beautiful because it was people referring other
people, looking out for each other.” (Wainiha community member)

Once immediate emergencies were addressed, community members mobilized to assess
impacted families’ needs and effectively direct aid. This process also relied on community
networks and strong social ties. One Anahola mother devised a simple google form with
questions on family needs such as number of children and kūpuna in the house, extent of job
loss, medical issues, and property damage. A group of mothers from across the island, many
single parents, volunteered to go door to door in impacted areas, helping families to fill out the
forms. These mothers had already been checking on impacted families in their home areas, and
they did far more than collect information. They continued to go back to the same ‘ohana every
few days, week after week, for months. As one explained, “The first time I went, they told me
they were fine, they did not need anything. But because they knew me already, and because I
continued to go back and check on them, slowly they started to tell me what was going on. Their child needed medicine, or they needed help getting an elder relative to the doctor.” In Anahola, another mother who participated explained the intensive work this entailed:

“There were 15 hour days sometimes, but it didn't matter. I think my nervous system was on high rev. And I just couldn't bring it down because I felt like everyone who had been impacted needed something. But I didn't want to approach that with the ‘savior’ characteristic of ‘let me help you.’ It was more like how can I help you, what do you really need? These are the things I have. And it kind of worked well.” (Anahola community member and leader in flood response)

Although the floods brought hardships and obstacles, most interviewees focused on the positive outcomes of working together, knowing one’s neighbors and finding ways to employ those relationships and everyone’s individual skills to create networks of support.

“Know who is in your neighborhood. Know who are your community members. Know what skills they have…. and I think before you have a disaster, you should know your people. We know each other.” (Hā'ena community member active in flood response)

*Mobilizing individual skills*

“It was phenomenal to see the community's support system and those that were able to volunteer...go and help if there was nothing else to do. Nothing else was as important as getting out and helping each other.” (Kīlauea community member)

Mobilizing volunteers based on their individual skills was a valuable component of the community response, which also relied upon existing community relationships and knowledge of one another. Four days after the flood, community members held an organizing meeting in Halele‘a. Over forty community and nonprofit leaders showed up with less than 24 hours’ notice. They signed up to volunteer to lead responsibilities in key areas such as family outreach, boats, health and medical supplies, meal provision, education and government communication. This informal community network, called Kokua Kaua‘i Floods, got permission from the county to work out of the neighborhood center in the old Hanalei courthouse. There, volunteers could report to be assigned tasks like loading supplies, cleaning houses, folding and sorting donated clothes, or apply their skills in other ways.

“We've been organizing... we have a hui page...We're trying to list names and phone numbers of people with skills. Who are the plumbers? Who are the roofers? ...Are there nurses or doctors?” (Wainiha community member)
People helped with whatever skills they had. A group of local retirees volunteered to enter the assessment forms of community needs into a database created by another volunteer with data management expertise. The database, including over 500 affected families, was completed weeks before the Red Cross or FEMA reached the scene. Canoe paddlers from across the island assembled to help the two Hanalei canoe clubs clean up and salvage their canoes, some of which were washed across the bay. Babysitters provided a mini school where children could go to keep them from playing in flood waters, while their parents worked to clean up their homes. Community members and organizations like Mālama Kaua‘i employed social media networks to mobilize numerous volunteers to help clean out flooded homes, both inside and outside. Volunteers with trucks drove through impacted neighborhoods, loading up trash lugged out of homes, and taking it to the landfill.

Families and non-profits launched community kitchens in each impacted area, providing over 4000 meals per week for a month to impacted families, volunteers and road workers, in a joint effort between residents, area churches, restaurants, two island food banks and other support organizations. Restaurateurs used their kitchens to cook food that would otherwise spoil to feed residents and volunteers. Area nonprofits offered their certified kitchens and refrigeration space to store and prepare food. The group dinners provided by local kitchens created a space for camaraderie at the end of long days. In some communities, residents gathered for dinners each night, while brown-bag lunches were delivered throughout the community so people could keep working on recovery.

“For the first month, we had different churches, organizations, restaurants donating dinner every night. So we have a schedule for that, and people knew that if they didn't get a meal all day because they were just literally buried in neck-deep mud and just trying to sort through their lives, that they could come there and get a hot meal at least once a day.” (Halele‘a community member and leader in flood response)

*Mobilizing through existing community organizations and nonprofits*

“To see a community mobilize as quickly as it did, I actually found that to be really just amazing...I think that part of it was handled really really well.” (Hanalei community member)

As weeks dragged into months, the Kaua‘i community found ways to sustain these initial informal volunteer efforts by mobilizing existing community networks and nonprofits. Interviewees emphasized the importance of vibrant local nonprofits in responding to a disaster and coordinating with national nonprofits and other groups. Through collective efforts, local nonprofits were able to divide responsibilities and support one another in filling needed roles before outside help reached Kaua‘i.
For the north shore, the Hanalei courthouse served as a coordination center for multiple area nonprofits, offering a meeting location, volunteer check in and supply center for boots and cleaning equipment. Medical assistance, food and clothing were distributed out of the nearby Catholic Church. Hale Hālawai ʻOhana o Hanalei, located just across the highway, became a center for child care, financial assistance and workforce development programs, with a table of laptop computers manned by volunteers. Hale Hālawai was formed in 1982 after Hurricane Iwa, because area kupuna recognized the importance of having a place to gather in a time of need. Mālama Kauaʻi continued to organize mass work days, such as one to help dig out the Waiʻololi taro farmers manowai. Other local nonprofits like Waipā Foundation and Limahuli dispatched their work crews to help with clean ups and other needs throughout the community while Waipā lent its certified kitchen to assist in feeding volunteers.

After people had been volunteering for months, Hawaiʻi Community Foundation offered funding for short term month-month employment for some individuals in key leadership roles such as outreach to impacted families, food distribution, and overall response coordination. To employ these individuals, and keep them working in their vital roles, some local nonprofits were willing to add them to their payroll. This employment came in the form of bi-weekly stipends, not hourly pay, and did not come close to covering the long days people were working, fifteen plus hours for many.

“The non-profits that are willing to be super bendable and dynamic are the ones that really helped early on and as things got more organized the bigger ones... helped pick up the bigger projects so I think all the non-profits found a place. But I just really appreciated them because in the emergency time they were on it and ready to go.”
(Wailua community member)

As outside aid began to pour in, local organizations deployed and directed this aid, connecting outside groups to families in need. Donations of food, water, cleaning supplies, and cash flowed into affected areas across Kauaʻi. For the north shore, the Hanalei Courthouse served as the central point for collecting and distributing provisions for residents cut off from the rest of the island.

Hale Hālawai took over management of the database of impacted families in order to help direct the diversity of responses from nonprofits and outside organizations. This database became a crucial tool in tracking families whose homes had been damaged or destroyed, community members with medical needs, and individuals who had lost jobs or the tools they needed for work. Over the next year, the database was used to distribute cash grants from community organized fundraisers to families most in need. It helped identify families eligible for particular forms of aid including utility bill relief, temporary housing, home rebuilding assistance and other services. Individuals who lost work, including those who were self-employed, were
connected to financial assistance through the state government and county economic development office.

Community leaders also worked to find housing for volunteers from outside organizations such as Team Rubicon, Samaritan’s Purse, and the Southern Baptist church, entities focused on first cleaning up flood damage and mold, then rebuilding homes. They worked with community leaders daily to review what work had been done and where, striving to spread out their volunteers to help people clean out their homes and yards without too much overlap.

Many interviewees also praised organizations that provided cash grants and financial aid, such as the Rotary Club, Catholic Charities, Mālama Kauai and the Office of Hawaiian Affairs. This type of direct financial support often came with minimal to no restrictions, giving residents the freedom to decide how it could best meet their needs. Food donations also came through to help feed the community. A weekly food bank organized through Mālama Kaua‘i and Hawaii Foodbank was temporarily set up at the YMCA Camp Nau‘e. This was a tremendous service to people living beyond the landslides since grocery stores were only reachable by boat. When the food bank could no longer be stationed at the YMCA, Aunty Belinda Chandler said, “throw it in my yard!” It continued to operate out of a tent in front of her Wainiha home for over a year after the flood, offering everything from bread and milk to frozen lasagna, fresh fruit, and toiletries. Taking care of kūpuna is a strong community value, so community members supplemented government services that did not prioritize kūpuna by checking on them daily and making regular deliveries of food and other needs.

In Kōloa, the Sheraton Kaua‘i, which was undergoing renovations, worked with longtime community leader, Uncle Teddy Blake, to offer shelter for those who were displaced. For two weeks the hotel provided all requested rooms. The Sheraton, along with other hotels in the area, donated refrigerators, beds, and furniture to residents whose belongings were damaged or washed away. The hotels regularly change out their furnishings and were able to support those in need while doing routine maintenance.

“This is the first time that the hotel industry has this kind of interaction with the community… I mean, they came out above and beyond, and they came laden with goods, and prepared meals and food, and stuff like that big time.” (Kōloa community leader)

After the floods, local businesses, nonprofits and informal networks such as the Kokua Kaua‘i Flood Group collaborated with The Hawai‘i Community Foundation and other outside entities such as food banks, charitable organizations and churches collaborated to provide support and work on flood recovery. Altruism and generous resourcefulness were mentioned
across 36 interviews, expressing the amount of collaborative effort throughout agencies and communities to help those who required assistance.

**Building leadership and relationships**

“When disaster hits it seems like communities rise up to the occasion and really take care of each other.” (Wainiha community member)

Effective leaders were another important component of recovery and resilience from the floods. Individuals stepped up to take leadership roles where direction was needed, such as coordinating the distribution of medical supplies, organizing and deploying cleaning teams, interfacing with government, or coordinating meal preparation and distribution for volunteers, kūpuna, and impacted families. Another example was helping families to connect to needed aid. Grant assistance was available for area farmers, but interviewees expressed that they would never have been able to access it without community leaders who walked them through the application process.

“She was a huge help because there was a few things that were coming on email and we still didn't have power or internet. And so she was printing stuff out for me, bringing it over, helping me fill it out...She was a huge help….to actually physically come and say ‘OK, Here sign this, fill this out. ...I'm gonna come pick it up because it's due tomorrow.' That was huge because you get so caught up in just trying to recover.” (Waikoko community member and taro farmer)

These types of connections were important to individual and community recovery.

“If you are technically savvy and you have a relationship with someone who's not, who doesn't even know how to go online because that's not their world or they're in a different demographic, that's where those relationships are so strong.” (Hanalei community member and leader in flood response)

Taking the initiative to locate specific needs and organize a grassroots response also reinforced a collective identity of self-sufficiency and assurance that people could, in fact, meet the “new normal” as a community. Leadership sat not only in individuals but in relationships built between teams of people who could count on one another to work together. Many interviewees felt the community had stepped up to the challenge and that they had successfully made a positive impact. In this way, community members had the opportunity to provide support. One interviewee explained that she now patrols her area with neighbors looking for rogue branches that interfere with power lines. “I've met new people that live in the area and we're close friends now” (Wainiha community member).
Referring to people volunteering together on cleaning crews, shoulder to shoulder passing supplies for hours, or running boats, another interviewee stated:

“The relationships that people have developed and the ties and bonding that happened as a result, that's going to affect the people that were involved for the rest of our lives.” (ʻAliomanu community member)

However, in a time of distress and uncertainty, reliance on community for immediate support placed an undue burden on those who were most vulnerable. Some also thought that the community did not come together as much as they had in past disasters, due to the amount of vacation rentals and “so much outsiders.” What was perceived by some as a strength of community leadership to identify those in need was also viewed as a governmental shortcoming, where the community had to address the gaps in government response. Others wondered whether it is fair or sustainable to expect community volunteers to step up in the same ways again and again in future disasters, asking “Will we be able to do this again?”

“They [Red Cross] turned away thousands and thousands of dollars of donations because they could not handle logistically taking water and supplies and I don't blame them but now that we know these things, we need to have some kind of plan. Kauai is so reactionary. … It's not until something happens and then [sarcastic tone] 'Everybody has aloha so we're just gonna work it out. Look what we did for the flood and this is all honkey-dorey and we're going to all work together.' Well, people didn't always know the ugly parts of that either. Where some people had to be called on over and over and over to do past their capacity because there was no one else.” (Anahola community member and leader in flood response)

"I think what we saw with a lot of [agencies], especially the federal agencies that came, there were a lot of people that would fall through the cracks. There was not a system …. in place that would have really reached out to everybody who needed assistance....Really, the community did all the legwork to make sure that people didn’t fall through the cracks.” (Kaua‘i nonprofit leader)

The immediate response spearheaded by communities relied on social ties and neighbor to neighbor response. Communities were innovative and linked resources and existing nonprofits into coordinated response networks. Many community leaders were still volunteering a year after the floods, both because the need is there and because they feel personal responsibility to continue caring for neighbors. Relationships created through community response played a key role in subsequent disaster responses such as later floods and landslides. Interviewee recommendations include enhancing the role and capacity of communities in disaster response and recovery.
C) Multi-sector Collaboration

The collaborative nature of emergency response and disaster recovery brought together state and county governments, residents, local and large-scale nonprofits, first responders, and community organizers. Disasters are a rare occurrence, but this also means many operational kinks are worked out in real time as response efforts unfold. The severity of damage of the April 2018 floods prompted the mayor to call for an emergency proclamation, with sixteen supplementary emergency proclamations declared over the course of a year and a half. Ongoing work and recent flood events in March 2021 have prompted an extension of the emergency proclamation. After witnessing government emergency response and living through the extended bureaucratic recovery process, interviewees highlighted key challenges and successes valued for building resilience.

**Effective government response**

Seventeen percent of respondents expressed appreciation for the government. They felt the initial emergency response went smoothly and multiple agencies were able to come together to pool resources and coordinate efforts.

“...all the agencies have been for the most part really incredible in stepping up and helping us and funding us...just taking care of us and bringing things that we need and helping people who lost homes and lost everything.” (Wainiha resident)

“The county was involved, the military was involved and Red Cross was involved and FEMA was involved. So right away our food and water. Because a lot of places didn’t have electricity so you lose everything within two days, all your food.” (Hāʻena community member)

Some interviewees particularly acknowledged government agencies that were able to devolve decision making to on the ground such as the Kauaʻi County planning department and fire department. The fire department played a significant role in connecting north shore communities with the Emergency Operations Center (EOC) in Līhuʻe because many of the firemen lived in Wainiha valley, a site of some of the worst flooding. Rather than requiring these five men to commute through road closures and landslides to their assigned stations across the island, the department allowed them to work their shifts in their home area. Known to the department as “Hāʻena Roving”, they served as front line responders and also sources of real time information and decision making.

“The five personnel that were out there...they kind of rotated shifts, and they staffed the area for about the first two weeks. Then after that we tried to give them breaks by flying
our personnel in during the day and then they would take care of the emergency response calls during the day time to give those guys a break because it was...pretty stressful. They have families and a couple of our guys had significant damage to their homes. One of our guys...lost everything. His whole house. But he was still out there, everyday, still responding and doing stuff. So that was pretty special for all of them.” (Kauaʻi Fire Department official)

Normally, communities past Hanalei river only have emergency responders present if the Hanalei fire department and police substation deploy vehicles and staffing across the river. Medical personnel are also in short supply past Hanalei, with a single medic who lived in Wainiha, PC Beamer, providing critical services to flood response and recovery.

“A lot of people were really sick for a long time...people were fine and then all of a sudden it was like, so-and-so is down, so-and-so is down. And I mean really, really sick, not like they have a cold...they had to get antibiotics. We could not dispense antibiotics at the courthouse, but when we had a doctor in the house, he could do a prescription and they could go get one.” (Hanalei community member active in flood response)

Here, Beamer explains how on the ground teams of emergency personnel were able to coordinate decision making with agencies through the EOC in Līhuʻe.

“Local firefighters linked up to figure out what's going on and contacted (the) Emergency Operations Center (EOC), in Līhuʻe....so we can contact them, they can contact the EOC, we can make collaborative plans for whatever needs to be done along with police and fire and all those guys. They are all in one spot of that emergency operations center where they can use their resources from there efficiently and be all together as one.”

The Planning Department also played an essential role after the floods, assessing damages for FEMA and distributing placards for transport access to residents. The department deployed its director to live in Hāʻena for several weeks after the floods, where he could field daily questions, deal with issues that arose, distribute fuel to impacted residents, and run operations. One of his colleagues spoke to the intensity of this assignment.

“All I know is, he came back like a war victim. Like a soldier coming back from war. Poor guy.” (Kauaʻi County Planning Department official)

**Challenges of government response**

More than 80% of the statements about government were negative. Challenges focused on the slow pace of government response due to bureaucratic obstacles and red tape, difficulty in coordinating across agencies at county, state and federal levels, and the need to improve
relationships and trust between communities and government. In total, 22% of interviewees suggested that the burden to provide initial response services unjustly fell to community organizations and nonprofits and that a lack of planning resulted in disconnected and ineffective response from government and emergency agencies.

“We didn't get any help from anybody that was government related...that was kind of hard to swallow because, while it was only a dozen houses or so down here, it was very much a catastrophe and so that was kind of hard to know that there were so many resources but none of them were coming down here.” (Kalihiwai community member)

**Slow pace and red tape**

Nearly 40% of codes associated with government intervention referred to obstacles of slow pace (mentioned by 16 individuals) and red tape/regulations (mentioned by 20 individuals). For many flood survivors, bureaucratic government processes hindered people’s ability to access and deploy necessary recovery resources. Interviewees acknowledged that local government is understaffed and underfunded, further slowing down the multi-step process of providing relief.

“We know that the wheels [of the government are] moving, and that takes time. And it’s government, so there’s all their processes and things that they have to go through, and so it’s just being patient knowing that that is going to happen.” (Wainiha community member)

For those who had flood damage to their homes, however, the need for aid was urgent. Delays in aid could mean longer exposure to toxic mold, more repair work, and higher bills.

“The speed with which government moves in the democratic system is, by design, supposed to be slow...to not have radical change. It was set up that way by the founders of the constitution. And ….it worked wonderfully for hundreds of years. But when we look at the times we're facing, a system that by design goes slow needing to respond to continuous crisis situations, one has to ask, ‘Are we going to be able to meet the necessary response to what we're facing in the future?’” (Kaua‘i County Planning Department official)

In many ways, layers of agency rules and regulations created extra complications, making it harder to address emergency needs with government support. For example, emergency medical personnel living in remote areas tried to work with community members to distribute needed medications to isolated families.
“We were kind of getting a hard time with the State. Some were controlled medication, so you can't just start bringing in medications to people because it's very regulated.”  
(Wainiha resident and paramedic)

Once restrictions on the type of support individual agencies could provide were understood, gaps could be filled through multi-sector collaboration.

“It really takes both government and non-government to make disaster response work...There’s things that the NGOs could do that government couldn't do like provide fresh fruit. The government for whatever reason can only supply canned and, I guess, processed foods. So the community bringing in their fresh produce, that was wonderful.”  
(Halele‘a community member and government liaison)

**Applying for aid and frustrations with FEMA**

The Federal Emergency Management Agency (FEMA) is the national agency designated to support communities that have faced disasters, and was one of the primary government organizations that affected community members turned to for financial assistance. Residents could file claims for Individual Disaster Assistance to support repairs to their businesses and homes. Interviewees described a strong sense of initial hope that FEMA aid would help individuals get out of crisis, with many residents interested in filing claims. However, most who tried found that the process of filing claims was not straightforward. They encountered confusing portals to upload photos and documents, cumbersome paperwork, long delays/lack of response, and little help to navigate the process. Ambiguity in the regulatory language was also problematic: What was the difference between major damage and minor damage? How should residents assess the value of what’s been lost? Unfortunately, most claims were denied for reasons such as missing a single document or lack of evidence of needed assistance.

“You would have to go back and go multiple times back to FEMA and people didn't have that time. By the time they stood in line, got there, they got a denial, and they're like denial? I had six feet of water in my house, I've lost everything, how could I get denied?”  
(Halele‘a community member and leader in flood response)

Those who did receive assistance felt they were awarded very little - much less than the value of the damage they sustained, or only given loans, which they had to struggle to pay back. Overall, there was an overwhelming sentiment of disappointment surrounding the process and outcome of FEMA relief.

Applying for assistance from all government agencies required burdensome and redundant paperwork. HIPAA regulations prevented the sharing of personal information between state and county agencies, so people had to fill out the same information over and over. One
interviewee pointed out how a cohesive system and a HIPAA waiver could streamline resource support and financial assistance, identify people who fell through the cracks, and immediately alert collaborating agencies to fraudulent claims. Nadine Nakamura, a state representative for many of the affected areas, is working on a common application for aid to minimize paperwork and make the aid distribution process more efficient:

“If there's another flooding event or emergency, [where] you're going to be interviewing and surveying residents, make sure you ask all of these questions up front so that you don’t have to do another round of meetings and you can plug people in the system.”

The challenges highlighted in the interviews centered around a mismatch between urgent requests for support and layered, complicated government systems that delivered aid. Both the federal and state governments adhere to processes that were designed to be slow and meticulous in ways that often felt more challenging than helpful. Overlapping jurisdictions between agencies made government processes even more difficult.

**Jurisdictional boundaries**

“There’s just so much rules and regulations and trying to get through whose kuleana it is to do this and that or you gotta get a permit [for] this and that.” (Waiʻoli taro farmer and community member)

Jurisdictional boundaries created obstacles in disaster response and recovery, as agencies struggled to figure out who was in charge of what. One Anahola community member described delays as the Department of Hawaiian Home Lands, state, and county negotiated jurisdiction over an area waterway.

“A long time ago [this] used to be maintained by the county but because it’s on Hawaiian homes, during the flood recovery work the county, the state, Hawaiian homes were all fighting that it was everybody else’s jobs to fix it.” (Anahola community member and leader in flood response)

Overlapping jurisdictions can delay response time. Representative Nadine Nakamura explained how disagreements between the state and the county made for a longer process of cleaning up:

“So the intent of the $25 million (appropriated by the legislature) was for county to spend the money to get the work done and fix the issues, don’t hesitate. The county said ‘no we want to work through the whole FEMA process, we are going to bid.’ So one year later they have not done the work. They want to go through this [process] so that they can get reimbursed from FEMA. I think it was a very noble thing they want to try and get
reimbursed 70%, 80%, but for fixing this road or cleaning this debris you gotta do things a certain way...Apparently the state perspective was to be spent right away and the county perspective was no we're gonna go through this whole process.”

The Hanalei Road Crew, many of whose families were personally affected by the flood, began working to clear the roads as soon as they could. Rather than focusing only on county roads, they also worked to clear landslides from the main state highway, the only access down the coast.

"In the past they sent us to go down there and open up the road. It depends on who's the boss at the time - on both ends - on the state and the county."

"We know what gotta be done, (but) we can't do it. We're helpless until they give us the OK to go and do anything. Kind of frustrating."

Both members of the road crew, clearing from the Hanalei side where the county base yard and machines are located, and community volunteers using their own excavators and bulldozers to clear from Wainiha and Hā‘ena shared how disrespected and helpless they felt when the state called them all off the job, with one lane nearly cleared, and assigned contractors to take their place.

“We went down for help, that's when the highway guys tell us, 'Oh we don't need you guys help.' They stayed away, two days, three days from the road, we couldn't do anything.”

“These guys wanted the money, it wasn't about family cleaning up and helping. When these contractors came in, 'You no more license, take your machine off. These (community) guys (were) just trying to clean the road so they can come out.'

As road clearing continued, residents were able to transport damaged appliances and metal refuse to a collection site on the Wainiha side of the convoy. The Hanalei Road Crew initially began managing the dump site, hauling loads of trash through the convoy to the regular County solid waste transfer station in Princeville, but jurisdictional responsibilities interfered again.

“That was another one that - 'it's our job; it isn't our job' back and forth in the county, we haven't been down there in months.”

“They divided the county up into different departments, so that came under the solid waste. We were public works. So, in the beginning we were doing it, but somehow solid waste went and did their job and now somehow it's back to us.”

Disaster response requires deployment of many different agencies all acting within their own systems, adjusting decision making based on incoming information. Interviewees shared
many similar stories of stop and go operations, or having to move designated evacuation areas and food distribution points multiple times as different agencies took command. These instances were exhausting and disheartening for already overworked agency staff as well as community volunteers. Government agency personnel noted that response networks could be strengthened through clearer shared channels of communications and chains of command across agencies.

“We are unique among county governmental agencies in that every single county, state employee or agency can play a role in preparedness, response, recovery, mitigation. So we have to maintain those relationships with such a big family. Such a big emergency management ‘ohana, bigger than any other agency...So we get to work with all kinds of people, private sector, telecom industry, energy and fuels, banking, engineering, you name it. We have such an extensive network.” (Kauaʻi Emergency Management Agency official)

Ultimately, effective disaster response requires improvements in communication and relationships between government agencies, as well as with the NGOs, and the communities they serve.

**Enhancing communication, trust, and connection**

“I love, I appreciate, [I] value government's role in our lives. And so I really wanted to strengthen those relationships and then hold them accountable and ask them for help.”  
(Hanalei community member and leader in flood response)

“Coming up with a plan to communicate better- that's the missing link.”  
(Haleleʻa community member active in flood response)

Collaborative efforts of community, state and county agencies highlighted ways in which response measures could be continually improved, such as better communication with impacted families and communities.

“There was so much response. So much. And not enough of understanding what people were actually going through. On the emotional level, even. And that's what I was concerned about from the beginning.” (Wailua community member)

“I just really wish that people would listen to the community again. We've come together...we know what we want...it shouldn't be so hard for a community to be able to have a say in what's going on with where they come from.” (Hāʻena community member active in flood response)
One respondent expressed her frustration with inadequate trash management and how she wished she could do more to help but was unsure of what to do. Another respondent felt that the government response did not align with flood victims’ needs:

“They overkill on some things, like too much water. Honestly, I had coordinated probably about six container loads of stuff that ended up being junk for us. People cared from across the country, they were sending things. But we had so many bottles of water, and it wasn't really thinking through about what and how we should be responding.” (Kaua‘i County Council member)

Moving forward, government officials and community members alike advocated for devolving leadership, both within individual agencies, from federal and state to county government, and to local community leaders.

“The thing I think I’m most disappointed about as far as government’s involvement is them not listening to community or involving community in their decision making especially when it came to funding programs and cycles...I think we need to look at, in times of emergency, how we can prioritize localized procurement of response activities and even move through that process quicker.” (Kaua‘i nonprofit leader)

Local leadership played a critical role in facilitating collaboration among government agencies, and with other sectors such as non-profits. While there were no paid or identified positions doing this work, it was key to have individuals in place that could represent and organize their communities, speak for on the ground needs in real time, and act as trusted liaisons in exchanging knowledge.

“We are the communicators to government… so the information is more readily available, and when they get the call, they're not getting the call from hundreds of people, but just from these heads, and they know when they get the call that is word. That's what's going on.” (Haleleʻa community member and leader in flood response)

Having paid positions for community leaders who are respected, responsive and clear communicators, capable of mobilizing others and working effectively across different groups and nonprofits, while also coordinating with outside entities such as government is critical to enhanced coordination of disaster response, rebuilding and recovery.

“The community is coming together in one space to talk about a particular subject. Whether we're [planning department] there or not is really inconsequential to the fact that this is something that they're passionate about...They start to come up with solutions that they can implement whether or not we're there. And so those things hopefully move forward even without us being there, and then we can report on how the community is mobilized in a certain way.” (Kaua‘i County Planning Department official)
Follow up: the value of enhanced relationships

Trust and improved communication were also discussed as positive outcomes of the floods. Challenges became opportunities to improve coordination and close gaps in disaster response. In March 2021 a small team of UH researchers visited Kaua‘i to do follow up interviews and found that working relationships forged during the floods have endured and strengthened, particularly between community leaders and county government entities. Community members shared stories of feeling more comfortable to speak directly with their local politicians now that the flood had provided a platform for more open communication. The Kaua‘i island hazards and resilience plan has recently been updated, incorporating learning from the 2018 floods and emphasizing community action plans and local level response. A new mayor for the island of Kaua‘i added community liaison positions, including to flood impacted areas, to his cabinet. A weekly community advisory call with State Department of Transportation officials regarding road repairs was reactivated in the wake of 2021 landslides. Relationships and leadership roles were also strengthened within the community and residents know they can count on each other in times of need.

“I think one thing in that flood...the trust in relationships is so valuable...We just had a landslide a couple of weeks ago. Those relationships that were built in the flood just were reengaged immediately. And the trust that you had, you knew that if you asked somebody to help you, they were going to definitely do it.” (Hanalei community member and leader in flood response, March 2021)

D) Exacerbating Existing Inequalities

“I think we need a better system for the people who don't have the means and the resources and yet have incredible needs for [obtaining aid]...how do we better find ways of channeling assistance to them in a more efficient way?” (Hā‘ena community member)

The disparate impacts of the flood brought forth a broad spectrum of needs throughout different communities. Unequal access to aid and resources exacerbated existing inequalities. Most of Kaua‘i’s Native Hawaiian population and long time local families struggled with housing and financial insecurity prior to the floods, surrounded by luxury second home and vacation rental owners, many of whom also sustained flood damage.

"The locals... you don't have to bother them - they fish, they hunt, they get everything else. You never hear one complaint from them. But the guys that come, 'I love this place, it's so nice, I love the culture, and this and that.' And they like take money .... They're all covered by insurance. Did they put any money back to, whose the guy doing all the cooking? ... You think these guys going to contribute? ....At some point, the word shame got to surface ….guys abuse the Aloha spirit. You know when you tell something, they
say, 'Where's the Aloha?' I say, 'Brah, my bucket is empty. You guys been grabbing without even asking for permission. Where's your bucket of Aloha? ’” (Kōloa community leader)

Uneven recovery

The flooding on the north shore became national news and aid poured in from all over the world. Other parts of the island received much less attention even though they also survived destructive flood waters. Outside of the north shore, community members were “So grateful that they got anything because they didn't expect anything.” (Anahola community member and leader in flood response)

When NGOs came through Anahola, a Hawaiian Homestead area, to take inventory of who needed assistance, many residents turned them away with the assurance that they were fine. People were reluctant to reveal to aid workers that they needed help. The impacts in Anahola seemed minor - no major road closures, no significant tourism disruptions - which made it more difficult to pinpoint who was impacted and what type of support they needed, ultimately extending the recovery process.

“No one took the time to cultivate the relationships here because in all honesty it looked fine. We didn't have an entire community that was impacted, our roads weren't shut down, we didn't have the whole tourist attraction on social media, being stuck and helicoptered out, that didn't happen for us, so I feel like the consistent story that we had was reminding people that our community was impacted and don't forget us.” (Anahola community leader)

Other areas, like Wailua, where few homes flooded were largely overlooked. In Keapana, where two to three families sustained tremendous flooding of homes, machinery and farms, extended families did most of the clean up on their own, with assistance from closely connected organizations such as the Kapa’a High school football team some family members played for. In Kalihiwai valley, one local nonprofit located near the area implemented all of the clean up and dispersal of aid. In Kōloa, FEMA representatives never came to offer assistance to those with flood damage. One resident criticized Josh Green, who was running for lieutenant governor at the time. “It’s like Kōloa didn’t even exist. He never showed up till 13 days later and it’s only a 20 minute drive from his office.” In Kōloa, hotels and businesses played a key role in providing for basic needs in the place of government.
Prioritizing human needs over infrastructure

“I think that there should be clear directions from the state on how emergency funds are to be spent...there needs to be some entity who is looking at the needs of the people, not just the bridges, not just the roads and drainage - somebody’s looking at the needs of the people.” - Government official of Kaua‘i

As recovery continued, more individuals expressed frustration at the lack of direct funding for flood victims to recoup losses and start rebuilding their lives. Although there were many sources of federal and state money for recovery in the aftermath of the floods, the vast majority was directed towards improving and repairing infrastructure, such as roads and bridges. While infrastructure was viewed as an important aspect to rebuilding, some residents felt that government prioritized reopening roads allowing tourists to visit and alleviate the local economy, rather than making sure every family had a roof over their head. The need to support residents first before infrastructure was suggested in nearly half the interviews (28).

“So that’s where their focus was, on physical needs - let's fix the roads, let's clear up this debris, let’s collect, all good stuff that had to be done, but what about the people needs?” (Kaua‘i State Representative)

“That gap needs to be filled. Somehow we need to be able to take care of our people and not just our infrastructure and I don't know where that money comes from because it's not enough.” - Kaua‘i nonprofit leader

Community members also expressed the need for more flexibility in allocation and use of funds, especially because on the ground needs after a disaster change so quickly. Overall, 25 people (36% of interviewees) raised issues with funding and the flow of finances after the flood. Many specifically noted a lack in funding for projects that both the community and government prioritized. Some interviewees found grants to be overly restrictive on how the money could be spent, further straining recovery efforts.

“Pretty much the state said ‘we are not going to give to each of these nonprofits, we gave the county $25 million, use that money.’ So that is what eventually happened. But it took so long, there's gotta be a better system and that’s what we gotta work on. I hope that’s what your report flags as a big need. It's nice that the $25 million is sitting there in a county account, but it is not being spent.” (Kaua‘i state representative)

The Hawai‘i Community Foundation was highlighted as a notable exception, quickly dispersing flexible funding with streamlined application and reporting requirements to community non-profits.
“...They need to set aside a $10 million recovery fund at Hawaiʻi Community Foundation because whether it's the lava flow on the Big Island or the flood on Kauaʻi, wherever it is, the [Hawaiʻi Community Foundation] is already connected in all those communities...through their existing network.” (Hāʻena community member)

The community also took it upon themselves to fundraise through various platforms such as Go Fund Me and to host donation drives to address pressing needs. Donations and unsolicited aid flowed in from all across the state and even outside of Hawaiʻi. These informal mechanisms bypassed the bureaucratic dispersal of funds from state and federal agencies. Based on recommendations expressed from interviewees, the government needs to direct more monies to flexible mechanisms to address actual on the ground evolving needs of communities affected by natural disasters.

**Housing**

“The taxes are high and ridiculous, so it makes it practically impossible for us to continue to stay home here. Our kids won't be able to pay for the land that we own.” (Wainiha kupuna)

“It's still where we live. It's still where we're from. Just because everyone in the world loves it, it's still our home. We want to share our home, but we shouldn't have to give up our home. And I just wish people would realize that a lot of us are being forced to give up our home, and that's not right.” (Hāʻena community member active in flood response)

The floods also exacerbated existing challenges and disparities in access to housing. Prior to the floods, residents in affected communities faced lack of affordable housing, conversion of long term rentals into visitor accommodations, and struggles to hold on to property in the face of rising land values and taxes driven by global real estate markets and an influx of new, wealthy migrants from other parts of the U.S.. Residents also faced high cost of maintaining, upgrading and insuring aging properties on lands rapidly changing through extreme weather events.

Interviewees shared ways in which county building codes updated prior to the April floods made it difficult and expensive for flooded families to rebuild. Many families had lived on their properties for generations, but to make repairs they had to navigate new permitting processes and wait for approval even to rebuild structures that had been grandfathered in. One interviewee shared that, when she bought her home, she made a one-time payment of $8,000 for flood insurance to get a loan. After Hurricane Katrina flood insurance policies changed and by 2018 she was paying $12,000 annually for flood insurance.
“The insurance companies are involved and the banks that loan the money are requiring all these different kinds of insurance. Flood insurance, tidal wave insurance, hurricane insurance, fire insurance. That’s a lot of insurance. And then you put on taxes and you put on a house payment and people can’t afford it.” (Hā‘ena community member)

Many properties on the North Shore, particularly along the coast, are vacation homes which also function as transient vacation rentals or TVRs, rented out as tourist accommodations. TVRs remove housing from the residential and rental market, and affect neighborhoods by changing social dynamics, eroding community cohesion, increasing vulnerability to crime, illegal parking, and noise.

“We're having these housing affordability challenges and yet we're not giving the housing that we already have to our local people. As a community, we're out of whack. We need to make some changes really fast. Otherwise, we're going to lose our middle class. We're going to be a playground for the rich and people who serve them. The floods just exacerbate our existing problems.” (Kaua‘i nonprofit leader)

Financial hardships were compounded by the road closure. Limited hours of convoy operation led to job losses for many residents on the North Shore. As people fought to keep what was left of their homes and rebuild, increasing costs and employment challenges made it harder to stay in their communities.

Affected residents, along with the Kauai Planning Department, considered whether it made sense to rebuild homes in the same places. New weather patterns brought on by climate change could render some longtime dwelling areas unfit for residential use. However, many residents feel connected to their land and lack options for relocating as the housing market grows increasingly expensive. The prevalence of luxury homes and transient vacation rentals is an impediment to both affordable housing solutions and movement of residents to higher, safer ground.

“Coastal areas in Hawaii now (have) such a speculative aspect ... that it doesn't matter how close you are to that shoreline in the sense that the people that own those houses for the most part, it's not a home, it's an asset that's... on the international market....There's definitely some local families that are generational and want to live on those, but a large share of that market is just like ‘I'm going to flip this in a couple years. And the closer it is to the ocean, the more lucrative pricing I'll get on the open market.’ And so I don't think we have the buy-in from that (flood) event to go and start down-zoning properties essentially.” (Kaua‘i County Planning Department official)

Ultimately, disasters like the flood intensify financial and social inequalities. Without attention to these inequalities, recovery processes can perpetuate housing instability and impoverish residential communities. It is imperative to consider underlying socio-economic
systems and prioritize community integrity and collective wellbeing in disaster recovery and rebuilding, as well as in planning options for families to relocate.

E) Impacts of Unregulated Tourism

One of the most critical threats to collective resilience described in these interviews was tourism, the primary industry supporting Kaua‘i’s economy. Restructuring tourism to be more sustainable was mentioned in 22 interviews, with 16 of them explicitly discussing the need to limit tourism in the future. Tourism drives many of the issues of inequity and housing insecurity mentioned earlier, while also presenting health and safety risks as tourists needed to be evacuated during the floods.

“(Tourism) overwhelms everything, overwhelms the bathrooms, overwhelms the parking lot, overwhelms the road...just everything” (Waikoko community member)

The North Shore of Kaua‘i, along with the entire island, is a popular tourist destination. Visitation to the island has been increasing since the 1980s. For the first half of 2018, average visitor count reached almost 30,000 per day, nearly equal to half the number of Kaua‘i residents - 67,091 counted in the 2020 census. The 2019-21 Kaua‘i Tourism Strategic Plan found that average daily visitation over 25,000 puts a strain on both infrastructure and the environment, and negatively impacts resident quality of life.¹

“Even the Hawaii Tourism Authority, who's supposed to be promoting tourism, they have even come to the assessment that Kauai has hit a tipping point. There's a maximum capacity that you can hold tourists and we're pretty much at it. Which is why you don't really see many new hotels coming out.” (Kaua‘i County Planning Department official)

Prior to the floods, historic bridges along Kūhiō Highway, all over 100 years old, were not safe for large vehicles such as tour buses. This was a key factor in regulating tourism along the north shore. However, after the landslides, bridges needed to be fortified to support machinery necessary for road repairs, opening the possibility of future traffic from tour buses and other large vehicles.

“The people that live there have a Community Association, and they want to keep all those bridges…. If it wasn’t for that you’d get these big Roberts tour buses running around the north shore. If the bridges could hold that much weight they couldn’t stop them from coming.” (Hā‘ena community member)

¹ Though these numbers decreased in 2020 due to regulations on travel including mandatory quarantines during the Covid 19 pandemic, they returned to pre-pandemic levels over the summer of 2021 once restrictions were lifted due to availability of vaccines.
One interviewee compared the anticipated influx of tourists once the road opens to the floods that came through in April, indiscriminately reshaping this sacred space as the communities continue to recover. Another Hāʻena resident commented:

“[Before the floods] picture this: from the beach park all the way down to here, cars on two sides of the roads and thousands of tourists walking down. And then even when they have emergencies, the firetruck had a hard time come down, because so much cars on the road, parking on the road, make it hard to even drive.”

The pressures of tourism increases are compounded by the type of tourism as well. Rather than booking hotel rooms and travelling in small groups via tour bus, the Kauaʻi Tourism Strategic Plan identifies most visitors as “free independent travelers (FITs), often staying in vacation rentals within communities, traveling in cars they rent for their entire stay and searching for special, ‘undiscovered’ places (often found on social media), including places they should not be” (p. ix). After the floods, the county spent over $2 million dollars to evacuate tourists from the North Shore. Some interviewees emphasized the need to enforce limits on visitor accommodation capacity to avoid impacts on parking and overstressed septic infrastructure for waste water. Multiple interviewees emphasized the need to move all visitor accommodations including transient vacation rentals out of hazard areas, especially where evacuation routes are limited. One Wainiha resident shared her worries about how to evacuate both residents and visitors using the single two lane highway out of low lying tsunami and flood prone areas.

“I worry about the road opening, and all of these tourists coming down. The reason for that is traffic. In the event of another disaster, no way we going make it out of here in time.”

Another facet of financial inequality and insecurity comes with the types of jobs tourism creates. Many of these are cash-based service jobs, often “off the books,” such as waiting tables, or cleaning accommodations. Without adequate documentation of income, those impacted by the floods found it difficult to qualify for post-disaster government-based financial relief and support programs. After the floods, these challenges combined with convoy schedules, prolonged home repair obligations, lost jobs due to reduced visitor traffic, and other obstacles to maintaining employment, adding to the precarity of life in a tourism-dependent economy. Finding ways to reduce reliance on tourism and to better manage visitor traffic, accommodations and impacts, were key recommendations emerging from this research.
Safety and infrastructure: Convoy and road repairs

“I want to go in and visit but the times don't work for when I need to be to work or not work and you know, I miss it. One time I went and I missed it by five minutes. I was so bummed. I hadn’t been home in two weeks.” (Hāʻena community member active in flood response)

“We had dealt with one or two landslides in the past and we had learned some lessons from that about the reopening of the highway. Don't just open it all at once”  
(Kauaʻi Emergency Management Agency Official)

After the flood extensive road repairs were needed to stabilize slopes where 15 landslides had closed off the 3 mile stretch of highway between Waipā and Wainiha and to rebuild bridges damaged by floods. Traffic could only flow in one direction for a few hours each day, and access was limited to vehicles with passes issued to residents (and visitors coming to stay in vacation rentals, through arrangements by rental owners). Residents were isolated from vital resources, stores, jobs and school, and faced long lines and waits in traffic, rearranging daily life as activities and work hours did not align with the convoy times. Nearly forty percent of interviewees (38%) commented on road closures, both the frustrations and unexpected blessings that emerged from the road repairs and resulting convoy system.

“I try to remind them too, ‘Hey, it's a lot quieter at night,’ but their house is right where the entry gate is, and that's always been a little bit of an explosive area just because you have people that...get a little fed up with being stuck at different times, or they've missed the convoy by a minute or two, so they're just some angry people outside.” (Wainiha fireman)

Essentially, the road closure presented a tradeoff between the inconvenience of travel restrictions for residents and the benefits of a time without tourists that allowed the community to recover and the land to rest. People generally felt positive about the road work itself and did not want it to be rushed. However the delays, convoy system, and bureaucracy involved was a point of high contention. The north shore of Kauai does not have a hospital. With the increase in needed medical attention after the flood, some residents were frustrated that the only way to get medical care after 11pm was in an ambulance. Many spoke of the uncertainties and fear surrounding potential emergencies. One Wainiha resident complained,

“Because if they [government] did [care about the community], they wouldn't lock us in here after 11 pm every night. They wouldn't have us go through these hard, hard times trying to get a convoy pass.”

Besides having to navigate through the bureaucracy of getting vehicle passes and planning one’s day around convoy operating hours, several residents also noted their frustrations around the lack of communication surrounding roadwork delays and reliable timelines. Having the convoy and
road construction, which was initially projected for 3 months, drag on for over a year after the floods, while the rest of the island went back to life as normal, wore on families.

“We're at (my daughters) track meet (in Līhuʻe) and I tell one of the (coaches), ‘You know what? It's 9:30 at night. We have to get home because if we don't get home and the Waipā bridge is closed, we're stuck. He said ‘oh, why is the bridge closed?’. That part's hard. Everybody else has gone on with their lives and they don't realize that these people out here are still dealing with this every day.” (Waikoko community member)

While many were frustrated with the slow speed of road repairs, others emphasized the need to move cautiously to ensure areas were ready for reopening, for example, that repairs to bridges, parks, and public restrooms were complete. More fundamentally, interviewees wanted to put in place systems for better management of tourists before fully reopening the road to all traffic. The road closure had reduced environmental pressures and improved coastal ecological health, which residents valued and hoped to maintain. These remain important considerations as floods and disasters continue to cut off areas of Kauaʻi, and community members and government negotiate what it means to reopen while adapting to and preparing for a new normal.

F) Recommendations for Resilience

Throughout our conversations, those we spoke with articulated ways in which the floods had impacted their lives and highlighted the need to build a more resilient future. They shared ideas to enhance connections between people and the environment, within communities and between communities and government, in order to provide more security in an uncertain climate. Three key themes for the future suggested by interviewees centered around ecological healing, limits on tourism, and adaption to the new normal.

Ecological rest and recovery

“Sometimes destruction comes to make us change, to make the people change—it's our responsibility” (Wainiha community leader)

Many of those interviewed described environmental recovery following the storms, and subsequent closure of the highway for over a year, significantly reducing human use and visitor traffic. “Definitely there's been positives from the lack of use now, and not having that daily amount of people and visitors” (Wainiha community member). In particular, interviewees noticed improvements in coastal marine ecosystems. Some said that the slime of sunscreen dissipated and the reefs began to recover in the absence of tourism. Others pointed to an increase in monk seal and honu sightings on the beach, including nesting of turtles on sandy beaches
where they had not been seen in decades. Schools of fish came in closer to shore and were less skittish, as confirmed by aerial photos and video. Studies conducted in Hāʻena by the State Division of Aquatic Resources in collaboration with the University of Hawaiʻi corroborate community observations. Though flooding initially deposited large amounts of sediment on some area reefs, there was a notable decrease in macroalgae cover which enabled new coral growth to settle onto the substrate. Most fish species were not only more abundant, but also had greater biomass, which was attributed to their being able to feed undisturbed by recreational users. “It has healed so much. [From] the day it got closed to today the fish have become so tame” (Wainiha fisherman). The lack of tourism also significantly reduced trash along the beaches.

Environmental recovery also extended into the mauka region and streams. One community member who works on stream monitoring and restoration in Waipā noted. “There’s three (oʻopu species) that are fairly common and then two of them that are pretty rare in our stream. I have been seeing more of the rare species (ala moʻo and nopili) since the flood.” Streams were also described as cleaner, having been flushed out by the storms. Interviewees expressed that they found the period of rest from overuse both environmentally and spiritually healing, positive benefits from a period without tourists and other non-community members accessing the area.

Many interviewees emphasized the need for community members, government, and planning officials to be mindful of the readiness of both land and people in planning timelines for recovery efforts – particularly in reopening the roads and bridges leading into Hāʻena. People noted that rushing recovery could negatively impact the land, residents, and even visitors. While interviewees felt that economic concerns, state agendas, and fiscal aid requirements are important, they should not take precedence over the land’s ability to rest and recover.

“You have the community members that are wanting the roadwork to be done and to be open, and then you have the community members that are like, ‘No, we don’t want the road to be opened. Slow things down, this is moving too fast.’” (Wainiha community member)

“You don't just open it because. You don't just let status quo creep back in. You hold the line on it and you do it the right way, right? Because [otherwise] it becomes out of control. Like it will be again.” (Kauaʻi County Council member)

Limiting future tourism

“It's like your house. There's only so much people can be in the house. You can pile up in the house, but will you be comfortable inside the hale?” (Wainiha community leader)
“There is always a lot of visitors that come in and it's part of what drives us as a community, is the tourism industry. But at the same time, it does have to be controlled somehow through parking or something because it was getting out of hand over there.” (Hanalei lifeguard)

“It's a tough one. I mean on the one hand, this is such a special area that can be impacted by volumes of people coming in. And yeah, trying to minimize, that's probably a good thing, to preserve it. On the other hand, it is a public highway and how do you, how would you ever say okay, “you can use a public highway, but you can’t.” (Hāʻena property owner)

As interviewees reflected on the past year, the change in tourism had many of them asking “How much is too much?” While tourism provides jobs and income for Kauaʻi residents, the industry also brings extensive impacts and pressures. Interviewees raised safety concerns about high volume foot and rental car traffic - especially on the north shore. Despite the inconvenience of the convoy, community members wanted to be sure the road was safe before it reopened. They expressed concern for the safety of children now used to riding their bikes on a quiet highway, and worried about how to evacuate hundreds of visitors safely in case of another disaster. Community members also articulated the need to manage visitors more effectively, noting that many tourists pay no attention to signs and warnings of danger.

“There was no place to park, and it was only residents. Everyone went to the beach. So with only the residents going to the beach it’s all full, there’s no parking. Where are we supposed to go with all the tourists here? There’s just not enough room for all of us.” (Wainiha community member)

Having seen daily life without the steady stream of cars and crowded beaches, interviewees began reimagining what tourism could look like when the road reopened. There was widespread support for implementing systems that would limit tourism to improve safety, reduce negative environmental impacts, and restore access for residents. Since the floods, community members, nonprofits and government have worked together to launch a shuttle service, establish parking limits and a reservation system for visitors to the Hāʻena state park at the end of the highway. Now, in 2021, as we witness the impacts of COVID-19, the need for sustainable tourism planning resonates across the islands. Having less tourists due to travel restrictions has reduced crowding of beaches, parks, roads and restaurants. Residents are taking their families to visit places they have not been in decades and reporting increases in their quality of daily life, despite the negative economic impacts. Meanwhile, in the most highly visited locations in the islands, such as Waikīkī or the resort coast of Poʻipū on Kauaʻi, fish are schooling, turtles are nesting, and even sharks are returning. The Hawaiʻi Tourism Authority reported that, from 2019 to 2020, average daily visitors to Kauaʻi declined significantly, from 32,986 to 1,027. However, recent counts from 2021 are averaging 30,194, indicating no significant change. As restrictions are lifted and visitor numbers continue to rise, many residents call for thoughtful consideration of the
social and environmental benefits of limited tourism and how this can lead to more responsible tourism management for the future.

**Adaptation for a new normal**

“We're all going to be going through this with the erratic changes with the climate. So everyone everywhere needs to start looking at what they're doing to be prepared.” (Wainiha resident)

“I've seen a more general interest in people thinking about their own resiliency.”

(Kaua‘i nonprofit leader.)

Amid stories of adversity, interviewees also shared their hopes that the flood could be a catalyst for change. Areas in need of improvement, such as capacity building and preparedness, were noted in reflections of the flood and recovery process. There is opportunity to strengthen social and ecological relations and enhance community capacity, such as increasing local farming to support self-sufficiency. The road closure temporarily restricted tourists and allowed communities the space to advocate for more responsible and sustainable tourism. Themes of holistic and comprehensive planning for the future were brought up by over half the interviewee (38), demonstrating the importance of taking time to reflect on the ‘new normal’ and the possibility for positive change.

“Everyone's been championing kind of the same thought process of restoring peace to the area and not letting the flood of people back in... just the onslaught of people everywhere and no control of natural resources and sacred sites. Just not respected the way they should be respected, in a pono manner that is pono to that area. So hopefully some of that can be restored as well.” (Hāʻena community member active in flood response)

“What nature gave us was a chance to reset. And it represented an opportunity unlike anything we could have ever tried to come up with through the normal system of creating change. Because they [opportunities for change] don't come along very often and if you're able to mobilize... and I think the other piece of it is already having that vision, will allow you to step into and take advantage of that opportunity when it comes. And this community had that vision.” (Hāʻena community member)

Many participants also expressed a desire to build more sustainable food systems, with most emphasizing kalo. “It would maybe be a week before (resupplies) came, so we have to really depend on our taro, our fish, and whatever we have in this area. But if this whole island got hit or if all the islands got hit it’d probably be a while before we had some help. So opening up more areas for more food is (something) that we’re working on” (Hāʻena community leader). Community members were grateful for deliveries of fresh produce from island food banks, and from local farms and gardens at local non-profits like Waipā Foundation. In the summer of
2020, the middle school girls group at Waipā summer program, elected to start a community vegetable garden in remote Hāʻena, to help residents learn to cultivate kale, beets and other nutritious and hardy staples. The ability for communities to grow their own food and provide for themselves was cited as critical to resilience.

“We plant taro because one day barges might not come....one day, we might not have a supermarket...insurance is the land that we work; that’s the real insurance, the food, self-sufficiency.” (Waipā community member)

Interviewees also mentioned the importance of green and sustainable infrastructure. Examples included permeable surfaces such as gravel in parking areas and visitor overlooks instead of cement, use of native vegetation to hold slopes and landscaping, and engineering solutions designed to give way in the face of water, or to slow and collect water, rather than simply cementing pathways and directing it elsewhere.

Floods are a complex disaster event with cascading hazards. Human sewage, bacteria from animals, wreckage from houses, sediment and chemicals from appliances and cars washed into waterways and the ocean all posed risks after flood waters receded. Some interviewees suggested minimizing health risks by improving wastewater infrastructure and obtaining personal protective gear for use in response and recovery efforts. Multiple residents also commented on the realities of living in vulnerable areas, “Imagine if you knew your house and everything in it could end up on the reef. Wouldn’t you live differently, use different products, have less, want your furniture and cleaning supplies and everything to biodegrade?” Flood experiences highlighted health risks to both people and the environment, while suggesting ways to build more sustainable and resilient infrastructure.

Balancing the need to rebuild alongside the push for more sustainable, long-term solutions to housing proved challenging. Many of the homes and businesses damaged by the flood were not built to existing codes. Rebuilding to meet updated safety codes is costly, especially when insurance companies and FEMA have replacement only policies. One interviewee explained that some residents did their own repairs, which was cheaper but resulted in “choke violations.” Another interviewee said that her insurance only covered flood damage above the 15ft floor of her raised home. While interviewees suggested that community members prioritized long-term locally-informed solutions to faster and cheaper alternatives, the futures they envisioned had significant financial barriers.

“FEMA said ‘okay you can build your house back’ and County too, but just as it was. But that doesn't solve our problem which is if the river is not going to be dredged and the hau is not going to be cut it will start coming that way.” (Hanalei community member)
The reality that severe flooding like this could become a regular threat created a general sentiment that the rebuilding of new infrastructure must be responsive to environmental change. Interviewees were concerned that new infrastructure did not take into account the consequences of a changing climate. For example, as flooding becomes a regular occurrence, cesspools become a greater threat to health and safety. One interviewee explained that “they couldn't even open the school after the classrooms were clean because the bacterial levels in the grass” (Hanalei community member active in flood response). One Kaua‘i county council member described his belief that place-based knowledge and local agency are essential to developing sustainable solutions:

“I think we're patching. Putting band-aids on things rather [than] looking at source issues… This is a water issue so we need to prepare for water, be able to manage our water resources better. That requires us to be able to take care and have a relationship with our environment in a way that we know best, so that we're the ones taking care of it.”

Kaua‘i county planners weighed their regulatory duty against residents’ property rights, explaining that they did not want homes that had been destroyed to be rebuilt where they could be taken out again by floodwaters. They are looking into the delicate process of developing policies to protect lives while respecting the rights of property ownership.

Overall, interviewees emphasized that the 2018 flood events highlighted the probability that such events would keep happening, and would likely become more dangerous. Participants described the flood as a blessing, noting that no one was killed or severely harmed and it provided an opportunity to learn, to practice and adapt. Coming away from this experience with new knowledge and relationships provides strength for individuals and their communities to address future challenges.

In addition to these three overarching recommendations for resilience - letting environments rest, limiting tourism and adapting to a new normal, this research offered more concrete recommendations for community members and policy members which might also be implemented in other places. These specific recommendations, offered below, center on five key areas: proactive care of land and waters, education and capacity building of individuals and communities, strengthening collaboration, implementing pono tourism, and planning for the new normal.
SOLUTIONS: Recommendations for the path ahead

Proactive Care of Land and Waters (A)

- Maintain streams, rivers, and waterways.
  - Empower and fund community organizations to lead recurring cleaning and maintenance. Restore native species to streams and surrounding land as well as removing invasives. Permitting processes for this work must be streamlined.
- Preserve lo‘i, wetlands and other green spaces for flood water.
  - Lo‘i and wetlands can serve as a pathway or catchment system for flood waters.
- Encourage connection to ‘āina and place.
  - Place-based, experiential, and ancestral knowledge is valuable during disaster events and recovery efforts. Consult kupuna and respect ancestral knowledge and leadership. Model environmental management after traditional practices.
  - Enhance continued monitoring of human impacts on the environment, changing and real-time weather conditions.

Build upon Community Capacity and Self Sufficiency (B)

- Learn to take responsibility and work to build your own resiliency.
  - Know your home or workplace’s disaster vulnerabilities
  - Have plans in place to either evacuate or shelter in place
- Educate those around you to better prepare for future disasters.
- Recommended Specific Actions:
  - Plan for backup water supplies
  - Prepare emergency centers full of supplies in areas easily isolated by disasters
  - Grow & support local food
  - Train those who want to learn to have post-disaster roles.
  - Delegate more responsibility to Community Emergency Response Teams, CERT
  - Employ local man-power for post-flood labor needs

Strengthen Collaboration (C)

- Enhance communication.
  - Create backup modes of communication.
  - Connect community groups together and ensure networks exist for checking on neighbors/family members.
  - Maintain relationships that strengthened after the floods.
  - Create government-community liaison positions
- Streamline government processes to support recovery.
  - Creating community liaison positions will expedite respectful assessments of community needs following a disaster.
○ Gather and integrate public input in recovery decisions related to repairs, reconstruction, and infrastructure.
○ Distribute resources and attention more equitably.

*Enhance Equitable Effective Allocation of Funding (D)*
○ Direct funding to flexible mechanisms such as the Hawai‘i Community Foundation flood relief fund.
○ Provide support for affected community members to navigate FEMA and other aid processes
○ Plan to fund positions and people, not just infrastructure.

*Implement Pono Tourism (E)*
- **Increase visitor education and awareness.**
  ○ Responsibility for visitor education and evacuation should be borne by tourism industry, hotels, vacation rental owners, not community. Explain risks and hazards that they might encounter and how to respond.
  ○ Adopt an approach to tourism that prioritizes residents’ concerns and is conscious of the social, cultural, economic, and environmental impact of visitors.
- **Set tourism limits.**
  ○ Limit the number of visitors in vulnerable areas through managed access and TVR enforcement.
  ○ Allow the environment to rest and recover through seasonal closures.

*Plan for the New Normal (F)*
- **Think long-term in recovery actions and repairs.**
  ○ Re-think where we build and develop in the face of increasing hazards.
  ○ Set new standards for safe and sustainable infrastructure.
  ○ Take actions to address climate change.
- **Encourage place-based learning.**
  ○ Pay close attention to environmental changes, share and prepare accordingly.
- **Help community members shift to more sustainable jobs caring for natural resources and community.**
- **Work towards enhancing resilience of natural resources by reducing negative environmental impacts.**
Mahalo Piha

Hawai‘i Community Foundation Flood Relief & Recovery Fund  
Darcie Yukimura & Kaua‘i HCF ‘Ohana

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Aloha and appreciation for tireless Kōloa community warrior,  
ʻAnakala Teddy Blake.
“We all know this is the new normal.”

“It feels good that we as a community are being asked to reflect on our choices and on our impact, not just live our busy lives. “

“We might be getting hit like this very regularly, and if we keep trying to fit into the mold of how things used to be... things will keep getting destroyed.”

“Have a strong community plan in place. Don’t just rely on the government.”

“Give people time and space.”

“Now, every time it rains I go out to watch the path of the waters, to learn how they have changed.”

“Just to see the place like this, the healing process in the air....”

"It's creating more opportunity for change in the right direction and going back to the old ways of taking care of the land and the ocean."

“First, it was survival. Now it's 'let's step it up so that we can be self-sufficient.'”

"You need to have a community, need to know who your neighbors are, you need to know who you can count on, who needs help."

“Keep that higher perspective and just solve the problem. Be a solution. That’s key.”