CLIMATE ADAPTATION STRATEGIES WORKSHOPS SUMMARY REPORT

Kaua'i Climate Adaptation Plan
December 13, 2023

This page was left intentionally blank.

Table of Contents

This page was left intentionally blank.

Workshop Overview

Purpose

The purpose of the Online and In-Person Workshops was to hear community members' opinions about potential climate adaptation measures to be included in the Kaua'i Climate Adaptation and Action Plan (KCAAP) and gather input on how they might apply in their area. Feedback from these workshops will directly inform which strategies are included in the draft KCAP.

The main purposes of the Online Workshop were to update the public on the project's progress, provide an overview of proposed adaptation strategies, and capture local knowledge. The County and consultant team facilitated large and small group discussions to hear community members' thoughts on three specific strategy types: managed retreat, nature-based solutions, and how to adapt public facilities. Lastly, the Online Workshop was used as an opportunity to encourage participation in the online Consider.it poll and the In-Person Workshops.

The purpose of the In-Person Workshops was to supplement the Online Workshop and to provide more opportunities for community members to understand and comment on the proposed strategies. The event design allowed community members to work their way through the stations at a leisurely pace and to engage with staff in discussion. At the In-Person Workshops participants were also encouraged to share their thoughts in the online Consider.it poll[1].

Approach

The Online Workshop was held on Zoom. It included an initial presentation, a large group discussion, and small group discussions. The presentation provided an overview of the KCAP purpose, progress, and types of adaptation strategies that are being considered for inclusion in the plan. It was immediately followed by a discussion with all participants in the main Zoom room about managed retreat led by a member of the consultant team. Its purpose was to get a temperature check on how community members feel about the County pursuing managed retreat policies and programs in the future. Lastly, there were small group discussions held in Zoom breakout rooms, which participants were free to move between and drop in/out as they wanted. In each room, a facilitator led discussion of two questions with a map of the planning area's climate hazard exposures as visual support on a Miro board.

The In-person Workshops were a series of events held in each of the five County Planning Areas (see locations and dates in "Schedule" below). The In-person workshops were held for two hours and started off with a brief 25-minute presentation followed by small group breakouts. Participants were able to move between the

[1] The Climate Adaptation Strategies poll aimed to garner community opinions of and levels of support for proposed adaptation strategies through an online format.

different small group breakouts at their convenience. Each breakout included visual educational materials to help inform the conversation, a project team facilitator, and a project team flipchart notetaker.

Schedule

- Online Workshop: Wednesday May 10, 2023, from 5:00 pm – 7:00 pm
- Līhuʻe Civic Center Moikeha Building, Conference Room 2 (In-person): Wednesday May 17, 2023, from 5:00 pm – 7:00 pm
- Kōloa Neighborhood Center (In-person): Thursday June 1, 2023, from 5:00 pm – 7:00 pm
- Waimea Neighborhood Center (In-person): Tuesday June 6, 2023, from 5:00 pm – 7:00 pm
- St. Catherine School (Kapala) (In-person): Tuesday June 13, 2023, from 5:00 – 7:00 pm
- Hanalei Elementary School (In-person): Thursday June 15, 2023, 5:00 pm – 7:00 pm

Participation

At its highest, attendance at the Online Workshop included 41 members of the public. Participants were invited to answer demographic questions via a Zoom poll, but responses were completely optional. Majority (80%) of respondents were adults over 40 years old; over half (53%) all respondents were older adults (60 years or older). A majority (51%) of respondents identified as White, meaning the group was overrepresented compared to the demographics of the County. Twenty-seven percent of respondents identified as Asian. Women were also overrepresented, as 60% of respondents identified as female. More than half (51%) of respondents have been a longer-term resident on Kaua'i (21 years or longer). Thirty-two percent of participants indicated living on the East side, 22% lived in Lihue, 18% lived South Kaua'i, 17% lived north shore, and 10% lived on the West side.

A total of 125 participants attended the In-Person Workshops.[2] Participation by event were as follows:

- West Kauaʻi: 23 participants
- Līhuʻe: 28 participants
- East Kauaʻi: 27 participants
- South Kauaʻi: 18 participants
- North Shore: 29 participants.

When signing in, participants were asked how they heard about the workshop event. Participants indicated that they heard about the events in a variety of ways:

- Email (e.g. KCAP list-serv) (40)
- Word of mouth from friends, family, and project team members (35)
- County Instagram and other social media (5)
- KCAP Technical Advisory Group correspondence (4)
- Post on KCAP project website(2)
- Press Release
- Kauaʻi Climate Action Coalition (KCAC)
- Flyer
- Mālama Kauaʻi
- Kauaʻi Community College

[2] These values indicate all attendees who signed into the event, and excludes those who chose not to sign in and those who may have entered from a separate entrance.

- Conservation Alliance
- Other (2)

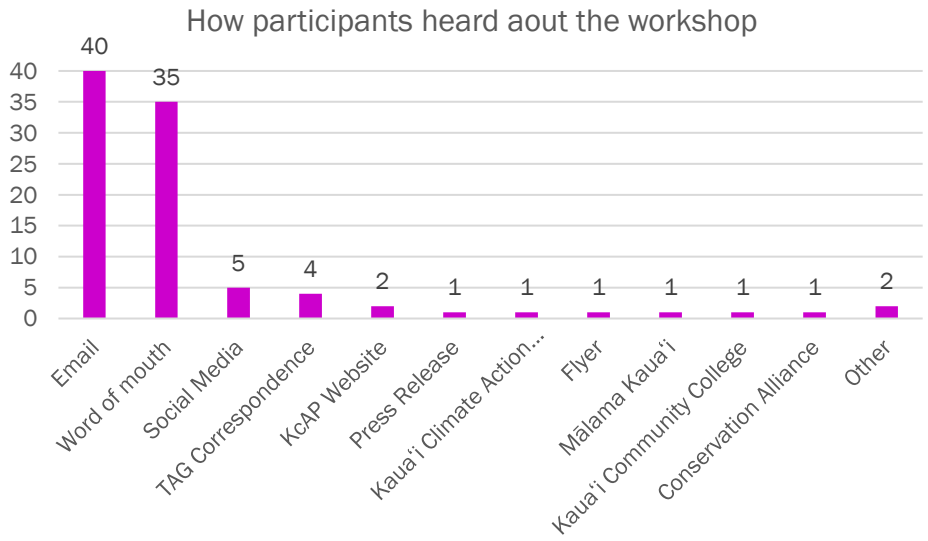


Figure 1 illustrates the different ways in which participants heard about the event, with the most common responses being 'email', 'word of mouth', or 'social media'.

Summary of Results

Online Workshop Large Group Discussion Summary

The comments from the verbal discussion and Zoom chat for the large group discussion about Managed Retreat are summarized in the following section. Raw comments grouped by topic can be found in Appendix B.

The discussion questions were 1) What is your vision for development (or lack of) in areas impacted by sea level rise? and 2) What managed retreat options should be explored for properties in your community that will be impacted by sea level rise?

The large group discussion focused at first on establishing that the KCAP can set policy direction to pursue certain managed retreat strategies, but not create the programs themselves. Participants expressed some confusion about how to provide feedback on a general concept of "managed retreat" when the programs must be extremely place-specific and detailed. The County and Consultant Team clarified the desire to have a general feel for what strategies community members would like the County to pursue more thoroughly in the future, and what pros/cons and other considerations they think the County should be aware of.

Equity was a key issue brought up in the discussion. Participants expressed that areas left from managed retreat strategies should serve public benefits, such as parks and community gardens, and not be used for profit and development. Some were also concerned about how coastal properties vulnerable to SLR impacts will be valued in managed retreat strategies (especially land swap), and/or if those valuations might benefit people inequitably. A specific concern was how to prevent landowners from earning speculation profits when participating in land exchange. Another was who bears the costs of managed retreat when visitor-serving uses like hotels and vacation rentals are impacted.

A few participants voiced their support for specific managed retreat strategies including leasebacks and transfer of development rights (TDR). One participant wondered where land for land swaps could come from, since other than Waimea 400 they did not think the County owns a lot of land. A participant also expressed support for strengthening the County's SLR Constrain District policies to not allow any development.

Participants also discussed the idea of trigger points for managed retreat. One liked that implementation of strategies is not only based on time, but wondered what the other thresholds could be. One participant pointed out that they think Hanalei has already hit a trigger point due to the vulnerability of the state highway and the fact that with any heavy rain it gets closed off.

Online Workshop Breakout Room Discussion Summary

The comments from the verbal discussion and Zoom chat are summarized in the following section for each Breakout Room. Raw comments grouped by topic can be found in Appendix B.

Room 1 – North Shore

The discussion questions were 1) Where and how in your community do you think nature-based strategies can be applied? And 2) What community facilities and infrastructure that are vulnerable to climate change impacts are you most concerned about?

One participant expressed that natural beach processes should be allowed to take place on the North Shore. The group discussed how dune restoration can be applied, as in how much can be done at one time, and how dunes can be restored when they naturally adjust to different wave patterns, beach width, and wind patterns. In general, participants were interested in nature-based solutions and wanted to learn more.

Participants identified roads and coastal highways as a key vulnerability in the planning area, specifically the highway from Princeville to Hanalei, roads at lowland elevations, and historic/protected highways. One person commented that beaches are vulnerable assets which need to be prioritized and protected as public trust resources. Coastal properties, specifically from Wainiha to Hā‘ena, were identified as vulnerable to erosion.

The group also continued the discussion on managed retreat. Participants expressed that people purchasing properties without knowing the climate risk have contributed to a situation where managed retreat is extremely expensive – and would make County managed retreat programs cost-prohibitive. Some participants also expressed support for restricting development in at-risk areas.

Room 2 – East Kaua‘i

The discussion questions were 1) Where and how in your community do you think nature-based strategies can be applied? And 2) What community facilities and infrastructure that are vulnerable to climate change impacts are you most concerned about?

Participants considered the pros and cons of nature-based solutions by discussing real-life examples such as mangroves (which have grown in Kapa‘a canals and the fishpond) and wetland restoration. They thought it is worth looking into if mangroves can be utilized for stabilizing the ground, but to carefully consider where they would be applied because they can hinder drainage and impact native species/ecosystems. A participant was supportive of green stormwater infrastructure like green roofs, bioretention, and permeable pavement, but noted that it is most useful to apply in areas outside of highly SLR-exposed areas since it’s where people will continue to live in the future. In their opinion schools could be a good place to apply these strategies, but they should be applied flexibly to buildings because not all can incorporate them structurally.

Participants identified roads and toxic facilities as important vulnerable facilities. The participants wondered if there is a plan to address the road from Wailua to Kealia, however it is state highway jurisdiction. Another participant recalled that the County could think about revisiting a plan from the 1960’s to build a new road that would be closer to Kalepa Ridge, build a new Wailua Bridge and bypass Kapa‘a town. Participants were also concerned about the vulnerability of cesspools, landfills, gas stations, and any location with a history of waste/chemical storage due to their ability to pollute waterways when impacted by climate hazards. Participants noted that some facilities in the planning area are already working on retreating from SLR, including the library and police station.

Room 3 - Līhuʻe

The discussion questions were 1) Where and how in your community do you think nature-based strategies can be applied? And 2) What community facilities and infrastructure that are vulnerable to climate change impacts are you most concerned about?

Participants supported thinking about ecosystem services as infrastructure, and identified wetlands and parks as nature-based solutions that could be applied in the planning area. Potential places for application discussed included adding trees and greenspace along Rice Street to help combat urban heat, as well as promote walkability if applied in conjunction with other pedestrian improvements. Participants suggested an urban forestry plan to implement this.

Participants identified Nawiliwili harbor/boat harbor and Līhuʻe Mill as critical facilities vulnerable to flooding. However, they observed that most properties in the planning area are not prone to climate impacts. Participants also noted issues related to drainage and natural water permeation, especially in extreme rainfall events, that could occur if more building takes place mauka.

Room 4 – South Kauaʻi

The discussion questions were 1) Where and how in your community do you think nature-based strategies can be applied? And 2) What community facilities and infrastructure that are vulnerable to climate change impacts are you most concerned about?

Participants discussed the potential drawbacks of trees as a nature-based solution, citing how Albizia trees are becoming a problem on the island because they are vulnerable to high winds and can damage electrical lines.

Participants identified posed questions they had about how to adapt to climate change when vulnerable infrastructure is private (and more expensive), such as hotels. They brought up key considerations like how to share the cost of adaptation, how to proceed when hotels are an important economic base and source of employment, and what to do about hotels if armoring the coastline isn't an option. They also identified Koloa School and a brownfield site in Anahola as vulnerable assets in the planning area.

Participants also continued the discussion of managed retreat. One expressed support for a program to buy and lease out lands to prepare retreat areas rather than the first line of inundation. Another made the point that managed retreat policy needs to be written in a way that land (where people have retreated from) is held by the commons and not developed for profit.

Room 5 – West Kauaʻi

The discussion questions were 1) Where and how in your community do you think nature-based strategies can be applied? And 2) What community facilities and infrastructure that are vulnerable to climate change impacts are you most concerned about?

Participants in the West Kauaʻi room mostly continued discussing managed retreat, but in the context of the area's historical ecology and ongoing Waimea 400 planning effort. Participants expressed concerns that managed retreat to agricultural land in the Mana Plain may not be a long-term solution, as it was a wetland prior to sugar cultivation and is not high enough ground to avoid future SLR impacts. Participants also discussed that a managed retreat program should try to move whole communities together to maintain their synergy and keep community members from having to move off the island, which is especially relevant in West Kauaʻi's tight-knit community.

Participants acknowledged that nature-based solutions are good when applied in appropriate areas, such as implementing wetland restoration in wetlands. However, a participant worried about their efficacy and prioritization over grey infrastructure like the rip rap along the highway, which they believe has been extremely important for protecting the highway and Kekaha from SLR and hurricane impacts.

In-Person Workshop Comment Summary

Each of the In-person workshops included small group breakouts that focused on exposed private properties, exposed infrastructures and assets, and increasing community capacity. A summary of each station and the input received is detailed below while raw comments at each of the workshop stations are provided in Appendix D. The following summary clusters comments by strategy type.

Exposed Private Properties: Managed Retreat

Discussion questions were provided at the first In-Person community workshop[3], and then the following workshops did not provide discussion questions. After the first workshop the facilitator organized the discussion based off adaptation strategies (e.g., dune restoration, beach nourishment, and managed retreat tools, such as land swaps, transfer of development rights, and buyouts) in order to get more feedback about the specific strategies. It is important to note that not all of the same adaptation strategies were discussed with the different communitys due to time constraints.

One common theme acknowledged by workshop participants was the notion that adapting to sea level rise is not a one-size-fits-all approach and will require a "battery of solutions." Participants tended to agree that adaptation strategies will largely require place-specific considerations and a case-by-case approach.

Furthermore, equity concerns were brought up by participants in each of the workshops. Participants emphasized that sea level rise decision-making should prioritize adaptation strategies grounded in equity and that enhance resident's livelihoods.

While there were many common themes in the different workshops, it is interesting to note that certain areas significantly differed in their opinion of and level of support for the different strategies. These commonalities and contrasting opinions are summarized below.

Nature-based solutions for beach health fronting private properties

Nature-based strategies for beach health were discussed in the Līhu'e, East Side, and North Shore workshops. Multiple participants encouraged 'working with nature' and supported the prioritization of strategies that aim to restore ecosystems that have degraded over time due to land use changes and mistakes. Dune restoration efforts, such as vegetative plantings and keeping people and vehicles off the sand dunes, were greatly supported by workshop participants. Participants also encouraged the County to provide more dune restoration education to homeowners, as well as provide planting incentives. Participants highlighted that greater County-State collaboration may be needed to implement these projects.

Beach Renourishment for private properties

Beach renourishment, the strategy of adding sand directly onto an eroding beach, for private properties was discussed at the East and North Shore community workshops. Participants expressed that such projects would depend on a case-by-case basis, dependent on the coastal processes of the area and the availability of

[3] The discussion questions at the Līhu'e community workshop were 1) What is your vision of a resilient coastal community as climate changes? And 2) How do you feel about managed retreat as a strategy for your community?

sand. For instance, participants noted that beach nourishment projects on the North Shore would likely not be an effective strategy given the high wave environment in this region.

The North Shore workshop participants expressed a lack of support for beach nourishment projects. Participants cautioned that while beach nourishment may preserve sand in one area, it could create detrimental impacts to another area. North shore participants encouraged the County to instead support the inland migration of coastal ecosystems. They thought that beach nourishment projects tend to prioritize protecting development rather than prioritizing a healthy coastal ecosystem.

East Side workshop participants were somewhat supportive of beach nourishment projects. However, concerns about who would bear the burden of financing a beach nourishment project, including costs of mainenance, was brought up by participants. East Side participants commented that they did not think that the County should bear the financial burden of beach nourishment projects fronting private properties. There was discussion about conducting such projects through a business improvement district model, where the community may be taxed a higher rate to replenish their sand.

Managed Retreat

Participant reactions about managed retreat varied significantly in the different workshop locations. While participants at the Līhu‘e, East and South side workshop expressed being neutral to somewhat supportive of exploring retreat as an adaptation strategy, participants at the West side workshop largely did not support managed retreat as a strategy, and participants at the North shore workshop was very supportive of managed retreat.

The West side and North shore workshops presented the greatest difference in participants’ reactions. At the West side workshop, participants largely rejected the mobility of communities unless there is no other option. Instead, participants were interested in exploring accommodation strategies, such as the construction of T-groins and effective pumping. West side participants noted that an increase in insurance premiums may naturally dissuade people to live along the coast, and in the case for the west side, many of the homes are protected by the seawall that protects the Kūhio Highway.

Overall, West side participants thought that the lack of affordable housing was a more pressing issue that the County needed to address, and there were concerns brought up about displacement of residents. While not explicitly mentioned by participants, participant concerns regarding housing, displacement, and retreat were potentially alluring to the recognition of place-based rights (e.g., self-determination, indigenous rights). Rather than focusing on retreating private properties, participants commented on instead just focusing on moving the facilties and structures that may cause a more serious safety and environmental concern if inundated.

On the flip side, the North shore workshop participants were more supportive of managed retreated as an adaptation strategy. North Shore workshop participants emphasized the importance in prioritizing the health of beaches over the protection of private properties. Participants stressed that at the very least, the County needs to ensure that structures are taken out before it falls into the ocean and becomes an environmental and safety hazard.

Overall, equity, as it pertains to managed retreat, was a major topic of discussion. There was discussion as to whether managed retreat is an equitable adaptation strategy in itself, as well as how retreat can be implemented equitably. The following key equity considerations including the following:

- Who will bear the burden of financing retreat efforts, especially when those who are impacted are largely visitor-serving uses (e.g. hotels) or are wealthy homeowners?
- Some participants noted concern as to how retreat could result in risking people’s loss of connection to place, whearas other participants viewed retreat as a means to preserve connection to place by preserving the access to and the resources of that place.
- As noted above, west side participants raised concerns regarding retreat, housing, and displacement, which may have, though not explicitly stated, been also alluding to the concern of retreat infringing on place-based rights (e.g. self-determination, indigenous rights).

- Being mindful that not all vulnerable property owners would be considered 'wealthy homeowners' and that there may be a need for providing greater assistance to property owners who are of a socially vulnerable population (e.g. lower income) in retreating.

In addition to equity concerns, workshop participants also provided additional considerations in the planning and implementation of retreat:

- Prioritize creating more green space for community enjoyment as properties retreat
- Explore best practices in other communities, such as sea level rise adaptation efforts in Alaska and Austin, TX
- The County should assess sea level rise impacts in infrastructure projects.
- The County should not support infrastructure expansion/improvements that are located in vulnerable areas.
- A voluntary retreat program should also explore including an incentivizeation or a financial aid program based on homeowners' financial need.
- Communicate and collaborate with large landowners.
- Communicate with insurance companies
- Explore legal binding mechanisms for those who are willing to buy and build in exposed areas (e.g., require a clean-up plan)

Workshop participants also provided feedback specific to different managed retreat tools. Summarized below are workshop participants feedback regarding a buyout program, land swaps, and a transfer of development rights program.

Buyouts

Buyouts were discussed in the South and East side workshops. Workshop participants expressed concern about the feasibility of a buyout program given the high cost of property in Hawai'i. Additionally, participants raised concerns regarding a buyout program that would primarily benefit wealthy homeowners. While there was a lack of support for a buyout program, there was more support for a buyout program that would be executed through federal funding and after a hazard event takes places. The Hawai'i Island Volcano buyout program came up as an example that Kaua'i could be informed by. Additionally, one participant stressed their concern about Hawai'is outdated building codes that do not allow the State to receive sufficient federal funding for buyouts.

Land Swaps

Land Swaps were discussed in the South, East, and North shore workshops. Workshop participants were supportive of the County facilitating retreat through a land swap program. The following considerations was noted by participants: 1) a land swap program should be grounded from an equity approach, in which assisting socially vulnerable populations (e.g., lower income) is prioritized; and 2) ensure that prior to acquisition and relocation, the land swap area will not expose relocated people to another hazard risk or be in an area of high cultural importance. One workshop participant also commented on prioritizing land swaps with property owners of undeveloped vulnerable properties.

While there is an appetite for land swaps in the South, East, and North shore, the question of where the County could acquire land for such a program would need to be further explored. For instance, North shore participants noted the lack of land availability in the North Shore region and questioned where land could be acquired to carry out a land swap program in this region.

Transfer of Development Rights (TDR)

Workshop participants from the South, East, and North shore workshops commented on facilitating retreat through a TDR program. The facilitator first gave participants an idea of what an effective TDR program could look like for the island. The facilitator explained that an effective TDR program would require a market that would allow for an increase in development density of an area above the local zoning regulations of that area.

Given Kaua'i's strict density standards for agricultural lands, having agricultural lands as the 'receiving zone' for a TDR program would likely bear the prices for coastal properties. In other words, a property owner of agricultural land could buy TDR credits from a vulnerable coastal property owner, resulting in the coastal property owner demolishing their structure and the receiving area being allowed to increase the density of farm dwellings on the property which goes beyond Kaua'i's local zoning regulations.

Workshop participants were concerned about the logistics and equity implications of a TDR program as described above but were open to the idea of exploring such a program. Equity was a key concern highlighted by participants, in which there was worry that allowing greater residential density on agricultural lands would create additional hardship for farmers. One farmer commented on the inequity in creating such a program for vulnerable homeowners, in which many may be considered 'wealthy homeowners', but not providing the same degree of assistance to impacted farmers. Another participant was concerned if a TDR program would result in greater scarcity of farmable land, resulting in greater challenges in farmer's ability to acquire land to farm.

Workshop participants wanted to explore whether a TDR program could initiate a process in which Agricultural zoning is re-envisioned. Participants asked whether a TDR program could target and rezone agricultural lands that met a certain criterion.

Downzoning

Downzoning, or allowing less intense types of land use in areas vulnerable to sea level rise, was brought up during the South, East, and North shore workshops. North Shore workshop participants especially encouraged the County to consider downzoning vulnerable areas. East side participants also supported downzoning efforts, but noted that the County should take a 'carrot-and-stick' approach, in which downzoning may act as the 'stick' and an incentive should also be offered to encourage people to voluntarily move from vulnerable areas. Additionally, participants in the South Shore workshop expressed support for downzoning, but also voiced their concerns about how this could impact real property taxes.

Exposed Infrastructure and Assets

The discussion questions were 1) Would you like to see exposed facilities and infrastructure protected or relocated? And 2) Where and how in your community do you think nature-based strategies can be applied?

The following section summarizes participant comments about assets of concern as well as protection, accommodation (e.g. nature-based), and retreat strategies that support participant's vision of a comprehensive mauka to makai management framework. It should be noted upfront that majority of participants emphasized not supporting protection efforts via shoreline hardening. However, West side participants did express interest in exploring construction of T-groins to protect the highway.

Transportation

Transportation impacts associated with climate change was a key concern expressed by participants from all the community workshops. Much of the discussion focused on sea level rise impacts on County and State roads as well as the need for emergency access.

In addition to expressing concerns about all roads in SLR inundation areas, participants expressed their specific concern and thoughts about the following County roads and transportation assets:

- Portions of the **Hoʻone Road in Poʻipū**, in which participants noted that the road has already been severely impacted by coastal hazards, including waves underminding the road. Participants wanted to explore whether the road could link up to Poʻipū Road to allow the coastal private properties access if the road is damaged. Retreating the road was brought up, but participants acknowledged the

complexity with relocation efforts and expressed concerned about the cost of relocatation and who would bear the burden of that cost.

- **Lāwa'i Road** was pointed to as a concern, but relocation of the road was viewed as difficult given the access the road provides to vulnerable private coastal properties. Participants wished to see a regional plan for that area, which includes assessing the adaptation options for that road.
- Portions of **'Aliomanu Road** in Anahola was highlighted as an as concern. Participants acknowledged the complexities, such as land use challenges and Department of Hawaiian Homelands restrictions, in implementing alternative strategies for the road. One participant, who is a limu practitioners, expressed concerns about the plans to build the 'Aliomanu seawall and its impact it could have on limu. Instead of constructing a seawall, this participant preferred to leave it as a single lane road or cut into the hillside to make two lanes.

Participants also reflected concern about the following State roads and transportation assets:

- Portions of the **Kūhio Highway**, especially on the East side by the Wailua Bridge and on the North Shore going through Hanalei and Waikoko. Participants wanted to explore whether relocation or elevation was an option for portions of the Kūhio Highway in the North Shore area. Causeways, particularly at Hanalei also came up as a strategy participants wanted to explore, but there was also concern about how causeways could impacts iwi kūpuna due to the drilling of pilings. Participants on the North shore also wanted to explore the cost and effectiveness of nature-based solution to protect the road.
- There was discussion about the adaptation strategies taking place by State DOT to protect the **Kūhio Highway by the Wailua Bridge**. In referring to the Kūhio Highway by the Wailua Bridge, one participant stated, "If we lose the road, we lose the island." State DOT informed the community about their efforts to put in rip rap revetment to protect the road, and "sand savers" at Wailua Beach. This adaptation strategy was met with hesitancy and skepticism, with participants concerned about whether the materials of the sand savers could erode and contribute to pollution and whether the sand savers could ever be removed. Participants wanted to learn more about the impacts of such a project, with one saying they wanted to see an Environmental Impact Statement for the project.
- Portions of the Kaumuali'i Highway, in which, as noted above, West side participants did express interest in exploring the construction of T-groins to protect the highway. Participants acknowledge that this would require a detailed assessment, as such a strategy could detrimentally change sand patterns and have downstream impacts.

It was noted by State DOT that proactively funding adaptation projects is difficult, in which projects are typically funded by the feds after an emergency.

Emergency access was stressed as a key concern by participants. Participants were concerned that in the case of a disaster event, people would not have the ability to evacuate due to lack of alternative transportation access. Participants commented on having a plan in place to identify emergency access modes and routes. In particular, south side participants identified needing emergency access routes in the coastal areas of Poipu and for developments along Lawai Road and portions of Pe'e Road. North shore and east side participants also stressed the need for alternative transportation access. Participants commented on alternative river crossings or a ferry system to transport people, as well as exploring routes that could be used for emergency access, such as old cane haul roads, old Kōloa Tunnel, and Prince Kūhio Park. Elevated roads also came up by participants, but State DOT explained the funding constraints on such projects, making it difficult to implement.

The loss of parking lots to access beaches was also noted as a concern by participants. For instance, the Old Middles Parking Lot at Waikoko no longer exists.

Cesspool Conversion

Participants at the South, East, and North shore workshops expressed concerns about cesspools on-site disposal systems (OSDS), including cesspools. One participant also expressed concerns about septic systems in very vulnerable areas. Participants expressed support in planning for Municipal sewage expansion and exploring smaller decentralized and shared sewer systems as well as the wetland treatment system, in which you can process your own septic waste into a garden. One person commented that the requirements for

permitting septic systems in highly vulnerable sea level rise areas should be revisited and updated if necessary.

Currently the Hanalei Initiative is exploring potential wastewater system options for the North Shore. Participants in the North Shore workshop noted that when the Hanalei Valley floods, the level of contamination from cesspools was very distressing, likening the entire area to a toilet bowl when it floods.

Kekaha Landfill

Participants at the workshop on the West side particularly stressed their concerns about the potential contamination that could occur from flooding of the Kekaha landfill. Participants encouraged actions that could incentivize communities to be more responsible for their own trash, as well as explore ways to strengthen recycling efforts and better manage construction and demolition debris. Participants also stressed that the County should work harder to find an alternative, non-west side site for the landfill.

County Parks and park facilities

Participants expressed concern about the vulnerability of beach parks and County Park facilities. East side participants expressed their concern for Wailua Beach and the Ke Ala Hele Makalae bike path. Participants noted that in preserving the bike path they would like to explore how this may be funded and whether adaptation efforts could be paid for via grants or focused fundraising.

South Side participants idenfied Poʻipū Beach Park as a particular beach park of concern, especially the popular recreation spot Brennekes. Participants were adamant about their lack of support for shoreline hardening in general in the Poipu area and expressed interest in exploring beach renourishment opportunities at Poipu Beach Park. The facilitator also noted that in the case of Poʻipū Beach Park, Hurricane Iniki was significant in sweeping sand offshore. In regard to beach nourishment efforts for county parks,participants also expressed the following concerns in the form of questions:

- How much would beach nourishment cost and would the benefits outweigh the costs?
- What impacts could beach nourishment have on reef systems?
- How frequent would nourishment efforts may have to take place?

Other County Facilities (First response facilities, Civic facilities)

Participants expressed the need for comprehensive adaptation plans for vulnerable County beach parks as well as vulnerable County facilities, including the Waimea Police Substation, Kapaʻa Pool, Kapaʻa library, and vulnerable Neighborhood Centers (e.g. Kapa'a Neighborhood Center and the sinkholes in front of the Kekaha Neighborhood Center) Frustration was expressed about County investment in the repair of vulnerable infrastructure, such as the Kapaʻa pool, rather than prioritizing the planning and implementation of relocating the facility. Participants also expressed concern about facilities and infrastructure being relocated into an area that is vulnerable to a different climate hazard if no site-specific vulnerability and adaptation assessment is done.

Comprehensive watershed management

When asked about nature-based strategies, participants often first commented about how adaptation needs to be considered through a holistic lens and should be informed by indigenous knowledge systems, practices, and worldviews. Participants stressed that indigenous worldviews and management should play a critical role in localizing climate change efforts and providing a historical model which exemplifies social-ecological system resilience. Participants also encouraged more research to be done on a place-based scale that looks into moʻolelo to inform adaptation actions. To support more comprehensive management and stewardship, participants acknowledged that more collaboration with State and Federal agencies, as well as with other local and regional partners, will be neccessary.

Drainage Infrastructure

Participants highlighted concerns regarding the existing drainage system. Participants stressed that drainage infrastructure need upgrade and maintenance, which requires increased multi-agency collaboration due to the multi-jurisdictional responsibilities in maintaining such systems. As noted above, participants stressed that managing drainage systems should adopt a comprehensive watershed management approach.

Stormwater Management and Green Infrastructure

Participants expressed concern regarding drainage and runoff discharge into the ocean. and supported green infrastructure strategies, such as redirecting stormwater runoff to green spaces and incentivizing green building designs (e.g. living roofs).

Fishponds were also pointed to by participants as a a means for stormwater management. While fishponds provide multiple benefits, including boosting the productivity of nearshore coral reefs and providing physical and cultural sustenance, participants also noted that fishponds can act as natural basins that capture stormwater. For instance, on the South Side, fishponds historically were areas of drainage; however, these fishponds were later filled in. Participants envisioned efforts to preserve as well as revitalize fishponds.

Ecosystem Restoration

In thinking about nature-based strategies, participants pointed to several ecosystem restoration strategies, including:

- Reef restoration to dissipate wave action along the shoreline
- Wetland restoration to assist in flood protection, shoreline erosion control, provide productive habitat, and sequestor carbon
- Stream restoration (e.g. removal of invasive species, stabalize and revegetate stream banks, , removal of trees cut down which fall into and dam the stream, and opening up streams that are diverted) to assist in flood protection, reduce sedimentation runoff, reduce wildfire risk, and enhance ecosystem habitat throughout the watershed and ocean. Stream health is especially important in limu harvesting, in which limu thrives in colder waters with lower salinity.
- Invasive species management to prevent spread and fueling of wildfires, which will likely require partnership with multiple entities. Incentives for better management of large land tracts was also brought up.

Implementation of ecosystem restoration projects will likely require the County to collaborate with State and Federal agencies as well as with local and regional partners. Pariticipants at the North Shore wokshop specifically pointed to wanting to see watershed restoration in Hanalei, including the plantings of native vegetation near the stream to alleviate flooding impacts. A limu practioner at ʻAliomanu urged coordination with the State in overall watershed menagement of our streams as well as Open Space purchasing an eassement at ʻAliomanu stream so that the community can steward the stream and restore its flow. There was an overall concern about the low-flow of streams due to upstream water diversions and the need to revisit in-stream flow standards; practitioner also explained how fresh, cool water is essential for a healthy nearshore ecosystem for limu growth.

Additional Assets of Concern

Participants expressed the following concerns about climate change impacts to the following assets:

- High hazard dams and reservoirs, including Waita Reservoir
- Shelters in the flood zone
- The Nawiliwili Harbor
- The Hanapēpē levee
- The Small Boat Harbor

While participants at the North Shore workshop expressed concern about saltwater intrusion in water wells, participants were informed by DOW staff that given that potable drinking water wells are located at higher elevation, and they are not very vulnerable to sea level rise impacts.

Community Capacity

The discussion questions were 1) How can the County best raise awareness of hazards and community resources for vulnerable populations, such as kūpuna?; 2) What support and resources do you need to expand your ability to adapt to climate change impacts?; and 3) What supplies and services do you think a resilience hub should have?

Visitor Education and Awareness

Participants supported expanding educational efforts to increase visitor awareness and preparedness for hazards. It was highlighted at multiple workshops that educational content should be shared in areas in which visitors may frequent, in which airports were specifically identified. Participants also stressed that awareness efforts should also encourage visitors to contribute to community organizations and programs involved in working on climate change and resiliency solutions. One participant also commented on incorporating climate change visitor education and preparedness for hazards into the future updates of the Kauaʻi Destination Management Action Plan. Increasing visible signage was also mentioned by participants, which can provide important educational information for both visitors as well as community members.

Climate Change Literacy

Increasing efforts to educate the community about climate change was supported by workshop participants. In addition to educating the community about climate change, participants mentioned wanting more education efforts that communicates climate change related policy and building design standards that may be adopted. Participants recommended prioritizing educational efforts to vulnerable populations, in which kūpuna and

youth were specially identified. Ideally, in educating youth, participants wanted to see climate change education integrated into the school's curriculum. However, in recognition that that would require State action, participants also recommended that the County conduct education efforts at spaces where people frequent (e.g., pop-ups at community events, food pantry pickups) and through various modes. Educational materials can also be shared for dispersion at community education centers.

Creating more data visualization education materials to communicate climate change impacts and strategies was discussed by north shore workshop participants. At the North Shore workshop there was also feedback on the need to better understand social-behavioral change campagins and strategies to improve the efficacy of efforts.

Building and Strengthening Pilina

Participants from multiple workshops acknowledged that a community who knows one another is a stronger and more resilient community; therefore, community capacity efforts should also include actions that seek to build and strengthen the community's interpersonal relationships, as well as strengthen the community's relationship with the County. Participants encouraged that the County support more community events, such as block parties, or safe co-creative spaces for the community, including youth, to interact. Participants noted that knowing your neighbors can be particularly beneficial in a disaster event, in which community members know which members may require more assistance and which community members may provide certain resources. One participant recommended that a place-specific list of community members who have certain resources (e.g., a tractor) in case of a disaster event may be helpful to have.

Community Liasons

Participants in multiple workshops supported the establishment and empowerment of community liaisons to help implement climate change strategies, including strategies such as strengthening the Community Emergency Response Team (CERT) program, engaging youth in climate change decision-making and implementation, and collaborating and supporting community organizations involved in adaptation and resiliency efforts.

In the relaunching and strengthening of the CERT program, participants envisioned this program could support community education and awareness about what to do in the case of a disaster event. Participants envisioned that a flexible training program is provided in a variety of formats (e.g., videos, visuals, in-person events, and inter-generational educational events) to encourage community member engagement.

Participants also emphasized the need for youth engagement. Participants envisioned a climate change youth program that could provide youth with the tools and skills to become 'youth climate change leaders' who could spread awareness to their peers.

Participants commented that the County could help to support community organizations involved in adaptation and resiliency efforts. This could be done by financially assisting these organizations to pay for supplies and materials critical to respond to hazards. Additionally, the County could work with these community-based organization to proactively develop a plan and funding program for disaster response.

Resilience Hubs

Participants commented on various supplies a Resilience Hub should provide, including the following:

- Emergency food + water*
- Healthcare supplies*
- Power, including off-grid energy*
- Gas/batteries
- Storage space for response materials
- Electric Vehicle infrastructure
- Gender neutral bathrooms

Participants also commented on services a Resilience Hub should provide:

- Reliable communication channels, including hand radios and broadband access*
- Community gathering space*
- Medical aid*
- Gardening*
- Education and outreach*
- Medication receiving and distribution capacity
- Mail capacity
- Space and utilities for temporary living facilities to be sheltered post-disaster.

The asterisk * indicates supplies and services that were mentioned by participants in more than one workshop.

It was envisioned by participants that Resilience Hubs should not only provide all the essentials you need in the case of an emergency but should also be active in the community prior to any disaster event. The Hub could act as a co-creative community gathering space to help strengthen community relationships. It can also be a space that focuses on education and outreach efforts to communities, especially vulnerable populations. Additionally workshop partiipants stressed the need for food security measures at the resilience hub and envisioned that some gardening aspects could be incorporated into the Hub design.

In thinking about the Hub's design, participants noted that the Hub's size and resources could be tailored based on the community's population size. One participant also commented on a monolithic dome design.

There were also some comments regarding the locations of Resilience Hubs. One participant thought that the Hub should be prioritized in areas of higher transportation vulnerability in being cut off from island services. The Hawai'i Hazards Awareness and Resilience Program (HHARP) currently has a plan which outlines emergency response center considerations and a potential location for such a center. One participant also noted areas they'd envision a Hub being located on the south side of Kauai- including Kahili School, Mountain Park, or Waikomo Park area. However, participants acknowledged that a thorough assessment would have to take place to know what area may be appropriate for a Resilience Hub.

Transportation to the Resilience Hub in the event of a disaster event was also a concern highlighted by workshop participants. Participants noted congestion issues making it difficult to access evaculation centers, and commented on the need for increased collaboration with the State DOT, the development of a transportation/mobilization plan in the case of a disaster event, and identification of alternative access routes. Participants also wanted to explore establishing trails to move up mauka in response to a disaster event and identifying temporary areas of safety for public utilization during a disaster event to relieve congestion issues. Transporting vulnerable populations to the Hub should be prioritized in a disaster event.

One participant pointed to the Resilience Hub work being done on Oʻahu (e.g. About Action 15 - (cerenehawaii.org) and pointed to the Hawaii Community Foundation and the Frost Family Foundation as possible funding sources.

Additional Strategies

While these strategies were not prompted by small groups, workshop participants brought up the following additional strategies.

Wildfire Prevention

Participants, particularly on the South side, brought up their concerns about wildfires and the consequences of wildfire events on air quality and loss of properties. Poipu and Mahaulepu were particularly noted as areas of concern. Participants encouraged exploring land use strategies to prevent wildfires from occurring, especially for fallow agricultural lands which act as fuel for wildfire events. Planting of a cover crop and invasive species removal strategies were also highlighted.

Pre-disaster Planning

Participants emphasized the need for community pre-disaster plans so that there is a process in place that can expedite recovery after a disaster event.

Resilient building standards

Participants from the west and east side workshop brought up their support to adopt resilient building standards. Participants also encouraged the County to consider providing financial assistance to vulnerable populations in weatherizing their homes. One participant also encouraged the County to encourage community members to incorporate “safe-rooms” in their homes.

Food Sovereignty

In recognition of Kauaʻi’s high percentage of imported food which makes it particularly vulnerable to disaster events, participants from multiple workshops encouraged the County to explore ways to increase our local food production and resiliency, such as leveraing farmers markets, supporting community gardens, creating a 'Victory Garden' program (https://www.history.com/news/americas-patriotic-victory-gardens), or providing grants to encourage backyard farming.

Urban Forestry

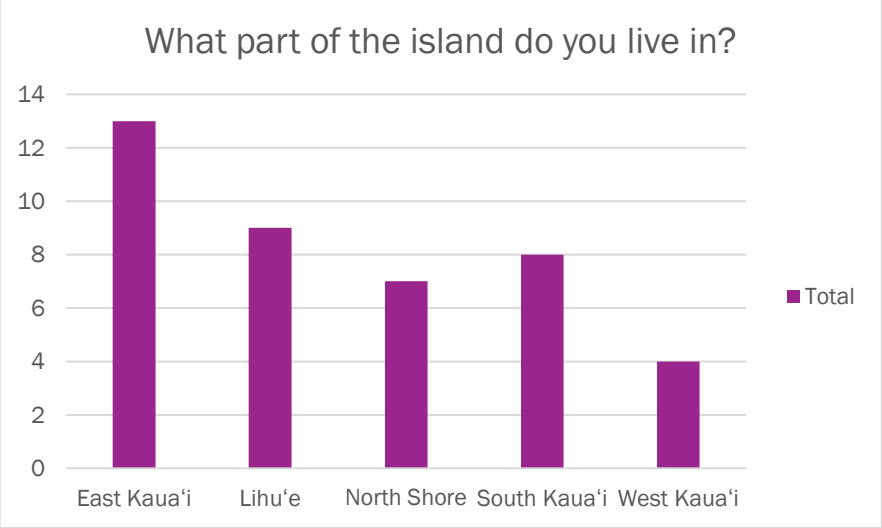
Participants at the South side workshop was concerned about the increase in air temperatures and how the heat could impact communities as well as the trees providing communities with shade. Participants encouraged tree planting strategies as well as identifying vegetation and trees that are appropriate for a changing climate. One participant wanted to focus on urban forestry efforts, as well as other nature-based strategies, in the Līhuʻe region since in addition to being a town and residential area, visitors also always land and leave from Līhuʻe.

Appendix A: Online Workshop Demographics

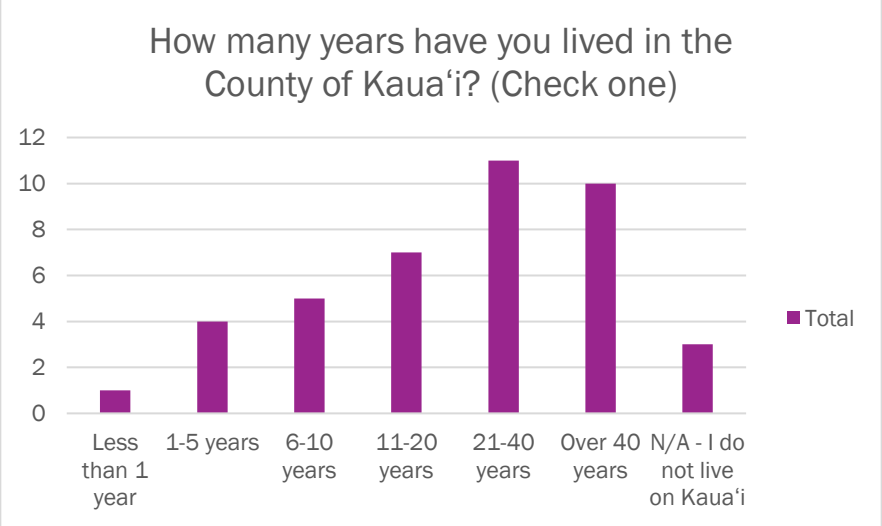
At its highest, attendance at the Workshop included 51 members of the public. Participants were invited to answer demographic questions via Zoom poll, but responses were completely optional. Not every question was answered by every participant.

Detailed demographics:

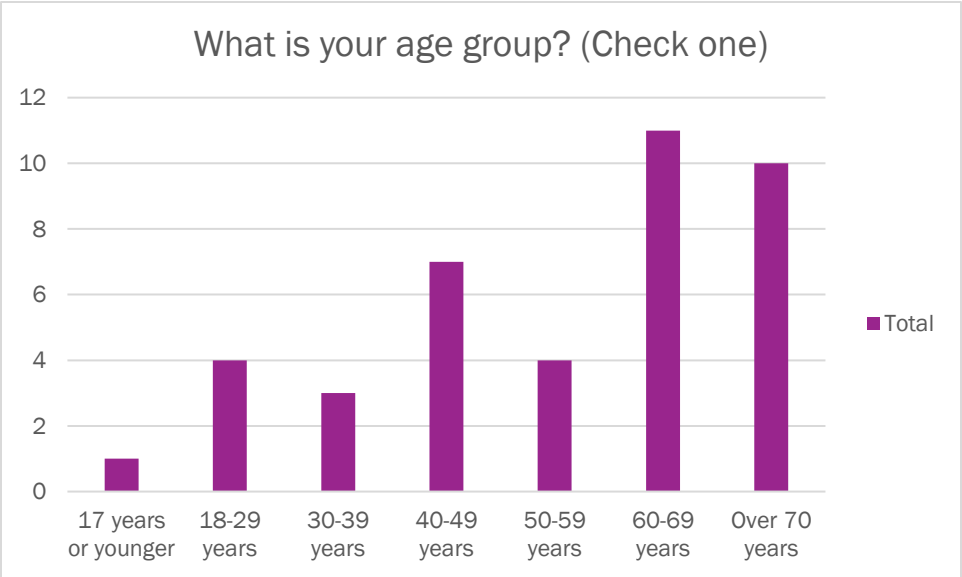
1. What part of the island do you live in? (Check one)



2. How many years have you lived in the County of Kaua'i? (Check one)



3. What is your age group?



4. With which race or ethnic group(s) do you most identify? (Select all that apply)

5. What gender do you identify with? (Select all that apply)

Appendix B: Online Workshop Comments

The following are interpretations of participants' verbal comments written by staff in real time and comments written in the Zoom chat. Some comments were edited for clarity. Comments are grouped by key themes that emerged and unique comments are grouped as "Other."

Managed Retreat

Make areas left from managed retreat strategies serve public benefits, such as parks and community gardens.

- New development in coastal areas should be minimal and for public benefit--for example natural parks etc.
- If managed retreats were to happen, I know my family would like to see that land used as parks. Having county/community free gardens or allotments on the shorelines could help strengthen our food independence and benefit people that live in drier areas or apartments that might struggle with that where they live would be another possible use.
- In terms of transferring development rights in Sea Level Rise areas, there are examples for other natural water hazards via FEMA floodways. I've heard in many communities across the US that there needs to be clear, strong regulations to ensure others can't find the loopholes to develop where others have given up rights and moved away from. Essentially, make sure the land is held by the commons and not able to be developed for profit.

Concerns about how coastal properties at risk of sea level rise impacts will be valued in managed retreat strategies, and/or if those valuations will benefit people inequitably.

- How do you protect against a land swap that benefits some wealthy people on shoreline property and takes away land from the option of affordable housing? How do you take speculation profits out of an exchange?
- How are at risk ocean side properties are valued?
- How will the 400 be valued?
- In Waimea property rights on some ocean front properties were already removed without compensation.

Support for leasebacks

- Just to get items into your meeting notes. I liked the concept mentioned by a participant of the ability to buy and lease out some lands. Perhaps, this is best poised for the fallback areas rather than the first line of inundation.

Support for Transfer of Development Rights

- Between managed retreat and transfer development rights, I prefer transfer development rights as long as the designation of sending lands and receiving lands is carefully done. TDR lets the market do the work and doesn't require a big outlay of taxpayer monies.

Question about where land for land swaps would come from

- The county does not own a lot of land, Waimea 400 being an exception. Where is the land for swapping coming from.

Do not allow development in at-risk coastal areas identified in SLR Constraint District

- I think the county's constraint district is really important because there should be NO development in those areas. Since the science and our unwillingness to act as quickly as strongly as we need to, it is important to note that the 3.2 sea level rise projected is very moderate at this point.

Concerns about who bears the cost of managed retreat when visitor-serving uses like hotels and vacation rentals are impacted.

- Curious what percentage of climate vulnerable structures are vacation rentals and Resort designated areas and if County and residents will foot the bill for the visitor industry and how the visitor industry is being challenged to support the health of the place they benefit from?

Trigger points for managed retreat strategies

- I like that the approach to implementing strategies is not time based only — with the inclusion of thresholds as approach to implement strategies. Beyond Sea Level Rise are there other thresholds being established?

Prioritize adapting roads

- Roads are a top of the list problem to be addressed for Kauai-westside, ec.
- I think our transportation routes are a primary government responsibility! Many of these will take 50 years. Property owners that have more time should be able to enjoy their property/

Wanting more clarification on what input is being asked for regarding managed retreat for the KCAP

- It's hard to give feedback to a general concept—the devil is in the details. So what are you asking for now?
- Managed retreat is probably necessary but difficult. JoAnn's question is paramount

Place-specific Managed Retreat Comments

Anahola

- DHHL will need its own Managed Retreat Plan for specific areas like Anahola, as the sending and receiving areas will need to be all on Hawaiian Home Lands. This info and the maps will be very helpful for us to figure that out, though. We see coastal areas that are vulnerable to SLR, flooding and other coastal hazards as better suited for recreation and cultural practices, as in beach parks and canoe facilities.
- I vaguely remember a brownfield site in Anahola. Do we know if that was totally cleaned.

Hanalei

- My first concern would be Hanalei and beyond because they already on the cusp

- Has Hanalei hit some trigger point. With any heavy rain it is already closed off. I know the road is a state road but is the county thinking of collaborating with state to try to expedite a plan. Isn't already a safety issue.

Other

Prioritize GHG Mitigation

- Does any part of the draft plan address mitigation? I am not opposed to spending money and time on adaptation, but not looking at cause and developing a plan for zero emissions seems like a fundamental oversight and missing a key priority. City and County of Honolulu and most progressive communities in the country have a Climate Action Plan that has mitigation as a large part of their plan.
- Is the money already appropriated? Will it be as much as that given to adaptation? Why is adaptation being given priority when it is so clear that time is of the essence. Why do adaptation before address cause?

Will we be talking about Food Security tonight?

North Shore

Nature-Based Solutions

Follow the lead of natural coastal processes

- Let natural beach processes rule on the North Shore

Consider and learn more about dune restoration

- How are dune restorations being done, if they are being done? Is it a big area all at once?
- How does it compare to how dune restoration is done on the east coast?
- Different wave patterns throughout the year--- are dune restorations designed to meet conditions when the beach is at its widest? Are wind patterns considered?

Provide more information on nature-based solutions

- In general, the group requested more information on nature-based strategies/solutions
- Attendees interested in learning more about nature-based solution options and how the County can begin examining and implementing NBS

Vulnerable Facilities and Infrastructure

Roads and highways

- HWY from Princeville to Hanalei -- difficult to conceive how it will be protected but is a priority
- Bridges don’t flood, roads at lowland elevations flood
- Concern that there are no adaptive options for historic/protected coastal highway through the north shore

Beaches are vulnerable and must be maintained in public trust

- In Hanalei, need to prioritize and protect the beaches as public trust resources

Coastal properties

- Concerned about properties from Wainiha to Haena, especially in terms of erosion; from double bridge to Camp Naue
- As the ocean moves landward, so do public beaches and therefore homes may be forced to relocate

Managed Retreat

People purchasing properties without knowing climate risk have contributed to the situation where managed retreat is extremely expensive

- County cannot possibly buy out the land on the north shore, values are not in sync with the values that exist; people buying properties without considering climate impacts
- Property buyers likely not aware of the risks associated with buying properties in SLRXA
- While property owners not aware of expenses associated with climate impact management, manage retreat, costs of vulnerable properties will continue to be prohibitive for County managed retreat programs

Restrict and move development out of the way of SLR

- As development is at risk it needs to move out of the way and public trust resources need to be perpetuated
- In 1990, State did a study of stretch along Wainiha and recommended no development be allowed
- Even after tsunami's, homes were allowed to be built along the shoreside

Other

See examples from other parts of the island and the world

- South shore: lost boardwalk in Poipu from Waiohai to Sheraton; Former CM Tim Bynum did study on observed erosion in the past
- Important to monitor possible adaptive solutions in places beyond HI and seeing how they work in the next 3-5 yrs

East Kaua'i

Nature-Based Solutions

Mangroves are an example of a nature-based strategy that could be applied in the area but has trade-offs

- Sometimes nature takes the lead – some of the canals in Kapaa already have vegetation that is not natives (mangroves) that are working way up estuaries. It's a double edged sword bc it stabilize but also hinders drainage
- In terms of managing mangroves, is it removing them or what?

- Manage mangroves – if you look at people at fishpond, they spent a lot of time and money taking them away. It's not a native plant so unsure how to manage. But it could be part of the solution
- Mangroves used elsewhere to provide armament and filtering system but may not be so appropriate in certain places here. Worth looking into.

Apply site/building scale nature-based solutions for stormwater (green roofs, bioretention, permeable pavement) where they will be best positioned

- Sustainable stormwater best management practices – green roofs, bioretention, permeable pavement are great for a lot of places, but it is a point well spoken, but if we talk about potential impact of SLR, those things are better positioned outside of the red area. Put money where ppl will continue to be. Put a lot of thought into strategy.
- Schools have been good place to do these projects
- [The application of green roofs and other sustainable building standards] should be flexible because a lot of roofs cannot withstand weight of it

Support for wetland restoration

- Love approach in Waimea with restoring wetlands
- Restoration of wetlands and cisterns (gathering and protecting water with low level filtration for drinking or other water uses). Not sure of future of water abundance so good to collect and store where you can.

Vulnerable Facilities and Infrastructure

Roads

- Road from Wailua to Kealia, it seems so compromised. Does the county have a plan for what to do with it? [County staff: it is a state highway. For Wailua area, they're using sand savers to capture sand and mitigate erosion impacts. State is open to listening to feedback for protecting highway]
- In mid 60s, a new road was proposed that would add a new Wailua bridge further inland. It would be closer to Kalepa ridge and bypass Kapaa town. Unfortunately the state sold it but merchants in Kapaa objected to having Kapaa town closed off but might want to dust off as option

Toxic facilities

- Facilities most concerned about are cesspools and landfill as far as toxicities of waterways.
- any location with history of waste storage or chemicals should definitely be identified on this map as priority areas to keep an eye on
- Gas stations too close to tsunami

County/community facilities that are already working on retreating

- Library
- Police station

Other

Include food and agriculture in plan and strategies

- Food security is more resilience but priority for this plan

- Agriculture is in the mix when it comes to managed retreat – esp when it comes to Taro farmers who are already suffering from saltwater intrusion

Līhu‘e

Nature-Based Solutions

Evaluate and promote messaging around the value of ecosystem services

- Wetland restoration and ecosystems services- evaluate as infrastructure and not just “ponds”
- Monterey Bay example, multiple benefits for public
- Economic value in nature based solution
- Educational tool to understand sea level rise, “living nature learning centers”

Support for more trees and parks for adaptation to urban heat and supports walking and housing as co-benefits

- Urban Heat: Rice Street lack of trees, ADD MORE TREES!
- Expanded sidewalk and greenery added are good
- Sidewalk going into the Kauai High would promote walkability
- Need more public parks, especially if more housing
- Urban Forestry Plan, cool!
- Look at different strategies, especially sharing responsibilities for maintenance
- Park improvements

Vulnerable Facilities and Infrastructure

- Most properties are not prone to climate impacts (sea level rise, flooding)
- Nawiliwili harbor, boat harbor, flooding. Need for recreational fishing. Critical facility
- Flooding hazard- Līhu‘e Mill

South Kaua‘i

Nature-Based Solutions

- Albizia is becoming a major problem – very vulnerable to high winds and can wipe out electrical lines

Vulnerable Facilities and Infrastructure

Concern about how to adapt when vulnerable infrastructure is private

- Some of the most expensive infrastructure on the island is private
- Economic base and source of employment

- How do we share costs of adaptation?
- What do we do with the hotels if we aren't going to harden/armor the coastline?
- What can we learn from Waikiki?

Other vulnerable assets

- Koloa School? Vulnerable to wildfire and maybe flooding
- I vaguely remember a brownfield site in Anahola. Do we know if that was totally cleaned.

Managed Retreat

- I liked the concept mentioned by a participant of the ability to buy and lease out some lands. Perhaps, this is best poised for the fallback areas rather than the first line of inundation.
- In terms of transferring development rights in Sea Level Rise areas, there are examples for other natural water hazards via FEMA floodways. I've heard in many communities across the US that there needs to be clear, strong regulations to ensure others can't find the loopholes to develop where others have given up rights and moved away from. Essentially, make sure the land is held by the commons and not able to be developed for profit.

West Kaua'i

Nature-Based Solutions

Questions and concern about what nature-based solutions are and if they work compared to grey infrastructure

- Participant lives in Kekaha right across from highway rocks that were put along the highway and they survived two hurricanes
- I guess I don't know if that does anything. I would like to see examples of this. What is nature based?

Apply nature-based solutions in the place-based context

- Like wetland restoration for the wetland
- Important to hear the stories of the history (re: historically Westside is wetlands)
- There are challenges with West Kauai that are more watershed level challenges especially when talking about nature-based strategies

Managed Retreat

Using Waimea 400 as an example, there is concern about efficacy of managed retreat in the context of the area's historical ecological condition and current settlement pattern

- Not enough space for all of Kekaha to retreat to the small space
- Is it possible to look at properties that are at even higher ground than Waimea 400?
- Problem with the Westside area is that the historical features of the area is that it's primarily wetlands with a strip along the ocean that's built up
- Question about the timing about SLR
- The Waimea 400 area is essentially a wetland

- The areas that are built up were for sugar, and it was primarily pumped. Used to be able to go from Waimea River to Mana with a canoe
- It seems to me it is a waste of time using the Waimea 400 for a retreat site as it will be next so we should be working with the state on the lower foothills above.

Implement managed retreat in a way that does not sever close community ties

- Community needs to maintain the synergy and move together if possible
- Don't want to see people move away from the island
- Want local people to be comfortable with the place relocating to and be scared about leaving a legacy to their next generation and still be worried about relocating

Other

Process of developing and implementing strategies needs more community preparation and concrete examples

- I think we need more time with more people at the table
- Need to have more time to digest material to be able to comment
- Want more concrete examples

Appendix C: In-Person Workshop Booth Boards

PHYSICAL STRATEGY TYPES

Enhance Existing Assets

Strategies to modify existing built and natural assets so they can better accommodate or withstand impacts of climate change.

Major Asset Alteration

Strategies that require transformative change of existing assets, mostly involving relocation/retreat.

Resilient Development

Strategies to direct future development away from places most impacted by climate change and that ensure future structures better withstand impacts.

KAUA'I CLIMATE ADAPTATION PLAN

LAULIMA STRATEGY TYPES

Community Capacity

Strategies to strengthen the broader community's ability to carry out adaptation actions.

Planning

Strategies focused on understanding changes in hazards and vulnerabilities and updating adaptation strategies and plans.

County Leadership

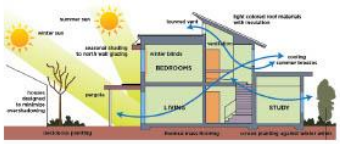
Strategies to build County staff and organizational capacity to implement climate adaptation actions.

KAUA'I CLIMATE ADAPTATION PLAN

RESILIENT DEVELOPMENT STRATEGIES

RESILIENT DEVELOPMENT – LAND USE

Strategies to direct future development away from places most impacted by climate change and that ensure future structures better withstand impacts



Reduce the intensity of development in hazardous coastal areas Downzone or allow less intense types of land use in areas vulnerable to sea level rise (existing structures could remain).

Resilient site design and development standards Implement standards to buffer structures from flood and fire risks, capture rainfall on-site, reduce heat, and otherwise reduce vulnerability to climate change impacts.

Resilient building standards Implement standards that allow or require new buildings to have systems that capture and reuse water, reduce heat, reduce fire risk, and otherwise reduce vulnerability to climate change impacts.

KAUA'I CLIMATE ADAPTATION PLAN

RESILIENT DEVELOPMENT STRATEGIES

RESILIENT DEVELOPMENT – MANAGED RETREAT

Strategies to direct future development away from places most impacted by climate change and that ensure future structures better withstand impacts

Land Swap Facilitate the exchange or "swap" of title to land between two or more property owners.

Transfer of Development Rights Facilitate the transfer of development rights (TDR) from areas vulnerable to sea level rise, such as passive flooding, high wave flooding, and coastal erosion, to mauka areas.

Buyout Program Purchase undeveloped and developed land vulnerable to sea level rise, such as passive flooding, high wave flooding, and coastal erosion, and properties destroyed by flooding.

KAUA'I CLIMATE ADAPTATION PLAN

RESILIENT DEVELOPMENT STRATEGIES

TRANSFER OF DEVELOPMENT RIGHTS

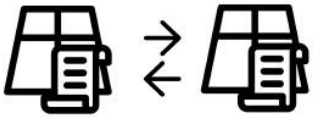
Facilitate the transfer of development rights (TDR) from areas vulnerable to sea level rise, such as passive flooding, high wave flooding, and coastal erosion, to mauka areas.

Type	Resilient Development
Time	5-10 years
Cost (per unit)	$
Cost (cumulative)	$$$
Funding Sources	Private Developers
Potential Co-benefits	Equity

LAND SWAP

Facilitate the exchange or "swap" of title to land between two or more property owners.

Type	Resilient Development
Time	3-5 years
Cost (per unit)	$ - $$$
Cost (cumulative)	$$$$
Funding Sources	Federal, County
Potential Co-benefits	Equity



BUYOUT PROGRAM

Purchase undeveloped and developed land vulnerable to sea level rise, such as passive flooding, high wave flooding, and coastal erosion, and properties destroyed by flooding.

Type	Resilient Development
Time	5-10 years
Cost (per unit)	$$
Cost (cumulative)	$$$
Funding Sources	Federal, State, County
Potential Co-benefits	Equity

KAUA'I CLIMATE ADAPTATION PLAN

ENHANCEMENT STRATEGIES

ENHANCING EXISTING ASSETS

Strategies to modify existing built and natural assets so they can better accommodate or withstand impacts of climate change

Park Improvements Implement nature-based solutions to support coastal ecosystems on County parklands near shoreline areas.

Harden Critical Facilities Enhance and protect existing critical facilities and infrastructure as needed based on findings of site-specific assessments.

KAUA'I CLIMATE ADAPTATION PLAN

NATURE-BASED SOLUTIONS

WHAT ARE NATURE-BASED SOLUTIONS?

"Planning, design, environmental management, and engineering practices that weave natural features or processes into the built environment to build more resilient communities." (FEMA)

Example Applications of Nature-Based Solutions:

Establishing parks that absorb coastal or inland flood waters

Restoring sand dunes that buffer inland areas from waves and other sea level rise impacts

Building green roofs which have plants that soak up rainfall and help reduce the heat island effect

Planting and caring for the urban forest which reduces stormwater runoff and helps reduce heat island effect

Restoring and caring for coastal wetlands that absorb wave energy and sequester carbon

Source: Federal Emergency Management Agency (FEMA)

MAJOR ALTERATION STRATEGIES

MAJOR ASSET ALTERATION

Strategies that require transformative change of existing assets, mostly involving relocation/retreat

Relocate Critical Facilities Relocate or build new critical facilities and infrastructure as needed based on findings of site-specific assessments. Could include assets like County buildings, roads, and water and wastewater treatment plants

COMMUNITY CAPACITY STRATEGIES

COMMUNITY CAPACITY

Strategies to strengthen the broader community's ability to carry out adaptation actions

Climate Change Literacy Build community literacy about climate change impacts and adaptation strategies through the lenses of both cultural knowledge and current science.

Disaster Self-Reliance Educate residents to be self-reliant for 14 days minimum.

Visitor Awareness Increase visitor awareness of and preparedness for hazards.

Neighborhood Resilience Hubs Upgrade existing neighborhood centers to function as resilience hubs that provide resources and refuge year-round.

New Emergency Response Centers Build new emergency operations centers for emergency responders in areas that could be isolated.

RESILIENCE HUBS

WHAT IS A RESILIENCE HUB?

"Resilience hubs use a physical space – a building and its surrounding infrastructure – to meet numerous goals, both physical and social. Resilience hubs are an opportunity to efficiently improve emergency management, reduce climate pollution, and enhance community resilience. These spaces also provide opportunities for communities to become more self-determining, socially connected, and successful in the long-term." (USDN)

COMPONENTS:

Resilient Programming and Services Offering additional services and programs that build relationships, promote community preparedness, and improve residents' health and well-being.

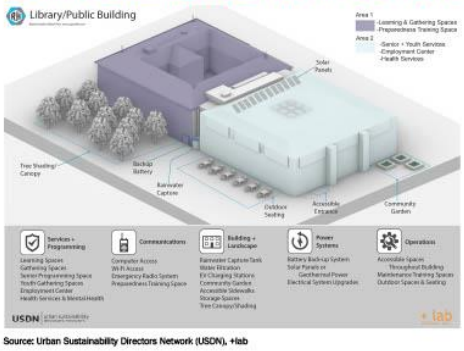
Resilient Structure Strengthening the resilience of the facility to ensure that it meets operational goals in all conditions.

Resilient Power Ensuring reliable backup power to the facility during a hazard while also improving the cost effectiveness and sustainability of operations in all three operating modes.

Resilient Communications Ensuring the ability to communicate within and outside the service area during disruptions and throughout recovery.

Resilient Operations Ensuring personnel and processes are in place to operate the facility in all conditions.

EXAMPLE RESILIENCE HUB APPLICATION:



Source: Urban Sustainability Directors Network (USDN), +lab

Nature Based Solutions

Kikiaola-Kekaha sand bypass

Kapa'a Beach Park

'Ainakuk'oa O Waiohuli Kai Restoration, Maui

Limahuli

Kaua'i Kailani

Kawaiele Bird Sanctuary

Lihū'e

HARDENING

Po'ipū

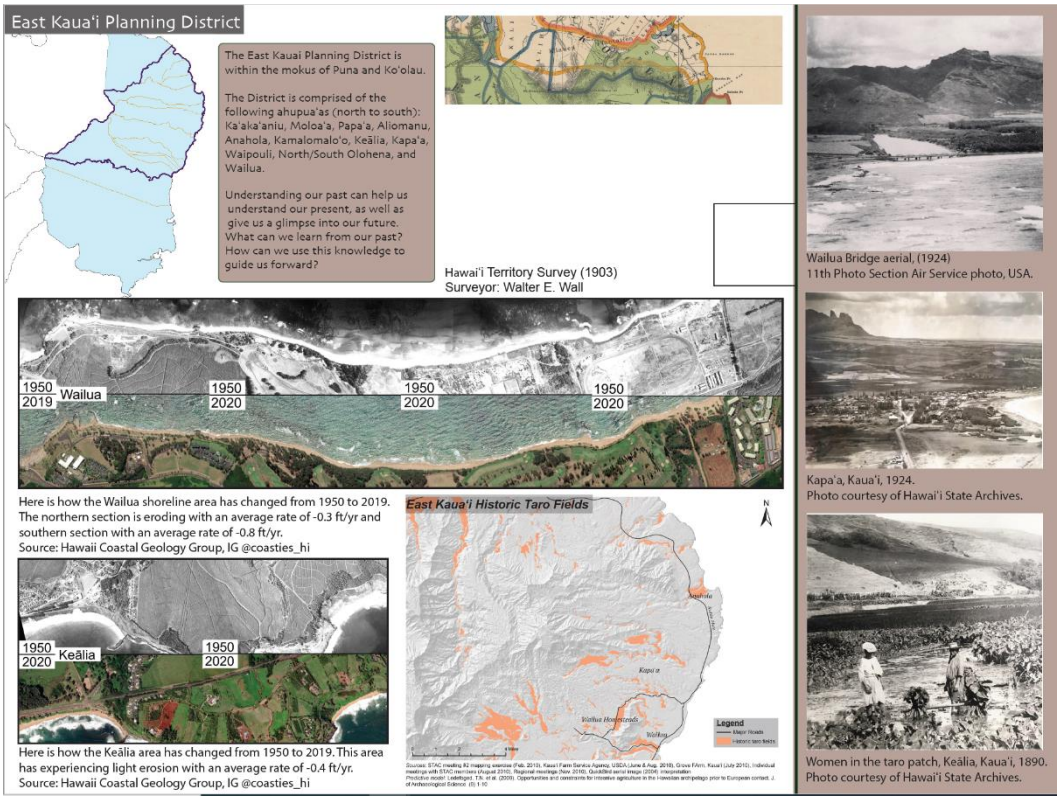
Lawa'i

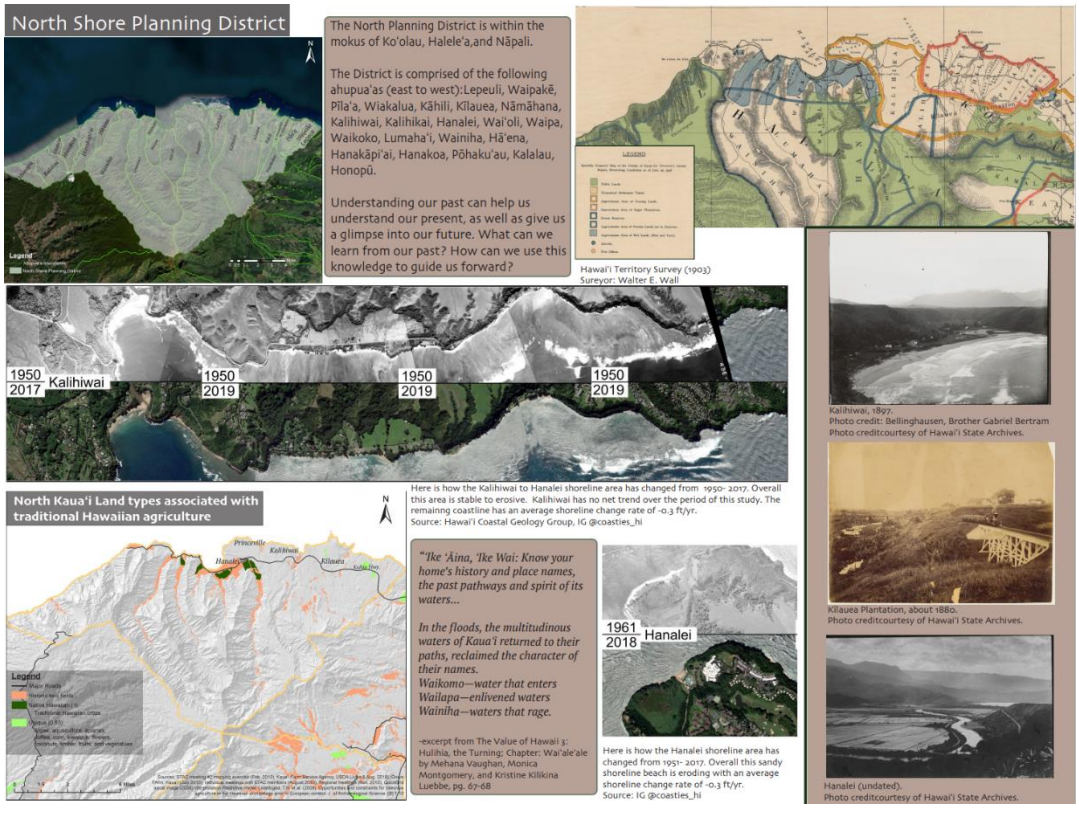
Lawa'i

Kapa'a Ke Ala Hele Makalai

Kapa'a Kaua'i Kailani

'Aliomanu Road, Anahola


East Kaua'i Planning District
The East Kauai Planning District is within the mokus of Puna and Ko'olau.
The District is comprised of the following ahupua'as (north to south): Ka'aka'aniu, Moloa'a, Papa'a, Aliomanu, Anahola, Kamalomalo'o, Keālia, Kapa'a, Waipouli, North/South Olohena, and Wailua.
Understanding our past can help us understand our present, as well as give us a glimpse into our future. What can we learn from our past? How can we use this knowledge to guide us forward?
Hawai'i Territory Survey (1903)
Surveyor: Walter E. Wall
Wailua Bridge aerial, (1924)
11th Photo Section Air Service photo, USA.
1950
2019
Wailua
1950
2020
1950
2020
1950
2020
Here is how the Wailua shoreline area has changed from 1950 to 2019. The northern section is eroding with an average rate of -0.3 ft/yr and southern section with an average rate of -0.8 ft/yr.
Source: Hawaii Coastal Geology Group, IG @coasties_hi
Kapa'a, Kaua'i, 1924.
Photo courtesy of Hawai'i State Archives.
East Kaua'i Historic Taro Fields
Legend
1950
2020
Keālia
1950
2020
Here is how the Keālia area has changed from 1950 to 2019. This area has experiencing light erosion with an average rate of -0.4 ft/yr.
Source: Hawaii Coastal Geology Group, IG @coasties_hi
Women in the taro patch, Keālia, Kaua'i, 1890.
Photo courtesy of Hawai'i State Archives.


North Shore Planning District
The North Planning District is within the mokus of Ko'olau, Halele'a,and Nāpali.
The District is comprised of the following ahupua'as (east to west):Lepeuli, Waipakē, Pīla'a, Wiakalua, Kāhili, Kīlauea, Nāmāhana, Kalihiwai, Kalihikai, Hanalei, Wai'oli, Waipa, Waikoko, Lumaha'i, Wainiha, Hā'ena, Hanakāpi'ai, Hanakoa, Pōhaku'au, Kalalau, Honopū.
Understanding our past can help us understand our present, as well as give us a glimpse into our future. What can we learn from our past? How can we use this knowledge to guide us forward?
Hawai'i Territory Survey (1903)
Sureyor: Walter E. Wall
1950
2017
Kalihiwai
1950
2019
1950
2019
1950
2019
Here is how the Kalihiwai to Hanalei shoreline area has changed from 1950- 2017. Overall this area is stable to erosive. Kalihiwai has no net trend over the period of this study. The remaining coastline has an average shoreline change rate of -0.3 ft/yr.
Source: Hawai'i Coastal Geology Group, IG @coasties_hi
Kalihiwai, 1897.
Photo credit: Bellinghausen, Brother Gabriel Bertram
Photo creditcourtesy of Hawai'i State Archives.
North Kaua'i Land types associated with traditional Hawaiian agriculture
Legend
"Ike 'Āina, 'Ike Wai: Know your home's history and place names, the past pathways and spirit of its waters...
In the floods, the multitudinous waters of Kaua'i returned to their paths, reclaimed the character of their names.
Waikomo—water that enters
Wailapa—enlivened waters
Wainiha—waters that rage.
-excerpt from The Value of Hawai'i 3: Hulihia, the Turning; Chapter: Wai'ale'ale by Mehana Vaughan, Monica Montgomery, and Kristine Kilikina Luebbe, pg. 67-68
1961
2018
Hanalei
Here is how the Hanalei shoreline area has changed from 1951- 2017. Overall this sandy shoreline beach is eroding with an average shoreline change rate of -0.3 ft/yr.
Source: IG @coasties_hi
Kīlauea Plantation, about 1880.
Photo creditcourtesy of Hawai'i State Archives.
Hanalei (undated).
Photo creditcourtesy of Hawai'i State Archives.

Appendix D: In-Person Workshop Comments

The following are the comments written by notetakers of the In-Person Workshop on flipchart paper. Comments are grouped by community workshop and small group breakouts.

Līhuʻe Workshop

Group	Comments
Exposed Private Properties: Managed Retreat	Work with nature first
	It's hard to move structures and communities that we have connection with
	What about the fishponds? Impacts of seawalls on ocean
	What about current investment in infrastructure? $$$
	Roads are important and should be prioritized
	Old cane haul roads? Can we use these roads (to supplement existing roads)
	A resilient community protects itself and doesn't run for the hills
	Protect our existing community, or it will cease to exist.
	Let's fight these hazards with all our tools
	Let's do nature based solutions (wetlands) that can mitigate hazards + wave action
	Let's focus on land management
	A limited amount of managed retreat was implemented with Iniki
	Where is the money for buybacks?
	Waikiki is an example of what happens with seawalls and eroding beaches
	Concern with fortification

Group	Comments
	How many people will need to be relocated? Answer (Kaaina): In coastal erosion area is 400-600 homes.
	Concern about how many people/homes impacted by hazards
	Are these temporary solutions if SLR just continues? Do we keep retreating?
	Where is the money coming from?
	Concern about costs and implementation
	How will these programs be funded?
	Concern about unintended consequences. We need to think about these potential impacts
	Concern about coastal landowners and impact of the managed retreat programs> need to think about the execution.
	"Managed Advance of the Ocean"
	Is there the money?
	Austin, Tx and Alaska Best Practices
	What if the community does not want managed retreat? No action? What then?
	Better investment is relation of infrastructure.
	Make these programs more attractive to the landowners (incentives)
	Land swaps must be equal value or better value
	Id rather move and have a house at the end of the day
	Concerned about planning vs. execution> disconnect
	Vulnerable areas: social equity - wealthy property owners - hotels
	Iniki demonstrates Kauai's resiliency - Do newcomers know how to bounce back?
	Harbor importance: what can be done? - Need to talk to State
	TDR: How much development rights can be transferred?
	Insurance doesn't cover wave impacts

Group	Comments
	Grant programs (financial tools) for people not 2nd homes
	In lihue, are we at capacity? Infrastructure needs if more development? Water
	Strategy: Put out a call on those willing/interested in donating land.
	Possible to retract development rights in coastal properties?
	Limit County's liability in cases where SLR impacted land/homes/structures
	Legal binding mechanisms for buyers willing to buy and build in SLR zones. Not just a disclosure.
	map comment (land parcel east of Hanamaulu beach): Ex: owner wants to convert from Ag, but cannot
	map comment (airport area): Airport vulnerability
	map comment (land fronting airport): County exchanged with lagoons
Exposed Infrastructure and Assets	Mapping exercise: SLR and Historical wetlands to justify where to recreate NBS
	Kelp farms/ gardens. Environment for fish, can harvest kelp
	Reef Restoration to raise the reef
	Long-term cost of reef restoration vs. managed retreat
	need holistic view for nature-based solutions
	green infrastructure
	wastewater, impacts if inundated
	ahupua'a system as a first manageable step
	redirect water to areas like parks
	Miro Board: Reef Restoration Efforts
	Miro Board: Limu farm opportunities to dissipate wave impacts
	Miro Board: Living roofs, green infrastructure
	Miro Board: Overlay projected impacts to land use-current and historical to inform best NBS strategies to specific place (watershed example)
	Miro Board: Help to keep water where it lands
	Miro Board: Redirect stormwater runoff to green spaces (i.e. public parks) vs. allowing runoff to discharge in ocean

Group	Comments
	Miro Board: Examine NBS from mauka through makai; apply an ahupuaa lens
	Miro Board: Implementing NBS w/ ahupuaa lens may be good starting point as a model
Community Capacity	Show educational video on flights > educate
	DMAP input/ access to include impacts/vulnerabilities to help put people on notice
	Direct info to changing demographic, including historical knowledge
	Kupuna program > have the conversation
	Community capacity is difficult (including transients)
	Resilience hub is doable with modest amount of resources
	Resilience hub- tailored per capita= smaller or larger with population size
	Hub sited along with county property
	How to manage resiliency hub - and partner with State/County/community -Capacity is needed to staff hub
	Instruction to K-12 to educate students/keiki
	fairs in communities/outreach to communities. re: where's hubs and resources
	radio and folks w/o internet
	info to visitors on programs to fund solutions and encourage tourists to contribute to community

Group	Comments
Comment Cards	Regarding managed retreat- insurance does not cover wave/water damage or loss nor should the County- cost prohibitive, especially for second homes, resorts. Would ike to see a grant program or home/landowner could apply for based on financial need to help relocate to a less vulnerable area. Why is the County rezoning the Kapaa Pool when its in a SLR area? Nature-based resiliency: -limu farming -coastal and elsewhere - native and food forests Literacy/education through our school communities. kids > staff> parents> ohana
	Slides look great. Easy to read and understand! Great presentation by Marie and Kaaina, Alisha Maybe more time for questions? Folks seem interested! They definitely have questions along the way. Its a matter of space, but a little hard to hear both Marie and Alan at same time in the small groups People wanted to stray from planned material, so maybe allow more time, like 15 minutes for open discussion. Good turnout! It's hard to address specific strategies when there is fundamental skepticism against government Should we have a way to follow up on specific issues? This card is a great method!

Group	Comments
	Under the idea/concern for what makes managed retreat more desirable I wonder how the planning board and members of the community/voters can intensify "restrictions" on both zoning and "how, who, what, when, where" is getting built (both private and public). I understand once approved/zoned you don't retreat but can we change/modify this with restrictions? I also think limiting outsourcing of materials, utilizing science and traditional/nature techniques where possible would make things more desirable perhaps also increase local employment and economic stimulation. Interested in tree planting/ volunteering if you have contacts/recommendations "Project Aware" through PADI is a group that works with reef restoration. I know people with project aware. 2nd part of discussion: I think in Lihue the airport is major infrastructure both for locals and tourist. Often 1st impression and last for visitors so to me it seems essential to need to implement as many nature-based strategies like more tree plantings, growing/living roofs, planting fire resistant greenery, carbon reducing plants, etc. Also requiring more eco concepts within airport, no bag sales. No water bottle sales. Education on nature-based strategies in community at the airport. How locals and visitors can participate, reduce footprint, donate, etc. Possibly % of sales at airport go directly to climate adaptation plan as a commitment to sustainable growth.
	We discussed a lot on coastal management which is important, upland though will need some partnership with private + state landowners for overall management. Some thoughts with the urban forestry but more thoughts towards urban ag which includes community gardens and encouraging community to have personal gardens, this helps with food sustainability as well. Wildfire was brought up, that also brings in invasive species management again towards ahupuaa and partnership discussion. Incentives for better management of large land tracts. I will fill out online, but just immediate additional thoughts
	NBS- make public more aware of water availability and wastage a) using gray water Climate cooling a) xxx seeding; b) less cars on road; c) less heat generating activities How to impact education of the public> A: This is too large and ambiguous

South Side Workshop

Group	Comments
	moving private property inland > possible downzone > lack of legal power
	rocky shorelines act as buffer areas left open to allow for flooding

Group	Comments
Exposed Private Properties: Managed Retreat	consider lifespan of roadways
	RE: Buyouts - concerns about reality of high costs of property
	Not appetite for buyouts for millionaires
	So what is the real property tax impact? Coastal properties fund the county coffers
	Concerns about tax base
	Not interested in buyouts…
	Possibly interested if money is provided for buyouts from elsewhere
	A south Kauai land swap would need land in/near Poipu area
	Keep in mind not everyone on the coast is a millionaire
	TDR seems complicated
	What about hurricane/storm impacts to coastal properties?
	Grove Farm won't allow access on to Waita Reservoir property to access water- how to work with them to address drought.
	Concern about dams/reservoirs- is our potable water safe?
	Mitigation for drought impacts.
	Septic system + SLR concerns
	Concern that even septic systems will seep/pollute the ocean. We need to update these systems to be self-contained (only pumped) or central sewer. They've observed septic overflow into ocean. Note: There are above grade septic systems.
	Should development be elevated above BFE-even higher due to SLR?
	Concern about insurance premiums.
	Does the County have to provide road access to hazardous areas? Ex: Haena floods+ roads.
	Are you talking to insurance companies?
	Appetite for downzoning: concern about taxes. Where will the $$ come from w/out coastal landowners > have to protect them to protect financial benefits > talk to insurance people. Need to know how much money comes from those land parcels…
	Waimea 400 land swap example > appetite for it? Yes. Will increase as climate change increase effects
	Need to build community education

Group	Comments
	County manage long-term expectations early on
	Not a one size fits all: battery of solutions
	Big island volcano buyout program - good example to inform Kauaʻi plans. Funding: federal
	Concern about increase intensity of storms and hurricanes. Coastal properties might not have insurance… FEMA assistance is changing based on historical data > dated
	Def. of "extreme event" is changing
	Drought: all water from rainfall (decrease precipitation). When does decrease rainfall become critical? What is the solution?
	TDR > appetite (?) maybe > positive and negative to all SLR solutions
	Possible problem: People will build in hazardous areas despite CC long-term impacts > when does panic begin?
	Waita: return water to Huleia, decrease flooding threat to Kōloa
	map comment: (in ocean near Lawai kai) ~Hurricane clips. ~Insurance issue. FEMA making adjustment from historical data ~ not on SLS (?xxx)
	map comment: (in ocean near Lawai kai) ~50 acres land property swap ~ inland swap > appetite will increase ~ Lawai road > movage for 20 years
	map comment: (in ocean by Kukuiula Harbor) ~ Fewer storms, less rain
	map comment: (condos at Prince Kuhio) ~Concern about property values of condos. Not millionaire homeowners
	map comment: (Kiahuna) ~scarping and exposed foundation
	map comment: (coastal road Weliweli ahupuaa) ~vulnerable stretch of road - affected during king tides

Group	Comments
	map comment: (Weliweli ahupuaa) ~update septic system requirements. Self containment or hook up to main line. Storms leech into ocean.
	map comment: (Mahaulepu) ~SLR undercuts Mahaulepu path > erosion on cliff. Need to maintain pathway and access
	map comment: (west of Ala Kinohiki and weliweli track) ~ connection between roadways more mauka
	map comment: (east of Ala Kinohiki and Weliweli track) ~ County needs to purchase south side mauka lands for land swap
	map comment: (mauka Weliweli ahupuaa) ~ drought impacts and intense precipitation. Concern about reservoirs> waita
Exposed Infrastructure and Assets	*Mentioned during intro* ~Waste-to-energy ~H20 Diversions ~Implementation Schedule and Funding ~Examples of Community Capacity
	Wahiawa is boundary of Koloa District But isn‘t included in south kauai planning district
	Prince Kuhio Park ~During Iniki, County had to reroute road through the park ~Potential to reroute Kukuiula Bypass road to park
	Are there projections Re: SLR/Impacts expected by midcentury?
	Fishponds acted as natural basins to capture stormwater ~Filled in when road moved mauka
	Old Koloa Tunnel Could be activated as alternative road for emergency access
	Road along Poipu Beach/Brenneckes > To protect vs. relocate would depend on cost
	How would implementation of adaptation strategies impact property taxes?
	Shoreline hardening at Poipu wouldn’t be desireable
	Alternative access to Poipu Beach Area via Pe‘e Rd.
	Protect Brenneckes Beach Area

Group	Comments
	Relocating Lawai Rd. more mauka is difficult. ~Private Properties require access ~Different routes needed
	Increase SMA > Increase insurance. Re: Private properties
	Stream diversions ~Affecting wildlife ~ related to increase wildfire risk ~H20 returned to estuaries to increase flora/fauna
	Waikomo Stream ~Turns to mud after heavy rain ~Flows to Koloa Landing and smothers reef ~Need to stabilize and revegetate stream banks
	High hazard reservoirs and dams need to be addressed
	Need interior road to north shore
	Road fronting brenneckes > May need other options. I.e. relocating access to area. ~ Potential linkage to Poipu Road to allow private properties access if road is wiped out again ~ Existing road may exacerbate shoreline erosion
	Almost all roads have infrastructure/utilities below. I.e. H20 lines, waste H20, etc.
	Wildfires east of Poipu ~Air quality hazard for Poipu Community ~Hazards for properties in Poipu ~Potential Land use strategies for fallow AG land. I.e. developed, cover crop, etc.
	Protection ok
	SLR estimate at 3.2 feet is an underestimate ~Projections continue to worsen ~Example given of Florida trying to harden vs. finding options to retreat
	Beach replenishment is a plus
	How long would replenishment efforts last?

Group	Comments
	What are impacts to reefs, re: replenishment efforts?
	Plans for regional sewer plan? ~incorporating private systems ~smaller sewer systems- decentralized and shared ~exploring wetland treatment system
	Shower trees along E. Bypass road look unhealthy ~Select climate appropriate species ~ Does CoK Irrigate street trees?
	Miro Board: Quite a few wildfires by Mahaulepu
	Miro Board: IN GENERAL. The 3 ft estimate is way underdone. Will be 20-30 ft. Ruby: Most extreme projection is 8 ft. I notice they keep realizing its worse than we thought. All of the investment is gone if we end up hardening things instead of retreating them. Very concerned that sea level rise projections keep getting worse. We will have to bite the bullet and do stuff (like Fiji but its a lot easier for them to do it).
	Miro Board: Rainbow shower trees that don't look good. Overgrown by buffalo grass. That kind of thing is not just limited to the road, but could be representative of other places. Select trees that can be adapted to water climate. Or do irrigation.
	Miro Board: (by Pe'e Road) Need to close windows and doors during fire. Not just issue for burning down, but hazard for breathing, should pay attention to possibility of wildfires east of Po'ipu
	Miro Board: Road under tunnel could be alternative road access. Near Waita. On grove farm land but access should be disputed because following ancient pathway disputed prior to 1886.
	Miro Board: Rebuild or take opportunity to rethink strategy to connect people in this area.
	Miro Board: It's not as simple as scooting the roads/highway over. But that area, with lawai road and pe'e, how can you say you could relocate it? Seems like you need to build up other access areas. You spoke about emergency evacuation rights during private areas but the swell summer is the writing on the wall. It's throwing money at band aid solutions. But there is private property, so where do you scoot it over to? Or build up routes that do exist. Condemn the private property?

Group	Comments
	Miro Board: (by Hyatt) People were stuck if they lived by the Hyatt because they didn't have the bypass road and roads between Hyatt and Poipu beach were affected by sea level rise.
	Miro Board: If Public Works will remove the roads, then water will move water lines under roads. They would follow with PW, including sewer and some electrical. If Planning will allow development in certain areas, need to provide water to them. Water important for fire suppression.
	Miro Board: (poipu rd and hoowili rd intersection area) Filled in fishponds and ponds that was drainage section of Poipu beach.
	Miro Board: (Pe'e Road): Ruby: What should we do with this road? Protect it? Answer: How much does each cost? Should we protect the road or move it? Depends on lots of factors, including cost. Answer: How much will this affect our property taxes? Is there money available to do this? The whole state will have to deal with it. We can't just say "honolulu, give us $' need to factor in loss of property tax, GE, TAT" Answer: When they were repairing the road, you could get around other properties by going on Pe'e Road. Big fishing area. Putting a big wall there would not be a good thing for local people. Maybe we can make it a dead end.
	Miro Board: (Pee Road) This road might have to have other options considered in future bc its so close to the beach. Probably going to have to consider relocating access to that area. At least a section of the road always gets wiped out. It is the way it is because of how its been rebuilt at least twice. There is potential, but no matter what you do some will like and others wont.
	Miro Board: (Poipu Beach park area): Should do beach replenishment project
	Miro Board: (East end of poipu beach park area): Characteristic that gives Poipu it's name is by rocks where waves crash together.
	Miro Board: (Poipu Beach Park): Ruby: is having a beach here important? Answer: We need to protect Brennekes area but you could cut it off past Brennekes. Does require continual maintenance. We have to find sand, which is currently offshore, which got washed off during Iniki.
	Miro Board: (Poipu Beach Park) Need to consider impacts to reefs if doing beach replenishment (remember what is happening in West Maui)
	Miro Board: (Poipu Beach Park) Waves trying to wash out from under the road. Its inevitable that it will get washed out from underneath at some point. Can engineering prevent it?
	Miro Board: (Poipu Beach Park): Should we let it go and erode? Or keep it healthy?

Group	Comments
	Miro Board: (Poipu Beach Park) One potential option is to go back and get offshore sand and replenish beach (if community wants it)
	Miro Board: Take care of Poipu village... shouldn't have fallow AG land. Can they cover crop it with something less flammable. Will take resources to do it.
	Miro Board: What would be a good option for individuals who need to convert their cesspools? Discussions about 15 years ago and having a regional sewer plan. Take private systems from hotels and pump to regional systems. When economy fizzled, idea died down.
	Miro Board: Do packaged sewer system plans within communities. Decentralized, small system. Plus another group had system that you could process your own septic waste into garden. Wetland treatment system. But felt a bit untested. But maybe it's time if its going to cost you to replace, I would consider it.
	Miro Board: (Waita Reservoir) Waita Reservoir is critically endangered. The whole town of Koloa is just thin layer on top soil on top of ? acts like a shower drain and spreads. Needs to be mitigated because there will be a lot more water coming in and lot more groundwater that will displace the community.
	Miro Board: Need to plan for impacts to Lawai Road because of El Nino event during 2023-2024
	Miro Board: Royal Order has acquired 16 acres, County had to put road through land during last hurricane. Since then, Kukuiula has put development behind park, and they have road that goes off Western Bypass into Kukuiula, and that goes right to the houses they built on other side of the park. It wouldn't take too much for them to redirect drive to harbor. If road becomes threatened, this road could be used as alternative access.
	Miro Board: (Kukuiula SB Harbor) Underwater structuring walls in bay there from last SLR.
	Miro Board: (Koloa ahupuaa) Stream diversion in Omao has been going on for past 12-20 years
	Miro Board: Took water from point of Lawai nursery and sent through cannel that went to private pond and garden at Kukuiula. Had been allocated when they were doing cane, but they closed it. Ended up using state water for private operation. Water from Alexander dam taken from Kaua'i Coffee and now completely dry. Things like huleia stream were water was diverted to Waita and Wahiawa stream should be restored to the estuaries so we have more greenery and more trees. Nature-based solutions.
	Miro Board: Mitigation measures in Wahiawa related to south Kaua'i
Community Capacity	RAISING AWARENESS Front load community with skills PRE-DISASTER ~Teen Center: teach kids ~ get community to talk beforehand increase relationships ~ Block party: "meet your neighbor." ~Victory Gardens: (WWII) grow garden

Group	Comments
	RAISING AWARENESS (CONTINUED) Integrate into school systems/ curriculum ~Climate Ambassadors: youth leaders to spread awareness ~Need to address communication gap between adults and youth
	COMMUNITY RESOURCES ~Leverage farmers market: food resiliency ~Old cane roads as alternate transportation/routes ~Coordinate beforehand ~ Open to cyclists! ~Small grants to encourage backyard farming ~Strengthen neighborhood capacity ~Every school district have climate coordinator
	RESILIENCE HUB ~Water, food, power (off-grid energy system) ~Use EVs? ~Active in community pre-disaster ~Radio systems (local radio, hand radio) ~Resilience hubs talk to each other ~Communication channels ~Assess vulnerable communities (Kupuna)
	Look at Makauwahi Cave ~Need additional resources to protect native plants
	Community communication within neighborhood level
	Flat roofs as a quick, temporary safe spot (hotels, tourist industry, condos) in event of hurricane
	Resilience hub needs resilient design
	Bus transportation to move kupuna ~Elderly affairs + civil defense create mobilization plans
	Tunnel above Waita Reservoir Old cane road to go through eastern bypass and join highway (Waihopono lake: OG Hawaiian Community, 1897. Alanui before 1887 > public access).
	Grove Farm involvement!

Group	Comments
	Schools as a designated safe spot or churches ~Koloa NC, School, and church are in flood zone
	Fear of traffic/length of time needed to evacuate to resilience hub
	Kahili School and mountain park as a good Resilience Hub up mauka, Waikomo Park
	Consider resilience with no cars
	Remove stream diversions and comply with federal standards so it can reach estuaries and water native vegetation. (Huleia stream decreased due to Koloa reservoir)
	Wetland restoration
	Collaborate with community orgs
	Explore permitting process to make it easier to restore wetland
	Kekaha: wetland
	Debris in streams, whose kuleana to clean and manage
Comment Cards	Connect with https://hawaiibluewave.org
	Topic: Ocean Pollution As storms and flooding crease because of climate change I am concerned with runoff, into the ocean, particularly from septic and cesspools, that overflow/ flow at? with heavy rains. There are 10 new houses going in at ? Point Estates (developer- WEEKS) oceanfront and septic systems are approved in this very pristine (formerly?) area; which directly affects all the Poipu beaches, and therefore the very popular tourist businesses in the proximity. The health department signs off on these permits and said the requirements for septic are the same island wide- no differences for oceanfront. That should be updated and connected. I believe one closed system (to be pumped) or hookup to central sewers should be allowed.

West Side Workshop

Group	Comments
Exposed Private Properties: Managed Retreat	Kikiaola> Harbor is causing erosion… can we move it? County doesn't own the harbor
	Homes only last 60 years… so the free market will solve this once insurance premiums increase. It will price people out in the future. Therefor just allow people to live on the coast in the meanwhile. Don't legislate people's bad mistake.
	More concerned with threatened affordable housing. How will this impact vulnerable people like kupuna.
	Kaaina Hull- Consider a future where laws around seawalls change… that's why we need to be proactive.
	Groins along the coastal areas with sandy beach. They work very well to trap sand.
	T-Groins are a possible solution for harbor impacts.
	Groins could detrimentally change sand patterns and have downstream impacts.
	Think about the legacy… will there be local people left in the face of these impacts.
	We can't lose the culture of this place. Need to relocate communities around schools and people- preserve the local community.
	Hard choices for local people: slim pickings.
	We don't want to lose people > how will the next generation afford this?
	Why assume we have to move? Why can't we continue pumping flood water?
	Moving entire communities is not a viable option
	Q re: the levees @ Hanapepe and Waimea. What is the projection of SLR and projected year? Concern about inaccuracies in modelling.
	Concern about highway sinkholes already occurring and the 3.2 ft impacts will happen sooner than later.
	How will we move roads? Cost prohibitive.
	Why not put T-Groins along entire highway? Much more detailed assessment needed.
	All of the sand west of the harbor is already impacted by Kikiaola Harbor

Group	Comments
	As long as State protects highway… the mauka homes are protected… What about the makai homes? What is the problem we are trying to solve.
	KH- our beaches are threatened
	State sand replenishment in Kekaha- R. Kouchi?
	*Note to Marie: Questions about ST-CE and downzoning which requires public hearing for development- Chris Faye and Kaua would like copy of 2nd letter)
	Qs about real estate disclosure in SLR
	Lots of money spent on this project and studies… Why can't we invest in pumps which is less expensive than all the studies and staffing.
	Qs on Hanapepe levee and SLR Flood District Applicability to existing homes.
	Qs re: flooding within past 5 years outside of floodplain (100 or 500 year flood)
	Will the sewer system be increased??? Qs running sewer line from Waimea to Kekaha.
	Kaaina Hull- private property rights consideration and even condemnation requires compensation.
	Can the County afford compensation? Yes in limited amounts with limited # of properties.
	Hilo tsunamis… people moved. People have options.
	What do we save? What is causing the greatest harm- it is the landfill. Think of moving those facilities and structures that cause the greatest harm. Glass Beach is an example. Healthy land, healthy ocean, healthy food.
	Keep things safe.
	Qs on projections, can we double check assumptions? How was TEK (Traditional Ecological knowledge) used in the science?
	People should know and be aware of where they bought
	More $$ investment on education and aina-base thinking
	Why should millionaires get buyouts?
	Investment needs to make a big difference
	The Waimea river is running low
	Reduce unnecessary water diversions

Group	Comments
	Concern about creeping high water mark on coastal properties
	County needs to coordinate with State
	We want to see what we talk about. Implementation is important.
	How will our comments be used? We need to sit with the people who can help us.
	Concern about housing and athletic facilities are not updated- think of the kids and quality of life.
	Put local housing in the communities that need it.
	Are we meeting local housing needs?
	Why develop in potential new flood areas?
	Land swap question? What if the land isn't even flooded by 2100?
	Reforestation and plant trees in areas that need it to combat wildfire and prevent erosion. Wiliwili trees have been effective. Rain follows the forest…
	MAP: (@ KEKAHA) Sink holes in front Kekaha NC
	MAP: (@ LANDFILL) Relocate Kekaha Rubbish Dump
	MAP: (@ Hanapepe levee) Build higher levee in Hanapepe
	MAP: (@ mauka Waimea/kokee) Grow trees in Kokee and Waimea. Trees stop drought. Rain follows forest.
	MAP: (@ Waimea River) Waimea River drought
	MAP: (@ Small boat harbor) Remove Kekaha harbor
Exposed Infrastructure and Assets	Do NOT expand landfill, especially across the street. ~Public works exploring alternative site a mile west ~concern with longevity of landfill (i.e. Glass beach, negative impacts) ~potential contamination in freshwater systems ~DO NOT SUPPORT IN KEKAHA. ~ Kilauea Landfill accepted hazardous waste, which later transported to Kekaha
	Think about legacy solutions! (look at overall, holistic systems. Avoid Red Hill situations).
	Kekaha currently has GMO corn, landfill, disruption to fisheries

Group	Comments
	How did you look in the past to determine future projections? ~Past systems: Waimea and Mana Plains previously wet marsh land. Dried out due to the sugarcane production ~Need a solid foundation of past systems that existed. (Are waters really rising? or water is coming back?) ~Will provide a more holistic picture
	Past systems were sustainable
	Don't agree with seawalls
	Ahupua'a: north side should have their own dump. Each community responsible for their trash.
	Reefs are a public asset.
	Re-establish fishponds.
	Invest in natural systems
	Restoration
	Serious recycling! Look at C&D
	Hanapepe baseball field has an existing seawall. Long term impacts of seawall (sand, refraction of wave)
	Kahakai, Kahawai, ancestors recognized movement of oceans. Difficult to maintain a system that's not meant to be there.
	Look at mo'olelo to see where you can and cannot stay
	Community frustration ~Dept. and agencies who implement are not in the room. Community has to chase all different efforts, can be seen as strategic in pushing a specific agenda.
	Highway between that was rebuilt post-Iniki ~ Leave revetment in place and use t-head groin, in Kekaha similar to Pearl Harbor.
	PMRF pump systems between Hanapepe and Polihale. ~Other group members concern with the idea above.
	Hanapepe levee: should elevate. ~Levee will not protect against storm surge.

Group	Comments
	Drainage! Existing systems not maintained. COMPREHENSIVE WATERSHED MANAGEMENT ~Failing infrastructure ~ Look at existing ditches! ~ Challenges since multi-agency responsibilities
	Should add cost estimates for each implementation strategy.
	Why were levees built instead of just moving whole communities?
	Consider engineered solutions in the plan, not just NBS. ~everything is engineered when controlled.
	Don't use the word HARDENING.
	Need a diversity of solutions to build resiliency!
	Share feedback from other parts of the island.
Community Capacity	Year around access to resilience hubs ~Would increase community awareness. Re: Hazards and resources
	Is it reasonable to colocate emergency facilities @ existing facilities ~Cost implications
	Need for broadband access @ proposed resilience hubs
	Emergency food @ resilience hubs
	Many communities will still require 1 on 1 outreach and door-to-door services
	How does County increase awareness about hazards and resources to those not regularly plugged into media? ~Pre-planning to increase awareness before hazards occur ~Volunteer network to spread awareness (trusted individuals by specific community)
	Increase public events for educational efforts
	Support that help communities better prepare, respond, and recover from climate impacts
	Community composed of long-time residents are better prepared to support each other
	Tourists/new residents may not be as ready
	Increase awareness of what to do/where to go in emergencies
	Increase outreach at airports to communicate to tourists

Group	Comments
	Important to have kupuna outreach and other vulnerable populations
	Closely knit island, esp. west side vs. areas with increase % of newcomers
	Support training for emergency response groups and community liaisons
	Resilience hubs in community could be valuable communication/outreach center
	Never talk at someone, talk with them
	Whoever is talking needs to be passionate
	Small Group discussions
	Target individual communities. i.e. Schools, kupuna, in vulnerable areas
	Share videos at kiosks, dmv, etc.
	Combination of digital and in-person
	Visuals are useful
	Align w/CBOs to increase reach of communications
	Involve a diverse representation of CBOs, gov. partners, etc.
	Resilience hubs need to be resilient ~i.e. prep for comms issues ~ Cat. 5 hurricane resilient building
	How do we help vulnerable populations to weatherize homes? i.e. against heat waves ~how do we balance efforts with GHG emissions?
	Guidelines for development helps community ~i.e. SLR Setback, building standards, etc.
	Think about cost burden of adopting resilient bldg adaptations
	Communities could definitely improve our resiliency. I.e. economic impacts of recent pandemic
	Encourage AG-Production and available resources to build resiliency
	CoK needs to know which orgs exist and what they do to increase collaboration, support, etc.

Group	Comments
	Support inter-generational education/workshop type events to increase resiliency and relationship building. ~Should be place-based ~*Group learning and knowledge exchange
	Incentivize youth to get involved with climate discussions, plans, etc. I.e. poster contests
	Evacuation routes/receiving areas are not readily accessible to west side residents
	Resilience hub on west needs to be mauka and accessible by each kokee access roads. ~Need to work with state agencies as well
	Resilience hub needs to be maintained, esp. parking and access roads ~Congestion issues decrease efficacy of evacuation centers
	Transportation plans are critical ~KVMH, Schools, etc.
	Kilauea eruption in Puna highlighted problems with using schools as emergency shelters. Issues: location, ability to resume fxn, poor bldg and property, resiliency to hazards
	Hanapepe hub potentially on elevated land makai of highway, Hawaiian cemetery
	Need hubs where transportation issues with cutoff communities. I.e. bridges
	Hanapepe disaster preparedness plan
	First responders should be present at each hub
	Old days, plantations were very organized ~every community had their own plan and bigger business had a role to play
	Hubs should have enough space for temporary living. I.e. areas for households to camp post-disaster, utilities provided; Japan example
	*Need pre-disaster planning
	3-4 year process for Hanapepe to be recognized as HHARP community ~Disaster resilience fairs ~Community discussions
	Single-walled construction= very vulnerable

Group	Comments
	Few homes have disaster shelter on-site (if any) ~Incorporate "safe-rooms" @ homes ~pre-approved plans to retrofit a room or home
	Lack of official/ bona fide shelters
	Adaptations and resilience measures need to take multi-pronged approach ~Same with communication efforts and education
	Need gathering place for groups like HHARP during emergencies. I.e. Hanapepe-eleele HHARP loss mtg space during covid; national guard activated, state facilities closed to public
	Need multi-level, multi-agency communication and collaboration for effectiveness ~Include businesses, CBOs, etc.
	Incentivize community, CBOs, and businesses to obtain training
	Make training opportunities accessible and intriguing to community sub-groups
	Training opportunities can increase relationship bldg access communities
	Need to build social infrastructure
	Build relationships and identify places for community education. I.e. Marine center at Kukui Grove
	Place-specific list of resources. I.e. who has 4x4, who has tractor, etc..
	Need better/reliable communication channels. I.e. power outage, broadband down > and no updates
	Utilize public infrastructure to improve awareness; i.e. informational signage ~Permanent evacuation routes that're clearly identifiable
	Need a plan for if/when O'ahu gets hit ~Pay extra attention to communities furthest away and most vulnerable to being cut-off from central kauai
	Resilience hubs have potential to be more than emergency center, but could also do much to build community
Comment Cards	1) Last 40 years with big rains water comes from Ele'ele down the hill/road and onto Puna Road (Hanapepe town) and floods Stanly Sakoda's Yard and our driveway. Appears the existing drainage system is not working. 2) How can I be updated and support the rebuilding/increase height to Hanapepe levees Think needed to increase by 3 feet

East Side Workshop

Group	Comments
Exposed Private Properties: Managed Retreat	Q: How does County deal with State Hwy? KH: They hold their own community processes. I.e. Wailua Sand savers
	Areas of flooding and concern> Coconut Marketplace and by Cocopalms
	Some insurance companies will give insurance but many wont give that SLR flood insurance
	Not one size fits all
	Look where dunes are for dune restoration
	Sand Replenishment ~KH: Waikiki sand restoration ~Kauai Kailani sand replenishment ~Soft strategies (i.e. sand replenishment) should County pay or private property? ~Community- depends on situation ~Kauai Kailani dredged ~ Sand replenishment not sustainable and needs to be done again> County should not pay ~What about a beach we use a lot? Kealia? ~Where will the sand come from? ~Needs to be collaborative and regional ~Business improvement district > community taxed higher rate to replenish their sand. ~Gift to public funds not good approach (1). County has historically gone out of the way to assist. i.e. pono kai and Moana kai ~Sand catchment and maintenance very $$$
	~Equitable use of regulation. Shouldn't say something is okay in one area and not another. ~KH: State used to permit seawalls > erosion impact and permanently impact beachfront beyond property. Option of seawall no longer an option
	TDR ~(1) No appetite for TDR AG idea ~KH: County obliged to give some development right to vulnerable property ~Residential for TDR ~Salt water intrusion of taro in Hule'ia > do not want to bail out millionaires and not farmers

	County cognitive dissonance with ways in which they permit
	Consider downzoning along coastline?
	Need incentive/carrot to entice ppl to voluntarily move.
	Preserve beach > loosing property > loose access to beach
	Oceanit did a good job with Kauai Kailani
	Want uniform enforcement (1)
	Civil Beat: FEMA fund> HI does not qualify for FEMA funds bc. bldg code upgrade needed KH: debate on cost of living n union side. Should know in a year ~Not in seismic area like California
	Greater setback KH: There are disclosure waivers
	Long-term> life span of structure Near term> next 5 years or so
	Soft mitigation (dune restoration, sand capturing) ~yes want> huge appetite ~addresses the root issue > degraded ecosystem. Exposed to climate changes and changes we made (i.e. sugar plantation). Fixes historic problems.
	Need to be regional
	Beach for public
	Who should pay (sand replenishment)? County subsidize or private property? ~Waikiki can afford it. ~Usually on an emergency basis and not pre-planned ~Koloa and Hanalei may be able to afford this. Pay for public areas not private
	Coastal mitigation planting incentives and process for community.
	Private landowners- dune restoration project. OCCL
	Resources for dune restoration: Limahuli. NTBG. Indigenous plants
	Buyout- Open Space Acquisition Fund > can afford 1 or 2 properties
	Dune restoration needs to work with State
	Use funds for other adaptation because managed retreat $$$
	Concern managed retreat because of cost

	Need to be strategic. Severely vulnerable properties, like the 450 units
	Land Swap ~Case by case? Depends. Think equity. Prioritize vulnerable populations ~Good idea > land swaps and prepare for it. Bank of land for various reasons.
	In TDR what about remaining home/structures?
	Have coastal areas not be residential> have more green space
	TDR AG idea ~ equity concerns ~(1) no ~greater scarcity AG land, harder to farm. Food sustainability. Zone areas in AG land to be denser. Rethink the AG zoning and make other AG land more affordable
	Want uniform enforcement (1)
	MAP: (behind Cocopalms) kalo and rice inundation
	MAP: (Moana kai) After Iniki> no fit
Exposed Infrastructure and Assets	?Why WAIMEA Police substation relocated to the flood zone? ~Consider where emergency responders should be located
	Info from DOT and PW: Wailua Bridge - pile on ~Beach: Using a rock revetment and NBS (dunes, vegetation, sand savers) ~all infrastructure will be tied to land use. County: Aliomanu Rd and other low-lying roads
	Highway is the issue! ~Need to start with roads for access. ~"If we lose the road, we lose the island." ~Focus on the bridge.
	Also focus on low-lying roads. Important for local travel and potential retreat access roads ~Challenge to focus on highway and bridge since under State's purview
	Kapa'a pool. Why renovate in place when in flood zone?
	Aliomanu Rd: Considered different alternatives but challenges (land use, DHHL restrictions)
	Bike path, Library, Police Station, Community Center

	Question/Concern of scope since whole of Kapaa is in the flood zone. It's a big picture
	Beach nourishment is expensive but potential impacts and damage might outweigh initial costs. Cost benefits
	Focus fundraising, everyone wants to save the bike path but who will pay? (grant writers and project manager)
	State highways around the island will NOT work
	Money is a big issue, most DOT rebuilding projects (i.e. North Side)where funded by feds after an emergency. No $$ to be proactive
	Explore old cane roads as alternative route
	DOT currently assessing most vulnerable parts of the highway to prioritize/focus
	Need to ask vulnerable groups (i.e. keiki) on assets they want to protect
	Library, park
	Access for all: need to center equity who are the groups that aren't loud?
	Bus stops: who takes the bus?
	Shelters that are in the flood zone
	Wetlands in back of kapaa
	Sand savers: pilot projects in great lakes, Africa ~Skeptical on results ~How to indicate success and when to remove sand savers? ~Concern with microplastics from sand savers
	To fix the dune, you need to keep people off them.
	Concern with septic, cesspool ~Should plan for sewage expansion ~Aerobic system ~ Do right thing now
	Reservoir ~farmer ~post-hazard: can provide fresh water

	Building infrastructure ~promote EV-Ready to assist transition ~Not enough public EV chargers ~Sewage, electricity, water
	Miami: raised highways, add pumps ~Relocate critical infrastructure. ~funding constraints from DOT
	Need to update building code to access federal funding.
Community Capacity	Where and how are county agencies working to increases communities' climate literacy?
	Work with airports to increase education and messaging to visitors ~Climate/hazard awareness ~Volunteer opportunities on island ~New Zealand and Patagonia examples. Re: visitor messaging @ airports
	Find community events and spaces that may be opportunities ~For education/outreach, especially for vulnerable populations ~i.e. food pantry pickups, 2nd hand stores, churches, community organization champions
	Build CERTs and similar community organizations
	Space/structure for resilience hubs with Food systems infrastructure. I.e. gardens, wind tolerant fruit trees, etc. (dome structures)
	Ask different questions to better understand why certain approaches don't work ~RE: Outreach, getting community members to "show up"
	Increase civic education/awareness
	Reservoir decommission
	Building code updates - Affordable housing challenges: Federal funds) BRIC
	Reducing infrastructure costs
Comment Cards	Please insist on E.I.S. and public hearings before moving forward on "sand savers"
	Just grateful for this meeting the knowledge and open forum to discuss. Niki and Alan were great and I really appreciate the effort that went into putting this series of events. As an outsider I was impressed and interested in concerns and comments and left with new knowledge. Thank you!
	Civil beat article from Aug, 3, 2022 "Hawaii is the only state not seeking Federal buyouts to move residents away from floods." by Paula Dobbyn

North Shore Workshop

Group	Comments
Exposed Private Properties: Managed Retreat	RE: Soft approaches (i.e. dune restoration, sand nourishment) ~If you put sand, still preventing sand from going landward> detrimental to beach. Artificially preserving beach ~ Beach is public trust> prioritize ~(1Do not rely on sand pushing ~Not good in high wave environment ~Sand catchment> can preserve in one area at potential detriment to other areas ~Even if there is a desire, in high wave environment it doesn't work. Very different context than Waikiki> not effective in North Shore ~nourishment artificially preserving beach ~do not be reactionary like Waikiki
	RE: Land Swap ~Equity. What if its a $$$ home or a vacation rental? ~In 50 years changes in land values as climate changes ~Cultural significance of mauka> must be conscious ~Economic value of houses doesn't align with risk ~Lack of land in North Shore
	Value of beaches more important than private properties
	County needs to ensure structures are taken out before falls in
	TDR AG ~Would it be a way for rich people to get more $$$? ~System based on income? ~From a zoning perspective cannot do this
	RE: Land Swap ~Where would the County $$$ come from? ~KH: Have to facilitate acquisition
	Plans for after disaster is important
	Downzoning? ~Yes!

Group	Comments
	How can we (County) support livelihoods? Be very conscious about moving needle forward on EQUITY!
	Concern (W)anini Rd
	Rezoning some of AG land(1)
	Downzone(1)
	Soft approaches (i.e. dune restoration and nourishment) ~veg planting backyard ~education to homeowners for dune restoration ~Ha'ena and visitor destination zones prioritize looking into ~natural remedies prioritize ~ If land undeveloped, leave undeveloped ~driving and parking on sand an issue
	Land Swap ~Checkerboard effect ~prioritize properties not developed yet
	Downzoning? ~Yes!
	FEMA does not want to keep insuring
	retreat is inevitable
	careful who and why > condemnation
	Soft approaches good but worry about soft approaches to protect development> prioritize retreat to have coastal system
	Hui Makaainana o Makana> plan to restore dunes ~need to remove ironwoods
	property owners (Haena/Waikoko side) know they'll have to move
	private property owner observation> water came up where model shows
	Grove Farm, Weinberg as part of TDR program? ~KH: Sitting on high density rights

Group	Comments
	TDR AG ~Yes! (handful of people) ~Always a tradeoff ~concern> attract wrong kind of buyer
	Waipa and Waikoko concerning
	want more TVR crackdown
Exposed Infrastructure and Assets	?Drilling: Concerns with drilling and potential saltwater intrusion ~DOW wells are high elevation ~private wells? large, wealthy owners have their own wells
	Water catchment: not in DOW purview.
	Presence of cesspool and current wastewater system- fear it'll be a large toilet. ~challenge to look at soil treatment considering water table and SLR (REQ:: 3 feet below bottom of leech field) ~Hanalei initiative exploring solutions (pros and cons of potential options) ~Also an issue for businesses ~Kilauea needs a sewage system! ~Directly related to stormwater system
	Infrastructure challenges Coastal Roads: ~Want to see examples and post options online ~Waikoko: moving road would bring it to a lower lying area ~Kaaawa (Oahu): if move road inland, will infringe on private property. ~Want to see potential costs of NBS solutions
	Is there another way across the island? ~ferry system ~alternative river crossings that might go into refuge land ~Need to work with FEDS!
	Climate Model Data GAP: captured in plans of Hanalei watershed (places that will be isolated… stories from kupuna) ~Wainiha Vulnerability study

Group	Comments
	1960s Hanalei wildfire ~Reason for lack of native plants
	Native Birds (i.e. Hawaiian ducks) ~should be a protected asset
	Hanalei Road is a historic road ~Entire Hanalei Town is in flood zone, nothing can change that. ~Development structure needs to be relocated
	Triggers ~funding availability ~wastewater facility relocation ~beach parks should stay
	Connect to Princeville wastewater system as an option ~this was on the table when area was rezoned from AG > VDA. County reneged on idea when saw the costs. ~Directional drilling might impact iwi kupuna
	Remove hau bush? ~potential impacts on flow of river ~Look at hydrology study from water hui
	Waikoko/old middles parking lot ~any identified life spans? ~can last until next disaster
	Look at "Quick fixes" after a disaster and federal funding since DOT circumvents public process.
	Causeways @ Waikoko but where does it end? ~Two Sag points on the road ~Need large beams/piers every 15 ft. ~Goes back to issue of bones
	Watershed restoration with native vegetation in upper hanalei near the river to alleviate flooding.
	Jet skis for all!
Community Capacity	Interest in C.E.R.T. type programs and getting connected to CBOs that liaise with community and gov. response agencies

Group	Comments
	Funding for CERT programs to improve long-term training opportunities
	Hanalei to Haena resilience team
	Build relationships and keep ongoing communication with community members that have strong relationship/trust
	Explore in-place representations of flood lines and projected waterlines ~Hilo example for SLR-XA data
	Beach loss impacts more than recreation ~Fishing access, etc.
	Increase affordable housing developments ~site outside areas projected to face increase risks
	Increase public transit
	Improve communication strategies before during and after disaster ~Education on using hand radio
	Subsidizing weatherization of homes to protect vulnerable community members
	Increase access and resources for people developing solar
	Cost-share with CBOs to help pay for software,subscriptions, etc. that are critical to CBOs ability to function and be in partnership with local gov
	Improve quick access to capital ~Work with orgs to proactively plan for disaster response funding programs
	RE: resilience hubs> anaina hou hub as good example
	Monolithic domes > hurricane resistance
	R-hub include shelter, food, medical supplies. Helipad, etc.
	Be prepared to go after federal funding opportunities
	Gender neutral restrooms @ resilience facilities
	Need more shelters to meet capacity needs of communities
	Garden/Food security measures @ R-Hubs
	Establish trails to move up mauka in response to flood/tsunami
	Increase visible physical signage

Group	Comments
	Improve data visualization tools to communicate with community ~3D visualizations ~ESRI/ArcGIS Tools
	Explore Opportunities @ Existing facilities ~i.e. exhibits that showcase tech/data visualizations, mobile installations, pop-ups@ community events
	Share information in "bit sized" pieces so as not to overwhelm
	Is CoK interested in exploring social-behavioral change campaigns/strategies?> Development of strategies improves efficacy of efforts
	Towers, ladders to roofs for immediate flood/tsunami threats esp. if roads are clogged or inaccessible
	R-Hubs and Centers should be outside tsunami zones
	Power, storage, food prep, shelter, healthcare supplies, communications, battery/Gas
	~Ability to expand facility and infrastructure
	Potable water, H20 Catchment and Filtration systems
	Gathering space, Naue example > maintained
	Storage space for response materials
	Mail, medication receiving and distribution capacity and strategies in place