

KAUA'I CLIMATE ADAPTATION PLAN: ADAPTATION STRATEGY WORKSHOP

May 10, 2023 | 5:00 – 7:00 PM



Voluntary Anonymous Poll

We use demographic information to ensure participation is representative.



WELCOME

Marie Williams
Manager, Long Range Planning



Workshop Overview

Agenda

5:00 to 5:05: Welcome

5:05 to 5:45: Presentation

5:45 to 6:15: Large group discussion

6:15 to 6:50: Small group discussions in Breakout Rooms

6:50 to 7:00: Report Out



We want to hear from you!

- Your personal experience and expertise will complement the technical work and the County's institutional knowledge
- Your feedback will be used to refine and prioritize strategies

To Inform the Draft Climate Adaptation Plan



Presentation Overview

- What is the Climate Adaptation Plan (KCAP)?
- Adaptation Strategies Overview

For more information and to sign up for updates:

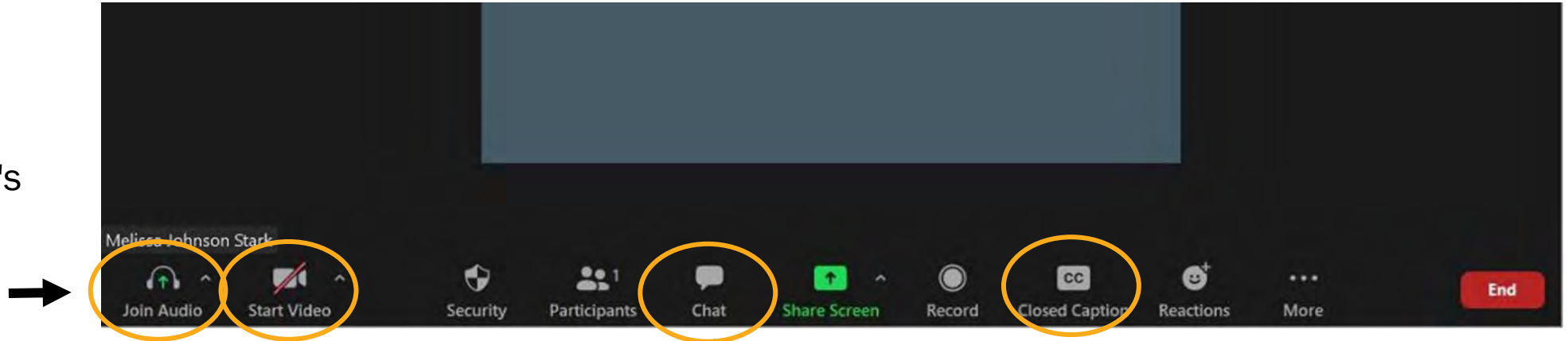
kauaiadaptation.com



Zoom Basics

Two options to join audio:

1. Use your device's audio
2. Call in using a cell phone



Please **mute** your audio unless a facilitator invites you to unmute.

You can turn your video on if you are comfortable

Type in the chat if you have comments, questions, or need help

Closed Captioning is available

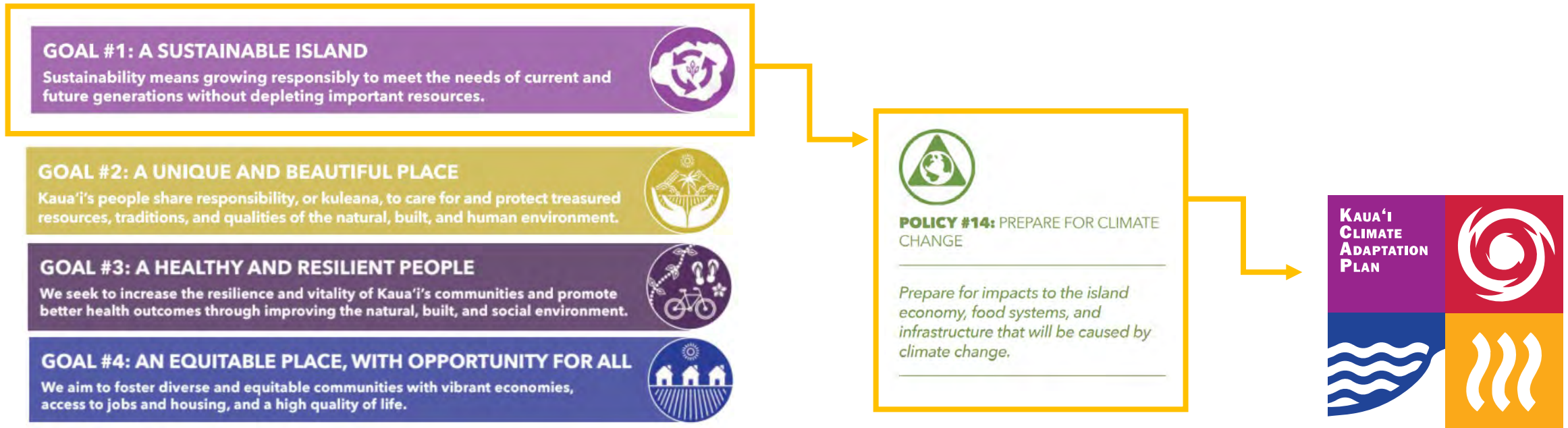
Help email:
sami@raimiassociates.com

What is the Climate Adaptation Plan (KCAP)?



Why do we need the KCAP?

The Kaua'i Climate Adaptation Plan (KCAP) implements the General Plan (GP) framework for a resilient island.



MITIGATION

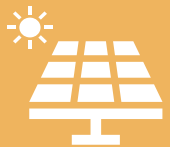
Actions that are taken to curb greenhouse gas emissions.



Low carbon transportation



Waste reduction & management



Renewable energy

ADAPTATION

Actions to reduce vulnerability to the effects of climate change



Prepare for sea level rise



Prepare for extreme heat



Emergency preparedness & response

RESILIENCE

Actions that increase the community's capacity to prepare, recover from, and grow from shocks and stressors.



Food system



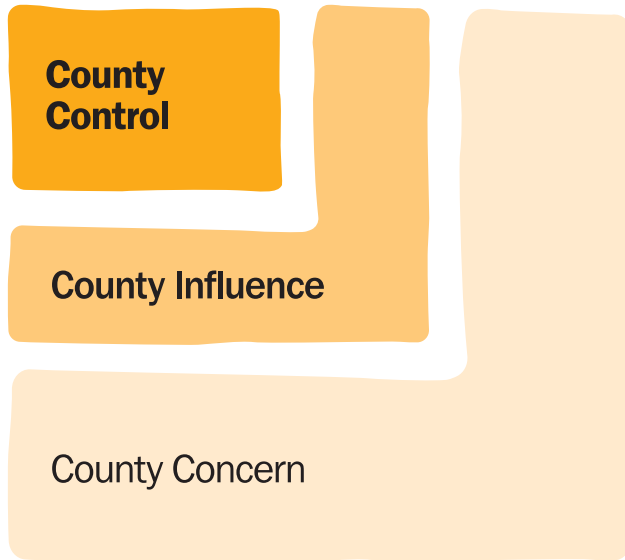
Affordable housing



Social cohesion

What is the purpose of the KCAP?

KCAP SCOPE

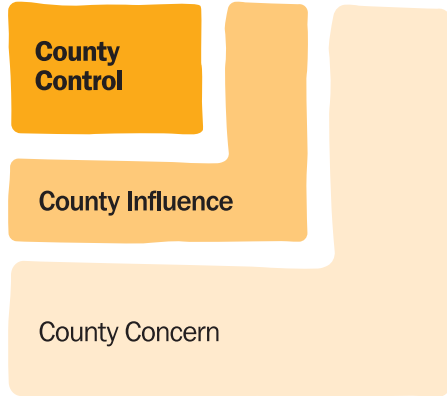


The KCAP will provide a **framework of strategies and actions** to ensure people, places, and natural and built systems are able to adapt to climate change impacts.

The KCAP will **guide County** actions to address climate change vulnerabilities with the tools within County jurisdiction, including land use policy, infrastructure improvements, department programs, and budgets.

What can the KCAP Address?

KCAP SCOPE



County Control

- County Facilities (parks, neighborhood centers, etc.)
- County Infrastructure (Water, Wastewater)
- County Roads
- Land Use

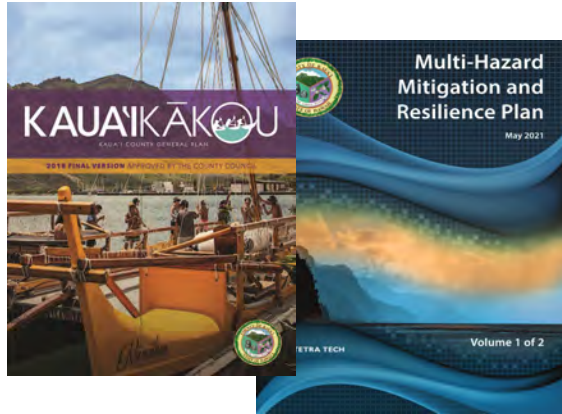


County Concern

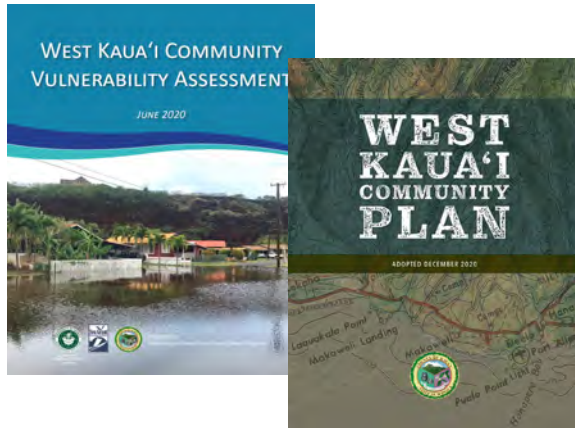
- Community Capacity
- Cultural Resources
- Drainage
- Hotels
- Beaches
- Private Buildings
- Homes and TVRs
- Agricultural Land
- State Highways + Bridges
- Harbors



Relationship to other County Plans



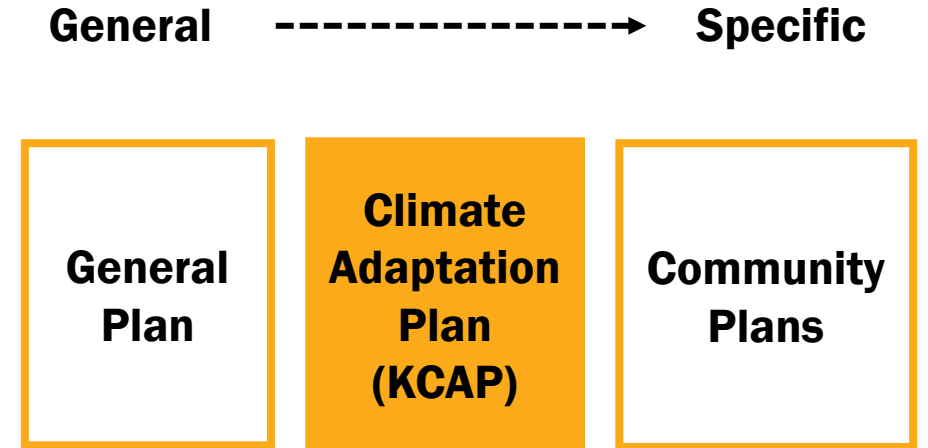
- Plans that guide the KCAP:
 - General Plan: Overall framework for a resilient island
 - Multi-Hazard Mitigation and Resilience Plan (MHRMP): Focuses on emergency management
- Plans that the KCAP will influence*:
 - Community Vulnerability Assessments: Planning Area scale climate vulnerability assessments that will include more place-based, site-specific vulnerability analysis
 - Community Plans: Planning Area plans that will apply the KCAP strategies in a local context



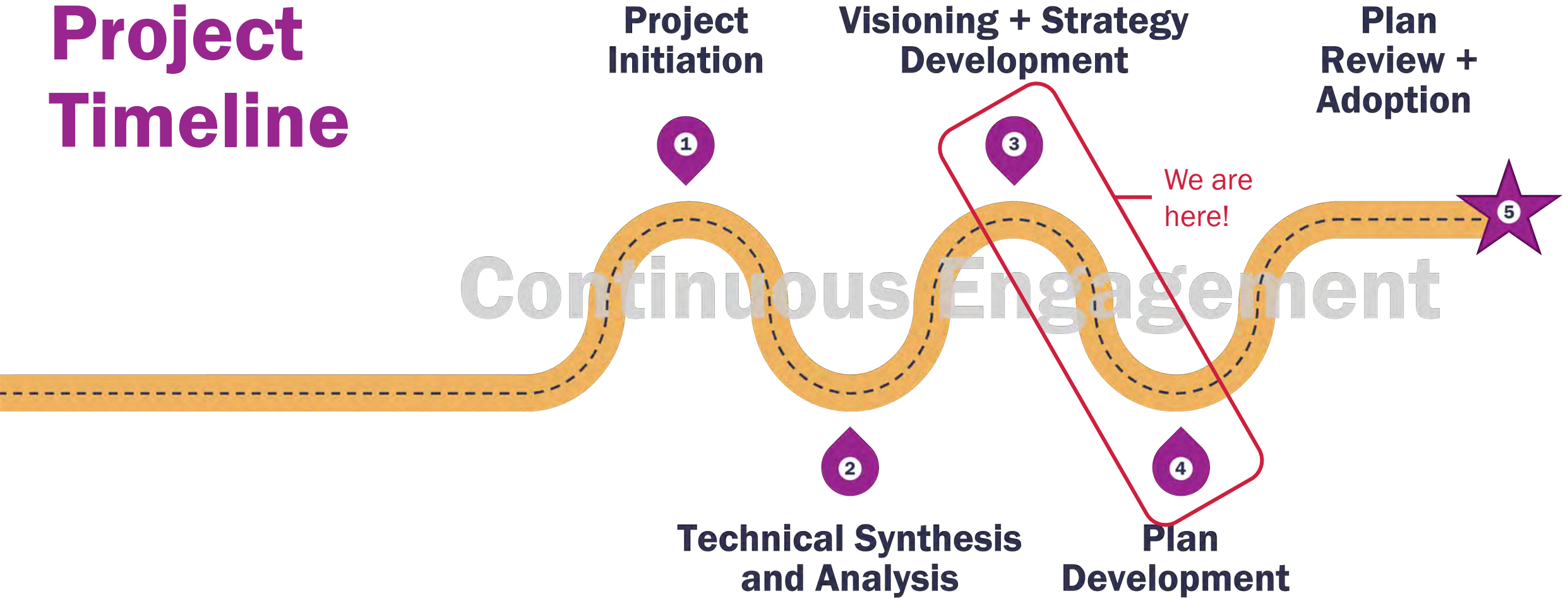
*West Kauai has completed these prior to the KCAP

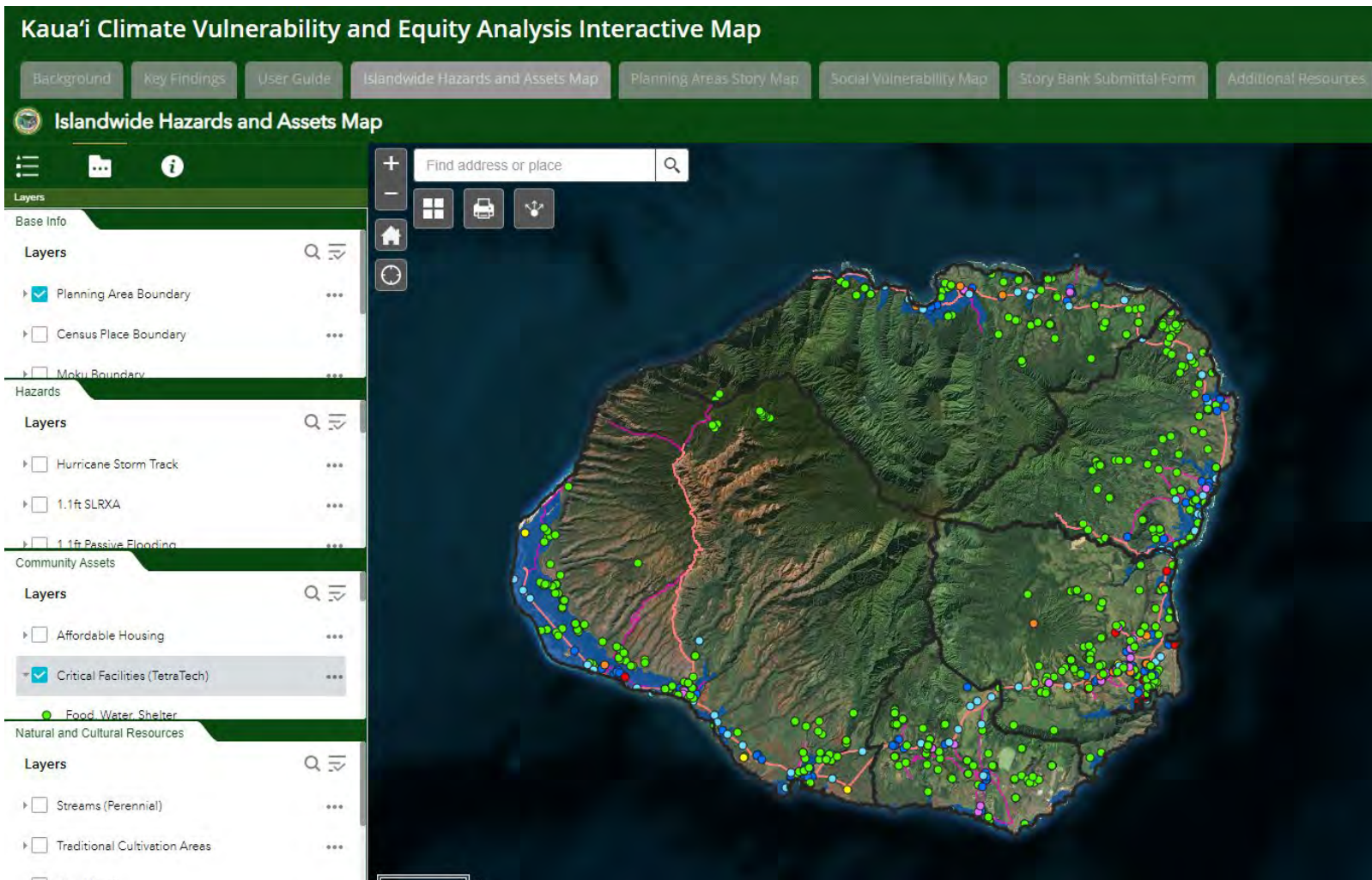
KCAP Scope and Focus

- *KCAP will not detail specific changes in land use regulation, infrastructure, or facilities.*
- Some strategies and actions will have island wide application.
 - KCAP will note where they apply.
- The KCAP will also identify specific, hot-spot vulnerable assets to inform future community vulnerability assessments and plans.



Project Timeline





<https://kauaiadaptati.on.com/impacts/>

Can also be viewed on the County GIS Portal:
<https://kuaigis.maps.arcgis.com/apps/MapSeries/index.html?appid=b09b3f250d7c4288b6cb696ca1d3b293>



Outreach and Engagement

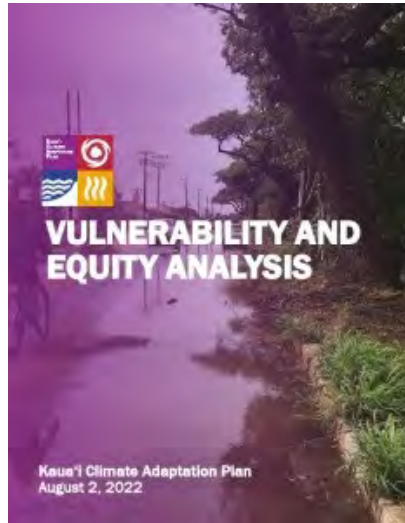
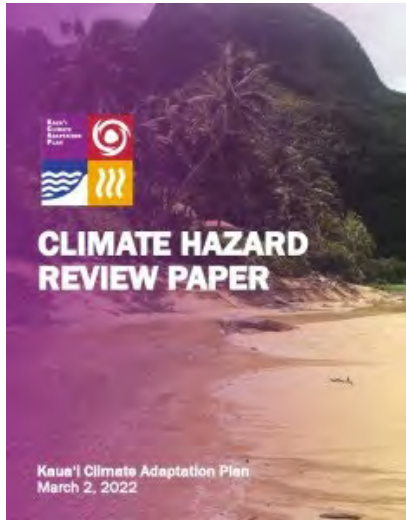
Completed to date:

- Stakeholder interviews and talk stories
- Community Pop-ups
- Open houses (Virtual and In-person)
- Community survey
- Youth Summit and classroom activities
- Department and Agency Check-ins
- Story Bank (ongoing)



<https://kauaiadaptation.com/>

Phase Two Reports



Read them at <https://kauiaadaptation.com/climate-adaptation-plan-documents/>



What Hazards on Kaua'i are Being Worsened due to Climate Change?



Adaptation Strategies



Methodology to Identify Strategies

Existing Plans, Studies, & Policies

What plans, policies, and strategies are in use?

- County plans and analyses
- State plans and analyses
- National and international “best practices”



Exposures & Vulnerabilities

What places and assets are vulnerable to hazards?

- Climate hazard exposures
- Social vulnerability to climate hazards
- Vulnerable assets (public, private, natural resource, cultural, etc.)
- Community input



County Jurisdiction

What can the County do?

- Existing policies and programs that can be modified
- New policies and programs that can be created



Strategy Types

- **Physical Assets:** Policies, programs, and physical interventions to make assets (built and natural) less vulnerable to the impacts of climate change
- **Laulima:** Changes in how we operate, collaborate, and plan for the future

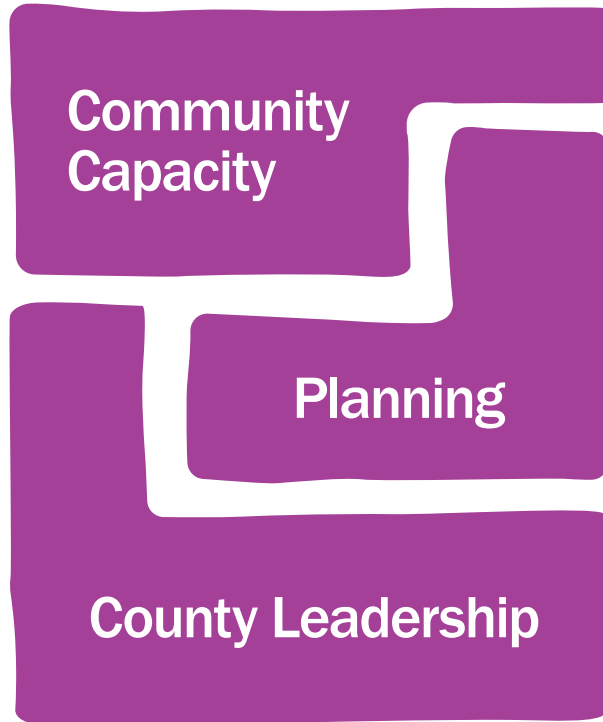
PHYSICAL ASSETS



LAULIMA



LAULIMA



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



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.

PLANNING

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



Climate Data Support studies that monitor climate hazards and inform and improve adaptation decision-making.

Site-Specific Vulnerability Assessments Conduct vulnerability assessments of County facilities, such as County roads, wastewater treatment plants, County parks, and civic facilities.

Disaster Recovery Plan Prepare a plan that establishes land use and other policies and recovery procedures that apply to areas impacted by disasters.

COUNTY LEADERSHIP

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



Collaborate Continue to coordinate with State agencies, utilities, and other local and regional partners to align climate adaptation efforts.

Climate Adaptation Staff Establish and fund a permanent climate adaptation and equity planner to monitor and track implementation of adaptation strategies.

Climate Funding Establish funding and financing for climate adaptation.



PHYSICAL ASSETS



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



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.

MAJOR ASSET ALTERATION

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

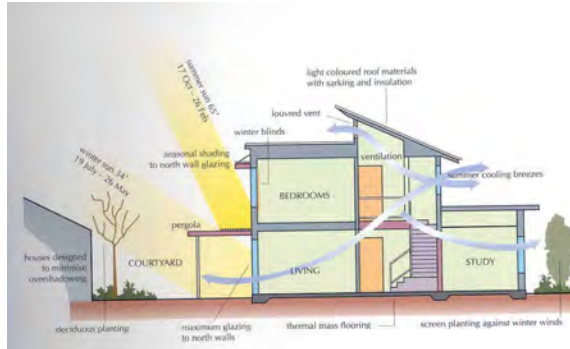


Relocate Critical Facilities Relocate or build new critical facilities and infrastructure as needed based on findings of site-specific assessments. Could include assets like County buildings, roads, and water and wastewater treatment plants.



RESILIENT DEVELOPMENT – LAND USE

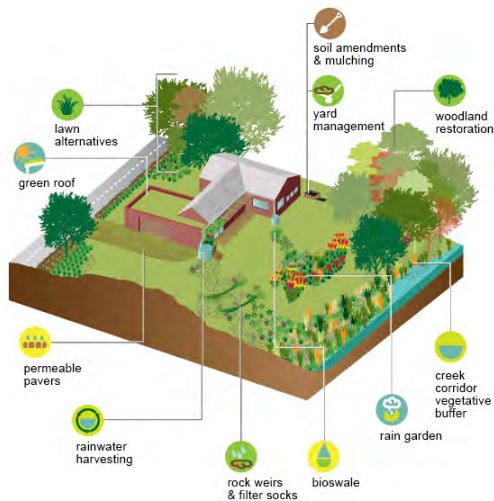
Strategies to direct future development away from places most impacted by climate change and that ensure future structures better withstand impacts



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).

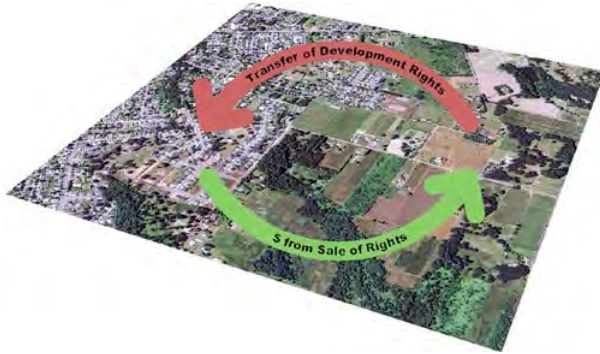
Resilient site design and development standards Implement standards to buffer structures from flood and fire risks, capture rainfall on-site, reduce heat, and otherwise reduce vulnerability to climate change impacts.

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.



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



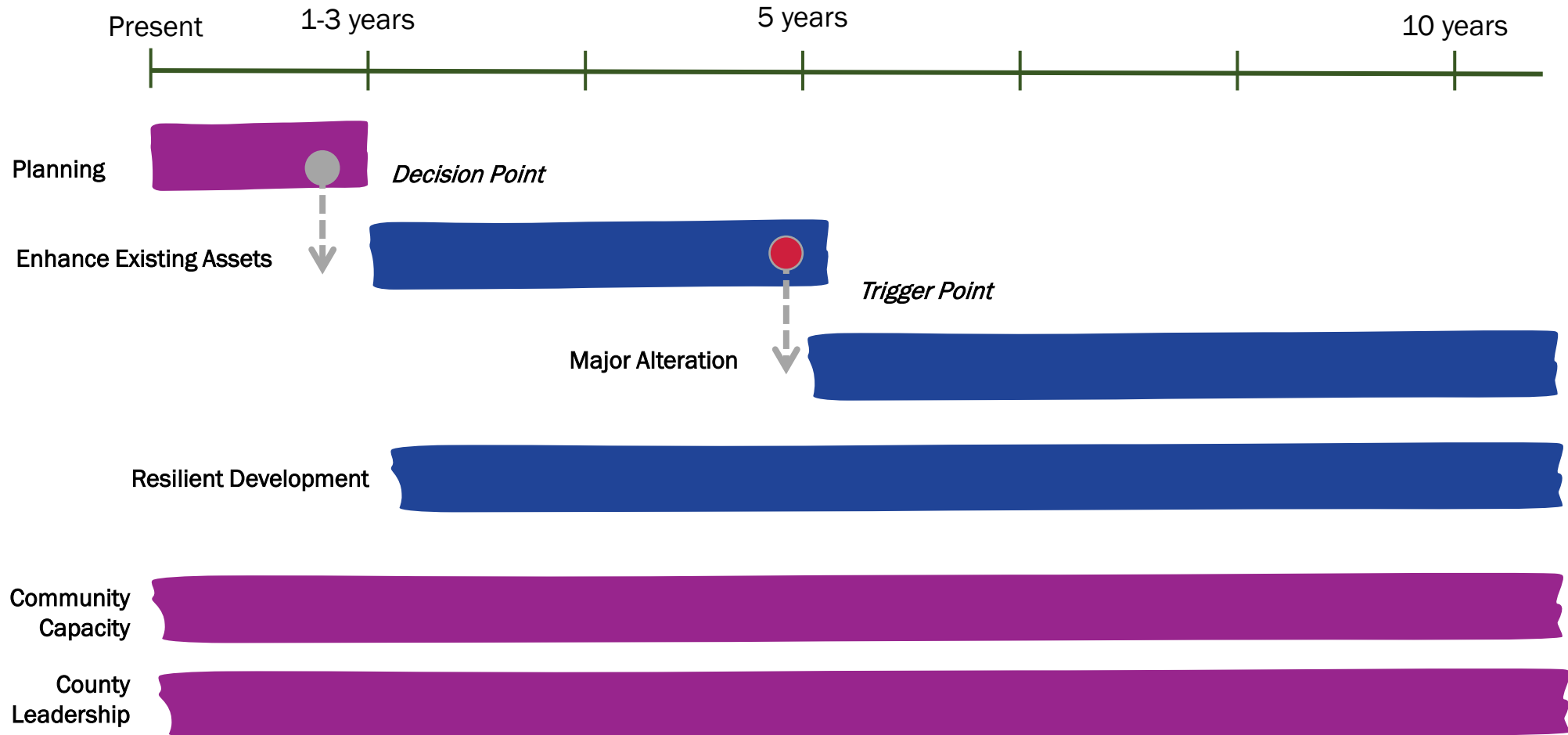
Land Swap Facilitate the exchange or “swap” of title to land between two or more property owners.

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.

Adaptation “Pathways” Approach



- Lailima Strategy
- Physical Strategy
- Decision Point
- Trigger Point: Needs Feedback



Community Experience & Expertise Needed

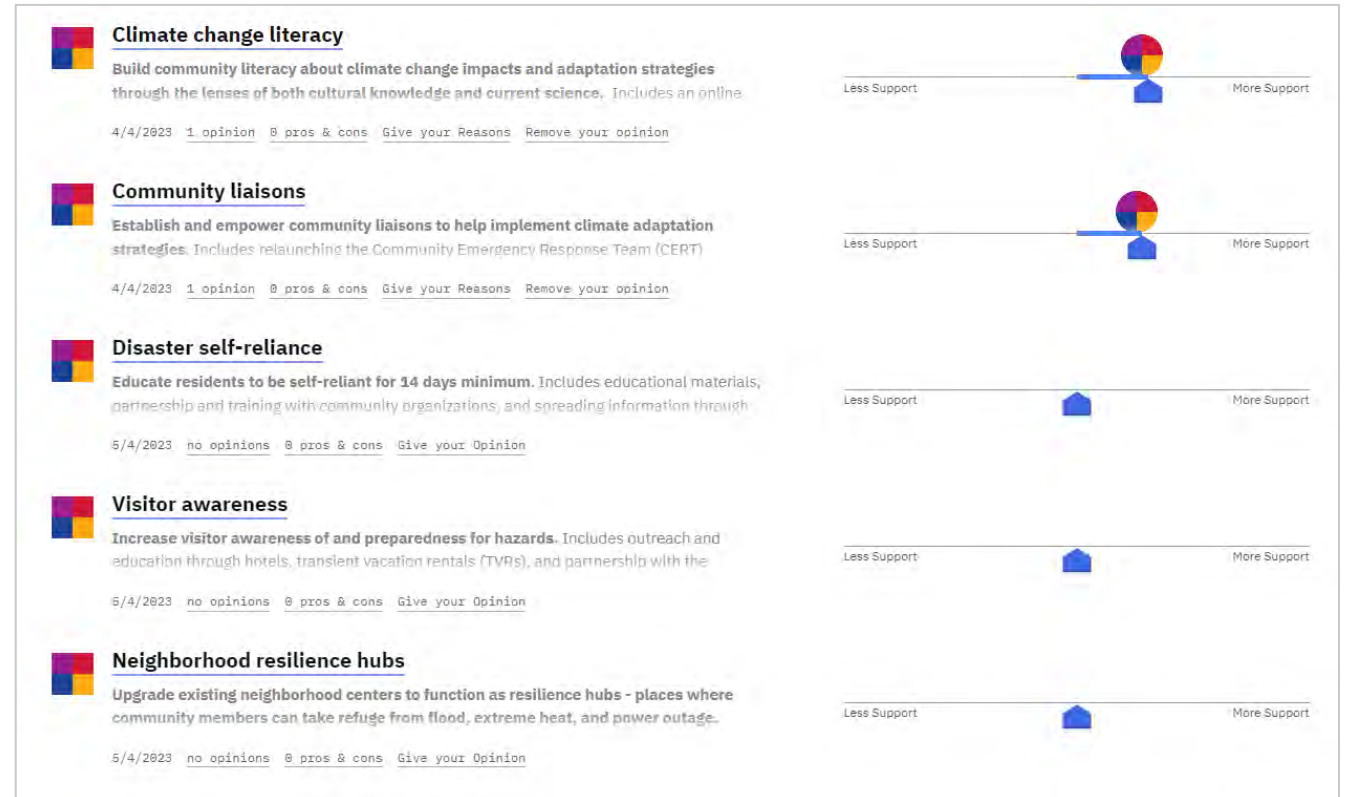


Adaptation Strategy Poll

Rate and comment on a possible adaptation strategies at:

kauaiadaptation.consider.it

Open May 10 – June 21



In-Person Workshops

In-Person Workshops

A light vegan dinner is provided! Bring your family!

**Līhu'e Civic Center
Moikeha Building
Conference Room 2**

Date & Time
Wed. May 17, 2023
5:00–7:00 PM

**Kōloa
Neighborhood Center**

Date & Time
Thurs. Jun. 1, 2023
5:00–7:00 PM

**Waimea
Neighborhood Center**

Date & Time
Tues. Jun. 6, 2023
5:00–7:00 PM

**St. Catherine
School (Kapa'a)**

Date & Time
Tues. Jun. 13, 2023
5:00–7:00 PM

**Hanalei
Elementary School**

Date & Time
Thurs. Jun. 15, 2023
5:00–7:00 PM

Discussion Topics

We need your feedback on strategies and actions:

- **Large Group: Resilient Development** (managed retreat)
- **Small Groups:**
 - **Enhancing Assets** (nature-based solutions)
 - **Asset Alteration** (protection, relocation)



Public Assets Strategies



Related Existing Policies



Nature-Based Solutions

Enhance
Existing
Assets

- Seek to **preserve natural beach processes** and avoid the construction of shoreline protection structures. (GP)
- Promote **strategic beach nourishment** in public use areas. (GP)
- Review and update drainage regulations and the drainage constraint district to incorporate and **encourage green infrastructure** concepts. (GP)
- Utilize **green infrastructure** concepts and best management practices in County projects. (GP)

Improving Public Facilities

Enhance
Existing
Assets

- In accordance with Hawai'i State Planning Act Priority Guidelines, **consider multiple scenarios of SLR** and associated flooding, wave inundation, and erosion impacts when developing and approving **capital improvement projects**. (GP)

Related Existing Policies



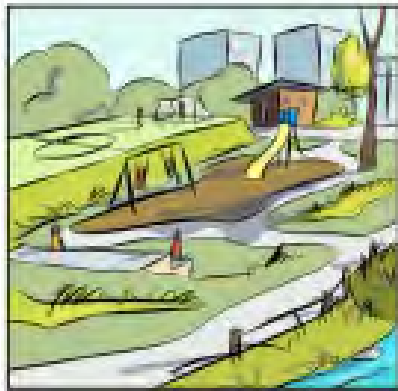
Assessment and Planning for Public Facilities

Planning

- Continue **assessing the vulnerability of critical assets using the best available science**, and support the **development of vulnerability assessments** specific to wastewater, roads, and other **critical assets**. (MHMRP)
- Assess hardening needs and develop implementation plans for critical infrastructure. (MHMRP)

What are nature-based solutions?

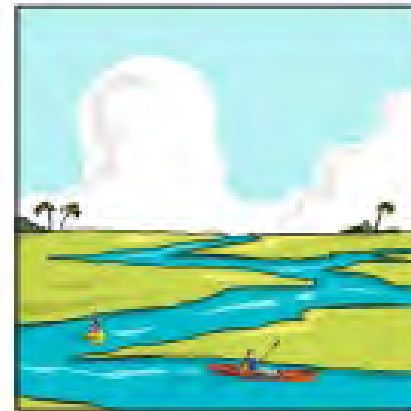
“Planning, design, environmental management, and engineering practices that weave natural features or processes into the built environment to build more resilient communities.” (FEMA)



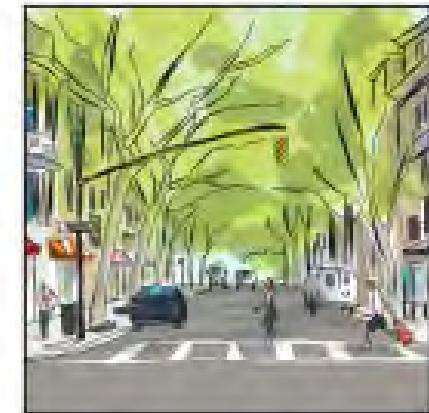
Parks that absorb coastal or inland floodwaters



Dune restoration



Coastal wetland restoration



Urban forestry/tree canopy

<https://www.fema.gov/emergency-managers/risk-management/nature-based-solutions>

Examples of Nature-Based Solutions



Wetland Restoration at Waiohuli kai, Maui

Source: Waiohuli Kai Stream - MauiWatersheds.org



Hawai'i Convention Center 'Intensive' Green Roof (above)

Volunteer tree planting (upper right); Source: Sari Pastore, [Climate Action Coalition takes action to sequester carbon - The Garden Island](#)



Dune restoration at Lower Pā'ia Park, Maui (lower right)

STRATEGY CHARACTERISTICS

Type	Laulima or Physical Asset strategy type
Time	When the strategy should begin implementation
Cost	Potential per-unit (if applicable) and total cost
Funding Sources	Where the money for the County to implement the strategy may come from
Potential Co-Benefits	Additional environmental or social benefits created

Community Capacity, Planning, County Leadership, Enhance Existing Assets, Major Asset Alteration, Resilient Development

1-3 years, 3-5 years, 5-10 years

Cost Magnitude	Range
\$	<\$100k
\$\$	\$100k - \$1M
\$\$\$	\$1M - \$10M
\$\$\$\$	\$10M - \$100M
\$\$\$\$\$	> \$100M

Federal, State, County

Equity, public health, ecosystem health, GHG mitigation, etc.



Public Assets Adaptation Strategies - Parks

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

Type	Enhance Existing Assets
Time	3-5 years
Cost (per unit)	\$ - \$\$
Cost (cumulative)	\$\$ - \$\$\$
Funding Sources	Federal, State, County
Potential Co-benefits	Ecosystem health, public access

Where and how in your community do you think nature-based strategies can be applied?



Public Assets Adaptation Strategies – Civic Facilities

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

What community facilities and infrastructure that are vulnerable to climate change impacts are you most concerned about?

Type	Enhance Existing Assets
Time	3-5 years
Cost (per unit)	\$-\$\$\$\$
Cost (cumulative)	\$\$\$\$\$
Funding Sources	Federal, State, County
Potential Co-benefits	N/A



Public Assets Adaptation Strategies – Civic Facilities

Relocate or build new critical facilities and infrastructure as needed based on findings of site-specific assessments.

Type	Major Alteration
Time	5-10 years
Cost (per unit)	\$ - \$\$\$\$\$
Cost (cumulative)	\$\$\$\$\$
Funding Sources	Federal, State, County
Potential Co-benefits	N/A

What community facilities and infrastructure that are vulnerable to climate change impacts are you most concerned about?



Pathway to Adapt Public Assets



Conduct Facility/Asset Specific Vulnerability + Site Assessments



*Decision Point:
Apply Findings*

Nature-Based Solutions on County Park Lands



Civic Facility and Site Design Improvements








Trigger Point could be repeat events, catastrophic damage, SLR projections

Establish New County Parks as part of Managed Retreat



Relocate Civic Facilities



-  Laulima Strategy
-  Physical Strategy
-  Lead Time
-  Decision Point
-  Trigger Point: Needs Feedback



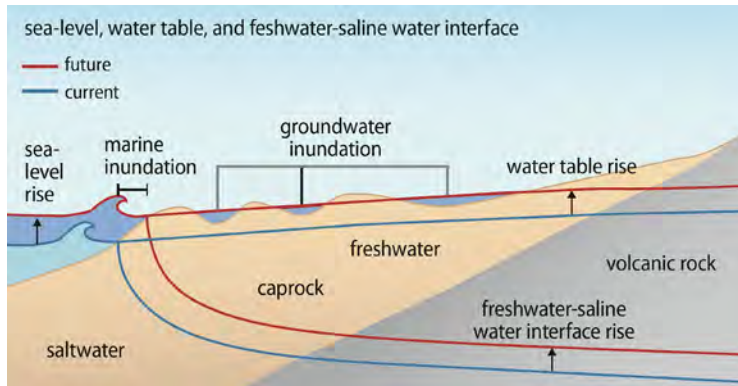
**Sea Level
Rise**

**Managed
Retreat**

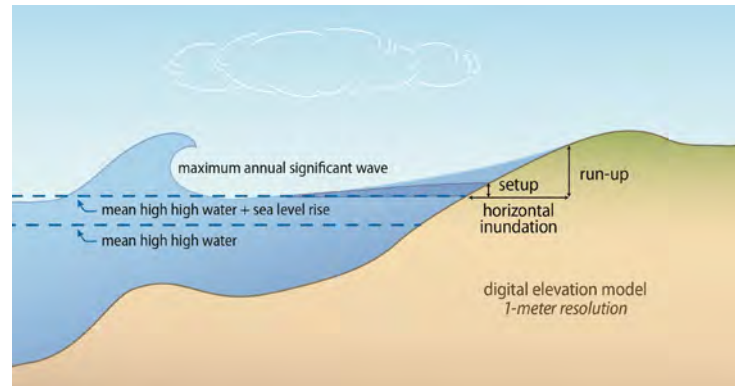


Climate Impacts – Sea Level Rise

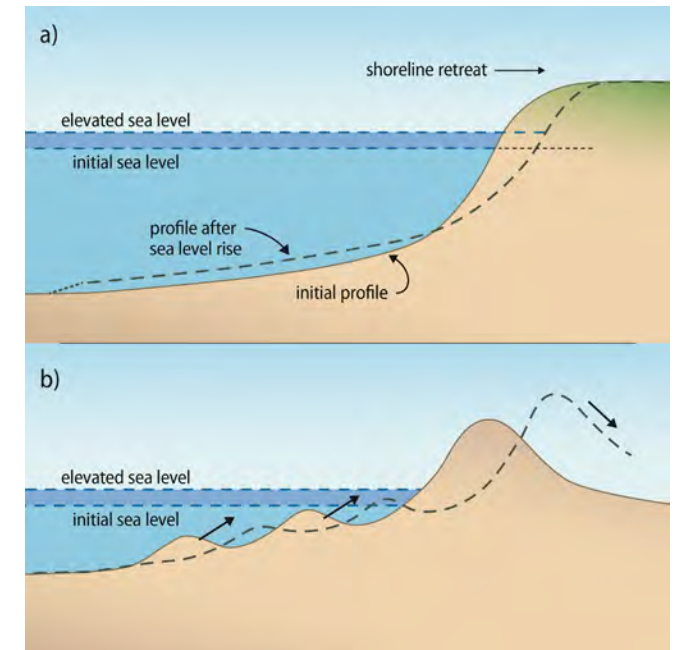
Passive flooding: In areas that are connected to the ocean (marine flooding) and low-lying areas that are not (groundwater)



High wave flooding: The distance over which annual large waves run-up and wash across the shoreline



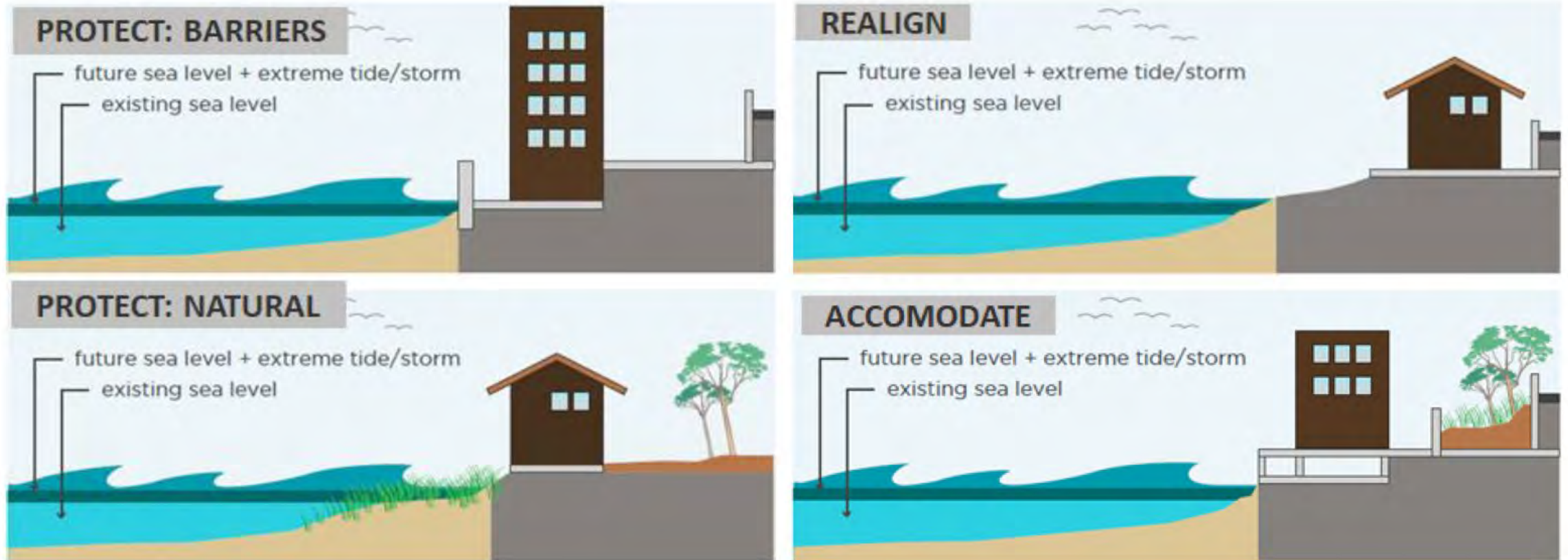
Coastal erosion: Erosion on sandy shorelines



<https://www.pacioos.hawaii.edu/shoreline/slr-hawaii/>



Coastal Adaptation Approaches



Related Existing Policies

Future Coastal Land Use



- Do not allow permanent armoring of the shoreline. (GP)
- Seek to preserve natural beach processes and avoid the construction of shoreline protection structures. (GP)
- Promote strategic beach nourishment in public use areas. (GP)
- Identify lands/areas that may serve as **buffers** from coastal hazards and restrict development within them. (GP)
- **Minimize coastal development** in areas of high risk of erosion, flooding, tsunami inundation, and sea level rise. (GP)
- Minimize coastal hazard risks through **planning and development standards** that:
 - ...b. Discourage development or redevelopment (including tourist uses) within hazardous areas, while **preserving adequate space for expected future growth** in areas located outside these areas. (GP)



WAIMEA TOWN PLAN MAP

Legend

- | | | |
|--|---|--|
| <ul style="list-style-type: none"> Town Center Walkable Neighborhood Residential Neighborhood Public Facilities Coastal Edge Agriculture (IAL) Park Natural Resort TMK Parcels | <ul style="list-style-type: none"> Bridge Cemetery Fire Station Hospital Mill Neighborhood Center Police Station Post Office School State Library | <ul style="list-style-type: none"> Exceptional Trees Registered Historic Properties Contour 40ft Levees Shoreline Armoring Structures Streams and Rivers Local Roads Other Roads Highways |
|--|---|--|

0 250 500 FT
 Data Sources: County of Kauai, Hawaii State GIS Program, USGS National Map, and ESRI Basemaps



Related Existing Policies



Managed Retreat of Existing Neighborhoods:



- Adapt West Kaua‘i’s low-lying neighborhoods for climate change impacts and lay the groundwork for managed retreat. (WKCVA)
 - **Designate Coastal Edge land use** that mirrors the Special Treatment Coastal Edge Zoning District
 - Direct new growth away from the most vulnerable areas. **Provide areas for potential retreat and relocation** of existing development due to SLR
 - **Improve green infrastructure**, low impact development, and other changes that can help neighborhoods outside of the Coastal Edge adapt.
 - Establish a program to **incentivize retreat** (Shoreline Setback Ordinance is an interim retreat policy but can be strengthened with future shoreline and SLR projections)

Related Existing Policies

SLR Development Regulations



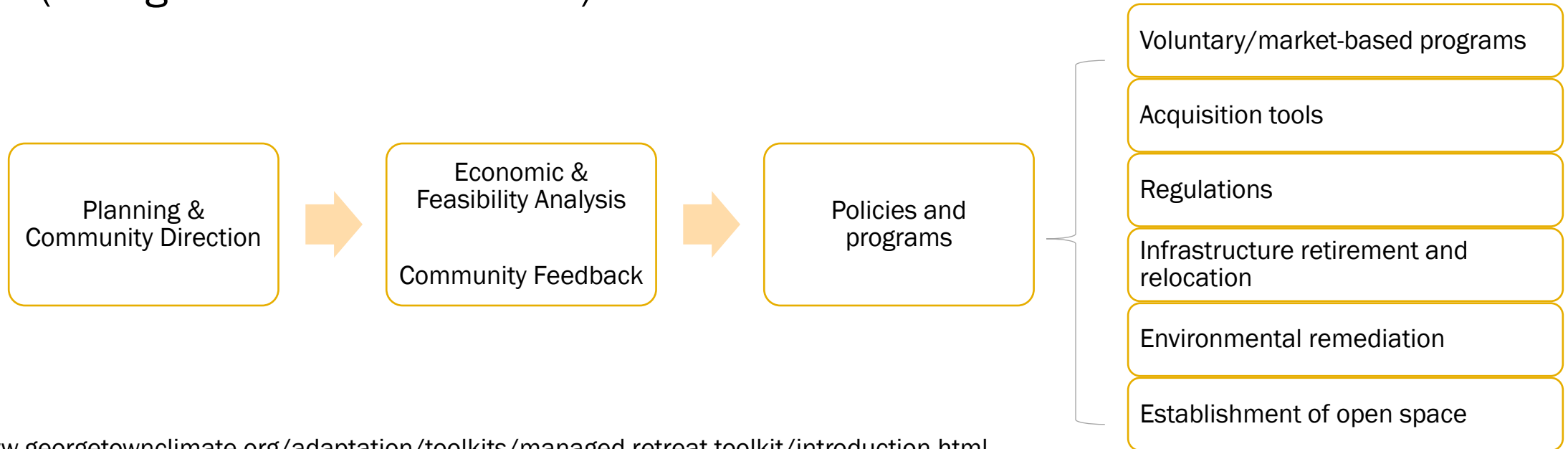
- **Special Management Area (SMA):** special controls on development within an area along the shoreline
- **Shoreline Setback (Ord. 1088):** regulates structures and activities proposed within 500 ft of the shoreline
- **SLR Constraint District:** new SLR district that applies design standards to construction, substantial improvements, and nonconforming structures on all lands subject to annual high wave flooding and passive flooding associated with 3.2 ft of SLR

(visit kauai.gov/planning for more details)



Land Use Strategy – Managed Retreat

Managed retreat is the umbrella term for a suite of approaches for the “voluntary movement and transition of people and ecosystems away from vulnerable coastal areas... in response to episodic or chronic threats” (Georgetown Climate Center)

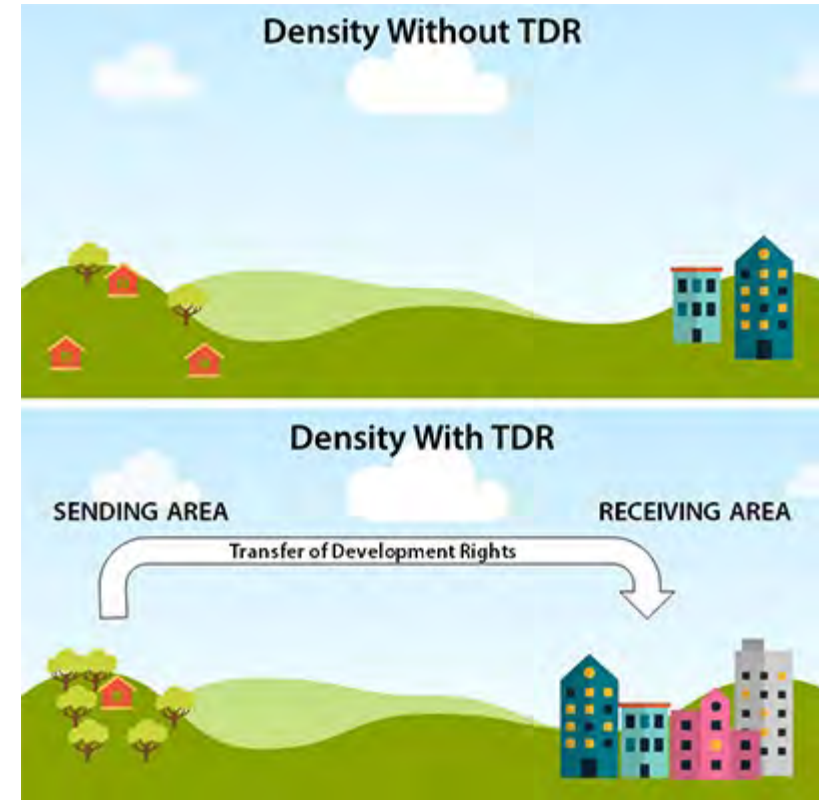


<https://www.georgetownclimate.org/adaptation/toolkits/managed-retreat-toolkit/introduction.html>

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.

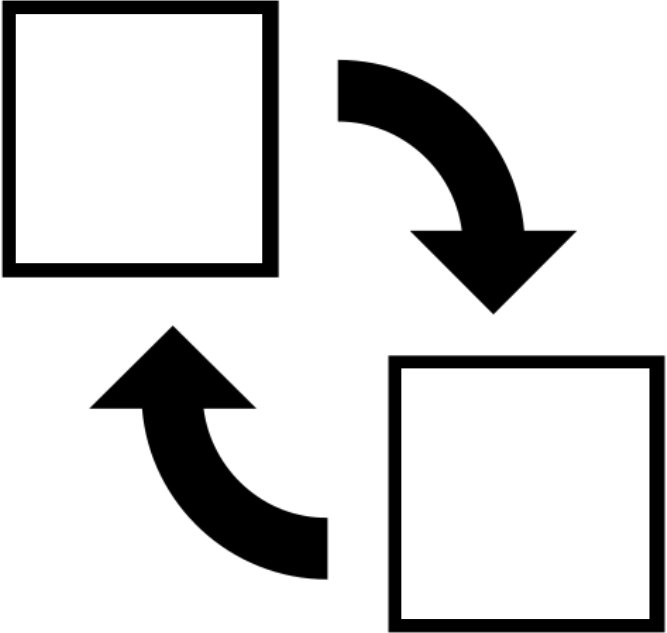
Type	Resilient Development
Time	5-10 years
Cost (per unit)	\$
Cost (cumulative)	\$\$\$
Funding Sources	Private Developers
Potential Co-benefits	Equity



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

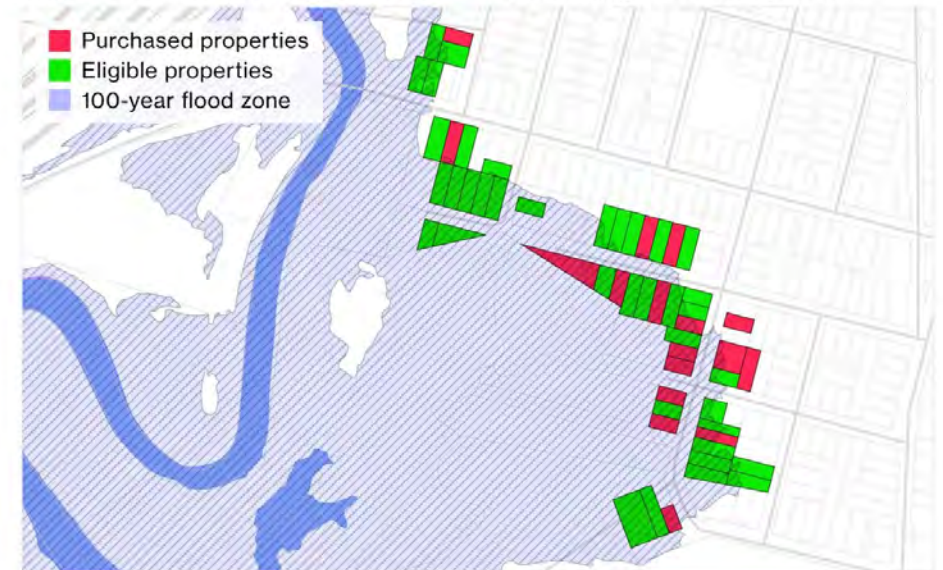


Buyout Program

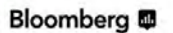
Purchase undeveloped and developed land vulnerable to sea level rise, such as passive flooding, high wave flooding, and coastal erosion, and properties destroyed by flooding.

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

South Robert St. area, Sewaren – Woodbridge Township, N.J.



Sources: Woodbridge Township, FEMA, N.J. Bureau of GIS, N.J. Geographic Information Network



New Jersey Blue Acres Post-Hurricane Sandy Lot Buyouts
 For more info: <https://developingresilience.uli.org/case/new-jersey-blue-acres-buyout-program/>



Pathway to Adapt Land Use



Implement Existing Policies:
Special Treatment Coastal Edge,
Shoreline Setback Ordinance








Expand or Modify Existing Policies:
Special Treatment Coastal Edge,
Subdivision, Permitting Policies



Trigger Point could be: Repetitive Loss, Catastrophic Damage, SLR Projections

Establish a Managed Retreat Program



-  Laulima Strategy
-  Physical Strategy
-  Lead Time
-  Decision Point
-  Trigger Point: Needs Feedback





What is your vision for development (or lack of) in areas impacted by sea level rise?

What options should be explored for properties in your community that will be impacted by sea level rise?



Managed retreat in Monterey, CA



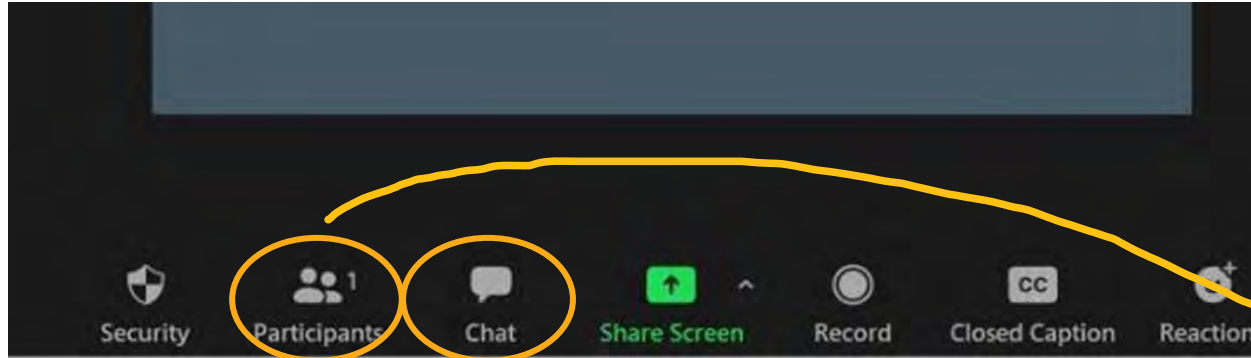
Discussions



Ground Rules

- Share your knowledge and experiences
- Allow other voices to be heard (don't dominate the discussion). Please keep comments to a minute or so
- Show aloha and respect to everyone's opinions and ideas
- Mute when not speaking
- Raise virtual hand to speak

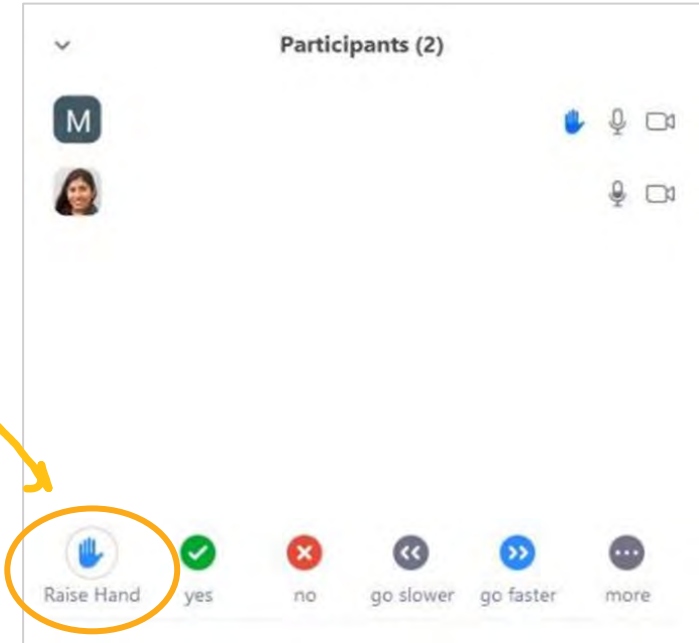
Zoom Basics



Raise your "hand" to speak (On the phone, press *9)

You can ask questions and share input using the **Chat** function during the meeting and small group exercise

Please stay on mute unless you are speaking



Managed Retreat Discussion



Discussion Room Activity

Questions

Discussion Questions

Where and how in your community do you think nature-based strategies can be applied?

What community facilities and infrastructure that are vulnerable to climate change impacts are you most concerned about?

Background

Background

What are nature-based solutions?
Planning, design, construction, and maintenance of a region's green infrastructure system that helps meet an assessment's needs and objectives in a cost-effective, resilient, and equitable way.

Examples of Nature-Based Solutions

Climate Hazards Map

Climate Hazards - East Kauai

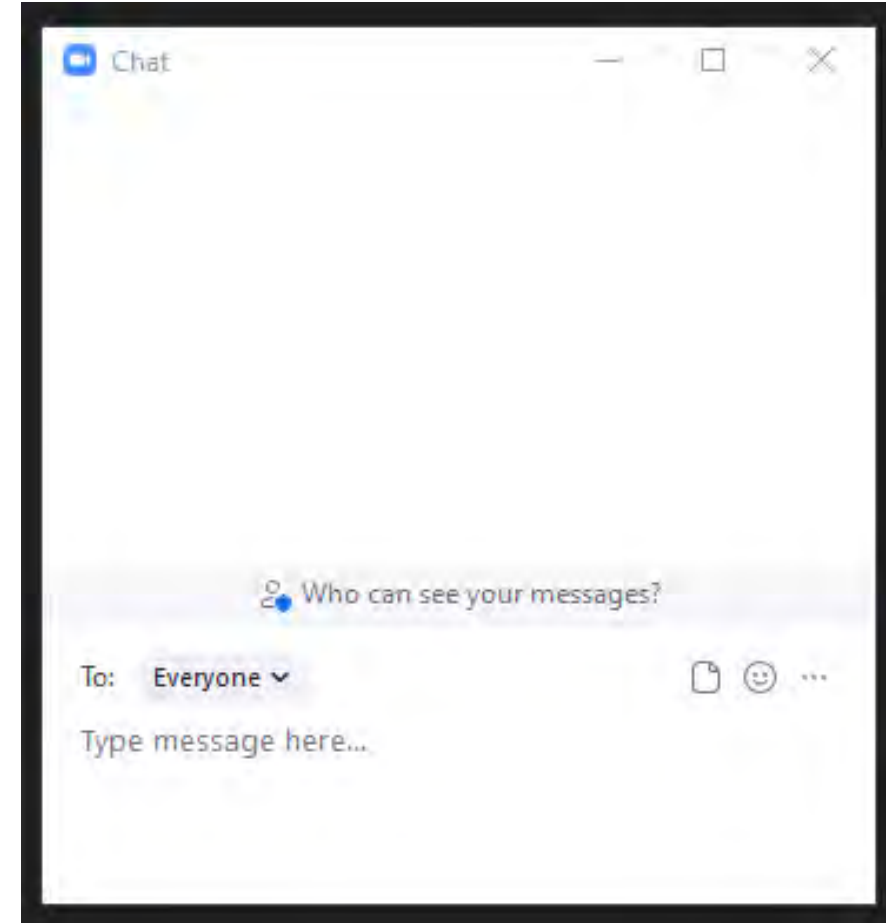
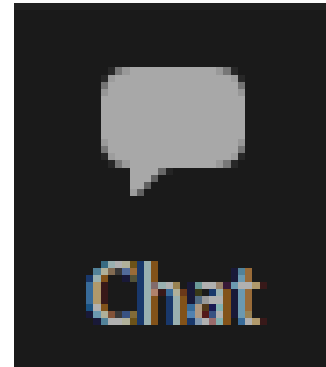
The map displays various climate hazards across East Kauai, including wildfire hazards (High, Medium, Low), flood hazards (1% Chance Annual Flood, 3.2 ft SLR-XA), and High Landside Risk. It also shows planning district boundaries, ahupua'a boundaries, and various community facilities like schools, hospitals, and fire stations.

- Planning District Boundary
- Ahupua'a Boundary
- Moku Boundary
- Wastewater Treatment Plant
- Parks and Open Spaces
- Fire Station
- Police Station
- Hospital
- Library
- School
- Highway
- Major Roads
- High Wildfire Hazard
- Medium Wildfire Hazard
- Low Wildfire Hazard
- Hurricane Storm Track
- 1% Chance Annual Flood
- 3.2 ft SLR-XA
- High Landside Risk



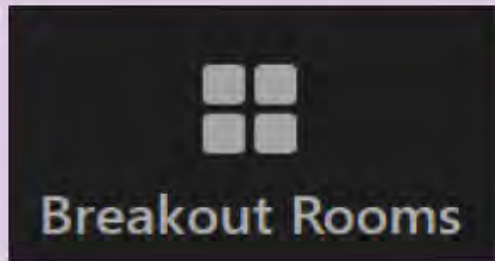
Breakout Room: Sharing Input

- How to share:
 - Verbal comments
 - Chat comments



Breakout Room Directions

Step 1: Select the **Breakout Rooms** icon in the Zoom navigation bar



Step 2: Click **Join** next to the room you would like to enter.

▼ ROOM 1 North Shore	Join
▼ ROOM 2 East Kaua'i	Join
▼ ROOM 3 Lihu'e	Join
▼ ROOM 4 South Kaua'i	Join
▼ ROOM 5 West Kaua'i	Join

← Click

If you are calling in, you need to be moved between rooms by the workshop host - press *9 to raise your hand and be moved.

Need help? If you have questions or need any technical assistance during the meeting, use the “*Ask for Help*” button, reach out to any of the breakout room facilitators, or return to the Main Room.

Discussion Room Reports



In-Person Workshops

In-Person Workshops

A light vegan dinner is provided! Bring your family!

**Līhu'e Civic Center
Moikeha Building
Conference Room 2**

Date & Time
Wed. May 17, 2023
5:00–7:00 PM

**Kōloa
Neighborhood Center**

Date & Time
Thurs. Jun. 1, 2023
5:00–7:00 PM

**Waimea
Neighborhood Center**

Date & Time
Tues. Jun. 6, 2023
5:00–7:00 PM

**St. Catherine
School (Kapa'a)**

Date & Time
Tues. Jun. 13, 2023
5:00–7:00 PM

**Hanalei
Elementary School**

Date & Time
Thurs. Jun. 15, 2023
5:00–7:00 PM

Adaptation Strategy Poll

Rate and comment on a possible adaptation strategies at:

kauaiadaptation.consider.it

Open May 10 – June 21

