



KAUA'I CLIMATE ADAPTATION AND ACTION PLAN PART I

FINAL PLAN
December 2025

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List of Acronyms

AFLOU	Agriculture, forestry and other land uses
CAAP	Climate Adaptation and Action Plan
CO₂	Carbon dioxide
CWWP	Community Wildfire Protection Plan
CZO	Comprehensive Zoning Ordinance
DLNR	State of Hawai'i Department of Land and Natural Resources
DOH	State of Hawai'i Department of Health
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment
FEMA	Federal Emergency Management Agency
GHG	Greenhouse gas
GP	General Plan
HDOT	State of Hawai'i Department of Transportation
HTA	Hawai'i Tourism Authority
KEMA	County of Kaua'i Emergency Management Authority
KIUC	Kaua'i Island Utility Cooperative
MHMRP	Multi-Hazard Mitigation and Resilience Plan
MTCO_{2e}	Metric tons of carbon dioxide equivalent
OED	County of Kaua'i Office of Economic Development
PW	County of Kaua'i Department of Public Works
RCP	Representative Concentration Pathway
SLR	Sea level rise
SLRXA	Sea level rise exposure area
SMA	Special Management Area
TDM	Transportation demand management
TVR	Transient vacation rental
UH	University of Hawai'i
WUI	Wildfire Urban Interface
ZEV	Zero emission vehicle

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Me ke aloha pumehana,
to our Kaua'i community,
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in demonstration of their commitment
to foster abundance and resilience across our County,
and to
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whose expertise and contributions have been instrumental
in shaping the direction of this plan.



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Elderly Affairs
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Disclaimer

The Kaua’i Climate Action and Adaptation Plan articulates broad policies to achieve equitable climate action and adaptation. The CAAP does not approve, fund, or authorize the implementation of any specific projects. Each implementation program will be reviewed and approved over time and follow protocols for adoption, which may require additional public review, review by County Council and/or other advisory bodies, and/or environmental review.

Land Acknowledgement



Ka na'auao o nā kūpuna ka lama e ho'omālamalama i ke ala no nā keiki

The wisdom of the elders is the torch that enlightens the path of the children.

The County of Kaua'i is located on the ancestral lands of the Native Hawaiian people, who have been stewards of Kaua'i and Ni'i'hau for generations. We honor the deep connection that kānaka maoli (Native Hawaiians) have to the 'āina and recognize that their ancestral knowledge serves as a cornerstone for developing culturally attuned place-based strategies to address climate change.

Equitably addressing climate change requires the implementation of equitable and sustainable solutions. Therefore, it is important to acknowledge the legacy of colonization that still burdens the Native Hawaiian people. The County is committed to forging a future that is just and inclusive for everyone and working in collaboration with Native Hawaiian communities by uplifting their perspectives, knowledge, and wisdom in our planning processes.



Glossary

A

Active transportation: A non-motorized form of transportation, primarily made up of walking and cycling.

Adaptation pathways: An approach to adaptation strategy development that allows decision makers to build capacity, maintain flexibility, and prioritize strategies. The pathway may contain “triggers” (i.e. when a threshold of climate conditions or impacts is met) and “decision points” (when a decision must be made about how to proceed based on current conditions, project phasing, etc.).

Adjusted Business-as-Usual Forecast (ABAU): A GHG emissions scenario that includes the influence that federal, statewide, and regional policies will have on the County’s projected emissions.

Agrivoltaics: Co-locating solar and agriculture operations so energy and agricultural production is optimized on a single site.

B

Business-as-Usual (BAU): A GHG emissions scenario that is based on the assumption that no mitigation policies or measures will be implemented beyond those that are already in progress that can serve to highlight the level of emissions that would occur without further policy effort.

C

Carbon sequestration: The process of capturing and storing carbon dioxide from the atmosphere.

Climate action: See Mitigation definition.

Climate adaptation: Adaptation is “an adjustment in natural or human systems to a new or changing environment” (such as the increased frequency

and intensity of climate-related hazards or other climate-related conditions). An adaptation adjustment “moderates harm or exploits beneficial opportunities” brought about by the change.¹

Climate change: Climate change refers to changes in the average and/or the variability of temperature, rainfall, and extreme weather that persist for an extended period.

Climate hazard: Short or long-term climate events that have the potential to cause damage or harm to humans and natural systems. These include meteorological, climatological, hydrological, geophysical or biological events.

Co-benefit: Additional benefits of climate mitigation and adaptation actions. Measuring co-benefits examines how climate action is interrelated with and delivers outcomes for provision of basic services, health, prosperity and other sustainable development agendas.

D

Decarbonization: Process of reducing embodied or operational GHG emissions. Typically refers to a reduction of the carbon emissions associated with energy consumption, industry and transportation. The intention to decarbonize the electric power grid is often referred to as Grid Decarbonization.

Disadvantaged community (DAC): A disadvantaged community is defined as “a low-income area that is disproportionately affected by environmental pollution and other hazards that can lead to negative health effects, exposure, or environmental degradation.

Distributed Energy Resource (DER): These resources are small, modular energy generation and storage systems that provide electricity or energy and can be connected or independent from the larger electrical power grid.

¹ Governor’s Office of Planning and Research, State of California. (2024). Adaptation Planning Guide. <https://resilientca.org/apg/>

E

Electrification: The process of transitioning away from technologies that use fossil fuels to technologies that use electricity. Electrification of systems paired with a power grid with 100% renewable energy sources can significantly reduce GHG emissions.

Emissions inventory: A quantified list of a county's GHG emissions and sources.

Emissions reduction potential: A measurement of the potential to decrease greenhouse gas (GHG) emissions from a particular sector or through an action. The abatement potential is measured in GHG emissions (e.g. tons of carbon dioxide equivalent).

Equity: The absence of avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically or geographically. As opposed to the concept of equality where everyone is given equal access, equity provides proportional access to redress historical and current disparities and ensure the same level of opportunity for all.

G

Green building: Green building is a holistic concept that starts with the understanding that the built environment can have profound effects, both positive and negative, on the natural environment, as well as the people who inhabit buildings every day. Green building is an effort to amplify the positive and mitigate the negative of these effects throughout the entire life cycle of a building. Considerations include energy use, water use, indoor environmental quality, material selection and the building's effects on its site.

Greenhouse gas (GHG): These are gases within the atmosphere that accelerate the warming of the Earth and are released from human activities that burn fossil fuels or from historic carbon sinks, such as melting permafrost.

Greenhouse gas mitigation: Actions to reduce GHG emissions to reduce the severity of climate change.

Greywater: The water generated from buildings that is not contaminated (e.g., sinks, dishwashers).

Greywater systems: This system collects domestic, uncontaminated wastewater and reuses it for irrigation or toilet flushing. Sources of greywater include sinks, showers, washing machines, and dishwashers.

L

Low-embodied carbon materials: Building materials which have lower GHGs associated with their lifecycle.

M

Mitigation: In the context of climate change, the reduction of GHG emissions, reducing the severity of climate change.

Mode shift: The transition from using one habitual form of travel, or mode, to another. Transportation modes include mass transit, walking, cycling, and driving.

Mode share: A number or percentage of users or trips, using a particular type of transportation such as driving a single-occupancy vehicle, carpooling, riding public transit, walking or cycling.

MTCO_{2e}: Metric tons of carbon dioxide equivalent. A unit of measurement for greenhouse gas emissions.

R

Resilience: Resilience is the ability of an individual, a community, an organization, or a natural system to prepare for disruptions, to adapt to changing conditions, withstand and rapidly recover from shocks and stresses, and to adapt and grow from a disruptive experience.

Resilience hubs: Community-service facilities that are augmented to support residents and coordinate resource distribution and services before, during or after a disruption or natural hazard. They may also be designed as refuges (i.e providing shelter during heat waves) and they are

different from a response center (see definition below).²

Response Center: A Response Center or Emergency Response Center (i.e. Kaua'i's Emergency Operations Center) coordinates official emergency response efforts. This is different from a Resilience Hub (see definition above) although both uses may occur at the same site.

S

Sea Level Rise Exposure Area (SLR-XA): Modelling of the combined footprint of passive flooding, annual high wave flooding, and coastal erosion that together define the projected extent of chronic flooding due to sea level rise.³ The SLR-XA overlays the three hazards and does not account for their interaction or future land use changes. The modelling was conducted by the Pacific Islands Ocean Observing System (PacIOOS) for four SLR scenarios.

Sustainability: Sustainability focuses on meeting the needs of the present without compromising the ability of future generations to meet their needs.

T

Transportation Demand Management (TDM): Strategies to change travel behavior in order to reduce traffic congestion, increase safety and mobility and conserve energy and reduce greenhouse gas emissions. Strategies may include ridesharing, telecommuting, park-and-ride programs and alternative work schedules.

V

Vehicle Miles Traveled (VMT): A measurement of miles traveled by vehicles within a specified area for a specified time period.

Vulnerability: The propensity for natural, built, and human systems to be harmed by climate change hazards, and encompasses a variety of concepts, including sensitivity, adaptive capacity, and exposure.

Z

Zero Emission Vehicle (ZEV): Vehicles that produce no tailpipe emissions. Generally, ZEVs feature electric powertrains either from a battery or a hydrogen fuel cell. ZEVs may still be responsible for some greenhouse gas emissions, if the GHG content from the electricity generation comes from fossil fuel sources.

² Urban Sustainability Directors Network. (n.d.) Resilience Hubs. <http://resilience-hub.org/>. Accessed 5/30/24.

³ Hawai'i Climate Change Mitigation and Adaptation Commission. 2021. State of Hawai'i Sea Level Rise Viewer. Version 1.13. Prepared by the Pacific Islands Ocean Observing System (PacIOOS) for the University of Hawai'i Sea Grant College Program and the State of

Hawai'i Department of Land and Natural Resources, Office of Conservation and Coastal Lands, with funding from National Oceanic and Atmospheric Administration Office for Coastal Management Award No. NA16NOS4730016 and under the State of Hawai'i Department of Land and Natural Resources Contract No. 64064. <http://hawaiisealevelriseviewer.org>.

Executive Summary

Kaua'i is already experiencing the effects of a changing climate. Both gradual climate change and climate hazard events expose people, infrastructure, neighborhoods, and ecosystems to a wide range of detrimental and hazardous situations. These hazards disproportionately affect the community's most vulnerable populations.

The County of Kaua'i is responding by taking action to both prepare for climate change impacts and reduce greenhouse gas emissions (GHG) that contribute to climate change. This Climate Adaptation and Action Plan (CAAP) is the roadmap for County departments and staff to increase the community's adaptive capacity and achieve GHG targets.

The CAAP is a product of detailed analysis and extensive community engagement. Based on key findings, community insight, and existing plans and policies, the CAAP identifies 79 different strategies, including new or modified County programs, public investments, requirements for future development, and partnerships within and outside of County government. As an action-based document, the CAAP includes "Division Action Plans" to guide the integration of CAAP actions into annual workplans and capital improvement program (CIP) requests. The CAAP also includes funding and financing options for CIP projects.

Because the science of climate change and the community's experience with it will change over time, the CAAP employs an "adaptive pathways" approach that advances near-term action while retaining flexibility to adapt to an uncertain future of changing exposure, risk, and technology. In addition, because the most vulnerable communities are often most impacted by climate change, the CAAP includes an Equity Implementation Tool to help County staff incorporate equity into CAAP programs and initiatives.

Furthermore, the CAAP recognizes that climate change poses a significant threat to affordability in Hawai'i by exacerbating the already high cost of living. The plan seeks to prioritize those strategies that not only help us adapt to climate change and reduce greenhouse gas emissions but simultaneously address the high cost of living.

While the CAAP is focused on actions within the County's jurisdiction, effectively addressing climate change requires coordinated action and collaboration from all sectors of society. Many of the CAAP actions direct the County to partner with state agencies, universities, cultural practitioners, and other community organizations. The CAAP also supports community members to become engaged in climate action and adaptation through outreach and education. The goal is to foster a network of collaborative relationships involving neighboring counties, state and federal agencies, private entities, non-profit organizations, and community groups through a variety of approaches.

1. The Call to Action

The Kaua'i Climate Adaptation and Action Plan (CAAP) is a framework of strategies and actions to reduce contributions to climate change and to ensure that people and natural and built systems can adapt as the climate changes. The focus is on County actions that will address climate change vulnerabilities and greenhouse gas (GHG) emissions.

CLIMATE ACTION AND ADAPTATION

According to the Intergovernmental Panel on Climate Change's 6th Assessment, it is "unequivocal" that human emissions of carbon dioxide and other GHG emissions have warmed the atmosphere, ocean, and land. Human-induced climate change is already affecting many weather and climate extremes in every region across the globe, with observed changes in the frequency and/or intensity of extreme heat, heavy precipitation, droughts, and hurricanes.

The CAAP aims to address climate change in two ways, illustrated by the Venn diagram in **Figure 1** below:

- We can **mitigate** our contribution to climate change (also referred to as climate action), meaning we reduce our GHG emissions that drive climate change. Examples of ways to mitigate climate change are in the yellow portion of the Venn diagram.
- We can **adapt** to climate change by reducing our vulnerability to climate-related hazards that threaten human life, ecosystems, and infrastructure. Examples of ways to adapt to climate change are in the purple portion of the Venn diagram.
- Sometimes strategies and actions support climate **mitigation and adaptation**, as represented by the middle portion of the Venn diagram. For example, restoring indigenous agrosystems can help reduce impacts of flooding (an adaptation benefit), but it also sequesters carbon (a GHG benefit).

Figure 1. Climate Action and Adaptation

Source: Raimi + Associates



Climate mitigation and adaptation also contribute to community resilience, which is the community's capacity to prepare for and recover from shocks and stressors. Climate change is one set of shocks and stressors, but resilience is much broader and also relates to food systems, social cohesion, and other community components that are outside the scope of the CAAP. Resilience is best addressed through more comprehensive plans, including the County's General Plan.

PURPOSE OF THIS PLAN

The CAAP implements the Kaua'i General Plan goal to be a sustainable island, where sustainability means growing responsibly to meet the needs of current and future generations without depleting important resources. More specifically, the CAAP implements two General Plan policies:

- **Policy #14: Prepare for climate change:** Prepare for the impacts to the island economy, food systems, and infrastructure that will be caused by climate change.
- **Policy #13: Complete Kauai's shift to clean energy:** Mitigate climate change and reduce system-wide carbon emissions by at least 80 percent by 2050 through deep reductions in energy use and by transforming electricity, transportation, and infrastructure systems toward the use of clean energy.

The CAAP is intended to guide actions of the County of Kaua'i to address climate change vulnerabilities and reduce greenhouse gas (GHG) emissions, with a focus on the things the County has direct control over or can significantly influence. The CAAP provides a framework of County strategies and actions to increase our adaptive capacity to climate change and achieve established GHG reduction targets.

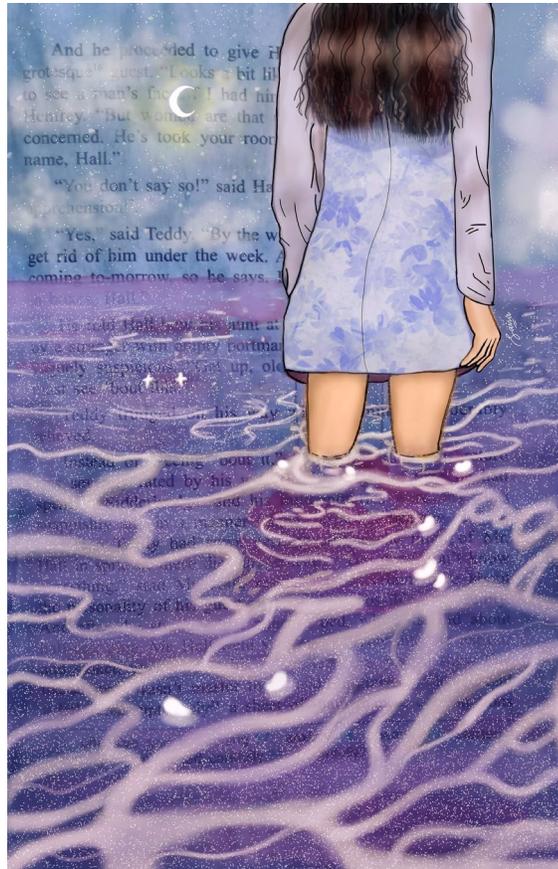
OUR VISION FOR A RESILIENT AND EQUITABLE KAUA‘I

The Vision Statement describes what this plan aspires to achieve. It was prepared by the County's Resilience Team and is based on community input.

Kaua'i is home to communities that respond to climate change in the spirit of aloha (compassion), lōkahi (unity), and laulima (working together). That work is grounded in Native Hawaiian knowledge and practices, which are rooted in the pilina (relationship) between the 'āina (land) and its people.

The County of Kaua'i recognizes that it plays a primary role in adapting to climate change, in which adaptation necessitates the shared kuleana (responsibility) to mālama (care for) the island and the people who are most impacted by climate change. This approach results in vibrant ecosystems, preserved cultural resources, resilient buildings and infrastructure, a more self-sufficient local economy and food system, and a safe and cohesive community.

Kaua'i County will spearhead innovative projects in climate action and emissions reduction, forging a trail across multiple sectors. The community is a vital partner in the journey towards energy transformation.



Sana Jahangir
Joint 2nd place, Youth Art Contest

HOW TO USE THIS PLAN

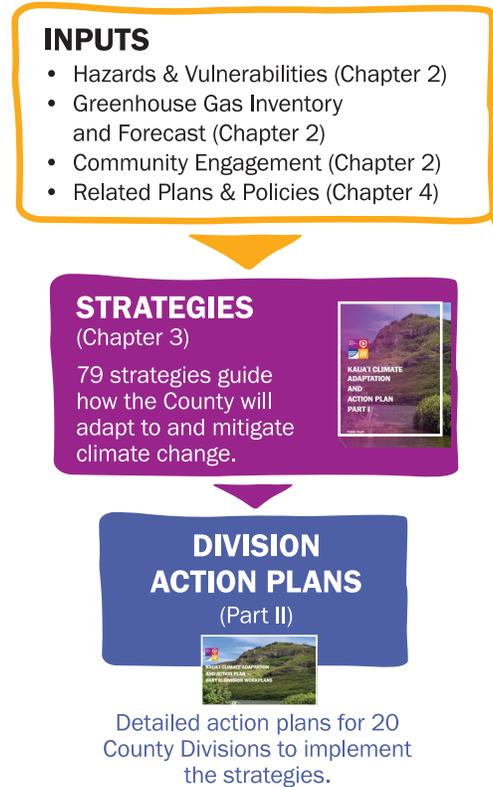
The CAAP has two major parts. **Figure 2** illustrates the relationship between the two sections of the CAAP.

The audience for Part I is the community-at-large. It includes background on the CAAP planning process, including a summary of climate change hazards and vulnerabilities, the GHG inventory, highlights of community engagement, and a summary of related plans and policies. Most importantly, in Chapter 3, it introduces the County's 79 climate adaptation and action strategies.

Part II of the CAAP focuses on the divisions or programs within County Departments that will be the primary CAAP implementors. This section includes 20 "Division Action Plans" designed to guide their workplans and capital improvement program (CIP) requests. This section of the CAAP provides a window into the nuts and bolts of the County's implementation of the CAAP.

The CAAP Appendices include the technical analyses conducted as well as other tools to support implementation.

Figure 2: CAAP Framework



WE ALL HAVE A ROLE

The CAAP is focused on what the County of Kaua'i can do. But everyone has a role to play in adapting to and mitigating climate change.

Community Members

We can all educate ourselves about climate change and prepare our households for hazard events like wildfires and floods. KEMA, organizations like the Hawaii Wildfire Management Organization (HWMO), and programs like the Community Emergency Response Team (CERT) are all excellent resources. Individuals can also get involved in adaptation efforts by participating in community stewardship and restoration efforts, engaging in adaptation planning (i.e. Community Wildfire Protection Plan or pre-disaster planning), and advocating for policies that promote climate adaptation and mitigation.

We can also help reduce GHG emissions by making climate-positive choices in our everyday lives, like reducing reliance on fossil-fuel powered transport, shifting to a plant-based diet, and conserving energy at home. Small personal changes like these contribute to islandwide reductions when they are done collectively.

Homeowners can increase their physical resilience to hazards (sea level rise, flooding, wildfire, and extreme heat) by upgrading/maintaining their yards, roofs, windows, and other building components. For instance, this may encompass measures such as elevating structures, integrating green infrastructure, establishing defensible space, and installing cool roofs. Many of the GHG reduction strategies in the CAAP rely on property owners to electrify buildings, reduce water consumption, and install infrastructure that supports ZEVs.

Organizations and Businesses

Businesses and organizations play a critical role in both climate change mitigation and adaptation efforts. These entities are uniquely positioned to implement strategies that not only reduce greenhouse gas (GHG) emissions but also enhance resilience to climate-related hazards such as sea level rise, flooding, wildfires, and extreme heat. Business owners can invest in resilient infrastructure by upgrading their properties. Additionally, businesses can reduce energy consumption, electrify their operations, and support the adoption of zero-emission vehicles (ZEVs). Furthermore, community organizations and businesses are oftentimes community leaders and demonstrating sustainable practices will encourage their employees, customers, and others to follow suit.

Although the County has jurisdiction over public facilities, infrastructure, and emergency management, private businesses and organizations complement these efforts by partnering with the County on climate initiatives, participating in incentive programs, and advocating for policies aimed at sustainability. Through collaboration and shared responsibility, both public and private sectors can work together to enhance climate resilience across Kaua'i.

State Government

The State coordinates statewide resiliency efforts, which involves setting climate adaptation and mitigation policy, assessing climate change impacts across sectors, and establishing climate-related goals and targets, such as greenhouse gas reduction, clean energy, and sea level rise planning targets. State agencies such as DLNR and DHHL manage a large percentage of the Island of Kaua'i, and State agencies control critical assets like highways and public schools. State agencies also play important regulatory roles, such as the Department of Health's jurisdiction over cesspools. Coordination among state, county, and federal entities ensure a cohesive approach to climate resilience across jurisdictions.

Federal Government

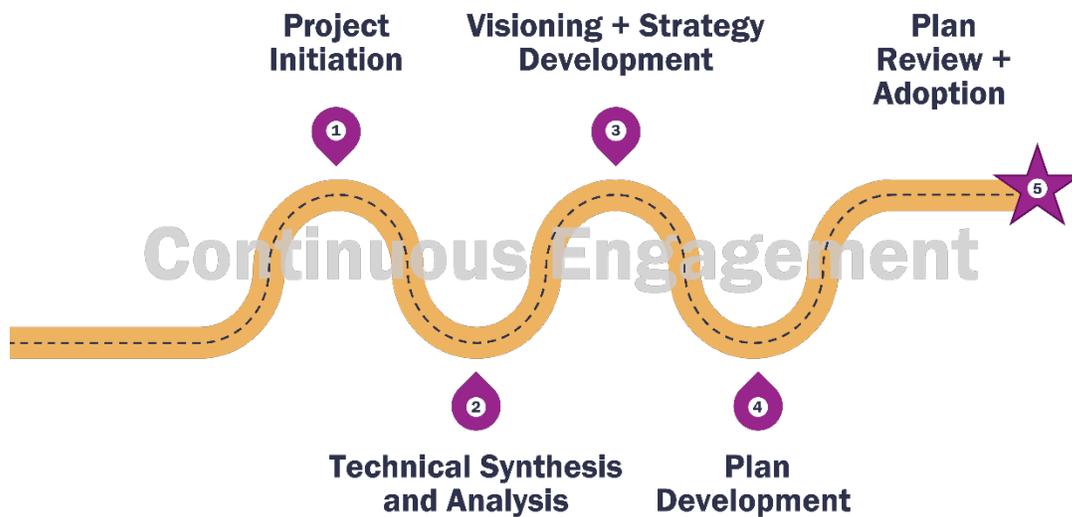
The federal government is an important source of funding for implementing climate adaptation and action strategies. Federal agencies are integral to adaptation strategies through their roles in supporting disaster response and recovery efforts; safeguarding public health and safety against climate impacts; and developing regulations and guidelines to enhance resilience in infrastructure, buildings, and natural resources management. Moreover, federal agencies establish industry standards that affect greenhouse gas emissions, including rules for vehicle emissions, the aviation sector, and energy.

2. How We Created the CAAP

The CAAP was developed through a five-phase process (see Figure 4). The process started with technical analysis to forecast future GHG emissions and identify climate hazards, vulnerabilities, and capabilities. Based on findings from that technical analysis, existing County and State plans, and community input, strategies were identified to reduce GHG emissions and adapt to climate hazards. Community feedback was solicited on these strategies, and their input is incorporated into this CAAP.

Extensive community engagement was conducted throughout the planning process. This included integrating climate science and local knowledge into the assessment of climate vulnerabilities as well as the development of adaptation and action strategies.

Figure 3. CAAP Workflow



TECHNICAL ANALYSIS

Climate Hazards and Vulnerability Assessment

A Climate Hazard White Paper and a Vulnerability and Equity Assessment were prepared for the CAAP; both are available in Appendix A and are summarized on the following page.

Local Climate Change Hazards

Climate on the island of Kaua'i is embedded in the larger Pacific and global climate system. Changes in atmospheric circulation (e.g., the Polar Jet Stream), the ocean (e.g., North Pacific sea surface temperatures), and in bio-physical systems such as tropical forests, permafrost, and others, will be seen in some fashion as changes in the climate on Kaua'i as well. As an isolated, and remote group of islands without the capacity to rapidly exchange critical resources such as freshwater, food, or medical supplies with neighboring communities, the state of Hawai'i, and Kaua'i specifically, are especially vulnerable to the accelerating impacts of climate change.



*"The Cycle Repeats" by Sydney Ki'ilau
Joint 2nd place, Youth Art Contest*

Several major categories illustrate the breadth of impacts to Kaua'i:

- **Rainfall Variability and Storminess** - Extreme precipitation and rainfall intensity have increased with related flooding.⁴ Exposure to hurricanes has increased as they have become larger, wetter, more intense, and are migrating poleward.⁵ On Kaua'i and across Hawai'i, extreme precipitation events are more frequent in La Niña years and less frequent in El Niño years.⁶ The frequency and intensity of large El Niño and La Niña events is projected to increase bringing more extreme weather to Hawai'i and Kaua'i.⁷
- **Wildfire** – Wildfire frequency & size has increased,⁸ often related to invasive grasses that act as tinder and fuel.⁹ The total burned area statewide has increased more than fourfold over the last century. The August 8th, 2023 wildfire on Maui, the deadliest in the U.S. in over a century, resulted in more than 100 confirmed deaths, destroyed homes and infrastructure, and displaced thousands of residents. This underscores the urgent need for climate change adaptation, as rising temperatures and

⁴ Chen, Y.R. and Chu, P.-S. (2014) Trends in precipitation extremes and return levels in the Hawaiian Islands under a changing climate, *International Journal of Climatology*, 34, 3913-3925, DOI: 10.1002/joc.3950

⁵ Sharmila, S., and Walsh, K.J.E. (2018) Recent poleward shift of tropical cyclone formation linked to Hadley cell expansion. *Nature Climate Change* 8, 730–736. <https://doi.org/10.1038/s41558-018-0227-5>

⁶ Kossin, J.P., et al. (2020) Global increase in major tropical cyclone exceedance probability over the past four decades. *PNAS*, DOI: 10.1073/pnas.1920849117

⁷ Chen, Y. R., P.-S. Chu (2014)

⁸ Cai, W., et al. (2014) Increasing frequency of extreme El Niño events due to greenhouse warming. *Nature Climate Change*. 5(2): 1–6.

⁹ Trauernicht, C., et al. (2015) The Contemporary Scale and Context of Wildfire in Hawai'i. *Pacific Science*, v. 69, no 4, October, pp. 427–444. <https://doi.org/10.2984/69.4.1>

⁹ Trauernicht, Clay, & Elizabeth Pickett (2016) Pre-fire planning guide for resource managers and landowners in Hawai'i and Pacific Islands, Forest and Natural Resource Management, College of Tropical Agriculture and Human Resources, <https://www.ctahr.hawaii.edu/oc/freepubs/pdf/RM-20.pdf>

prolonged drought conditions—both exacerbated by climate change—significantly increase the frequency and severity of such fires.

- **Accelerated Sea Level Rise** - Collapse of Thwaites Glacier ice shelf could rapidly accelerate sea level rise. Thwaites Ice Shelf has doubled its outflow speed over the last 30 years, and its base has eroded rapidly. Thwaites could raise global sea level by >61 cm (2 ft) and could lead to 3 m (10 ft) if it draws surrounding glaciers with it. New giant fractures have been observed, and researchers are concerned that part of the shelf could shatter within 5 years.¹⁰
- **Sea Level Rise Flooding** - Sea level rise, extreme tide flooding, and compound coastal flood events are increasing.¹¹ Coastal erosion and land loss is increasing with growing threats to private and public property, transportation systems, bridges and other forms of public infrastructure. When shoreline armoring is used to mitigate erosion, the result is often loss of beach¹² which becomes a public trust issue.¹³
- **Ocean Heat Content** - Last year (2021) was the warmest year on record for ocean heat content, which increased markedly between 2020 and 2021.¹⁴ The oceans absorbed the heat equivalent of seven Hiroshima atomic bombs detonating each second, 24 hours a day, 365 days a year.¹⁵ Studies document increasing sea surface temperature with growth in marine heat waves as well as compound heat, acidification, and deoxygenation events.¹⁶
- **Winds** - The frequency of Hawaiian northeast trade wind days has decreased, and the frequency of east trade winds has increased.¹⁷ Changes in wind direction from NE to E bring warmer air than in the past and interact with ridgelines in ways that reduce precipitation.¹⁸ Despite extreme rain events, the change in wind direction is expected to increase the number of dry days, contributing to more frequent and prolonged droughts.
- **Declining Rainfall** - In Hawai'i, on average, there has been a decline of 1.78% of annual rainfall per decade since 1920. A significant downward trend in annual rainfall per decade is seen in mountainous regions of Kaua'i, while leeward areas mostly show no trend in annual rainfall. Wet season, and dry season precipitation has decreased in mountainous and windward areas of Kaua'i.¹⁹
- **Water Resources** - Climate change has fundamentally altered the water cycle on tropical islands which is a critical driver of freshwater ecosystems and water resource renewal.²⁰ Long-term decreases in precipitation result in negative impacts to water resources, stream discharge, watershed and coastal ecosystems, and mauka to makai watershed connectivity. Streamflow has declined with increasing numbers of perennial streams running dry between direct rain events.²¹ Kauai's water supply is

¹⁰ Giant cracks push imperiled Antarctic glacier closer to collapse (2021) <https://www.nature.com/articles/d41586-021-03758-y> *Nature*, Dec. 14.

¹¹ Hawai'i Sea Level Rise Vulnerability and Adaptation Report (2017) Tetra Tech, Inc. and the State of Hawai'i DLNR, OCCL, DLNR Contract No: 64064.

¹² Summers, A., Fletcher, C.H., Spirandelli, D., et al. (2018) Failure to protect beaches under slowly rising sea level. *Climatic Change* 151, 427–443. <https://doi.org/10.1007/s10584-018-2327-7>

¹³ Lee, C. A. (2021). Eliminating the Hardship Variance in Honolulu's Shoreline Setback Ordinance: The City and County of Honolulu's Public Trust Duties as an Exception to Regulatory Takings Challenges. *University of Hawai'i Law Review*, 43(2), 464-518.

¹⁴ Cheng, L., Abraham, J., Trenberth, K.E., et al. (2022) Another Record: Ocean Warming Continues through 2021 despite La Niña Conditions. *Adv. Atmos. Sci.* <https://doi.org/10.1007/s00376-022-1461-3>

¹⁵ <https://thehill.com/changing-america/sustainability/climate-change/589187-oceans-absorbed-heat-equivalent-to-7-hiroshima>

¹⁶ Gruber, N., et al. (2021) Biogeochemical extremes and compound events in the ocean. *Nature* 600, 395–407.

¹⁷ Garza, J. A., P.-S. Chu, C. W. Norton, and T. A. Schroeder (2012), Changes of the prevailing trade winds over the islands of Hawaii and the North Pacific, *J. Geophys. Res.*, 117, D11109, doi:10.1029/2011JD016888.

¹⁸ Marra, J.J. & Kruk, M.C. (2017) State of Environmental Conditions in Hawai'i and the U.S. Affiliated Pacific Islands under a Changing Climate: https://coralreefwatch.noaa.gov/satellite/publications/state_of_the_environment_2017_hawaii-usapi_noaa-nesdis-ncei_oct2017.pdf.

¹⁹ Frazier, A.G. and Giambelluca, T.W. (2017) Spatial trend analysis of Hawaiian rainfall from 1920 to 2012, *International Journal of Climatology*, 37, 2522-2531, DOI: 10.1002/joc.4862

²⁰ Leta, O.T., et al. (2018) Impact of climate change on daily streamflow and its extreme values in Pacific Island watersheds, *Sustainability*, 10, 2057, doi:10.3390/su10062057

²¹ Bassiouni, M., and D. S. Oki (2013) Trends and shifts in streamflow in Hawai'i, 1913–2008. *Hydrological Processes*, 27 (10), 1484–1500. doi:10.1002/hyp.9298



mainly derived from groundwater.²² The probability of chronic water shortages may grow as rainfall decreases and the water requirements of a growing population increase.

- **Drought** - Drought has increased with longer and drier periods between rain events. Leeward areas are projected to experience significant drying, temperatures will continue to rise, and drought severity and frequency in the future will increase because of greater evaporative demand. Already-dry, drought-prone leeward areas are projected to become drier. These leeward areas are expected to be at high risk for drought in the future.²³ The frequency of extreme El Niño events is projected to increase which will likely result in more extreme drought.²⁴
- **Compound Events** - The probability of compound events such as hurricanes followed by heat waves, and the co-occurrence of intense rain-king tide-and large swell are increasing.²⁵
- **Heat** - Communities globally are experiencing increased heat stress, and extreme weather events.²⁶ State-wide, there has been an increase in air temperature with growth in record-setting hot days, rising urban heat, increased general heat stress, and increases in compound heat and humidity.²⁷
- **Ecosystems** - Land and ocean ecosystem impacts associated with changes in precipitation, water availability, ambient temperature, ocean acidification and sea surface warming, extreme events, disease, and recovery time are numerous and widespread.²⁸
- **Global Tipping Points** - Some major global bio-physical systems (e.g., terrestrial carbon sinks) show early indications of abrupt, potentially irreversible change that could accelerate warming and related climate change impacts.²⁹

Table 1 summarizes key observed and projected climate change hazards and threats to Kaua‘i.

Table 1. Historical and Expected Climate Hazards on Kaua‘i

Climate Hazard	Past Trend	Future Trend	Confidence
Average Rainfall	↓ Declining (last 100 years)	↓ Decreasing wet and dry season rain	High
Heavy Rainfall Events	↑ Increasing (last 100 years)	↑ Increasing	Moderate
Drought	↑ Increasing length	↑ Increasing with changing rainfall and temperature	Moderate
Stream flow	↓ Decreasing (last 20 years)	↓ Decreasing with declining rainfall	Moderate

²² Oki, D. S., et al. (1999) Hawaii. *Ground Water Atlas of the United States*, Segment 13, Alaska, Hawaii, Puerto Rico, and the U.S. Virgin Islands. Miller, J. A., et al., Eds., U.S. Geological Survey, Reston, VA, N12–N22, N36.

²³ Longman, R.J., et al. (2015) Sustained increases in lower-tropospheric subsidence over the Central Tropical North Pacific drive a decline in high-elevation rainfall in Hawaii. *Journal of Climate*. 28(22): 8743–8759. See also: Zhang, C., et al. (2016) Dynamical downscaling of the climate for the Hawaiian Islands. Part II: Projection for the late 21st century. *Journal of Climate*. 29(23): 8333–8354.

²⁴ Wang, G., et al. (2017) Continued increase of extreme El Niño frequency long after 1.5 °C warming stabilization. *Nature Climate Change*. 7(8): 568–572. See also: Cai, W., et al. (2014) Increasing frequency of extreme El Niño events due to greenhouse warming. *Nature Climate Change*. 5(2): 1–6.

²⁵ December 6, 2021: National Weather Service, <https://twitter.com/WMO/status/1468530412163149824>

²⁶ IPCC, 2021, SPM

²⁷ Keener, V., et al. (2018)

²⁸ Keener, V., et al. (2018)

²⁹ Steffen, W. et al. (2018) Trajectories of the Earth system in the Anthropocene, *PNAS – Perspective*, Aug. 14, v115, no33, 8252-8259, www.pnas.org/cgi/doi/10.1073/pnas.1810141115

Climate Hazard	Past Trend	Future Trend	Confidence
Wildfire	↑ Increasing (last 50 years)	↑ Increasing with changing rainfall and temperature	High
Average Temperature	↑ Increasing (last 70 years)	↑ Increasing	High
Warm Days & Nights	↑ Increasing (last 45 years)	↑ Increasing	High
Trade Winds	↓ Decreasing, turning easterly	↑ Continuing	Moderate
Sea Level Rise	↑ Increasing (last 65 years)	↑ Increasing	High
Tidal Flooding	↑ Increasing	↑ Increasing with higher SLR	High
Tropical Cyclones	↑ Increasing (last 40 years)	↑ Increasing	Moderate
Marine Heatwaves	↑ Increasing (last 40 years)	↑ Increasing	High
Global Disease	↑ Increasing (last 40 years)	↑ Increasing	High

Source: County of Kauai Climate Hazard Review Paper

Vulnerability Assessment Summary

This Vulnerability and Equity Analysis summarizes the sectors and assets that are exposed and vulnerable to climate change hazards on Kaua'i. It focuses on County assets (such as infrastructure, services, and parks that are within County jurisdiction), though other county-wide assets are included. The following are key findings of the most pressing issues that need to be addressed based on the analysis and community input.

- Residents:** Though climate change's impacts will be felt by everyone, there are certain groups and communities who will face higher risks than others with the same hazard exposure. Communities who face the most social vulnerability to climate change are in the Līhu'e and West Kaua'i planning areas. Furthermore, climate change will further exacerbate the high cost of living in Hawai'i, such as increasing utility costs and insurance rates, which threatens vulnerable households with displacement.
- Economy:** Reliance on the tourism industry and the impacts of tourists themselves are two vulnerabilities community members are particularly concerned about. Lack of visitor preparedness paired with the fact that many visitor destinations and uses are exposed to hazards makes them vulnerable and puts a strain on community members.
- Housing and Businesses:** Many populated areas are located in low-lying or coastal zones, increasing their exposure to flooding and sea level rise. Wildfire poses the greatest hazard to developed areas in terms of the number of buildings at risk and the potential cost of recovery.
- Critical Facilities:** Analysis from the Multi-Hazard Mitigation Plan finds that wildfire is expected to cause the most damage to the 798 critical facilities countywide. Though flood and sea level rise (SLR) affect fewer facilities, their impacts to roads, water and wastewater facilities, etc. will have outsized impacts.

- **Transportation:** Roads and bridges are vulnerable to flooding, sea level rise, and landslide. As demonstrated by disaster events in recent years, the transportation system in the North Shore is particularly vulnerable due to lack of redundancy in the network, which means there are no alternative routes if one section of a road or bridge is compromised during a hazard event. West Kaua'i also has the most miles of roads exposed to climate hazards.
- **Utilities and Infrastructure:** Cesspools emerge as one of the top concerns for community members and are highly exposed to flood and SLR in West Kaua'i's towns and other low-lying areas. As sea levels rise, the island's groundwater table is elevated, causing cesspool effluent to mix with the water table and flow into the ocean. This can result in wastewater backing up into homes and pose risks to clean water, ecosystems, and public health. The electrical system is also vulnerable to multiple hazards (flood, heat, wildfire, SLR); outages then cause cascading impacts to communications and potable water supplies.
- **Cultural Resources:** Cultural resources, including significant ancestral sites important to Native Hawaiians, will be impacted by all climate change hazards. This may result in a significant loss of cultural resources. About 550 Hawaiian cultural sites are exposed to chronic flooding with a sea level rise of 3.2 ft.³⁰ Sea level rise impacts cultural practices such as fishpond maintenance, cultivation of salt, crop cultivation, and gathering from nearshore fisheries.
- **Food Systems:** Dependence on imported food is vulnerable to interruptions from natural disasters and other disturbances. Locally grown food is also vulnerable to climate change impacts, especially the flooding of kalo and the impacts of heat, drought and pests on other crops. The food system is also a sector where practices like regenerative agriculture can help mitigate climate change.
- **Natural Resources:** The island's native bird species are acutely impacted by warming temperatures, habitat loss/degradation, and diseases which have pushed many to the brink of extinction. In the ocean, coral reefs are experiencing bleaching events that harm the species who live there and reduce the shoreline's defenses against wave action. Beach loss is accelerating at a rapid pace, affecting coastal development, social infrastructure, and people's connection with the ocean and its resources.

Greenhouse Gas Inventory and Forecast

Current Emissions Profile

The 2017 Kaua'i Greenhouse Gas Inventory prepared by the County served as the foundation for projecting emission trends. The inventory captures communitywide emissions generated from transportation, energy consumption in homes and buildings, solid waste, water, and agriculture, forestry, and other land uses (AFOLU).

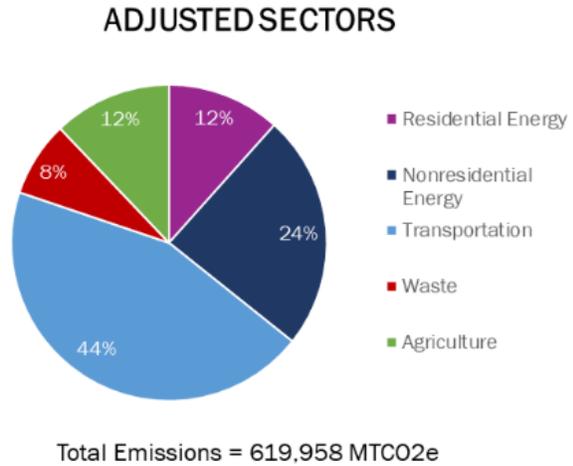
The 2017 adjusted communitywide emissions were 619,958 metric tons of carbon dioxide equivalent (MTCO_{2e}) (**Table 2**). This total reflects the emissions from sources located within the county boundary, known as Scope 1 emissions. The largest sources of communitywide GHG emissions in 2017 were ground transportation (275,645 MTCO_{2e}, 44 percent of the total) and energy (221,369 MTCO_{2e}, 36 percent of the total) (Table 2). Transportation emissions are the result of vehicle miles traveled in the county. Energy emissions are the result of the consumption of electricity, natural gas, and other fuel sources such as propane from residential and nonresidential buildings.

³⁰ Hawai'i Climate Change Mitigation and Adaptation Commission (2017).

Table 2. Adjusted 2017 Emissions by Sector

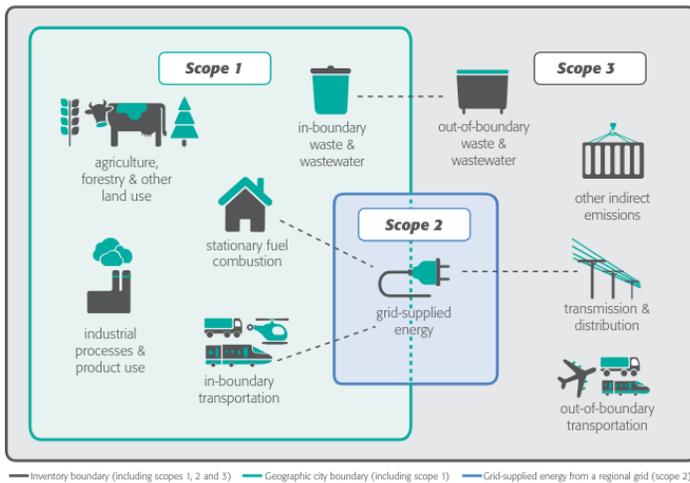
Sector	Emissions (MTCO ₂ e)	Percent
Residential Energy	72,099	12%
Nonresidential Energy	149,20	24%
Transportation	275,645	44%
Waste	47,746	8%
Agriculture	75,200	12%
Total	619,958	100%

Source: Raimi + Associates

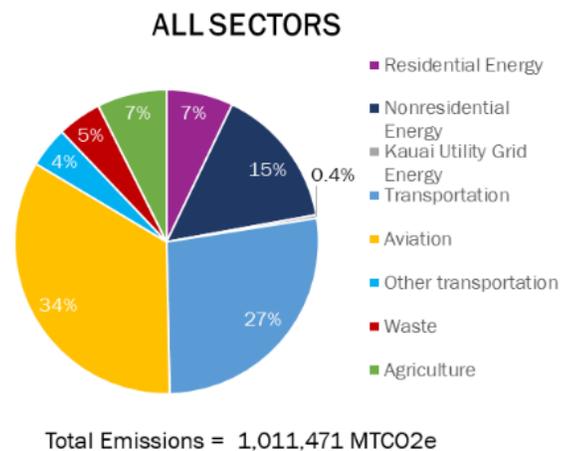


The 2017 adjusted community emissions do not include those from aviation, maritime uses, and utility grid (losses in energy transmission). While these sectors were included in the GHG inventory prepared by the County in 2017 (**Table 2**) they are excluded from the inventory for the purposes of the CAAP because they are not directly associated with activities conducted in the county, are regulated by other federal and State agencies, and are not within the County’s authority to control. The different scopes of GHG emissions and the unadjusted emissions inventory are shown in **Figure 4**.

Figure 4. Emissions Scopes and 2017 Unadjusted Emissions



Source: World Resources Institute, C40 Cities, ICLEI; County of Kaua’i



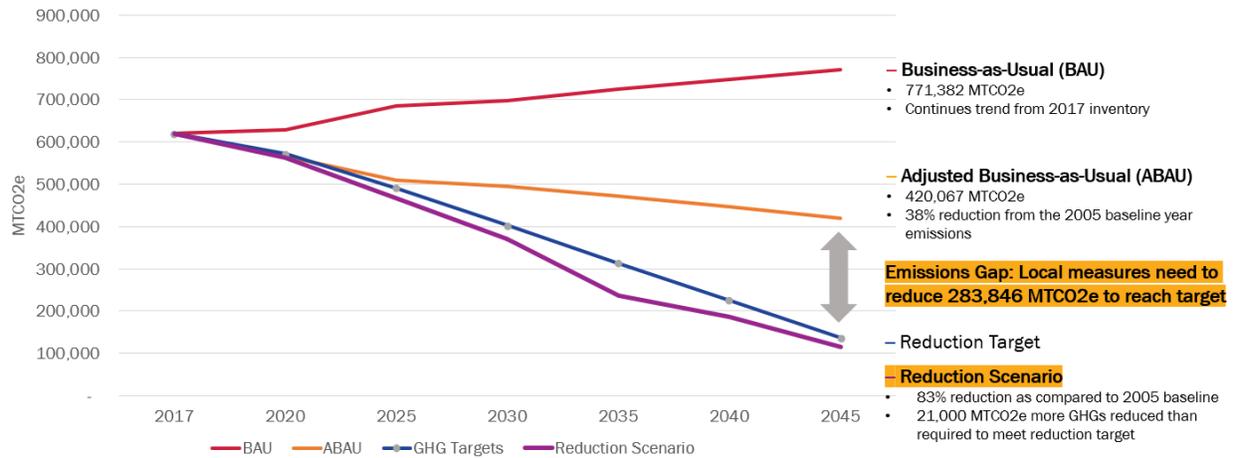
GHG Forecast and Reduction Pathway

Three emissions forecasts were prepared to estimate the county's emissions from 2017 to 2045 (see **Figure 5**). They all assume increases in housing units (+36 percent), jobs (+31 percent), and population (+24 percent) by 2045. The blue line in **Figure 5** shows the emissions reduction pathway to achieve the County's reduction target as stated in the General Plan, which is to reduce GHG emissions by at least 80 percent as compared to 2005 baseline by 2050. The other three lines in **Figure 5** illustrate three climate action scenarios, from least to most aggressive action:

- **“Business-as-Usual” (BAU) scenario** (red line in **Figure 5**): This scenario forecasts how emissions will likely change if no action is taken to reduce emissions. The BAU forecast emissions are expected to rise to 771,382 MTCO_{2e} in 2045, a 24 percent increase from the adjusted 2017 emissions.
- **“Adjusted Business-as-Usual (ABAU)” scenario** (blue line in **Figure 5**): This scenario reflects emissions reductions from federal fuel standards and implementation of the KIUC Renewable Portfolio Standard. These alone will reduce transportation emissions by 24 percent, residential energy emissions by 53 percent, and nonresidential energy emissions by 66 percent. The ABAU forecast emissions are expected to decrease 420,067 MTCO_{2e} in 2045, a 32 percent decrease from the adjusted 2017 emissions.
- **Reduction Scenario** (purple line in **Figure 5**): The Reduction Scenario reflects emissions reductions from the implementation of CAAP mitigation measures in addition to those realized through state policies (the ABAU). The Reduction Scenario requires the County and community to take ambitious climate action within the realistic bounds of current capacity, technology, and state and federal policy. It models the GHG reductions from phased-in actions including:
 - 25-38 percent of buildings implement energy efficiency and/or decarbonization upgrades.
 - 14 percent of total vehicles are electric.
 - 13 percent additional transportation mode shift on top of existing County efforts (for a total of 27.5 percent non-single-occupancy vehicle travel).

The results of the Reduction Scenario show that the County is meeting the General Plan GHG reduction target (to reduce GHG emissions by at least 80 percent as compared to 2005 baseline by 2050). With this, 2005 is used as the baseline year to compare 2045 projected emissions from the Reduction Scenario. Implementation of the Reduction Scenario will slightly exceed the County's reduction target in terms of emissions and timeframe. It will result in 21,000 MTCO_{2e} reduced in excess of the General Plan target and will achieve this five years early.

Figure 5. 2045 Emissions Projections



Even with GHG reductions from federal and state actions (ABAU), local actions are needed to reduce an additional 283,846 MTCO_{2e} to reach the County’s target of reducing GHG emissions by at least 80 percent as compared to 2005 baseline. The CAAP Reduction Scenario will exceed the minimum GHG required to meet the County’s target, and will do so by 2045 instead of 2050.

Source: Raimi + Associates

COMMUNITY ENGAGEMENT

Community engagement was a central aspect of the entire CAAP process, encompassing both online and in-person outreach at different stages of the project. Notably, there was a significant emphasis on youth engagement, recognizing the pivotal role their perspectives and insights will play in shaping the future impacted by climate change.

Each engagement effort was strategically conducted to inform subsequent project phases, with the initial phase focusing on gathering place-based knowledge to characterize the island’s vulnerability and the latter phase emphasizing the identification and development of locally appropriate adaptation strategies.

The graphic on the next page summarizes the various engagement efforts.



Talk stories with **35** unique groups

51 participants in the Youth Summit

Over **50,000** website views over the life of the project

585

Unique Survey Respondents

100+

Storybank Entries

7,000+

Unique Website Users

391 participants over 3 workshop series totaling **12 in-person** and **3 online events**

Stakeholder Meetings

Stakeholder Interviews and Talk Stories

As part of the early phase of the CAAP's planning process, the project team conducted a series of virtual listening sessions with key community stakeholders, and community groups. This included the following: 1) formalized interviews with key community stakeholders from October to November 2021; and 2) informal conversations, which were referred to as 'talk stories,' that took place from November 2021 to January 2022. These conversations sought to listen to their concerns, perspectives, insights, and experiences to better understand the potential impacts of climate change on the island, as well as hear how the CAAP can meaningfully engage the community. An additional aim of the talk stories was to actively involve and nurture connections with community groups that could be disproportionately impacted by climate change hazards. The insights gathered from these conversations informed both the findings of the Vulnerability and Equity Analysis and the design of the CAAP's engagement strategy. The 'Talk Story Summary' document can be found here, [KCAP-Talk-Story-Summary_051322.pdf \(kauaiadaptation.com\)](https://www.kauaiadaptation.com/KCAP-Talk-Story-Summary_051322.pdf).

Department and Agency Check-Ins

Over the course of the project, the project team met with County and State agencies to integrate their expertise into the plan. The primary objective of these discussions was to gather insights on how climate change affects their operations and to identify strategies or actions that could support them in addressing these impacts. The input from these conversations was utilized in developing strategies and actions for the CAAP. Regular check-ins with County and State agencies were conducted to develop and refine the strategies and actions for the CAAP.

Native Hawaiian Practitioner Group Meetings

The project team convened with Native Hawaiian practitioners in 2023 to gather insights on adaptation strategies rooted in Native Hawaiian place-based knowledge systems. Meetings took place across various locations on the island, accompanied by a lunch provided for all attendees. Additionally, participants unable to attend in person offered feedback via email. The invaluable perspectives shared during these discussions helped shape the strategies and actions outlined in the CAAP.

Hotel Operators Group Meeting

The project team met with hotel operator owners to discuss observed climate change impacts at their facilities and gather feedback on adaptation strategies, with a particular focus on addressing sea level rise. The insights shared informed the development of strategies and actions delineated in the CAAP.

Open Houses and Workshops

Open House Series 1

The Open House Series comprised one online session and five in-person gatherings conducted from late March to early April 2022. These events aimed to understand personal and local community experiences with climate hazards and adaptation measures. More specifically, their objectives were to introduce the public to the CAAP, disseminate information on climate hazards, capture the community’s vision for a resilient and equitable Kaua’i in the face of a changing climate, and gather place-based experiences related to climate hazards and adaptation initiatives. The feedback provided guided the development of the CAAP’s Vision Statement and the design of the Adaptation Workshops. The ‘Open House Series #1 Summary Report’ document can be found here, [KCAP OpenHouse1_FINALSummary_22_0707.pdf \(kauaiadaptation.com\)](https://www.kauaiadaptation.com/KCAP_OpenHouse1_FINALSummary_22_0707.pdf).

Left: University of Hawaii Sea Grant Extension Agent, Ruby Pap, engaging a community member in the Open House event in Līhū’e. Right: County staff Niki Kunioka-Volz engaging a community member in the Open House event in East Kaua’i.



Photo source. Alisha Summers

Open House Series 2

The final Open House series, held from May to June 2025, included five in-person workshops to obtain feedback on the public draft of the CAAP and its proposed strategies. In addition, an online comment form was made available to allow community members to provide final input before the plan is finalized for adoption by mayoral executive order. Feedback gathered through these efforts was integral in ensuring the strategies reflect community priorities.

Adaptation Workshops

The Adaptation Workshops, consisting of one online workshop and five in-person workshops, were conducted from May to June 2023. These workshops were convened to solicit community members’ perspectives on potential climate adaptation measures to be included in the CAAP and to gather inputs on their applicability within their respective areas. The feedback was integral in forming the foundation of the adaptation strategies and actions incorporated into the CAAP. The ‘Climate Adaptation Strategies Workshops Summary Report’ document can be found here, [KCAAP AdaptationDDWorkshopsSummary_FINAL.pdf \(kauaiadaptation.com\)](https://www.kauaiadaptation.com/KCAAP_AdaptationDDWorkshopsSummary_FINAL.pdf).

Climate Action Workshops

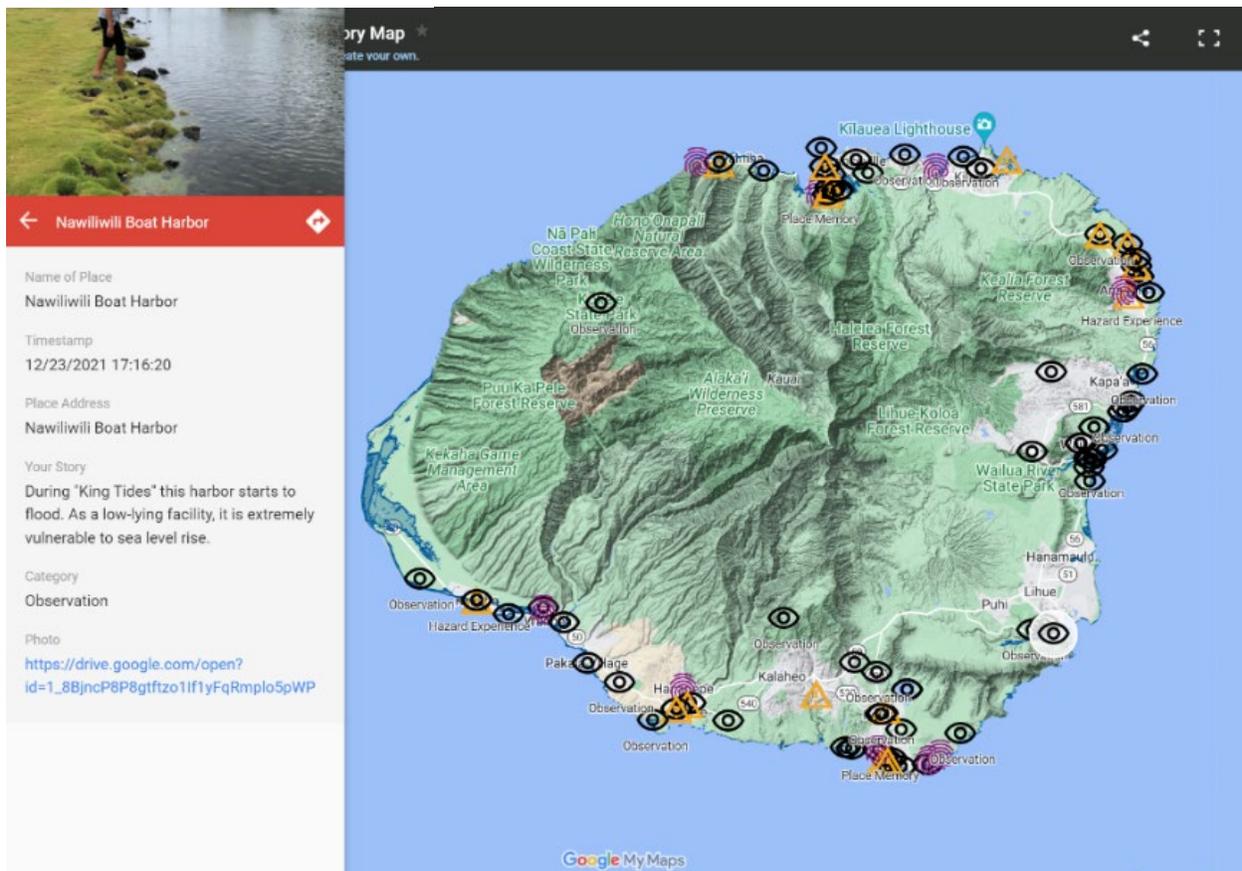
The Climate Action Workshops, consisting of one online session and two in-person sessions, were conducted in September 2023. These workshops aimed to gather community members' opinions on potential greenhouse gas reduction measures for inclusion in the CAAP and to collect input on their implementation. The feedback obtained played a crucial role in establishing the groundwork for the greenhouse gas reduction measures integrated into the CAAP. The 'Climate Action Strategies Workshops Summary Report' document can be found here, [KCAAP_ClimateActionWorkshopsSummary_final_121323.pdf \(kauaiadaptation.com\)](https://www.kauaiadaptation.com/KCAAP_ClimateActionWorkshopsSummary_final_121323.pdf).

Online Surveys and Activities

Story Bank

On the project website, [kauaiadaptation.com](https://www.kauaiadaptation.com), members of the public had the opportunity to interact with the participatory online Story Bank (see **Figure 6**). This platform enabled community members to document their experiences and insights regarding the changing climate on Kaua'i. Through an online form, individuals could record their memories and knowledge of specific locations. The Story Bank was regularly updated, allowing others to view and engage with the entries submitted by fellow community members. These memories and observations were also captured through 'Talk Story' conversations and during the Open House Series. Story Bank comments were incorporated into the Vulnerability and Equity Analysis report.

Figure 6. Story Bank Map



The Story Bank is an interactive map which allows community members to record and share their observations, experiences, and insights regarding Kaua'i's changing climate.

Photo source. [Story Bank - Kaua'i Climate Adaptation Plan \(kauaiadaptation.com\)](https://www.kauaiadaptation.com/Story-Bank-Kaua-i-Climate-Adaptation-Plan)

Community Survey on Climate Change Impacts in Kaua'i

The Community Survey on Climate Change Impacts in Kaua'i was available from March to mid-May of 2022. The survey aimed to collect insights into community members' perspectives and experiences regarding the effects of climate change across the island and within their respective communities. Visitors who took the survey were directed to a distinct set of questions from those for current and former residents. The Survey Responses Summary document can be found here, [KCAP Survey1 Summary 22_0602.pdf \(kauaiadaptation.com\)](#).

Adaptation Strategies Poll

The Climate Adaptation strategies poll was open from May through July 2023 and aimed to gather community opinions and levels of support for proposed adaptation strategies using an online [Consider.It](#) platform. The poll categorized adaptation strategies into collaboration and community capacity efforts, as well as strategies focusing on physical assets. Participants could express their support level for each strategy and provide feedback on its pros and cons. Moreover, the public could also submit their own adaptation strategy suggestions. The insights gathered from the poll played a critical role in shaping the climate adaptation measures included in the CAAP. The summary of poll responses for the adaptation strategies can be found here, [KCAAP Survey2 Summary_010924.pdf \(kauaiadaptation.com\)](#).

Climate Action Strategies Poll

The Greenhouse Gas Mitigation strategies poll aimed to gauge community opinions and levels of support for proposed greenhouse gas mitigation strategies. The poll, which used the [Consider.It](#) platform, was open from September through October 2023. The insights gathered from the poll directly influenced the greenhouse gas mitigation strategies incorporated into the CAAP. For a summary of poll responses, please refer to [KCAAP Survey3 Summary Mitigation_121323.pdf \(kauaiadaptation.com\)](#).

Youth Engagement

Youth Summit

On May 7th, 2022, the County held its first ever Youth Climate Change Summit, engaging youth aged 11 to 25 and fostering a space for youth to share experiences and ideas. The summit introduced Kaua'i's youth to the CAAP, provided information on local climate hazards, and gathered youth perspectives on vulnerability and adaptation efforts. It also encouraged youth involvement in broader climate change initiatives. The Youth Summit featured a Youth Panel Discussion and interactive booths providing information and activities. Feedback from the summit informed the development and design of the Adaptation Workshops. The 'Youth Climate Change Summary Report' is available at this link, [KCAP YouthSummit Summary_062222.pdf \(kauaiadaptation.com\)](#).



*Left: Youth members engaging with the interactive floor mapping activity. The wooden structures to hold comment cards were created by HTA students with strawberry guava and hala bush.
Right: Youth panel session.
Photo source. Ruby Pap*

Classroom Activities

During the initial stages of the CAAP (February-March 2022), the project team engaged with various youth groups, as well as middle, high school, and Kaua'i Community College students, through a climate pop-up activity. One activity, called 'Climate Change in Photos' allowed students to discuss and analyze photographs to grasp the impacts of climate change and better understand adaptation and mitigation measures. The second activity, titled 'Domino Effect: Web of Interdependence' involved exploring with the youth how climate change disrupts the interconnected relationship between all land and sea organisms, leading to a chain reaction of consequences. This was facilitated through an interactive game utilizing string and resource cards. During these visits, the project team also introduced the CAAP and encouraged youth to attend the Youth Climate Change Summit scheduled for May.



*Engaging Island School students in the 'Domino Effect- Web of Interdependence' (left) and 'Climate Change in Photos' (right) class activities.
Photo source. Alisha Summers*

Youth Contests

Throughout the CAAP process, youth had the opportunity to engage in various contests aimed at inspiring their active participation and encouraging the sharing of their unique perspectives and visions for the island's future in a changing climate. Three contests were available for youth participation: the Recycled Material Art Contest, the Kilo Climate Challenge, and the Climate Adaptation on Kaua'i Art Contest. Below are brief descriptions of each contest:

- The Recycled Material Art Contest invited youth members to utilize recycled materials to depict their understanding and experience of climate change and its impact on their community. The winning entry was celebrated at the Youth Climate Change Summit.
- The Kilo Climate Challenge encouraged youth to document their observations of climate change-related changes and share them in the online interactive Story Bank. Comments from the Story Bank were integrated into the Vulnerability and Equity Analysis report.
- The Climate Adaptation on Kaua'i Art Contest prompted youth to creatively reimagine beloved spaces and demonstrate how they envisioned adapting to climate change. Winning entries are showcased in the final CAAP plan.



Mrs. Ashley's 3rd grade students at Alaka'i o Kauai Charter School won the Recycled Materials Art Contest. They created an endangered green sea turtle swimming through sea of plastic to raise awareness of the problem of plastic pollution and the impact this has on marine life. Each plastic piece used was found on the beaches of Kauai during their field trip with Surfrider Foundation. Photo source. Alaka'i o Kaua'i Charter School

Community Pop-Ups

Throughout the CAAP process, the project team actively engaged the community by setting up pop-up booths at various community events, including farmers markets, the Wāipa Mango Festival, the 2023 Girls Scouts STEM Fest, the 2023 Ho'olaule'a No Ka Hōnua Earth Day Event, the KCSC Climate Connect VR Students Worlds Showcase Event, and more. These pop-up events served as platforms for the project team to disseminate information on climate hazards, gather place-based experiences related to climate hazards and adaptation initiatives, and encourage community members to participate in the CAAP process through ongoing engagement opportunities available at the time of each event.



*Engaging youth at the Girls Scouts of Hawai'i STEM Fest (left) and at the Ho'olaule'a No Ka Hōnua Earth Day event (right).
Photo source. Alisha Summers and Marie Williams*

Advisory Bodies

Resiliency Team

The County convenes an internal Resiliency Team to coordinate climate-related initiatives. This team comprises representatives from multiple departments, including Planning, Public Works, Emergency Management, Water, Economic Development, the Mayor’s Office, and a University of Hawai’i Sea Grant Extension Agent. Through collaborative efforts and interdepartmental cooperation, the team aims to identify, prioritize, and execute county projects aimed at enhancing Kaua’i’s resilience to climate change. Leveraging their collective experience and expertise, the team actively contributed to shaping the development and design of the CAAP, in addition to facilitating various engagement endeavors.



*Resiliency Team members at the North Shore Adaptation Workshop.
Photo source. Christina Kaser*

Technical Advisory Group

The main purpose of the Technical Advisory Group (TAG) is to ensure that the CAAP process is utilizing the best available data and tools to assess vulnerability and generate adaptation recommendations for Kaua’i. The TAG is composed of 19 persons with scientific expertise as well as Kaua’i residents with local expertise of ecological processes, cultural expertise, and societal dynamics. High school and college student representatives on the TAG helped to ensure the participation of Kaua’i’s youth (the segment of our population who will be most impacted by climate change over the course of their lifetime). The TAG held four virtual meetings during the project's duration and supplemented their input with additional contributions via email.

3. How We Adapt to and Mitigate Climate Change

The CAAP seeks to adapt to and mitigate climate change and achieve our vision for a resilient and equitable Kaua'i. The strategies in the CAAP focus on what the County is uniquely positioned to do based on its jurisdiction and authority, including land use, County facilities and infrastructure, programs, and community engagement.

The CAAP includes 79 different strategies organized into six different strategy types. Twelve of those strategies are identified as priorities. There are many specific County actions required to advance those strategies, so the CAAP includes 20 County “Division Action Plans” to guide the integration of CAAP actions into workplans and capital improvement program (CIP) requests. The CAAP also includes funding and financing options for CIP projects.

Because the science of climate change and the community’s experience with it will change over time, the CAAP employs an “adaptive pathways” approach that advances near-term action while retaining flexibility to adapt to an uncertain future of changing exposures, risks and technology. In addition, because the most vulnerable communities are often most impacted by climate change, the CAAP includes an Equity Implementation Tool to help County staff incorporate equity into CAAP programs and initiatives; and to help prioritize strategies that address the high cost of living.

OUR CLIMATE ACTION AND ADAPTATION STRATEGIES

CAAP strategies are organized into six major types:

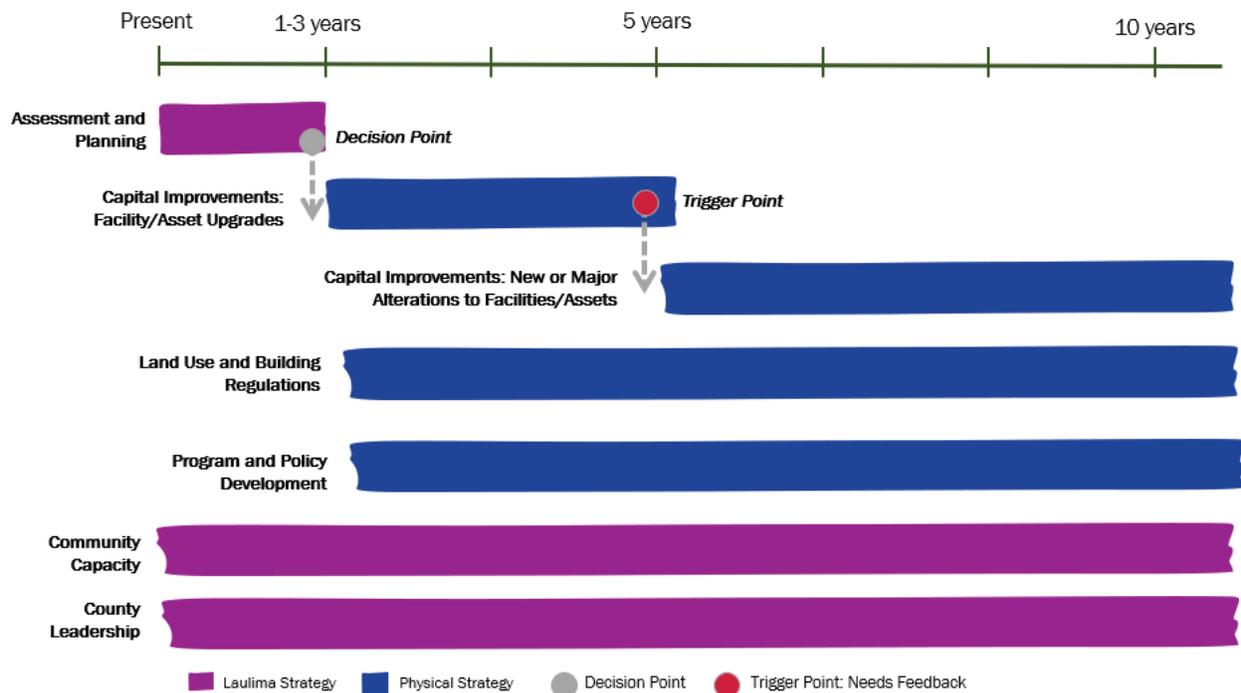
- **Assessment and Planning:** Improve our understanding of climate hazards and vulnerabilities, including the status of GHG emissions reduction, and update strategies accordingly.
- **Capital Improvements:** Modify existing built and natural assets and build new facilities or infrastructure.
- **Land Use and Building Regulation:** Update zoning, subdivision, and building regulations.
- **Program and Policy Development:** Stand up new County programs and adopt new County policies.
- **County Leadership:** Build County staff and organizational capacity, strengthen partnerships, advocate at the State and federal levels, and secure funding and financing.
- **Community Capacity:** Strengthen the broader community’s ability to understand, mitigate, and prepare for climate change.

The complete list of CAAP strategies is organized by these six types. Additionally, the strategies can be described as either *laulima* (collaborative or supportive strategies that require cooperation) or *physical* strategies that lead to tangible changes or the construction of projects. These are color coded in Figure 10.

ADAPTATION PATHWAYS

The “adaptation pathways” framework explains the relationship among the different types of CAAP strategies, as illustrated conceptually in Figure 7. Assessment and Planning inform decisions about Capital Improvements, Land Use and Building Regulations, and Program and Policy Development. Over time, triggers, like achieving GHG emissions milestones or measuring a certain amount of sea level rise, prompt the implementation of updated or new strategies. These pathways are, in turn, supported by strengthened County Leadership and greater Community Capacity. This approach advances near-term action while retaining flexibility to adapt to an uncertain future of changing exposures, risks and technology. Robust and proactive monitoring ensures that action is taken at the appropriate time.

Figure 7. General Adaptation Pathway



Source: Raimi + Associates

EQUITY CONSIDERATIONS

“Climate work is inherently justice work.” - Community member, Native Hawaiian Practitioner Group Meeting

One of the key purposes of the CAAP is to set Kaua’i on the path of equitable climate action and adaptation.

Equity

Although equity is like equality, they are not the same thing. Equality means everyone receives the same thing regardless of any other factors. Equity, on the other hand, aims for equal outcomes and is about ensuring that all people have access to the opportunities they need to thrive and succeed. Figure 8 illustrates this distinction. In addition, three different types of equity need to be considered: Procedural, Distributional, and Structural.

Procedural Equity:

- Transparent, fair, and inclusive process; and increase civic engagement opportunities
- Ensure all are treated openly and fairly

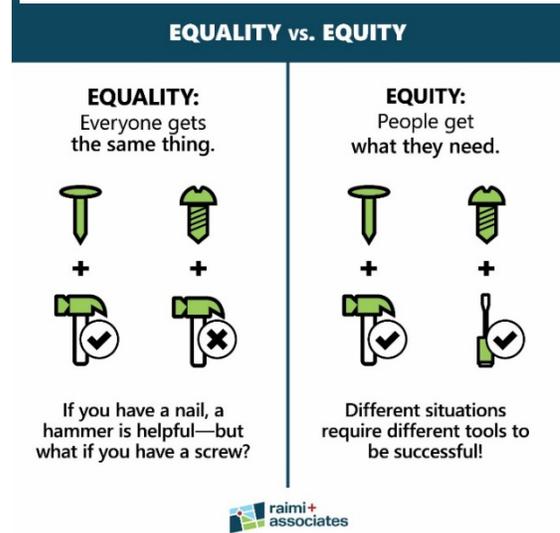
Distributional Equity:

- Fairly distribute resources, benefits, and burdens
- Prioritize resources for communities that experience greatest inequities and unmet needs

Structural Equity:

- Make a commitment to compensate for past harms and prevent future unintended consequences
- Address underlying structural and institutional systems that are the root causes of social and racial inequities

Figure 8. Equality vs. Equity



Disproportionate Impacts

Inequitable economic, governmental, and social systems have resulted and continues to result in the disproportionate distribution of climate burdens and exposures, such as living in areas more prone to flooding. A growing body of social epidemiological research has also found that repeated experiences of racism become biologically embedded in the body and results in “weathering” or premature physiological deterioration.³¹ This is relevant to a population’s sensitivity to climate hazards, as having a chronic illness (e.g., heart condition, lung condition, obesity) makes people more likely to experience health effects from extreme heat, wildfire, and other hazards.³² As Kaua’i’s demographics shift toward an aging population, it is important to recognize that

³¹ Geronimus, A. T. (2023). *Weathering: The Extraordinary Stress of Ordinary Life in an Unjust Society*. Little, Brown Spark.

³² US Environmental Protection Agency. (2021). *Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts*.

older adults are especially vulnerable to climate hazards such as extreme heat. This increased risk is due to factors including reduced ability to regulate body temperature, a higher prevalence of underlying health conditions, and potential challenges with mobility or evacuation during emergency events. Socially vulnerable communities are often burdened with multiple, overlapping challenges that cumulatively impact their ability to adapt or respond to climate change.

Furthermore, Kauai residents are burdened by the highest transportation, electricity, and housing costs in the nation. The high cost of living disproportionately impacts socially vulnerable populations, such as low-income families, seniors, and indigenous communities. These groups often have limited financial resources and are less able to absorb rising costs for housing, transportation, and necessities. As expenses escalate, many are forced to relocate to more affordable areas, leading to displacement. This displacement disrupts social networks, access to essential services, and cultural ties, further marginalizing these vulnerable populations.

Climate change exacerbates the high cost of living in Hawai'i by intensifying storms, wildfires, and other natural disasters. These events lead to higher insurance premiums, increased property repair and reconstruction costs, elevated utility and food prices, and strain on the tourism and agriculture industries. The impact of hazard-related events on insurance rates is significant. Following the August 8th Maui wildfires, insurance rates across the state have surged, with some properties experiencing rate increases of up to threefold or more. This sharp increase adds financial strain on residents and businesses, exacerbating concerns about the affordability and accessibility of insurance, and increasing the risk of displacement.

Equity in the CAAP and Implementation

Everyone in Kaua'i deserves a healthy, sustainable future. It is ethically imperative to solve the climate crisis while simultaneously addressing the inequities. Therefore, CAAP strategies support community-based solutions that create community stability, greater public health, and economic well-being for all community members. Key equity considerations reflected in the CAAP strategies include:

- Prioritizing strategies that address and help alleviate the high cost of living.
- Benefits to those who are most impacted by climate change and/or sensitive to its negative effects.
- Native Hawaiian cultural resources are protected or otherwise adapted to climate impacts in partnership with cultural practitioners.
- Multiple facets of equity are addressed (procedural, distributional, institutional).
- Programs are put in place to assist low-income residents with the costs of implementing GHG reduction and climate adaptation actions.
- Barriers related to language ability, housing tenure, and other socioeconomic factors are addressed so that all residents have access to opportunities to take climate action to increase their adaptive capacity.
- The County performs outreach to community groups to hear concerns, elicit input, and directly engage community members about climate policies and programs.

The CAAP includes a Vulnerability and Equity Analysis (Appendix A) that assesses climate hazard exposures and social vulnerabilities across Kaua'i at planning area and community scales. The analysis uses demographic, socioeconomic, housing, and neighborhood indicators to develop a Social Vulnerability Index with detailed maps, also shown interactively at kauaiadaptation.com. Building on these findings, Appendix B provides an Equity Implementation Tool to guide County staff in using the SVI mapping data and incorporating equity considerations into implementation of CAAP programs and policies.

PRIORITY STRATEGIES

Of the 79 strategies, twelve priority strategies are critical to the successful implementation of the CAAP. These strategies are identified based on one or more of the following criteria:

- The strategy is foundational to other strategies and will inform or support other strategies.
- The strategy addresses hazard impacts that the community and County consider to be high priorities.
- The strategy furthers one or more types of equity.
- The strategy helps to mitigate and reduce the high cost of living.
- The strategy will result in high GHG reductions.
- The strategy aligns with priorities from other County planning efforts and/or state priorities.

List of Priority Strategies

- **AP-2 Site-specific vulnerability assessments:** Conduct vulnerability assessments of County facilities, such as County roads, wastewater treatment plants, County parks, and civic facilities.
- **AP-10 Decarbonization plan for existing buildings:** Adopt a phased in decarbonization plan for existing buildings that promotes, and as-needed, requires the retrofit of existing buildings to be powered using carbon-free energy.
- **CI-1 Nature-based strategies for beach health:** Help to ensure the health of beaches in the short term through beach and dune restoration.
- **CI-12 Relocate critical facilities:** Relocate or build new critical facilities and infrastructure as needed based on findings of site-specific assessments.
- **CI-13: New emergency response centers and shelters:** Build new emergency response centers and shelters as needed in areas that could be isolated during extreme precipitation events, floods, landslides, and/or wildfires. Centers can serve as places of refuge for residents and be a base for KEMA and other partners during a climate hazard event.
- **CI-15: Multimodal transportation networks:** Plan and build seamless multimodal transportation networks in Kauai's jobs/housing centers of Lihu'e, Kapa'a-Wailua Corridor, Koloa-Poipu to facilitate the shift to active transportation modes for all users (from keiki to kupuna).
- **LU-2 Resilient site design and development standards:** Develop and implement standards including Wildland-Urban Interface (WUI)-specific regulations to reduce climate vulnerability by requiring fire- and flood-resistant construction; promoting onsite stormwater capture; mitigating urban heat; and guiding new development away from high-risk areas
- **LU-7 Support EV ready/EVSE:** Encourage and fund EV ready/EVSE-installed for commercial and multi-family dwellings, and explore long-term progressive policy modifications applying to existing ordinances.
- **PD-2 Managed retreat:** Encourage and facilitate the managed retreat of existing buildings from vulnerable coastal areas.
- **PD-5: Curbside collection for recycling:** Evaluate implementation of a new curbside collection for recycling with a potential future addition of green waste and food waste or enhance drop-off recycling.
- **CL-2: Climate adaptation staff:** Establish and fund a permanent climate adaptation and equity planner on County staff to monitor and track implementation of adaptation strategies.
- **CC-2: Climate change literacy:** Build community literacy about climate change impacts and adaptation strategies through the lenses of both cultural knowledge and current science.

CAAP Strategy Overview

Top 12 priority strategies are highlighted and marked with a “◀”

Assessment and Planning

Research and Studies

- AP-1: Climate data
- AP-2: Site-specific vulnerability assessments ◀
- AP-3: Pre-planning for cultural resources

Plan Development

- AP-4: Facility Adaptation Plans
- AP-5: Community Wildfire Protection Plan
- AP-6: Disaster Recovery Plan
- AP-7: Urban Forest Management Plan
- AP-8: Establish proactive floodplain management procedures
- AP-9: Decarbonization plan for County facilities
- AP-10: Decarbonization plan for existing buildings ◀
- AP-11: Clean Fuel Transportation Plan
- AP-12: Kaua'i Bus Short-Range Transit Plan

Capital Improvements

Enhance Existing Assets

- CI-1: Nature-based strategies for beach health ◀
- CI-2: Restore indigenous agrosystems
- CI-3: Encourage wetland and riparian restoration
- CI-4: Park improvements
- CI-5: Stormwater management and green infrastructure
- CI-6: Manage water supply issues
- CI-7: Harden critical facilities and infrastructure
- CI-8: Neighborhood resilience hubs
- CI-9: Expand County renewable energy projects
- CI-10: Methane capture and reuse at wastewater treatment facilities
- CI-11: Implement Complete Streets principles

Major Asset Alteration

- CI-12: Relocate critical facilities ◀
- CI-13: New emergency response centers and shelters ◀
- CI-14: Cesspool Conversion
- CI-15: Multimodal transportation networks ◀

Land Use and Building Regulation

Code and Rule Updates

- LU-1: Reduce the intensity of development in hazardous areas
- LU-2: Resilient site design and development standards ◀
- LU-3: Resilient building standards
- LU-4: Streamline permitting
- LU-5: Energy source code requirements
- LU-6: Adopt low embodied carbon material use code
- LU-7: Support EV ready/EVSE ◀
- LU-8: Transportation Demand Management program
- LU-9: Parking Standards Reform
- LU-10: Energy and water benchmarking ordinance
- LU-11: Green plumbing building code
- LU-12: Model Water Efficient Landscape Ordinance (MWELO)

Program and Policy Development

Land Use

- PD-1: Transit-Oriented Development
- PD-2: Managed retreat ◀
- PD-3: Coastal open space

Natural Resource Management

- PD-4: Working Lands strategy

Waste

- PD-5: Curbside Collection for Recycling ◀
- PD-6: Ban food waste from landfill
- PD-7: Ban disposal of select C&D Materials
- PD-8: Explore PV and EV battery recycling options
- PD-9: Expand County Recycled Product Purchasing Policy
- PD-10: Expand refillable water stations around Kaua'i
- PD-11: Expand plastic packaging reduction policies

Water

- PD-12: Explore strategies for low impact water development

Energy

- PD-13: Energy Savings Performance Contract

Transportation

- PD-14: Provide visitors with clean transportation options
- PD-15: Support the adoption of e-mobility options by residents, businesses, and visitors
- PD-16: Pilot ZEV carshare
- PD-17: County Transportation Demand Management
- PD-18: Transition County equipment to alternative fuels

County Leadership

County Organizational Capacity

- CL-1: County adaptation working group
- CL-2: Climate adaptation staff ◀
- CL-3: Climate funding

Collaboration

- CL-4: Collaborate with outside partners
- CL-5: KIUC partnership to support ZEV
- CL-6: ZEV Training Programs

Advocacy

- CL-7: Lobby state for ZEV support
- CL-8: Source reduction laws
- CL-9: Legislation to advance regenerative practices

Community Capacity

Outreach and Education

- CC-1: Visitor awareness
- CC-2: Climate change literacy ◀
- CC-3: CAAP progress reporting
- CC-4: Green building and “climate ready” guide
- CC-5: Promote greywater
- CC-6: KIUC efficiency incentives and programs
- CC-7: Promote State water efficiency incentives and programs
- CC-8: Public ZEV Education Campaign
- CC-9: Robust solid waste public engagement program

Community Self-reliance

- CC-10: Community liaisons
- CC-11: Improve community notification about climate hazards
- CC-12: Disaster self-reliance
- CC-13: Evacuation preparedness

IMPLEMENTATION APPROACH

The CAAP is organized to support and advance implementation. Every action to implement the CAAP strategies is assigned to a specific County Division as the lead, and each County Division has a Division Action Plan. Potential sources of funding and financing are also identified for each capital improvement strategy in Appendix C.

County Implementation

The CAAP actions will be implemented by divisions within County departments, as assigned in the Division Action Plans. Each Division Action Plan contains the actions that the division is assigned to lead, organized by strategy type and chronologically. The Division Action Plan is a tool for County staff to integrate CAAP implementation into their workplans. It is also organized to support the completion of Capital Improvement Program (CIP) Project Initiation forms for projects identified in the CAAP. Each Division Action Plan also includes a list of strategies implemented by other Divisions that it is assigned to support.

Funding and Financing

Climate adaptation and GHG mitigation projects typically involve large capital expenditures and often do not provide a direct source of revenue, making these projects difficult to finance through traditional means. It is therefore essential to identify sources of funding and financing available specifically for climate change projects.

For the capital improvement strategies identified in the CAAP (CI-1 through CI-15), the CAAP includes 56 potential funding sources: thirty-four (34) grants, twelve (12) revenue sources, and ten (10) financing instruments. Specifically, the CAAP identifies the most applicable funding and financing sources for each of the 15 capital improvement strategies. The CAAP also includes a robust list of grants, revenue sources, and financing instruments identified as potential funding sources for climate action and adaptation. That list, which includes eligible entities, potential uses, and other relevant information, is included as an appendix. The funding sources were current as of June 2024.

Grants

Grants include opportunities for direct funding from federal and state entities. These are resources that have either been allocated to the County of Kaua'i at the federal or state government levels (sometimes referred to as formula grants) or resources that the County would need to apply for in a competitive process. To determine whether a grant is applicable, the administering entity, eligible applicants, eligible uses, the amount of funding available, and local context are outlined in Appendix C.

Revenue Sources

Revenue sources refer to revenue streams that can be immediately available or monies that will derive from a future revenue stream and be used to repay financing. Revenue sources in the CAAP include revenue that can be captured through the real estate development process, special taxes and assessments that could potentially be created, and user fees and surcharges that would be charged to property owners and developers. Each potential revenue source has a brief description of the local context to provide an understanding of whether the source is currently being used or contemplated, or challenges related to implementing the source.

Financing Instruments

Financing instruments refers to the processes to raise upfront capital to expedite projects by providing funds earlier than would otherwise be available. This typically involves borrowing or otherwise leveraging future revenue streams. Financing instruments include both bond financing and credit programs. Bond financing options are bonds that the County could issue to raise revenue to fund climate resilience projects and would be repaid to investors through either tax or project revenue. Credit programs are financing programs where specific projects could apply to receive lower interest rates or higher loan to cost ratios.

Partnership Needs and Supportive Actions

While the CAAP is specifically focused on actions within the County's jurisdiction, effectively addressing climate change requires coordinated action and collaboration from other sectors. Many of the CAAP actions direct the County to partner with, coordinate with, or partner with outside groups including state agencies, universities, cultural practitioners, and other community organizations. The CAAP also supports community members to become engaged in climate action and adaptation through outreach and education. The Division Action Plans include specific measures and actions that require heightened collaboration.

The goal is to foster a network of collaborative relationships involving neighboring counties, state and federal agencies, private entities, non-profit organizations, and community groups through a variety of approaches, including:

- Collaborating with regional partners, community groups, non-profits, and cultural practitioners in sharing best practices, coordinating efforts, and the implementation of CAAP projects.
- Strengthening collaboration and coordination with State agencies (e.g., State Department of Transportation and the Commission of Water Resource Management) on adaptation planning.
- Enhancing community capacity to respond to climate hazards through training and citizen science initiatives.
- Building community climate change literacy through educational initiatives, including partnering with schools.
- Expanding stewardship, co-management, and community-management of spaces.
- Providing funding and support for community-based efforts.
- Strengthening partnerships with government (state and federal agencies), private, and non-profit groups in forest and watershed ecosystem conservation.
- Engaging the community in climate change planning (e.g., pre-disaster recovery planning, wildfire protection planning, establishment of resilience hubs) and implementation.

CAAP STRATEGIES

Below is a comprehensive list of strategies implemented in the CAAP, categorized into six types:

- **Assessment and Planning (AP)**
- **Capital Improvements (CI)**
- **Land Use and Building Regulation (LU)**
- **Program and Policy Development (PD)**
- **County Leadership (CL)**
- **Community Capacity (CC)**

Overall, the strategies are classified as either *laulima* (collaborative or supportive strategies that require cooperation) or *physical* strategies that lead to tangible changes or the construction of projects. Each section is further divided into sub-sections, with each strategy assigned a unique number. Additionally, the list specifies the County Division Action Plans responsible for implementation and indicates whether the strategy supports GHG mitigation, climate adaptation, or both. The graphic on the following page explains how to read the CAAP strategy tables and how to find more details in relevant Division Action Plans if desired.

HOW TO NAVIGATE CAAP STRATEGIES

Overview of the Strategies Table

What kind of strategy is this?

Strategy Type

Strategies are organized into six types: Assessment and Planning, Capital Improvements, Land Use and Building Regulations, Program and Policy Development, and Community Capacity.

Strategy Type Sub-Sections

Each Strategy Type is organized into sub-sections.

What is the strategy?

Strategy Number

Each strategy is assigned a unique number that can be used to find the corresponding implementation actions in related division action plans.

Strategy

Each strategy includes an underlined signpost header summarizing the focus of the strategy followed by the full strategy text.

Mitigation or Adaptation

Denotes whether the strategy advances climate mitigation, adaptation, or both.

Assessment and Planning

These strategies increase our understanding of GHG emissions reduction potential as well as changes in climate hazards and vulnerabilities. From these studies, strategies, plans, and actions can be implemented more effectively.

Research and Studies

Strategy Number	Strategy	Division Action Plans	GHG Mitigation and/or Climate Adaptation
AP-1	<u>Climate data</u> : Support studies that monitor climate hazards and inform and improve adaptation decision-making. Incorporate the most up-to-date information into departmental policies. Improve data on SLR, groundwater and landslide hazards.	KEMA OED-Agriculture Planning-Long Range PW-Engineering Wastewater Sea Grant	Mitigation and Adaptation
AP-2	<u>Site-specific vulnerability assessments</u> : Conduct vulnerability assessments of County facilities, such as County roads, wastewater treatment plants, County parks, and civic facilities. Assessments are needed to determine and prioritize adaptation strategies for specific buildings, sites, and on-site infrastructure.	Parks PW-Engineering Wastewater Water	Adaptation

Which County Divisions are responsible?

Related Division Action Plan

This column identifies the division action plan(s) that contain implementation actions for this strategy.

Navigating to a Division Action Plan

Example:

I'm interested in learning more about how the County is going to implement the strategy "CI-5 Stormwater management and green infrastructure."

1 Strategy Table

Find the responsible County Division(s) in the "Division Action Plan" column.

Public Works (PW) -Engineering is the division responsible for CI-5.	CI-5	<u>Stormwater management and green infrastructure</u> : Update drainage plans and implement green infrastructure and low impact development methods of stormwater management on County property (e.g., bioswales, permeable pavements).	PW-Engineering	Adaptation Potential co-benefits: Ecosystem health, water filtration
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2 Go to Part II

Find that Division's Action Plan in Part II.

Go to the Division Action Plan for Public Works - Engineering and Roads



3 Strategy Linkage

Find the strategy in the "Strategy Linkage" column to identify implementation actions. More than one action may be associated with a single strategy.

The strategy is CI-5. Looking through the strategy linkage column there are two actions that relate to CI-5.

#	Action	Strategy Linkage	Timeline	Applicability	Supporting Departments	External Partners
2.	Identify and prioritize consistently problematic stormwater areas to develop and implement targeted solutions, such as bioswales, permeable pavements, and berms.	AP6 Floodplain management (Adapt.) CI-5 Green infrastructure (Adapt.)	1-3 years	Countywide	N/A	DLNR
10.	Incorporate bioswales, permeable pavements, berms, and other green stormwater management techniques into county road projects. Install green/grey infrastructure to protect roads as an alternative to hardening to preserve beaches in the short-term where assessed as an appropriate adaptation strategy. This could include beach or dune restoration or hybrid approaches.	CI-5 Green infrastructure (Adapt.)	1-5 years	Countywide	N/A	N/A

Assessment and Planning

These strategies increase our understanding of GHG emissions reduction potential as well as changes in climate hazards and vulnerabilities. From these studies, strategies, plans, and actions can be implemented more effectively.

Research and Studies

Strategy Number	Strategy	Division Action Plans	GHG Mitigation and/or Climate Adaptation
AP-1	Climate data: Support studies that monitor climate hazards and inform and improve adaptation decision-making. Incorporate the most up-to-date information into departmental policies. Improve data on SLR, groundwater and landslide hazards.	KEMA OED-Agriculture Planning-Long Range PW-Engineering Wastewater Sea Grant	Mitigation and Adaptation
AP-2	Site-specific vulnerability assessments: Conduct vulnerability assessments of County facilities, such as County roads, wastewater treatment plants, County parks, and civic facilities. Assessments are needed to determine and prioritize adaptation and mitigation strategies for specific buildings, sites, and on-site infrastructure.	Parks PW-Engineering Wastewater Water	Adaptation
AP-3	Pre-planning for cultural resources: Strengthen procedures for preserving and protecting Native Hawaiian cultural resources from SLR impacts, storms, and floods. Assess historic fishponds, iwi, and small taro farms and update cultural resource GIS data. Explore opportunities with agencies, cultural practitioners, and community groups to steward and restore resources; utilize cultural burning practices; and plan for climate-related impacts.	OED-Agriculture Planning-Regulatory	Adaptation

Plan Development

Strategy Number	Strategy	Division Action Plans	GHG Mitigation and/or Climate Adaptation
AP-4	Facility adaptation plans: Develop adaptation plans and policies for specific County assets vulnerable to climate hazards. This could include developing an adaptation plan for a County road, wastewater facility, a park or	Parks PW-Engineering Wastewater Solid Waste Transportation Water	Adaptation



	civic facility to address climate hazards like sea level rise and flooding.		
AP-5	Community Wildfire Protection Plan: Update and implement the Community Wildfire Protection Plan. Link recommendations to updates of the CZO, Building Code, Fire Code, and other relevant county codes to ensure that wildfire-resilience measures are fully codified across operational, construction, and development frameworks.	Fire	Adaptation
AP-6	Disaster Recovery Plan: Prepare a plan that establishes land use policies and recovery procedures for areas impacted by wildfire, coastal hazards, and other disasters. Policies may require that post-disaster rebuilding meets safer, hazard-resilient standards – including ignition-resistant construction, defensible space, and design guidance informed by the CWPP, hazard mitigation plans, and WUI regulations.	Mayor KEMA Housing Planning-Long Range	Adaptation
AP-7	Urban Forest Management Plan: Develop and implement an Urban Forest Management Plan to improve the health, resilience, and ecosystem services of trees in developed areas to increase tree canopy and cool neighborhoods. Includes both County management of street and park trees as well as partnerships, such as with the Citizen Forester Program, that encourage community stewardship.	Parks	Mitigation and Adaptation Potential co-benefits: Ecosystem health, public health, equity
AP-8	Establish proactive floodplain management procedures: Implement a suite of measures to manage development and drainage in floodplains. Includes updates to County regulations, design standards, and drainage plans.	PW-Engineering	Adaptation
AP-9	Decarbonization plan for County facilities: Develop a decarbonization plan for County facilities that aligns with the CIP process.	OED-Energy	Mitigation
AP-10	Decarbonization plan for existing buildings: Adopt a phased in decarbonization plan for existing buildings that promotes, and as-needed, requires the retrofit of existing buildings to be powered using carbon-free energy.	OED-Energy	Mitigation
AP-11	Clean Fuel Transportation Plan: Develop a Clean Fuel Transportation Plan that identifies areas of the county to prioritize clean fuel	OED-Energy Transportation	Mitigation

	infrastructure installation and outlines how to transition county fleet to ZEVs.		
AP-12	<u>Kauai Bus Short-Range Transit Plan:</u> Implement and update the 2018 Kaua'i Short-Range Transit Plan.	Transportation	Mitigation

Capital Improvements

These strategies modify existing built and natural assets and build or relocate new facilities or infrastructure.

Enhance Existing Assets

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

Strategy Number	Strategy	Division Action Plans	GHG Mitigation and/or Climate Adaptation
CI-1	<u>Nature-based strategies for beach health: Help to ensure the health of beaches in the short term through beach and dune restoration.</u> May include preventing sediment loss, restoring dunes, augmenting sediment supply where necessary, and reef restoration. Identify beaches for restoration/nourishment and avoid armoring as much as feasible.	OED-Sustainability Parks Planning-All Sea Grant	Adaptation Potential co-benefits: Ecosystem health, public access
CI-2	<u>Restore indigenous agrosystems: Help to ensure the health of indigenous agrosystems through habitat restoration.</u> May include incentive programs to encourage community restoration, pilot projects, or County led-restoration efforts.	OED-Agriculture	Mitigation and Adaptation Potential co-benefits: Ecosystem health, equity
CI-3	<u>Encourage wetland and riparian restoration:</u> Increase public access and create programs to encourage habitat restoration on private and public lands.	PW-Engineering	Adaptation Potential co-benefits: Ecosystem health
CI-4	<u>Park improvements: Implement nature-based solutions to support coastal ecosystems on County parklands near shoreline areas, absorb floodwaters, and reduce wildfire risk.</u> Consider projects related to sea level rise (like test plots for salt-tolerant plants, wetland migration space, dune restoration), flooding (like bioswales, rain gardens, and permeable pavement), and wildfire (like vegetation management).	Parks PW-Engineering	Adaptation Potential co-benefits: Ecosystem health, water filtration
CI-5	<u>Stormwater management and green infrastructure: Update drainage plans and implement green infrastructure and low impact development methods of stormwater management on County property (e.g., bioswales, permeable pavements).</u>	PW-Engineering	Adaptation Potential co-benefits: Ecosystem health, water filtration

CI-6	Manage water supply issues: Manage water supply issues resulting from saltwater intrusion, drought, and other hazards	Building Wastewater Water	Adaptation
CI-7	Harden critical facilities and infrastructure: Enhance and protect existing critical facilities and infrastructure as needed based on findings of site-specific assessments. Could include assets like County buildings, roads, bridges, and water infrastructure and wastewater treatment plants.	Mayor Parks PW-Engineering Solid Waste Water	Adaptation
CI-8	Neighborhood resilience hubs. Upgrade existing neighborhood centers to function as resilience hubs - places where community members can take refuge from flood, extreme heat, wildfire, and extended power outages. Improvements such as air conditioning and filtration, solar, backup power, green roofs, and communications systems should be prioritized in vulnerable communities and high-risk areas.	Parks	Adaptation Potential co-benefits: Equity, public health
CI-9	Expand County renewable energy projects: Expand County renewable energy projects/solar panel and battery installation at County facilities such as base yards, and focusing on opportunities at Solid Waste Facilities, the landfill, and facilities with the highest energy consumption.	OED-Energy	Mitigation
CI-10	Methane capture and reuse at wastewater treatment facilities: Seek partnerships and opportunities to explore methane capture and reuse at solid waste facilities and anaerobic digestion at wastewater treatment facilities.	Solid Waste Wastewater	Mitigation
CI-11	Implement Complete Streets principles: Prioritize, fund, and construct roadway improvements that prioritize the safety and comfort of vulnerable users.	PW-Engineering	Mitigation



Major Asset Alteration

Strategies that require transformative change of existing assets or new infrastructure of facilities.

Strategy Number	Strategy	Division Action Plans	GHG Mitigation and/or Climate Adaptation
CI-12	<u>Relocate critical facilities:</u> Relocate or build new critical facilities and infrastructure as needed based on findings of site-specific assessments. Could include assets like County government buildings, the landfill, roads, and water and wastewater treatment plants.	Mayor Parks Solid Waste Wastewater Water	Adaptation
CI-13	<u>New emergency response centers and shelters:</u> Build new emergency response centers and shelters as needed in areas that could be isolated during extreme precipitation events, floods, landslides, and/or wildfires. Centers can serve as places of refuge for residents and be a base for KEMA and other partners during a climate hazard event.	KEMA	Adaptation Potential co-benefits: Equity
CI-14	<u>Cesspool Conversion:</u> Work with State Department of Health to support efforts to convert cesspools. Focus on outreach to residents in priority areas about local cesspool conversion requirements/resources and on expanding local incentive programs to assist with the financial cost of upgrades.	Housing Wastewater	Adaptation Potential co-benefits: Ecosystem health, water quality
CI-15	<u>Multimodal transportation networks:</u> Plan and build seamless multimodal transportation networks in Kauai's jobs/housing centers of Lihu'e (Lihu'e, Puihi, Hanama'ulu), Kapa'a-Wailua Corridor, Koloa-Poipu to facilitate the shift to active transportation modes for all users (from keiki to kupuna). Construct supportive infrastructure, such as mobility hubs, protected bike lanes, and shared use/multi-use paths.	Planning-Long Range PW-Engineering Transportation	Mitigation

Land Use and Building Regulation

Update zoning, subdivision, and building regulations to reduce GHG emissions, direct future development away from places most impacted by climate change, and ensure future structures better withstand impacts.

Code and Rule Updates

Strategy Number	Strategy	Division Action Plans	GHG Mitigation and/or Climate Adaptation
LU-1	Reduce the intensity of development in hazardous areas: Downzone or allow less intense types of land use in areas vulnerable to SLR hazards (passive flooding, high wave flooding, coastal erosion), riparian areas (streams and wetlands), landslides, and wildfires. Modify applicable code sections, constraint districts, setbacks, etc. to accommodate hazard impacts.	Planning-Regulatory	Adaptation Potential co-benefits: Ecosystem health
LU-2	Resilient site design and development standards. Develop and implement standards, including Wildland-Urban Interface (WUI)-specific regulations, to reduce climate vulnerability by requiring fire- and flood-resistant construction; promoting onsite stormwater capture; mitigating urban heat through landscape and design; reducing wildfire ignition potential through landscape requirements, defensible-space concepts, and noncombustible materials; and guiding new development away from high-risk areas. Periodically update development and fire codes to ensure that the standards utilize best practices and the best available science.	Fire Planning-Regulatory	Adaptation Potential co-benefits: Equity, public health, water conservation and filtration
LU-3	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. Periodically update building codes to ensure that the standards utilize the best available science and technologies.	Building	Mitigation and Adaptation Potential co-benefits: Equity, public health, water conservation and filtration, GHG mitigation
LU-4	Streamline permitting: Streamline the permitting process for solar, battery, and EV charging installations.	Building	Mitigation



LU-5	Energy source code requirements: Adopt a phased-in reach code requiring new construction and retrofits at least 50% the size of existing buildings be designed to incorporate energy efficiency measures and be at least 50% powered using carbon-free energy sources, including electrified appliances, refrigeration, air conditioning, and motors, efficient building envelope, and renewable energy sources, with increasing percentage by an agreed upon increment and timeline.	OED-Energy, Building	Mitigation
LU-6	Adopt low embodied carbon material use code: Adopt a policy that phases in requirements for usage of low embodied carbon materials in the structural, exterior elements of a building. These can include cement/concrete, products that are locally sourced, and/or products with a percentage recycled content, and are to be disclosed in building permit applications for County review. Policy should encourage usage of low embodied carbon materials throughout the rest of the build.	Building, Mayor	Mitigation
LU-7	Support EV ready/EVSE: Encourage and fund EV ready/EVSE-installed for commercial and multi-family dwellings and explore long-term progressive policy modifications applying to existing ordinances.	OED-Energy	Mitigation
LU-8	Transportation Demand Management program: Explore adopting a mandatory TDM program for employers, housing developments, and hotels and resorts.	OED-Energy Planning-Long Range	Mitigation
LU-9	Parking Standards Reform: Reform parking standards for new development to prioritize parking for bicycles, carshare, and to remove parking minimums focusing on town centers/ commercial areas.	OED-Energy Planning-Regulatory	Mitigation
LU-10	Energy and water benchmarking ordinance: Adopt energy and water benchmarking ordinance for commercial buildings (businesses, industrial, resort, hotels, golf courses) over a specified square footage.	OED-Energy	Mitigation and Adaptation
LU-11	Green plumbing building code: Update the building code to the more efficient UPC green plumbing code for new construction	Water	Mitigation and Adaptation

	and alternations or additions of 50% the size of the original building.		
LU-12	Model Water Efficient Landscape Ordinance (MWELo): Adopt a Model Water Efficient Landscape Ordinance (MWELo) to require all new landscape projects and renovations to obtain a landscape permit and establish prescriptive irrigation, plant lists, or water budget requirements.	Building, Water	Mitigation and Adaptation

Program and Policy Development

Stand up new County climate programs and adopt new County policies.

Land Use

Strategy Number	Strategy	Division Action Plans	GHG Mitigation and/or Climate Adaptation
PD-1	Transit-Oriented Development: Promote compact, walkable development consistent with the General Plan and mode shift goals. Focus on community design that encourages mode shift and expands transportation options.	OED-Sustainability Planning-Long Range	Mitigation and Adaptation
PD-2	Managed retreat: Encourage and facilitate the managed retreat of existing buildings from vulnerable coastal areas. Develop a suite of programs and projects to move infrastructure and private property away from areas highly vulnerable to sea level rise (passive flooding, high wave flooding, and coastal erosion).	OED-Agriculture Planning-All	Adaptation Potential co-benefits: Equity, ecosystem health, public access
PD-3	Coastal open space: Expand or establish open space along coastlines as part of the County's managed retreat program. Preserve areas where vulnerable development has been demolished through easements or acquisition.	Parks	Adaptation Potential co-benefits: Ecosystem health, public access

Natural Resource Management

Strategy Number	Strategy	Division Action Plans	GHG Mitigation and/or Climate Adaptation
PD-4	Working Lands strategy: Develop an Agricultural/Working Lands strategy to protect	OED-Agriculture Planning-Regulatory	Mitigation



	agricultural lands, and work with property owners to support healthy soils, carbon sequestration, and other regenerative practices.		
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Waste

Strategy Number	Strategy	Division Action Plans	GHG Mitigation and/or Climate Adaptation
PD-5	Curbside Collection for Recycling: Evaluate implementation of curbside collection for recycling, with future additions of green and food waste and enhanced drop-off recycling.	Solid Waste Planning-Regulatory	Mitigation
PD-6	Ban food waste from landfill: Implement a tiered approach to ban food waste from the landfill.	Solid Waste	Mitigation
PD-7	Ban disposal of select C&D Materials: Expand disposal bans to include select C&D materials.	Solid Waste	Mitigation
PD-8	Explore PV and EV battery recycling options	Solid Waste	Mitigation
PD-9	Expand County Recycled Product Purchasing Policy: Update the County's recycled product purchasing policy to increase the emphasis on source reduction and reuse.	OED-Sustainability	Mitigation
PD-10	Expand refillable water stations around Kaua'i: Add refillable water stations to County facilities and parks to reduce plastic water bottle use and provide opportunities for people vulnerable to the negative health impacts of heat to cool off and avoid dehydration.	Parks	Mitigation
PD-11	Expand plastic packaging reduction policies: Build off and expand policies for plastic and polystyrene reduction and compostable use to include single use plastic packaging materials and foodware.	Solid Waste	Mitigation

Water

Strategy Number	Strategy	Division Action Plans	GHG Mitigation and/or Climate Adaptation
PD-12	Explore strategies for low impact water development: May include incentives and/or an ordinance update	Water	Mitigation and Adaptation

Energy

Strategy Number	Strategy	Division Action Plans	GHG Mitigation and/or Climate Adaptation
PD-13	<u>Energy Savings Performance Contract:</u> Explore entering into an Energy Savings Performance Contract (ESPC) for County facilities including scope for energy efficiency, renewable energy, fleet conversion, large facilities upgrades (waste water, landfill, etc.)	OED-Energy	Mitigation

Transportation

Strategy Number	Strategy	Division Action Plans	GHG Mitigation and/or Climate Adaptation
PD-14	<u>Provide visitors with clean transportation options:</u> Partner with the hospitality industry (hotels and TVRs) and rental car companies to increase usage of clean transportation by visitors.	OED-Tourism Planning-Regulatory	Mitigation
PD-15	<u>Support the adoption of e-mobility options by residents, businesses, and visitors:</u> Develop programs to make e-mobility options more readily accessible and affordable.	OED-Energy	Mitigation
PD-16	<u>Pilot ZEV carshare:</u> Partner with a shared mobility company to pilot a ZEV carshare program.	OED-Energy	Mitigation
PD-17	<u>County Transportation Demand Management:</u> Establish a Transportation Demand Management (TDM) program for County employees.	Mayor	Mitigation
PD-18	<u>Transition County equipment to alternative fuels:</u> Transition County grounds maintenance, small engine, and construction equipment to alternative fuels.	OED-Energy	Mitigation

County Leadership

Build County staff and organizational capacity, strengthen partnerships, advocate at the State and federal levels, and secure funding and financing.

County Organizational Capacity

Strategy Number	Strategy	Division Action Plans	GHG Mitigation and/or Climate Adaptation
CL-1	County adaptation working group: Expand the County's Resiliency Team working group to coordinate interdepartmental climate adaptation planning and implementation strategies.	Mayor	Adaptation
CL-2	Climate adaptation staff: Establish and fund a permanent climate adaptation and equity planner on County staff to monitor and track implementation of adaptation strategies.	Mayor	Adaptation Potential co-benefits: Equity
CL-3	Climate funding: Establish funding and financing for climate adaptation. May include hiring a County grant writer and manager to focus on applying for Federal, State, and grant funds for both the County and community groups.	Mayor Finance	Mitigation and Adaptation

Collaboration

Strategy Number	Strategy	Division Action Plans	GHG Mitigation and/or Climate Adaptation
CL-4	Collaborate with outside partners: Continue to coordinate with State agencies, utilities, and other local and regional partners to align climate adaptation efforts. Collaboration can focus on natural resources (e.g., ecosystems mauka and makai), cultural resources (e.g., lo'i, fish ponds, salt ponds, iwi impacted by erosion), agriculture, infrastructure (e.g., highways, electrical grid), facilities (e.g., schools and hospitals), and other community assets.	Mayor Planning-Long Range	Adaptation Potential co-benefits: Equity
CL-5	KIUC partnership to support ZEV: Partner with KIUC and Hawaii Energy to create programs that support ZEV adoption.	OED-Energy	Mitigation
CL-6	ZEV Training Programs: Partner with KCC and other workforce training partners to create ZEV-specific training programs and pathways.	OED-Workforce	Mitigation

Advocacy

Strategy Number	Strategy	Division Action Plans	GHG Mitigation and/or Climate Adaptation
CL-7	Lobby state for ZEV support: Lobby the state to create programs and adopt policies that support ZEV adoption	OED-Sustainability	Mitigation
CL-8	Source reduction laws: Work with other municipalities and the State Legislature to create laws related to source reduction Statewide.	OED-Sustainability Solid Waste	Mitigation
CL-9	Legislation to advance regenerative practices: Work with other municipalities and the State Legislature to support and develop legislation to address healthy soils, GHG sequestration, and other regenerative practices.	OED-Sustainability OED-Agriculture	Mitigation and Adaptation

Community Capacity

Strengthen the broader community’s ability to understand, mitigate, and prepare for climate change.

Outreach and Education

Action Number	Strategy	Division Action Plans	GHG Mitigation and/or Climate Adaptation
CC-1	Visitor awareness: Increase visitor awareness of and preparedness for hazards. Includes outreach and education through hotels, transient vacation rentals (TVRs), and partnership with the Hawai’i Tourism Authority, Hawai’i Lodging and Tourism Association, and the Kaua’i Visitors Bureau.	KEMA	Adaptation Potential co-benefits: Public health
CC-2	Climate change literacy: Build community literacy about climate change impacts and adaptation strategies through the lenses of both cultural knowledge and current science. Includes an online climate information hub on the County website, youth engagement activities, outreach to non-English speaking communities, and empowering community members.	OED-Agriculture OED-Sustainability Parks Planning-Long Range Sea Grant	Mitigation and Adaptation Potential co-benefits: Equity
CC-3	CAAP progress reporting: Report on the County’s progress implementing climate change-related projects and policies	Planning- Long Range	Mitigation and Adaptation



CC-4	Green building and “climate ready” guide: Develop a comprehensive guide of green building strategies and “climate ready” retrofits. Provide to project applicants, developers, architects, and builders.	Fire OED-Workforce Building	Mitigation and Adaptation
CC-5	Promote greywater: Promote dual plumbing and laundry-to-landscape in residential buildings to increase the use of greywater.	Building Water	Mitigation and Adaptation
CC-6	KIUC efficiency incentives and programs: Work with KIUC to promote and implement efficiency incentives and programs.	OED-Energy	Mitigation
CC-7	Promote State water efficiency incentives and programs	OED-Agriculture OED-Sustainability Water	Mitigation and Adaptation
CC-8	Public ZEV Education Campaign: Develop an ZEV public education campaign in partnership with local organizations.	OED-Energy OED-Tourism OED-Workforce	Mitigation
CC-9	Robust solid waste public engagement program: Partner with local organizations and agencies to develop and implement a robust solid waste public engagement program.	OED-Sustainability Solid Waste	Mitigation

Community Self-reliance

Action Number	Strategy	Division Action Plans	GHG Mitigation and/or Climate Adaptation
CC-10	Community liaisons: Establish and empower community liaisons to help implement climate adaptation strategies. Includes youth climate leadership in County advisory bodies, and supporting community adaptation and resiliency efforts (e.g., Hawaii Hazards Awareness and Resilience Program, Firewise, and the Community Emergency Response Team program).	Mayor KEMA Sea Grant	Adaptation Potential co-benefits: Equity
CC-11	Improve community notification about climate hazards: Increase participation in the Wireless Emergency Notification System and partner with community organizations to reach their service populations.	KEMA	Adaptation Potential co-benefits: Equity, public health & safety
CC-12	Disaster self-reliance: Educate residents to be self-reliant for 14 days minimum. Includes educational materials, partnership and training with community organizations, and spreading information through County website and community events.	KEMA	Adaptation Potential co-benefits: Equity, public health & safety

CC-13	Evacuation preparedness: Work with communities at risk to event-based climate hazards and with limited redundant access to plan evacuation procedures. Focus on vulnerable groups.	KEMA Planning-Regulatory PW-Engineering	Adaptation
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EMBRACING CHANGE

In the heart of the Pacific, where beauty knows no bounds,
Lies an island paradise, where nature's symphony resounds.
Kauai, beloved home, where locals' spirits soar,
Adapting to climate change, we strive to protect our shore.
As the warming Earth embraces us with its gentle touch,
We witness the changes that mean so much.
Rising sea levels caress our sandy shores,
But we stand strong, united, as our love for this land pours.
Amidst the verdant valleys and majestic peaks,
Our hearts ache for the future that climate change seeks.
But like the mighty Waimea Canyon, carved by time,
We adapt and evolve, embracing a paradigm.
From Hanalei Bay's crescent embrace to Poipu's golden sands,
We witness shifts in weather patterns and understand
That our beloved landmarks may face new trials,
Yet we remain steadfast, fueled by love that never wanes.
The Na Pali Coast, a rugged masterpiece of nature's art,
Stands as a testament to resilience in every part.
Its towering cliffs and cascading waterfalls,
Remind us to stand tall amidst climate change's calls.
The lush rainforests of Wailua whisper ancient tales,
Of adaptation and survival through countless gales.
As rainfall patterns shift and droughts become more severe,
We learn from nature's wisdom, holding our island dear.
The sacred Wailua River flows with strength and grace,
A lifeline for our community, a symbol we embrace.
As temperatures rise and storms become more fierce,
We come together, finding solace in unity's pierce.
From the summit of Mount Wai'ale'ale, where rainbows dance,
To the serene beaches of Poipu, where sunsets enhance,
We witness the delicate balance of nature's design,
And pledge to protect this paradise, for it is truly divine.
In the face of climate change, Kauai stands tall,
For our love for this island will never falter or fall.
With resilience in our hearts and hope as our guide,
We adapt, we protect, and forever we abide.

By Brooke Carter

3rd place, Youth Art Contest

4. Foundational Principles, Plans, and Policies

The County’s plans, policies, and regulations—including the General Plan, community plans, Special Management Area guidelines, and zoning regulations—serve as the foundation for integrating climate adaptation and resilience into local decision-making. These frameworks help ensure that communities are better prepared for the challenges of a changing climate. Recognizing the value of indigenous knowledge and stewardship, the County’s planning framework acknowledges traditional Native Hawaiian land management practices, such as ahupua‘a systems, loko i‘a (fishponds), and agroforestry, which have long supported ecological balance and community resilience. Below is a summary of County and State plans and policies, and a short description of Native Hawaiian traditional land management principles.

GENERAL PLAN

The [Kaua‘i County General Plan](#) is adopted by ordinance and serves as a roadmap for the island's long-term development, addressing land use, transportation, housing, and other key aspects of growth. The 2018 General Plan Update acknowledges that the County faces hazards greatly amplified by climate change, such as sea level rise, coastal erosion, and tropical storms. The General Plan incorporates policies and strategies to mitigate hazards and enhance climate resilience. This includes guidance to direct growth away from vulnerable coastal areas, promoting sustainable agriculture practices, and integrating traditional Hawaiian land stewardship principles.

The General Plan policy for climate change states: “Climate change and resulting sea level rise (SLR) are evidenced and documented on global, national, as well as local levels. While data forecasts are in flux, the best available science for our island indicates we should plan for at least three feet of sea level rise. As an island with many residences and activities close to the coastline, it is important to provide direction to prepare our island for increased coastal hazards and their impacts to business, homes roadways, drinking water, and ultimately health and safety.”

Climate adaptation and action guidance is in the following sections: Coastal Areas and Shorelines; Global Warming and Climate Change Adaptation; Hazards Resiliency; and Reduction of Greenhouse Gas Emissions. An example of a specific action is: “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.”

MULTI-HAZARD MITIGATION AND RESILIENCE PLAN

The County's [Multi-Hazard Mitigation and Resiliency Plan](#) (MHMRP) is regularly updated every five years and explicitly includes climate change in its list of natural hazards, complying with new FEMA requirements to expand discussion and assessment of climate impacts and cascading impacts on other natural hazards. The analysis and risk assessment helped develop and prioritize plan strategies.

COMMUNITY PLANS

Community Plans provide detailed guidance for specific regions of the County and consider local characteristics, needs, and vulnerabilities. These plans tailor the General Plan's broad strategies to the unique challenges faced by different communities.

West Kaua'i Community Plan and Community Vulnerability Assessment

For instance, the [West Kaua'i Community Plan](#) developed a resiliency vision and policies for the highly vulnerable coastal towns of Waimea, Kekaha, and Hanapepe. The plan also adopted recommendations from a community vulnerability assessment conducted by the University of Hawaii Sea Grant Program.

To prepare West Kaua'i's low-lying neighborhoods for climate change impacts, particularly sea-level rise (SLR), the plan zoned vulnerable neighborhoods as "Special Treatment – Coastal Edge" which is a new designation that requires all development to comply with resiliency standards. The plan also lays the groundwork for managed retreat by identifying a higher elevation area owned by the County which could facilitate a land swap program. The plan benefitted from a community vulnerability assessment prepared by UH Sea Grant.

COUNTY CODES AND RULES

Zoning regulations in Kaua'i County govern land use and development activities, including building setbacks, density, impervious surface cover, and permitted land uses. Several regulations address climate vulnerabilities specific to Kauai.

Special Management Area

The Special Management Area (SMA) was established in 1975 as part of the Hawai'i Coastal Zone Management (CZM) program. The CZM program supports management of coastal areas in a manner that prioritizes protection and restoration of beaches, dunes, and other coastal ecosystems.

The County's Special Management Area Rules and Regulations guide development activity within the SMA. With limited exemptions, development within the SMA is required to obtain a SMA permit. Depending on the type, impact, and/or value of the development, either an SMA Minor Permit or SMA Use Permit is required. The permit is a tool to ensure the development activity complies with SMA rules and is consistent with the objectives and policies of the General Plan and Coastal Zone Management Program. For example, an approved

permit may include conditions addressing hazards, ensuring public access, and mitigating impacts on coastal ecosystems, recreation, and cultural resources.

Shoreline Setback Ordinance

The Shoreline Setback and Coastal Protection Ordinance require that all coastal development is set back from the shoreline. The setback line is based on average lot depth and coastal erosion rates. In 2020, the ordinance was amended to factor in new historical erosion rates based on recently mapped shoreline positions from the Kaua'i Coastal Erosion Study.

Sea Level Rise Constraint District

A recently adopted regulation is the Sea Level Rise Constraint District which delineates areas prone to flooding and inundation due to rising sea levels and provides guidelines for development within these vulnerable zones. The district utilizes the passive flooding and wave runup models developed for the Hawai'i Sea Level Rise Viewer. The standards require the elevation of at least two feet out of harm's way for residential structures and at least one foot out of harm's way for non-residential structures.

STATE INITIATIVES

The CAAP benefits from a strong history of resiliency planning at the State level. In 2017, the Hawai'i State Legislature established the Hawai'i Climate Change Mitigation and Adaptation Commission to coordinate statewide resiliency efforts. Since then, the Commission has supported vulnerability assessments, scenario modeling, and policy review to understand climate change impacts across sectors such as infrastructure, agriculture, natural resources, and public health.

Hawai'i Sea Level Rise Vulnerability and Adaptation Report

The [2017 Hawai'i Sea Level Rise Vulnerability and Adaptation Report](#) assesses the threat posed by climate change to the State's built environment, economy, natural resources, and public safety. The report specially examines the State's exposure to sea level rise related hazards and proposes recommendations to reduce vulnerability. A 2023 Addendum updated the climate and sea level rise science and includes new recommendations.

Hawai'i Sea Level Rise Viewer and Sea Level Rise Exposure Area Data

The State of Hawai'i Sea Level Rise Viewer (Viewer) is an online atlas that complements the 2017 Report, widely utilized by state and county agencies for adaptation planning. Through a modeling study, the Viewer assesses islands' exposure to coastal hazards induced by sea level rise. Chronic flooding risks such as passive flooding, annual high wave flooding, and coastal erosion were examined and integrated into a comprehensive projection termed the sea level rise exposure area (SLR-XA). This delineates regions susceptible to long-term flooding events, encompassing annual or more frequent occurrences.

Other Technical Reports

State agencies have also provided technical assistance through reports such as:

- Sea Level Rise Report Addendum: The Guidance for Using the Sea Level Rise Exposure Area in Local Planning and Permitting Decisions
- Guidance for Addressing Sea Level Rise in Community Planning



Avia Bonvillian Walker, 1st Place in Youth Art Contest

Description: "Because of climate change, algae growth will start multiplying because of the rise in water temperature. Some of this algae can be toxic to humans also, so my idea is that we adapt by wearing hazmat suits when surfing."

NATIVE HAWAIIAN TRADITIONAL LAND MANAGEMENT STRUCTURE

‘He Ali‘i Ka ‘Āina; He Kauwā ke Kānaka

The land is chief; man is its servant

This ‘ōlelo no‘eau (Hawaiian proverb) reflects the Hawaiian philosophy of the reciprocal relationship between people and ‘āina. For Kānaka Maoli (Native Hawaiians), ‘āina—meaning “that which feeds”—is the provider of all essential needs.³³ This concept of ‘āina signifies a deeply interconnected relationship not only between people and the land but also with all living things that depend on and are interdependent with the land, including plants and animals. In the Kumulipo (the Hawaiian creation story), ‘āina is viewed as a familial elder sibling to kānaka. As the elder, ‘āina holds the kūleana (responsibility) to sustain, love, and protect the younger sibling, while the kūleana of the younger sibling is to love, serve, and protect the elder.³⁴ This relationship is captured in the proverb: ‘He Ali‘i Ka ‘Āina; He Kauwā ke Kānaka, which emphasizes people’s kūleana (responsibility) to respect, care for, and serve ‘āina, ensuring its ability to nurture and sustain both current and future generations.

Native Hawaiian knowledge systems, practices, and perspectives provide a historical model of social-ecological resilience. Prior to the Great Māhele, ‘āina was not privately owned but instead communally accessed and stewarded through local governance within one’s moku and ahupua‘a. These two land divisions served as key political and resource management boundaries in the traditional governance system.

A moku is a large social-ecological region in which terrestrial zones (wao) were designated based on ecological and cultural functions.³⁵ The wao zones include:

Wao Akua (sacred forest): A restricted zone preserving endemic biodiversity, accessible only with strict protocols.

Wao Kele (wet forest): Primarily designated for aquifer recharge, maintained as a native-dominant plant community with limited access.

Wao Nāhele (remote forest): Minimally tended to support native bird habitats, with limited human intervention except for traditional bird-catching practices.

Wao La‘au (agro-forest): Forest area managed for timber and non-timber products, incorporating integrated agroforestry practices.

Wao Kānaka (habitation zone): Conversion of the landscape to maximize the availability of food, medicine, and housing.

³³ Winter, K., Beamer, K., Vaughan, M., Friedlander, A., Kido, M., Whitehead, A., Akutagawa, M., Kurashima, N., Lucas, M., & Nyberg, B. (2018). The Moku System: Managing Biocultural Resources for Abundance within Social-Ecological Regions in Hawai‘i. *Sustainability*, 10, 3554. <https://doi.org/10.3390/su10103554>

³⁴ Malo, D. *Hawaiian Antiquities (Moolelo Hawaii)*; Bishop Museum Press: Honolulu, HI, USA, 1951. [Google Scholar]

³⁵ Winter, K., Beamer, K., Vaughan, M., Friedlander, A., Kido, M., Whitehead, A., Akutagawa, M., Kurashima, N., Lucas, M., & Nyberg, B. (2018). The Moku System: Managing Biocultural Resources for Abundance within Social-Ecological Regions in Hawai‘i. *Sustainability*, 10, 3554. <https://doi.org/10.3390/su10103554>



Within each moku, an ahupua‘a functioned as a smaller, place-based social-ecological community designed to align with natural resource distribution and cultural practices. While wao extended horizontally across a moku, each ahupua‘a spanned vertically from mauka (inland) to makai (seaward), ensuring access to diverse resources.³⁶ This structure enabled system-based management within each ahupua‘a while also facilitating coordinated stewardship of key resources across multiple ahupua‘a within a given moku.

The traditional Hawaiian resource management system was both collaborative and adaptive, ensuring the sustainable stewardship of natural resources. Governance was structured at multiple levels: each moku was overseen by an ali‘i ‘ai moku, while each ahupua‘a was managed by an ali‘i ‘ai ahupua‘a. Within the ahupua‘a, a konohiki (land steward) functioned as a general manager, responsible for overseeing the resource system. The konohiki possessed extensive knowledge of local ecology and natural cycles, regulating resource use through the enforcement of kapu (restrictions) to maintain sustainability.³⁷

Supporting the konohiki were luna (specialists) and senior male land tenants known as haku. The luna supervised specific aspects of resource management, such as the luna wai, who was responsible for freshwater flow and irrigation systems. Within each ‘ohana (family) of the maka‘āinana (common people), the haku played a key role in konohiki planning, organizing, executing the plans, and communicating important directives between konohiki and the maka‘āinana.³⁸

This governance and management structure enabled localized decision-making through a collaborative network involving the ali‘i, konohiki, luna, and maka‘āinana, ensuring that resource management remained responsive to ecological conditions and community needs. The konohiki, with input from this network, determined when to enforce restrictions or regulations on resource use, in which the effectiveness of the regulations was evaluated over time. If regulations were found to be ineffective, they were adapted accordingly. This adaptive management approach, rooted in continuous learning and observation, allowed for sustainable resource use and ensured the long-term abundance of food and materials for over a millennium.

In the context of climate change, traditional Hawaiian resource management offers valuable insights for contemporary mitigation and adaptation strategies, land use planning, policy development, and resource governance. Effectively addressing climate hazards—such as shifting precipitation patterns, rising sea levels, and increased wildfire risks—requires localized, knowledge-based decision-making that integrates traditional ecological knowledge with modern science.

Similar to the iterative learning process employed in traditional Native Hawaiian management—where regulations were adjusted based on observed environmental changes—modern climate adaptation strategies must prioritize real-time monitoring, stakeholder collaboration, and data-driven decision-making. This approach ensures that policies, action triggers, and adaptation measures remain dynamic and responsive to evolving climate conditions, fostering resilience in the face of increasing environmental uncertainty.

³⁶ Winter, K., Beamer, K., Vaughan, M., Friedlander, A., Kido, M., Whitehead, A., Akutagawa, M., Kurashima, N., Lucas, M., & Nyberg, B. (2018). The Moku System: Managing Biocultural Resources for Abundance within Social-Ecological Regions in Hawai‘i. *Sustainability*, 10, 3554. <https://doi.org/10.3390/su10103554>

³⁷ Glazier, E. (2019). *Tradition-Based Natural Resource Management Practice and Application in the Hawaiian Islands* (1st ed. 2019.). Springer International Publishing. <https://doi.org/10.1007/978-3-030-14842-3>

³⁸ Cachola-Abad, Carolyn K. 2000. "The Evolution of Hawaiian Socio-Political Complexity: An Analysis of Hawaiian Oral Traditions." PhD diss., Department of Anthropology, University of Hawai‘i, Mānoa.