



# KAUA'I CLIMATE ADAPTATION PLAN

## Precipitation Extremes

### How are precipitation patterns changing?

Precipitation patterns are being disturbed on Kaua'i due to climate change. The island is facing decreased average rainfall during the wet season but increases on the extreme ends of the spectrum—heavy rainfall events and drought. Consecutive wet days and consecutive dry days are both increasing.<sup>1</sup>

The heavy rainfall and drought periods have intensified, leading to increasing runoff, erosion, flooding, and water shortages.<sup>2</sup> On Kaua'i there have been over 81 flood events between 2005 and 2020, with especially severe flooding occurring in 2018 and 2020. On the opposite side of the spectrum, all areas of Kaua'i are susceptible to drought. The past two decades have been marked by frequent periods of abnormally dry to severe drought conditions.

1. Kruk, M.C., et al. (2015), On the state of the knowledge of rainfall extremes in the western and northern Pacific basin, *Int. J. Climatol.*, 35(3), 321–336.  
2. Bassiouni, M., and D.S. Oki. 2013. Trends and shifts in stream flow in Hawai'i, 1913-2008. *Hydrological Processes* 27(10):1484-1500.



Precipitation Extremes



Waiamea Flood



Lumahai Landslide

“Growing up on Kaua'i, I was taught that Mount Wai'ale'ale was the **wettest spot on Earth**, and we keiki memorized this as part of what made our home unique and special. Within the past decade, Wai'ale'ale has been surpassed by places like Pu'uku'kui on Maui. This is one small example of how what we know and rely upon about the places we call home is changing with the weather.”

- Mehana Vaughan et. al (2020)  
*Value of Hawaii 3: Hulihia, the Turning*

Drought



# Projected Changes and Related Impacts

3. 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. Zhang, C., et al. (2016) Dynamical downscaling of the climate for the Hawaiian Islands.

4. Intense precipitation is less effective at recharging groundwater aquifers than extended, less intense wet weather.

## Projected Changes

- Increase drought severity and frequency due to rising temperatures and reduced cloud formation <sup>3</sup>
- Possible increase in precipitation intensity and wet season flooding in windward Kaua'i <sup>4</sup>

## Related Impacts

- **Decreased rainfall** is connected to:
  - Longer droughts leading to increased wildfire risk
  - Lower stream flow
  - Lower groundwater levels and higher probability of chronic water shortages
- **Extreme storms** can cause:
  - Landslides which can close roads and isolate communities
  - Water quality issues that damage stream and coastal ecosystems

## Key Vulnerabilities



Almost 6,800 people and 95 critical facilities exposed to 1% annual chance flood<sup>5</sup>



Roads and highways



Water and wastewater systems



Agriculture such as lo'i kalo

5. County of Kauai. (2021). County of Kauai Multi-Hazard Mitigation and Resilience Plan

## How can I get involved?

- Attend an Open House
- Attend a Deep Dive session
- Share a story on the website
- Participate in an online survey
- Contact the Planning Department

## Get in Touch

For more information on the Kaua'i Climate Adaptation Plan visit [kauaiadaptation.com](http://kauaiadaptation.com) or scan the code below with your phone.

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