

ECOLOGICAL DROUGHT MANAGEMENT CHALLENGES

Understanding drought impacts to fish, wildlife, their habitats, & people

NATIONAL & REGIONAL CLIMATE ADAPTATION SCIENCE CENTERS

ALASKA

- Larger, more frequent wildfires
- Less snowpack & earlier melt
- Rapidly warming winters & springs

NORTHWEST

- More frequent wildfires
- Less snowpack & earlier melt
- Warmer winters & hotter summers

NORTH CENTRAL

- Competing water demands
- More rain, less snow
- Diverse seasonal warming trends across the region

GREAT LAKES

- Competing water demands
- Changing river flows & lake levels
- Impacts to forests & timber production

NORTHEAST

- More rain, less snow
- More intense short-term droughts
- Rich biodiversity at risk



ECOLOGICAL DROUGHT IS:

Drought that impacts fish, wildlife, their habitats, & people



HOW OUR WORK IS DIFFERENT

- Drought can change ecosystems, with implications for human communities
- But these **ecological impacts of drought** are not typically examined
- We are identifying how drought impacts ecosystems to **support adaptation planning**

Learn more:
casc.usgs.gov/science/ecological-drought

PACIFIC ISLANDS

- More severe wildfires
- Invasive species are spreading
- Rich biodiversity at risk

SOUTHWEST

- Larger & more severe wildfires
- Competing water needs
- Forests are dying

SOUTH CENTRAL

- Competing water demands
- Rapid drought development
- More extreme & expensive drought & flood cycle

SOUTHEAST

- Competing water demands
- Changing water flows
- Rich biodiversity at risk

Symbols courtesy of the Integration and Application Network, University of Maryland Center for Environmental Science (ian.umces.edu/symbols/)



USGS
science for a changing world



ADDRESSING MANAGEMENT CHALLENGES: HAWAII



KEY CHALLENGES

- More severe wildfires & dry season = forest loss & erosion
- Native species at risk of extinction
- Invasive species are spreading

DROUGHT WORK

- Improve understanding of climate variability & watershed processes
- Identify drought tolerance of native species
- Promote resilience & fire management

CONTACT US

Pacific Islands CASC

usgs.gov/casc/pacificislands
pi-casc.soest.hawaii.edu/

Learn more about these projects*:

usgs.gov/casc/ecodrought

***Note:** While these projects focused on the Hawaiian Islands, additional drought-related work is being done throughout the Pacific Islands CASC's domain, which includes the U.S.-Affiliated Pacific Islands.

DROUGHT IN HAWAII: AT A GLANCE

- Over the past 160 years, **Hawaii has seen a consistent decrease in rainfall.**
- Temperatures have also increased**, especially in high elevation areas. These changes have implications for the water supply, native wildlife, the spread of invasive species, and wildfires.
- For example, **Hawaii's wildfire risk is now among the highest in the nation.** From 2005-2011, a greater percentage of Hawaii's land area burned each year than in the 12 western-most states, including Alaska.

STUDYING THE PAST TO PLAN FOR THE FUTURE

OUR SCIENCE: Examining how historic droughts have impacted Hawaii to better understand what future trends mean for fire risk, the spread of invasive species, freshwater supply, and more.

IMPACT: Supports development of management strategies that increase the resilience of ecosystems and human communities to future drought and its impacts.

"Pu'u Wa'awa'a Forest Reserve suffered a very severe drought from 2008 to 2012, likely exacerbated by a 30+ year decline in precipitation. This project provides a valuable historical context to understanding drought in Hawaii and a synthesis of lessons learned from different managers that will be valuable for planning for future droughts."

- Elliott Parsons, Coordinator of the Pu'u Wa'awa'a Forest Reserve



Learn more: <https://go.usa.gov/xQJFn>

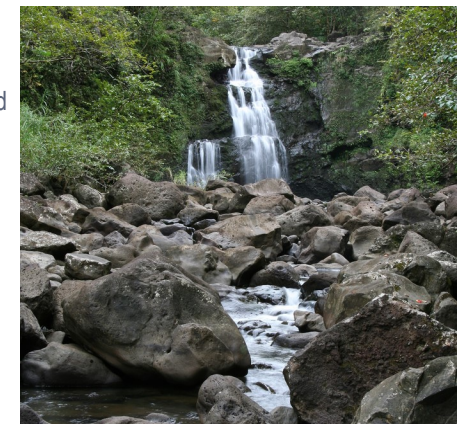
CHANGING FRESHWATER SUPPLY

OUR SCIENCE: Identifying if drought impacts on Hawaii's water supply are mitigated by cloud-water interception—a process where small water drops that would normally stay in clouds (like fog) are captured by high elevation trees and fall to the forest floor, making their way into the soil and replenishing groundwater supplies. In some areas, input from this process makes up 46% of total precipitation.

IMPACT: Improve estimates of changes in water availability during drought, which is critical to Hawaii's water, forest, and wildfire managers, as well as farmers and ranchers, as they work to develop adaptive management strategies.

"This project will greatly aid our development and refinement of management tools and policies to protect and manage Hawaii's public trust water resources."

- Suzanne D. Case, Chairperson, Hawaii Commission on Water Resource Management



Learn more: <https://go.usa.gov/xQJFU>