ECOLOGICAL DROUGHT MANAGEMENT CHALLENGES

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

USGS National Climate Change & Wildlife Science Center

DOI Climate Science Centers

ALASKA

- Winters and springs are rapidly warming
- Less snowpack & earlier melt = "snow drought"
- Larger, more frequent wildfires

NORTHWEST

- Warmer winters, hotter/drier summers
- Less snowpack = less spring/ summer streamflow
- More wildfire & pests/pathogens

NORTH CENTRAL

- Greater demand for less water
- Warmer temperatures make drought worse
- More rain, less snow

GREAT LAKES

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

NORTHEAST

- Fewer, more intense rain & snow events
- Worse summer droughts
- Plants and animals not adapted to drought

PACIFIC ISLANDS

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

SOUTHWEST

- Increasing water demands in a region with limited supply
- Larger & more severe wildfires
- Invasive species are spreading

SOUTH CENTRAL

- Competing water needs
- Droughts can develop quickly, making timely response difficult
- More extreme & expensive drought & flood cycle

SOUTHEAST

- Rapid population growth = competing demands for water
- Drier summers, wetter falls
- Rich biodiversity at risk

ECOLOGICAL DROUGHT IS:

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

HOW OUR WORK IS DIFFERENT

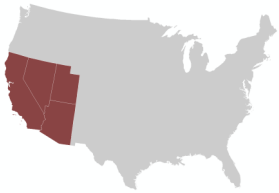
► Drought can change ecosystems, with **implications for human communities**

► But these **ecological impacts of drought** are not typically examined

► We are identifying how drought impacts ecosystems to **support adaptation planning**

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

ADDRESSING MANAGEMENT CHALLENGES: SOUTHWEST REGION



KEY CHALLENGES

- ► Increasing water demands in a region with limited supply
- ► Larger & more severe wildfires
- ► Invasive species are spreading

DROUGHT WORK

- ► Identify the consequences of changing temperatures & precipitation
- ► Support adaptive management of water resources, forests, & wildlife

CONTACT US

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Learn more about these projects:
https://nccwsc.usgs.gov/science/ecological-drought

DROUGHT IN THE SOUTHWEST: AT A GLANCE

Since 1999, the Southwest has been experiencing the **longest and hottest drought on record** for the U.S.

Trees are dying as drought promotes **larger wildfires and pest outbreaks** - a key example of the ecological impacts of drought.

Without an increase in precipitation, projected increases in temperature suggest that the **odds of a multi-decadal megadrought in the Southwest will increase from 15 to 90%**.

CHANGING WATER SUPPLY

OUR SCIENCE: Found that warming temperatures—not just reduced precipitation—have impacted the Colorado River's water flow. Less snow is accumulating and snowpack is melting earlier, reducing flow.

IMPACT: Enhances streamflow forecasts and addresses a gap consistently raised by water managers—what are the conditions that lead to reduced flow in the Colorado River basin?

"This work is extremely timely and important to my district. The drought we experienced from 2000-2013 was a critical shock to the system. It's essential that we understand the relationship between rising regional temperature and streamflows if we're going to be prepared for future droughts."
-Eric Kuhn, General Manager, Colorado River District

WATER-TRACKING TOOL FOR WETLANDS

OUR SCIENCE: Developed a water-tracking tool to visualize the extent of wetlands in California's Central Valley, which provide critical habitat to waterfowl, and used the tool to identify the impacts of recent drought.

IMPACT: Help land managers coordinate the timing and use of limited water resources during drought to ensure that water and habitat is available to meet the diverse needs of humans and wildlife.

"This project provided key information about the timing and extent of wetland and ricefield flooding during the recent historic drought in California. This information was essential for refining the spatial habitat objectives in our Implementation Plan, and developing conservation strategies to ensure our Joint Venture partners are providing food resources for migratory birds where they need it most." -Mike Dunphy, Central Valley Joint Venture Coordinator