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

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

ECOLOGICAL DROUGHT IS:

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

HOW OUR WORK IS DIFFERENT

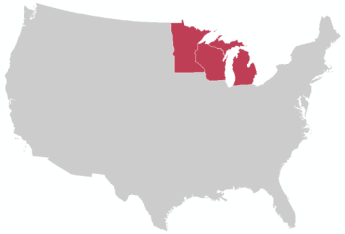
- Drought can change ecosystems, with **implications for human communities**
- But these **ecological impacts of drought** are not typically examined
- We are identifying how drought impacts ecosystems to **support adaptation planning**

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

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: GREAT LAKES REGION



KEY CHALLENGES

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

DROUGHT WORK

- ▶ Identifying adaptation strategies to sustain forests
- ▶ Incorporating early drought detection & adaptation measures for water and natural resource managers
- ▶ Identifying changes in streamflow and water temperature

CONTACT US

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***Note**: The Northeast CASC domain includes the Northeast and Great Lakes states.

Learn more about these projects:

https://casc.usgs.gov/science/ecological-drought

DROUGHT IN THE GREAT LAKES REGION: AT A GLANCE

The forestry industry in the Great Lakes region is worth several billion dollars. More frequent short-term droughts are expected as temperatures in the region warm, threatening not only timber production but also the wildlife, plants, and people that depend on forests.

Severe drought and accompanying low river flow contributed to a record-breaking oxygen-depleted "dead zone" in Lake Erie in 2012. Dead zones decrease the amount and quality of habitat available for fish.

HELPING FORESTS SURVIVE DROUGHT

OUR SCIENCE: Scientists found that forests in northern Minnesota are more vulnerable to drought when there is high tree density, likely because there is more competition for water.

IMPACT: Forest managers in Minnesota need to know whether reducing tree density—a technique called thinning—can help the state's red pine forests survive drought. The results help managers understand how thinning could be implemented to reduce the impact of drought on forests.

USERS: USFS Northern Research Station ● Minnesota Agricultural Experiment Station ● Minnesota Dept. of Natural Resources, Division of Forestry ● Chippewa National Forest

Learn more: https://bit.ly/2N94KB9

'SLOWING THE FLOW': DROUGHT & FLOOD RESILIENCE

OUR SCIENCE: Scientists are examining whether a "slow the flow" approach can decrease vulnerability to droughts and floods. The approach aims to increase natural water storage through activities such as floodplain reconnection, beaver management, and restoring stream channels.

IMPACT: This is being tested in the Connecticut and Ipswich River basins, as well as Lake Michigan and interior Wisconsin tributaries. Supports managers in both regions identify effective strategies for drought and flood resilience, as climate conditions change.

USERS: USFWS ● USFS ● Menominee Nation ● State management agencies ● The Nature Conservancy ● Trout Unlimited ● USACE ● EPA ● Regional water planning commissions

Learn more: https://bit.ly/2JJRLDb