SOUTH CAROLINA DROUGHT GUIDE for Emergency Managers

WHAT IS A DROUGHT?

Drought is a complex hazard that can occur in any type of climate or geographic region, resulting in insufficient water supply to support communities, businesses, or ecosystems.

In contrast to other extreme weather events, droughts can vary greatly in duration, severity, and geographic extent. They often develop slowly over a period of weeks, months, or years, when an area receives less than normal rainfall over an extended period of time.

Did you know?

- "Flash droughts", are shorter events, and are often associated with or exacerbated by heat waves and rapidly decreasing soil moisture.
- In the United States, drought is the 2nd most costly weather- and climate-related event, causing an estimated $244.3 billion dollars in economic loss from 1980 to 2018.

SOUTH CAROLINA'S DROUGHT RESPONSE PROGRAM

The goal of South Carolina's Drought Response Program is to help water managers and users monitor, conserve, and manage the State's water resources in the best interest of all South Carolinians.

The SC Drought Response Act and supporting regulations establish and describe

- Agency responsibilities for drought response and planning
- Data and information used to determine the State's four drought alert phases
- Actions for the State to take

The SC Drought Response Plan is part of the State's Emergency Operations Plan.

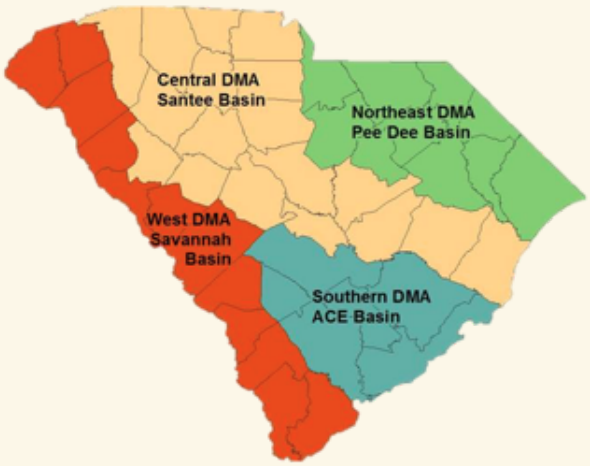
- The Drought Response Plan, the Emergency Management Division, and State Emergency Response Team are activated when drought conditions have reached a level of severity beyond the scope of the Drought Response Committee (DRC) and local communities.

Who monitors drought in South Carolina?

- Department of Natural Resources
- State Climatology Office
- Drought Response Committee

Find information on the South Carolina Drought web portal, http://scdrought.com

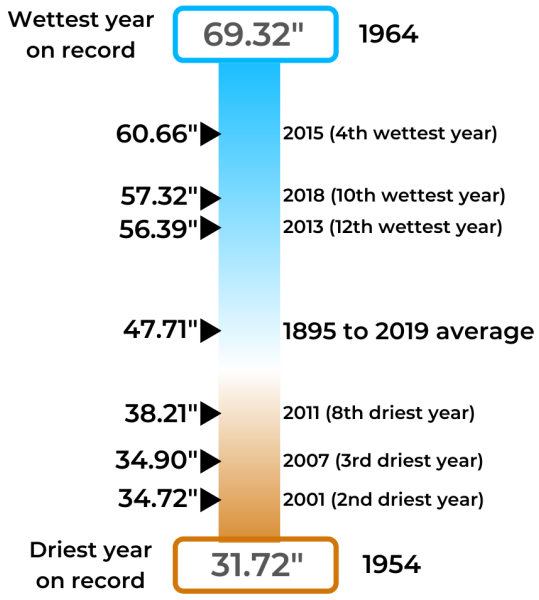
The Drought Response Committee consists of state agency and local members. Local members represent Drought Management Areas and vote county by county to determine drought severity level.



HOW DO WE KNOW WHEN WE ARE IN A DROUGHT?

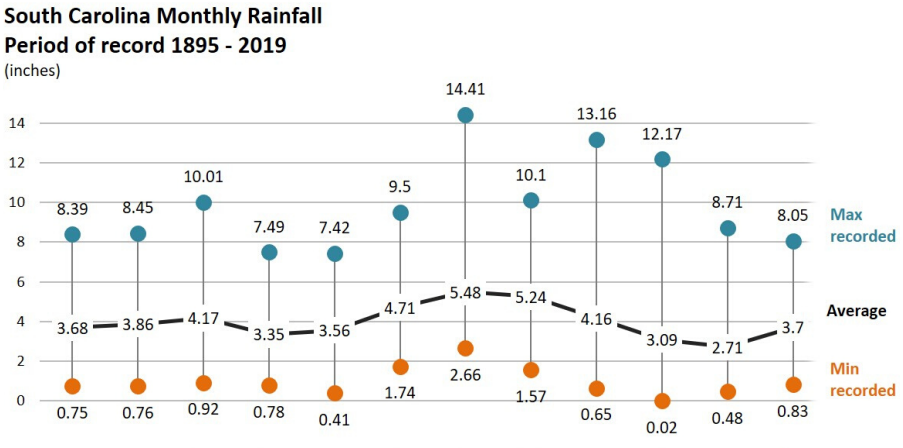
South Carolina's rainfall varies significantly from year to year, making it difficult to know when drought is beginning, worsening, or ending. Understanding what is "normal" can help us know when conditions are changing.

This graph shows the wettest and driest years on record, and where recent years fit between the two extremes.



South Carolina's rainfall also varies by season and month.

This graph shows the range of monthly rainfall. The black line shows the average monthly rainfall. The blue marks show the highest rainfall amounts recorded for each month. The orange marks show the lowest rainfall amounts recorded for each month. During droughts, we expect monthly rainfall to fall closer to the lower amounts.



Did you know?

- Even during drought we can have wet months.
- During long-lasting or extreme droughts, it may take several months of normal to above-normal rainfall to make up the deficit and for water levels to recover.

SOUTH CAROLINA'S DROUGHT INDICATORS

South Carolina uses multiple indicators and indices to determine drought severity. A single indicator typically cannot capture the complexities associated with water availability for any given sector or region. Indicators may depict the different types of drought, such as:

- meteorological drought: when a specific location or region receives below-normal rainfall for an extended period of time
- agricultural drought: when plants lack adequate moisture to grow
- hydrological drought: when water levels in streams, reservoirs, lakes, and groundwater wells decline

Percent of Normal Rainfall shows cumulative dryness or wetness compared to long-term rainfall averages.

Crop Moisture Index shows short-term (up to 4 weeks) abnormal dryness or wetness for the agricultural growing season.

Palmer Drought Severity Index shows prolonged (months to years) abnormal dryness or wetness;

Keetch-Byram Drought Index is used to assess soil moisture conditions and monitor forest fire danger.

Streamflow, lake, reservoir, and groundwater levels are used to assess water resource conditions.

United States Drought Monitor is produced weekly by weather and climate experts showing which areas of the country are in drought.

WHAT TO EXPECT DURING A DROUGHT

The South Carolina Drought Response Act and Regulations establish four severity levels: incipient, moderate, severe, and extreme.
As drought conditions and impacts become more severe, response actions increase accordingly.

INCIPIENT

Conditions

- Drier than normal
- Soil moisture declines
- Irrigation increases
- Indices indicate a threat of drought

State Response

The Department of Natural Resources (SCDNR)

- notifies the Drought Response Committee,
- increases monitoring activities
- begins to disseminate information to the public.

MODERATE

Conditions

- Crops and plants wither
- Irrigation continues to increase
- Wildfire risks increase
- Water levels decrease

State Response

The Drought Response Committee (DRC):

- evaluates conditions to assess the need for action beyond the scope of local entities
- may request greater involvement of state agencies in monitoring drought conditions and communicating to the public
- may recommend voluntary or water use restrictions

SEVERE

Conditions

- Poor grazing and agricultural conditions
- Number of wildfires increases
- Water levels continue to drop
- Water use and irrigation may decrease as crops are lost and water restrictions are put in place

State Response

- Drought monitoring activities and communications to the public increase.
- Beginning at the Severe level, and upon evaluating local conditions, the DRC may require mandatory reduction of non-essential water use including car washes, watering lawns, and recreation.
- The DRC may request assistance from the Governor in requesting water conservation and other actions to address impacts.
- The Governor may activate the National Guard to assist with fire suppression.

EXTREME

Conditions

- Widespread impacts to agriculture, forestry, water utilities, and water dependent businesses

State Response

- If the DRC determines that state-level response is needed, they may recommend activation of the Drought Response Plan to the Governor.

Agriculture is typically the first sector affected by a drought. Impacts include damaged crops, low yields, and poor pasture conditions. Expect widespread crop and financial losses for farmers during severe and extreme events.

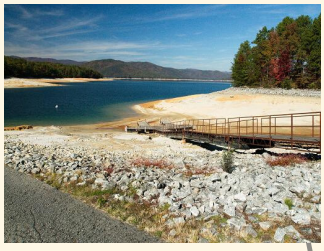
Fire risks become more dangerous during drought. The fire season may begin earlier and/or last longer, and alerts and burn bans may be issued. As drought progresses, fire crews may face fires that increase in number, extent, and intensity.

Water resource impacts usually occur at higher severity levels. At the beginning of a drought, irrigation and water use increase. As drought progresses, water levels in reservoirs, lakes, streams, and wells will decline. This may lead to water use restrictions and boat ramp closures.

EXAMPLES AND IMPACTS FROM PAST EVENTS

LAKE JOCASSEE, 2011

In summer 2011, a lack of rainfall and low inflows in the Upper Savannah River basin led to steady declines in lake levels. Lake Jocassee was more than 20 feet below its target levels.



PINNACLE MOUNTAIN FIRE, 2016

Lingering drought conditions, combined with high fuel loads, low relative humidity, and strong gusting winds, contributed to the 2016 Pinnacle Mountain Fire, the longest, largest, and costliest fire in Upstate history. The fire lasted from November 9 to December 16, 2016, burned over 10,000 acres in and around Table Rock State Park, and cost close to $5 million.

HAYLIFT, 1985

Drought can contribute to diminished pasture conditions and reduced hay yields, affecting farmers' ability to feed their livestock. In 1985-1986, South Carolina farmers received emergency aid in the form of a "hay lift." Thousands of bales were transported from the Midwest to the Southeast to help save affected livestock.

LAKE HARTWELL, 2007

2007 was the third driest year in South Carolina's record. Low water levels on major lakes and rivers affected water providers, irrigators, water-dependent industries, and power production. Water use restrictions were issued across the State to address water supply shortages.

SALTWATER INTRUSION, 2002

During droughts, low river levels bring less freshwater to coastal locations. 2002 was a particularly challenging year, as streamflows and groundwater levels reached record lows after several years of below-normal rainfall. Drinking water supplies were threatened, and one municipal intake was closed in August 2002, due to high salinity levels..

FLASH DROUGHT, 2019

In May 2019, hot and dry conditions contributed to a brush fire that closed a section of I-20 and forced the evacuation of forty homes in Aiken County. At the time, Aiken County was in incipient drought status, showing that severe impacts can occur within short time periods and at lower levels of drought.

In September-October 2019, below-normal rainfall coupled with late-summer heat led to a severe agricultural drought. Pastures, streams, and ponds dried up, endangering livestock and hay supplies. 39 of 46 counties received Secretarial drought designations by the U.S. Department of Agriculture, due to poor harvests and crop losses.

LAKE MARION, 2007

This sign warns boaters of low water levels in 2007. Drought can reveal hazards, such as formerly submerged tree stumps, docks, roads and bridges, and other debris.

SOUTH CAROLINA DROUGHT RESPONSE PLAN EMERGENCY OPERATIONS PLAN, APPENDIX 10

Activation of South Carolina's Drought Response Plan is based on pre-identified conditions that may affect a community's ability to provide for the safety of its citizens due to limited water availability. For instance, if:

- Communities have initiated water restrictions or rationing
- Community water supplies are continuing to be depleted to the level of exhaustion
- Local utility companies have begun shutting down power generation
- Requirements for firefighting resources are beyond the capabilities of the SC Forestry Commission

The South Carolina Emergency Management Division (SCEMD) maintains the Emergency Operations Plan and leads multi-agency response to hazard events.

Access the Plan at: https://scemd.org/em-professionals/plans/emergency-operations-plan/

The Drought Response Plan identifies the types of assistance and actions that may be necessary to help local agencies address water shortage, firefighting, and agricultural emergencies. Additional agencies may be involved, depending on specific impacts and community needs.

PRIORITY ACTIONS	SUPPORT FUNCTIONS	INVOLVED AGENCIES
WATER FOR DOMESTIC USE		
• Ration water • Truck in water, distribute bottled water • Drill new or deeper wells • Evacuate citizens from affected areas	• Critical Transportation • Housing • Mass Care Services • Health and Social Services • Operational Coordination • Public Information and Warning	• National Guard • Department of Transportation • Department of Health and Environmental Control • U.S. Army Corps of Engineers • Health and Human Services • Environmental Protection Agency • American Red Cross
WATER FOR AGRICULTURE USE		
• Bring in water, feed • Drill new or deeper wells • Evacuate animals from affected areas	• Critical Transportation • Logistics and Supply Chain Management • Natural and Cultural Resources • Operational Coordination • Economic Recovery	• National Guard • Department of Transportation • Department of Agriculture • Clemson Cooperative Extension • U.S. Department of Agriculture • Small Business Administration
WATER FOR FIREFIGHTING		
• Control and suppress fires • Protect lives, property, environment • Evacuate affected individuals and communities	• Fire Management and Suppression • Environmental Response, Health and Safety • Housing • Mass Care Services • Natural and Cultural Resources • Public Health, Healthcare and EMS • Operational Coordination • Public Information and Warning	• Forestry Commission • National Guard • Department of Transportation • U.S. Army Corps of Engineers • Federal Emergency Management Agency
WATER FOR POWER PRODUCTION		
• Monitor water levels in reservoirs • Report loss of capability	• Secondary Power Production • Economic Loss Information	• Office of Regulatory Staff

WHAT SHOULD CITIZENS DO DURING DROUGHT?

South Carolina Drought
SC State Climate Office

DROUGHT INFORMATION

For up-to-date information about South Carolina's drought conditions and other resources, visit scdrought.com.

IF DROUGHT IS AFFECTING YOU, WE WANT TO KNOW.

The South Carolina State Climate Office collaborates with the National Drought Mitigation Center and others to collect information on the effects of drought.
To submit a drought report, visit:
https://droughtimpacts.unl.edu/

AGRICULTURE

Information and resources to assist farmers and producers are available through state and federal agencies.

- Clemson Extension, https://www.clemson.edu/extension/
- U.S. Department of Agriculture Farm Service Agency, https://www.fsa.usda.gov/

FIRE

Heed warnings from your local fire department or the South Carolina Forestry Commission about burn restrictions or bans.
https://www.state.sc.us/forest/fire.htm

Check the fire weather forecast from your local National Weather Service office:

- Charleston, https://www.weather.gov/chs/
- Columbia, https://www.weather.gov/cae/
- Greenville-Spartanburg, https://www.weather.gov/gsp/
- Wilmington, NC, https://www.weather.gov/ilm/

WATER CONSERVATION

Heed requests for water conservation. These requests will come from your local water provider or local government agencies.

RECREATION

Heed warnings for boat ramp closures and other hazards related to low water levels.

Search the South Carolina Department of Natural Resources website for boat ramp information and links to the managing organizations.
https://www2.dnr.sc.gov/ManagedLands/Boatramp/BoatRampSearch

ENERGY CONSERVATION

Power production requires water.
Heed requests from your power provider or local utility to save energy.

FOR MORE INFORMATION

South Carolina Emergency Management Division
SCEMD
scemd.org @SCEMD

South Carolina Department of Natural Resources

Carolinas Integrated Sciences and Assessments
CISA
A NOAA RISA TEAM

This flyer was developed by the Carolinas Integrated Sciences and Assessments (CISA) program in conjunction with the South Carolina Emergency Management Division and Department of Natural Resources. CISA is funded by the National Integrated Drought Information System (NIDIS) and the National Oceanic and Atmospheric Administration (NOAA).

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