

DROUGHT BASICS

What is drought?

Most of us think of it as “no rainfall,” but it's not that simple. Drought is when you have less rainfall than you expected for an extended period of time, usually several months or longer. Drought is a normal part of climate, and it can occur almost anywhere on earth. For example, Arizona and North Carolina have different climates, but drought occurs in both states. Drought's features and effects vary from place to place because of different geographical features and cultures, which affect how people use water.

What causes drought?

Drought is caused by a lack of rainfall or snowfall.

Winds cause weather patterns to move around the world, including clouds that bring rain. Over the years, these patterns become routine, creating climate. Sometimes, these patterns change and when they do, some areas can receive less rainfall than normal.

Can drought be predicted?

Generally, periods of drought cannot be predicted. Predicting drought depends on our ability to forecast seasonal precipitation and temperature. Scientists don't know how to predict a month or more in advance for most parts of the world with the precision needed to predict drought. But they are studying the global weather patterns and how those patterns' repeated occurrence can help us determine if we could have an extended period with less than normal rainfall.

What are the impacts of drought?

A shortage of rainfall can result in major impacts on agriculture, city water supplies, tourism and recreation, energy (power) production, river navigation, and the environment.

If you are a farmer, drought means that you do not have enough water in the soil for crops to grow normally or for pastures to produce enough grass for livestock. For farmers who rely on irrigation to produce their crops, drought may be a shortage of water in reservoirs, streams, or groundwater, and irrigation may be restricted. If you live in a city, drought may result in a shortage of water for watering grass, trees and other plants. Often during drought, people in cities are asked to conserve water used inside the home and outside.

Where can I find the most current information on the drought and dry conditions affecting North Carolina?

State and federal officials maintain a map online that shows what parts of North Carolina are affected by drought or abnormally dry conditions. The map, called the U.S. Drought Monitor of North Carolina, can be found at www.ncdrought.org. It is updated every Thursday.

The monitor illustrates the latest picture of drought in North Carolina and serves as the reference for drought classifications and response actions in the state. The monitor is a map that identifies general drought areas and labels droughts by intensity. For example, the D1, or moderate drought, is the least intense form of drought, and D4, or exceptional drought, is the most intense. D0 signifies areas that are drying out, headed for drought, or recovering from drought.

Why do some areas of North Carolina experience different levels of drought?

Drought categories are based on stream flows, groundwater levels, the amount of water stored in reservoirs, soil moisture, the time of year and other relevant factors for assessing the extent and severity of drought conditions. These factors often vary in different areas of North Carolina. The ranking system used in N.C. avoids the problems that some states have experienced in declaring drought warnings statewide, when conditions did not warrant it in all regions of the state. Instead, North Carolina experts tailor drought advisories to local conditions.

What do the different drought categories mean?

Category	Description	Conditions
D1	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested
D2	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies

There are four categories of drought. From least detrimental to worst, the drought categories are moderate, severe, extreme and exceptional. Abnormally dry, or D0, is not a drought category, but means that the affected area could soon go into a moderate drought if dry conditions persist. State and federal officials use the different drought categories as a barometer to assist local governments and other water users in taking appropriate drought response actions. For instance, drought officials recommend to water users and

local governments experiencing moderate drought to minimize non-essential water uses. Non-essential uses include those that do not have health or safety impacts such as car washing and cleaning streets or sidewalks. However, officials recommend that water users eliminate non-essential water use when areas are experiencing severe drought, a category that is one step worse than moderate drought.

Who determines the drought categories for North Carolina?

Each Tuesday, members of the N.C. Drought Management Advisory Council and the National Weather Service speak via conference call to discuss the most recent data available on water resource conditions. The group includes meteorologists, climatologists and experts in forestry, agriculture and water resources. They discuss data measuring streamflows, groundwater and rainfall, the rain's affect on crops as well as wildfire activity and forecasts for each area of the state. The group makes a recommendation to the U.S. Drought Monitor staff about whether drought conditions are receding or spreading in North Carolina based on the data and its discussion. The U.S. Drought Monitor author for the week uses the state's recommendation and its own data to represent conditions in North Carolina. The final drought map is released each Thursday by the U.S. Drought Monitor and posted on the state's drought website, www.ncdrought.org.

Why are some communities that are experiencing drought not faced with water shortages?

The severity of the drought and amount of water a public system has available for residents and businesses to use are two distinct things. Drought is based on a number of factors, including streamflows and expected rainfall as well as water availability for public consumption. A community may be experiencing a drought because of below average streamflows and a lack of rainfall but may have enough water stored in lakes and reservoirs to supply residents' water demands for the foreseeable future.

How much rainfall do we typically receive during the winter months?

Our average precipitation for these months is typically 11 to 12 inches.

Is the winter an important time for helping to relieve some of these drought conditions?

Winter is a critical time of year for rainfall. This is the time of year we expect a recharge of our water supply because water use is way down. Evaporation is low because the air is cooler and the plants and trees are not growing and are not using as much water as they need when they begin to grow vegetation again in the spring. So, we need rainfall at this time of year because by the summer we'll all be using more water and the trees and plants will be sucking water from the ground as they "green over."

How dependent is our water supply on tropical weather such as hurricanes, tropical storms and depressions in North Carolina?

In North Carolina, tropical systems can account for as much as 25 percent of our annual rainfall. Abnormally dry summers can sometimes lead to drought in the absence of moisture from tropical storms.

Do we need tropical weather to recharge our water supply?

Not necessarily, but it can be very helpful. We can typically expect to experience at least some influence of between one and two tropical storms in any given year.

If we do not receive a significant tropical system in one hurricane season, are the odds favorable that we will receive one in the next hurricane season?

Not necessarily. The odds for a tropical storm to impact North Carolina is about the same every year given the general storm frequencies in the Atlantic Ocean. Since we aren't able to predict the tracks of tropical storms more than a few days in advance, we don't know if we're any more likely to experience the impacts of a storm on any specific year.

How does La Nina contribute to a drought?

During the winter, the cause of drought has a lot to do with a prevailing La Nina, a climatic episode characterized by lower-than-normal sea surface temperatures in the Tropical Pacific Ocean. A La Nina typically brings with it a ridge of high pressure over the Southeastern United States. This ridge of high pressure essentially blocks weather from reaching the Southeast. Therefore, all the major systems go west and north of the southeastern states such as North Carolina.

Was the drought of 2007-2008 an anomaly or are we expected to have more of these droughts in the future?

We did not see a drought like that of 2007-2008 in this state over the past 100 years of modern records, based on numerous drought indicators that have been recorded in the state since the 19th century. Thus, we don't expect to see droughts as bad as this one every time we have a drought.

What we are able to conclude is that no matter what climate change may be happening, we know that droughts can and will occur. For that reason, we all need to make drought planning and water conservation part of our everyday lives because one thing we expect to see in the future is more people using a finite amount of water. Therefore, population growth may increase our vulnerability to drought.

Is the current drought and dry conditions an indication that we are experiencing climate change?

No single event can be attributed to climate change. Scientists believe that climate change occurs over many years or decades and has many causes and effects, which include rising sea levels. It may be many years before we can say how much of the 2007-2008 drought is associated with global climate change. We're much more sensitive in North Carolina to the increasing demands on our water supply, mostly due to our population growth.

CURRENT DROUGHT INFORMATION

Where can I find out more about the drought?

Check out the state's drought website, www.ncdrought.org, for the latest information.

What else can I find at the www.ncdrought.org website?

The website includes:

- A drought map depicting the current situation at www.ncdrought.org
- Water conservation tips at www.savewaternc.org
- Weekly water use by North Carolina communities at http://www.ncwater.org/Drought_Monitoring/reduction/weeklyreport.php
- The status of streamflow conditions in North Carolina at <http://nc.water.usgs.gov/drought/droughtsw.html>
- The drought outlook at http://www.cpc.ncep.noaa.gov/products/expert_assessment/season_drought.gif
- The status of the public water systems facing the most severe water shortages at http://www.ncwater.org/Drought_Monitoring/reporting/weekstatust123.php
- The status of the state's reservoirs at
<http://epec.saw.usace.army.mil/>
<http://www.duke-energy.com/lakes/levels.asp>
<http://www.progress-energy.com/aboutenergy/powerplants/hydro/lakelevels.asp>
<http://www.dom.com/about/companies/ncpower/lakedata.jsp>
http://www.alcoa.com/yadkin/en/lakes/reservoir_data.asp
<http://www.nantahalapower.com/lakes/levels/>
<http://www.tva.com/river/lakeinfo/index.htm>

- The latest news on drought at <http://www.ncdrought.org/news.php>

WHAT CAN I DO IF I WANT TO REPRODUCE THE DROUGHT MAP IN MY PUBLICATION OR WEB SITE?

You will find a high-resolution PDF of the drought map that you are welcome to reproduce. Go to www.ncdrought.org and click on “hi-resolution PDF,” in blue lettering beneath the drought map.

WATER CONSERVATION

What’s our best option for combating the effects of the drought?

In times of drought and other water emergencies, using less water by increasing water efficiency and managing demand through conservation is our best option. For this reason, we encourage public water system managers to plan ahead and set up interconnections to other water supplies, conduct water audits and adopt conservation based price structures to encourage citizens to conserve water.

Why are people asked to conserve water?

The water we receive from rainfall is the supply we have available. Some communities store water in reservoirs and lakes while others depend on water available in underground aquifers. During drought, the amount of available water is reduced. Therefore, it’s essential that we reduce our use or demand for water so that there is enough available to meet our basic needs until conditions improve.

What’s the easiest way residents can conserve water so that their efforts can extend our available water supplies?

1. Reduce bathroom water use. About half of all indoor water is used in the bathroom, where we flush toilets and bathe. Turn off water while lathering, shampooing, shaving and brushing teeth. Reducing showering time to five minutes can save an average of 20 gallons to 40 gallons of water a day.
2. Reduce or eliminate outdoor irrigation. The typical single-family suburban household can use 30 percent of their water outdoors for irrigation. So, during times of severe drought reduce or eliminate outdoor irrigation.
3. Fix leaks. Leaks account for about 15 percent of all household indoor water use. Check tub and sink faucets for drips and replace washers and “O-rings” as necessary. Put food coloring in your toilet tank. If the coloring shows up in the toilet bowl before flushing, replace the leaking flap. Turn off all water to your home and look at the readout dial on your water meter. If the dial moves, you have a leak.

For more water conservation tips check out the state's conservation link at www.savewaternc.org.

Has my community instituted water restrictions?

To find water restriction information go to http://www.ncwater.org/Drought_Monitoring/reporting/displaystate.php . Scroll down the page to find if your community water system has reported to the state the latest on any water restrictions.

Where can I find a statewide overview of water use restrictions in North Carolina?

Go to http://www.ncwater.org/Drought_Monitoring/reporting/displaystate.php. At the top of the page, you will find the number of people subject to voluntary and mandatory restrictions as well as those who are not subject to water use restrictions.

Are all water systems and the state's entire population included in the data on water use restrictions?

No. The overview of water use restrictions includes only those systems the state is required to track. By law, the state Department of Environment and Natural Resources tracks all local government systems, other systems with 1,000 or more service connections or those systems that serve 3,000 or more people. In 2009, these systems provided water to 84 percent of people with North Carolina.

Generally, what's the best way we can ensure we have enough water during the drought?

In times of drought and other water emergencies, increasing water efficiency and managing demand through conservation is presently our best option.

What authority does the state have to force communities to conserve water?

The Division of Water Resources cannot mandate water conservation until a county reaches the second worst level of drought, severe drought status, as stated in Section 5 of the 2008 Session Law. To see the language in Session Law 2008-143 go to <http://www.ncleg.net/Sessions/2007/Bills/House/HTML/H2499v6.html>.

Water restrictions are decided on the local government level. For a list of water systems and what water restriction they are under go to www.ncwater.org/Drought_Monitoring/reporting/displaystate.php.

Administrative rules developed in response to passage of Session Law 2002-167, require the development and implementation of drought response plans by water systems that are required to prepare a local water supply plan; large self-supplied water users; local

governments; state agencies; and agricultural and horticultural water users. These plans must be implemented when the N.C. Drought Management Advisory Council indicates the area from which they get water is experiencing extreme and exceptional drought conditions.

The Governor has the authority to declare a Water Shortage Emergency in response to a request from the Secretary of the Department of Environment and Natural Resources. With such a declaration, the Secretary has authority to require water conservation efforts as well as water sharing measures to protect the public health and safety.

WATER SUPPLY

What does it mean when a community says they have a certain number of days of water left?

Communities with reservoirs may estimate the number of days of water remaining by dividing the volume of water they have available by the average amount of water the community uses each day. Water conservation efforts that reduce the community's use of water can make the available supply last longer, and improve the chances they will get rain to replenish the supply before it runs out.

A lot of people have mentioned that if you use well water to irrigate, wash your car or drink you will not affect the amount of water other users have available to them. Is this true?

In some cases this is true, but it depends on the aquifers supplying the well and the proximity of other wells tapping in to the same source. It is not uncommon for the amount of water that can be pumped from a well to be affected by pumping at neighboring wells. During droughts, when rainfall is less frequent, the water flowing in our rivers and streams comes from ground water leaking into the stream channels. When water tables drop below the bottom of the stream beds it can cause the stream to dry up. Pumping ground water from the aquifers that support stream flows can exaggerate drought effects; hastening the decline of stream flows and exaggerating the effects on downstream water users and water quality.

Has anyone suggested taking the treated sewer water, piping it back to the filtration plant, cleaning it up, and putting it back into the water system to use again?

Yes this has been suggested. Direct supply connections from wastewater treatment plants to drinking water treatment plants are not allowed in North Carolina to protect the public health. However, there are many locations where a community withdraws water for their drinking water treatment plant downstream from another community's treated wastewater discharge. Changing this arrangement by reducing the upstream community's discharge volume could limit the amount of water available to the downstream community.

Typically there is at least a five mile separation between the discharge location and the withdrawal location.

Has government in North Carolina ever thought of the possibility of transferring excess snow from other states to help with the drought situation?

Due to costs and logistics, this is simply not a feasible operation.

Would it be possible to extend water supplies and provide more potable water to North Carolinians by desalinization, or removing the salt from ocean or brackish water?

Desalination using reverse osmosis treatment systems is used to produce drinking water for several communities along the coast already. Where freshwater sources are limited and where existing freshwater sources become over-taxed, the cost of these techniques are less of an impediment. The volume and high concentration of salts in the treatment byproducts can make it difficult to site these facilities.