

Climate change: US megadrought 'already under way'

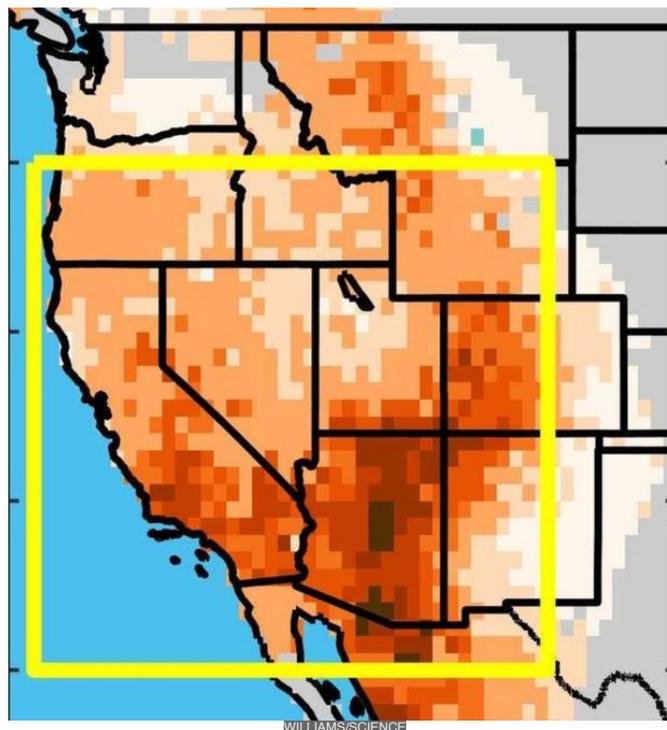
By Matt McGrath
Environment correspondent
8 hours ago



A drought, equal to the worst to have hit the western US in recorded history, is already under way, say scientists.

Researchers say the megadrought is a naturally occurring event that started in the year 2000 and is still ongoing. Climate change, though, is having a major impact with rising temperatures making the drought more severe. Some researchers are more cautious, saying that it is too early to say if the region really is seeing a true megadrought.

So what exactly is a megadrought?



According to the authors of this new paper, a megadrought in North America refers to a multi-decade event, that contains periods of very high severity that last longer than anything observed during the 19th or 20th centuries.

The authors say there have been around 40 drought events over the period from 800-2018 in the western US.

Of these, only four meet the criteria for a megadrought.

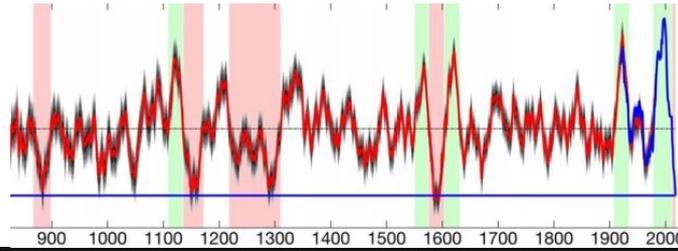
These were in the late 800s, the mid-1100s, the 1200s and the late 1500s.

How do researchers know what drought conditions were like in the past?

The key to this new study is the use of tree ring records to reconstruct soil moisture data for the past 1200 years.

The team were also able to use supporting evidence such as medieval tree stumps growing in normally wet river beds, the abandonment of settlements by indigenous civilisations at the peak of the 13th century drought, plus evidence from lake deposits indicating wildfire activity was enhanced during these drought periods.

What did the study find?



WILLIAMS/SCIENCE A graphic showing soil moisture across the centuries in the western US. The blue line at the bottom shows mean soil moisture 2000-2018

The researchers discovered that when they compared the worst 19-year drought events in the past to soil moisture records from 2000-2018, the current period is already worse than three of the four megadroughts recorded.

The fourth one, which ran from 1575 to 1603 was likely the worst one of all, but the difference with the present event is slight.

"The first two decades of this drought look just like the first two decades of all of the mega droughts," said lead author Dr Park Williams, from Columbia University in New York.

"In fact, it is essentially tied with the worst two decades of the worst of the mega droughts."

Is the current megadrought a natural event or was it caused by climate change?

The authors say that undoubtedly the current drought situation is a natural event but is being made much worse by climate change.

The key event seems to have been the El Niño/La Niña weather phenomenon.

"We know from, from many lines of evidence that when you have La Niña type conditions in the tropical Pacific Ocean, then the southwestern US and northern Mexico get dry. And that's what we've seen over the last two decades," said Dr Williams.



GETTY IMAGES Lake Mead saw huge drop in water levels during the recent drought.

But climate change has super-charged the current drought.

The authors say that in the western US, temperatures have gone up by 1.2C since 2000. Hotter air holds more moisture and that moisture is being pulled out of the ground.

They believe that climate change is responsible for about half of the pace and severity of the current event.

"It doesn't matter if this is exactly the worst drought ever," said co-author Benjamin Cook, who is affiliated with Columbia University and Nasa's Goddard Institute for Space Studies.

"What matters is that it has been made much worse than it would have been because of climate change."

What have been the impacts of the megadrought?

The authors say the two most important water reservoirs in the region, Lake Powell and Lake Mead have both shrunk dramatically during the drought.

Wildfires across the region are growing in area.

"At any given year, there's over ten times more forest area burns than we would have expected in a given year, 40 years ago," said Dr Williams.

What has helped to mitigate the impact of the drought has been groundwater - the water held underground in aquifers.



GETTY IMAGES The amount of land impacted by wildfire in recent years in the US has increased

This has increasingly been used to bolster supplies for agriculture.

The longer the drought goes on, the deeper into these reserves that people are digging, and they take a long time to replenish.

Is there full agreement among scientists that a megadrought is taking place right now?

No. This new study is contentious, especially as the definition of what exactly a megadrought means is still being argued over. Some say that it is also way too early to declare that a megadrought is ongoing. But even those who disagree with the idea, acknowledge there is water stress in the region and this is likely to get worse in the future. "Whether or not the western US has crossed a threshold into an event that goes by any specific label, what's been clear this century is that water is an essential resource in the western US, and it's a precarious one, because the region can have long spells with little precipitation," said Dr Angeline Pendergrass, a scientist with the US National Center for Atmospheric Research (NCAR). "And it looks like climate change won't make it better - indeed, it will likely make it worse." The **study has been published** in the journal Science.