# ERCOT Drought Risk Monitoring Tool



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⇨Reservoir Prediction Example

⇨Water Supply Prediction Methodology for ERCOT Drought Risk Monitoring Tool

⇨ERCOT Retrospective Analysis of the 2010-2015 Drought


ERCOT Resource Adequacy
Dan Mantena - dmantena@ercot.com


## SUMMER 2021 WEATHER FORECAST

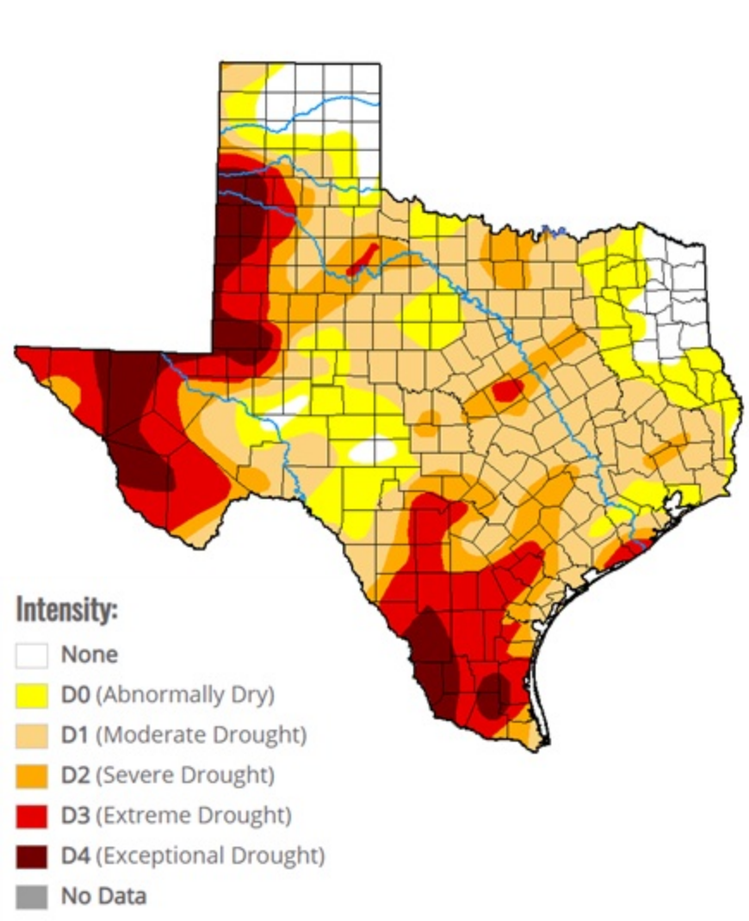
### Preliminary Summer 2021 Weather Outlook from Chris Coleman, ERCOT Senior Meteorologist

Should the spring weather outlook hold (warm and dry), it's likely to have significant impacts on the summer season. This is a trend that's unlikely to change until the La Niña pattern fades. As a result, the preliminary forecast for Summer 2021 is both hotter than normal and drier than normal for the entire ERCOT region. The area that is forecast to be the most above-normal for temperatures and below-normal for precipitation is West Texas. There are no current indicators to support milder temperatures or a wet pattern anywhere in Texas this coming summer.

At this point, it's too early to forecast potential heat and drought intensity for the summer season; however, 2011 is being closely monitored for historical comparisons. The La Niña pattern, combined with the drought, is at levels not seen since early in 2011. In addition, Texas experienced a cold extreme in February of this year, as was also the case in February 2011. That said, for this coming summer to approach 2011 levels, the spring season will also need to approach 2011 levels. 2011 was both the hottest and driest spring on record for the state of Texas. 100-degree temperatures were being recorded in Waco, Austin, and San Antonio in May of 2011. But more importantly, the drought ramped up significantly during the spring of 2011. If we see similar patterns developing this spring, similarities to the summer of 2011 are possible this coming summer.

*The full weather outlook for Summer 2021 can be found here:*
*http://www.ercot.com/about/weather/updates*

### Drought Monitor Map: April 15, 2021



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## APRIL 2021 DROUGHT RISK UPDATE (1/2)

ercot **Electric Reliability Council of Texas**

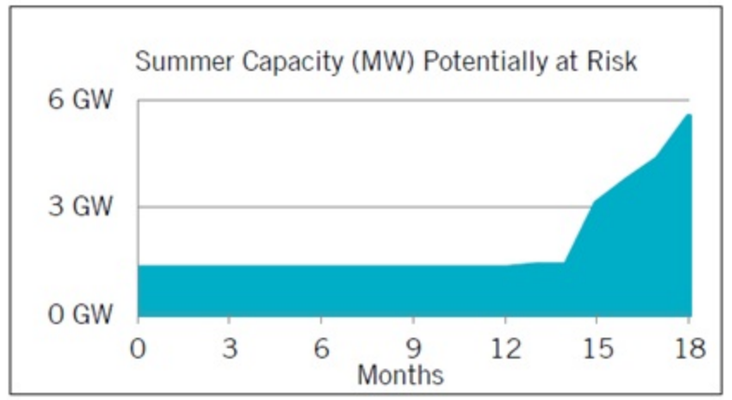
ERCOT Drought Risk Analysis: April 2021

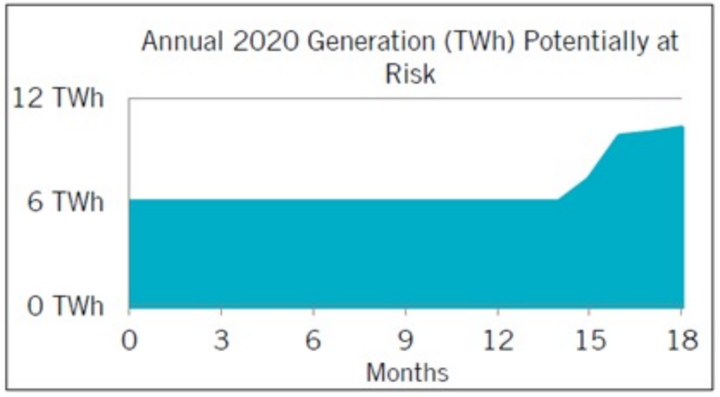
This report summarizes the results of ERCOT's drought risk prediction model for April 2021. This analysis identifies potential drought-related impacts on thermal generation availability in the region based on a current snapshot of system conditions.

ERCOT estimates the amount of capacity and generation potentially at risk of losing water supplies within the next 18 months based on current reservoir levels, historical withdrawals under drought conditions, and a three-month weather forecast.

Generation or capacity "at-risk" refers to generation resources with water supplies at or approaching low levels (i.e., level of intake).

**Although the risk assessment tool indicates 1,272 MW are at risk within the next six months, thermal plant owners don't anticipate significant operational impacts at this time.**




Generation or capacity "at-risk" refers to generation resources with water supplies at or approaching low levels (i.e., level of intake)—20% of total storage for drainage-fed reservoirs and 50% of total storage for off-channel reservoirs.

# ERCOT Drought Risk Monitoring Tool

SUMMER 2021 WEATHER FORECAST

**APRIL 2021 DROUGHT RISK UPDATE**

BACKGROUND OF TOOL

TRENDS AND OBSERVATIONS

NEXT STEPS

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## APRIL 2021 DROUGHT RISK UPDATE (2/2)

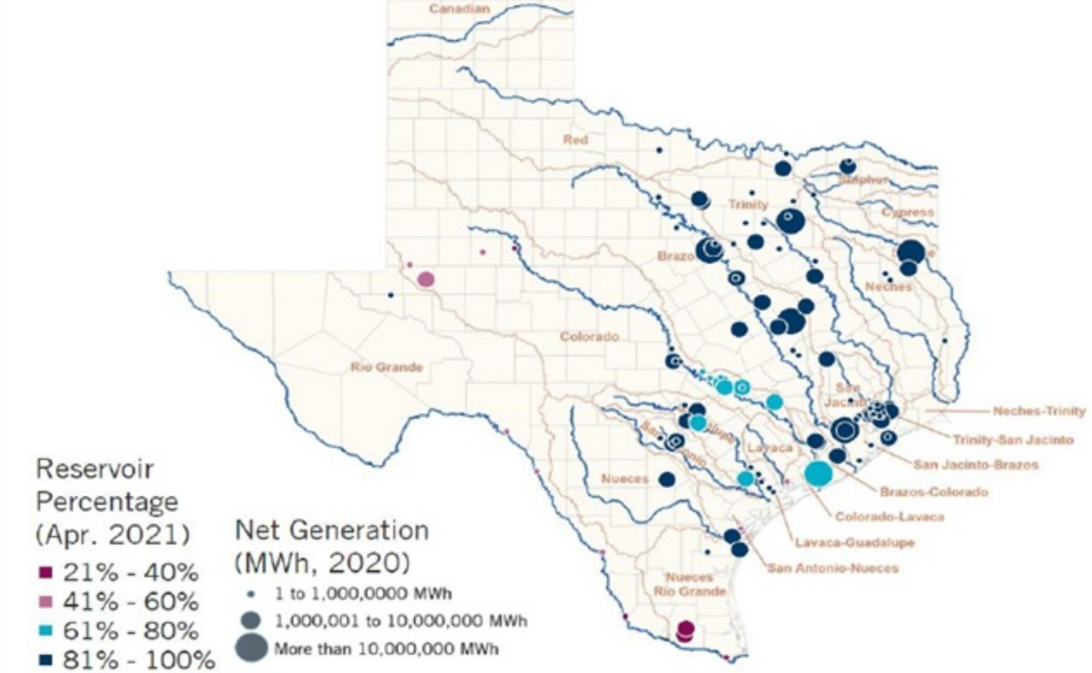
ercot Electric Reliability Council of Texas

ERCOT Drought Risk Analysis: April 2021

The map below shows the current reservoir or groundwater storage available in the primary reservoirs from which generating resources in the ERCOT region withdraw water.*

Each dot on the map corresponds to a generating site, sized according to the amount of energy (MWh) provided to the grid annually in 2020, and colored according to the amount of storage currently available in the reservoir or aquifer.

Reservoir Storage as of April 1, 2021



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## BACKGROUND

During the 2010-2015 drought period, ERCOT consulted with Black & Veatch to identify the factors contributing to drought risk for power generation.

The analysis identified that the most significant risk of failure due to drought was related to the water storage in each of the relevant cooling water storage systems.

An Excel-based monitoring tool was developed to identify the future impacts of drought on ERCOT generation.

The potential impacts of drought on ERCOT generation are determined by simulating historical withdrawals under drought conditions.

## MODEL INPUTS

Key inputs used to predict when water supplies could reach at-risk conditions:

⇨Monthly storage levels for 40 reservoirs and 5 groundwater aquifers from Texas Water Development Board

⇨Short-term three-month weather forecast from Chris Coleman, ERCOT Senior Meteorologist

⇨Maximum discharge temperature measurements (into cooling reservoirs) across coal and nuclear units from EPA ECHO data

## PROACTIVE COMMUNICATION WITH RESOURCES OWNERS

When a reservoir is expected to reach "at-risk" conditions within a six-month time horizon, ERCOT contacts the resource owners that use that reservoir to:

1. Confirm the drought risk
2. Understand the mitigation strategies owners have in place to manage the risk
3. When units could become unavailable

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## TRENDS AND OBSERVATIONS

Capacity (MW) identified as "at-risk" within an eighteen-month time horizon in the drought updates

| | 2016 | | | | | | | 2017 | | | 2018 | | 2019 | 2020 | | | | 2021 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | APR | MAY | JUN | JUL | AUG | SEP | OCT | MAY | AUG | NOV | MAR | AUG | MAR | APR | MAY | JUN | OCT | JAN | MAR | APR |
| Gas Combined Cycle | 1,415 | 1,415 | 1,415 | | 1,710 | | | | | | | | | 1,186 | 1,186 | 1,190 | 1,190 | 2,616 | 2,616 | 2,616 |
| Gas Steam | 226 | 226 | 226 | 226 | 235 | 235 | | 669 | 669 | 669 | | | | | | | | | | 1,065 |
| Gas Simple Cycle | 726 | 726 | 726 | 407 | 453 | 407 | 407 | | | | | | | 46 | 46 | 46 | 46 | 365 | 365 | 962 |
| Coal | | | | | | | | | | | | | | | 660 | | | | 655 | 655 |
| Other | | | | | | | | 105 | 105 | 105 | | | | | | | | | | 105 |
| Hydro | | | | | 36 | | | | | | | | | 36 | 36 | 36 | 36 | 36 | 36 | 36 |
| Grand Total | 2,367 | 2,367 | 2,367 | 633 | 2,434 | 642 | 407 | 774 | 774 | 774 | 0 | 0 | 0 | 1,268 | 1,928 | 1,272 | 1,272 | 3,017 | 3,672 | 5,439 |

Summary of ERCOT contact with generator owners regarding drought impacts on unit availability

**20**

public drought risk reports released since 2016

**15**

emails sent to resource owners regarding generator water availability

**3**

owners **expected** capacity derations due to water-related reasons

**3**

owners **confirmed** capacity derations have occured due to water-related reasons

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## NEXT STEPS

ERCOT is currently developing an extensive RFI survey in order to validate the information used in the drought model.

The survey is intended to

⇨provide an audit of the river systems used by generation owners for plant operations

⇨understand the mitigation plans of generation owners in the event water supplies becomes reduced or unavailable

Draft version of the survey can be found in the Drought Risk Tool Resources zip file located on the April 2021 SAWG meeting page: http://www.ercot.com/calendar/2021/4/23/215934-SAWG

| III. Mitigation Plans | | | |
|---|---|---|---|
| A | B | C | I |
| Unit Code | Does the plant have a mitigation strategy in place should water supplies become reduced or unavailable? | If YES to B, please describe the mitigation plan (e.g., secondary water supply source) | Comments |
| UNIT_CODE_EXAMPLE1 | Yes | | |
| | | | |


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