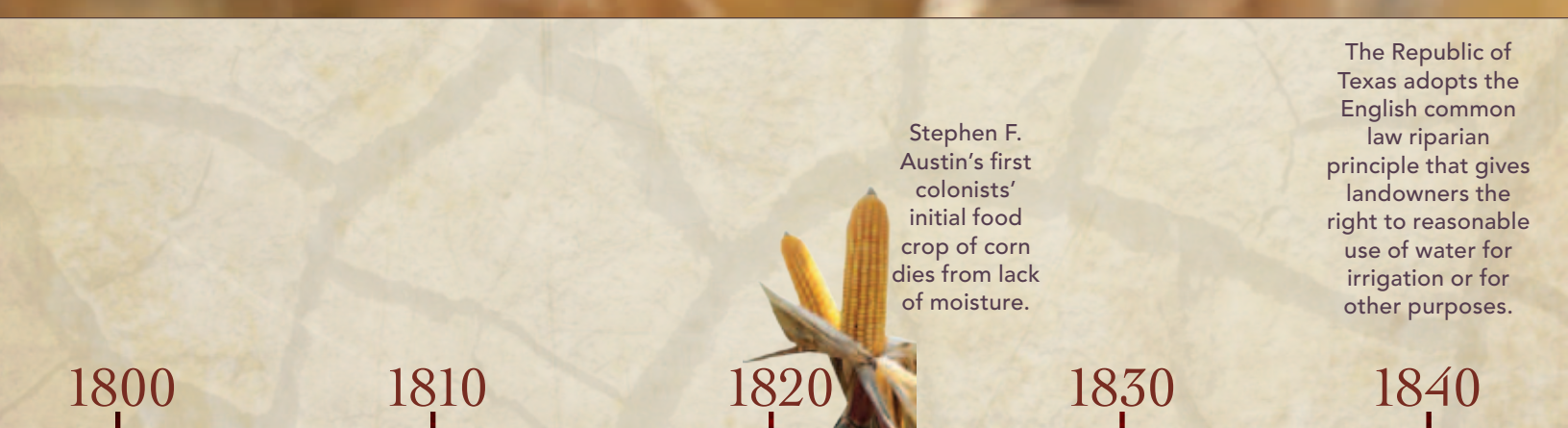




# THE GRASS ISN'T GREENER ON THE OTHER SIDE

*Drought's effects on waterbodies, crops, livestock, energy, consumers and pocketbooks*



1800

1810

1820

1830

1840



Stephen F. Austin's first colonists' initial food crop of corn dies from lack of moisture.

The Republic of Texas adopts the English common law riparian principle that gives landowners the right to reasonable use of water for irrigation or for other purposes.

**D**rought—a word that’s receiving a lot of attention throughout Texas—seems to be on everyone’s mind. From agriculture to urban life, from farmers and ranchers to energy producers, water suppliers and consumers—everyone and everything are being affected by drought.

“No one has escaped the far-reaching impact of this historical disaster,” said Texas Agriculture Commissioner Todd Staples. “By the numbers, beef cattle have the greatest cash loss, followed by cotton, a loss of hay, corn and sorghum. Dairy producers are suffering because of high feed costs they’ve been associated with. The pain has been broadspread, and no one has escaped, unfortunately.”

The drought’s effects on the agricultural industry are also passed on to consumers, who depend on these products for their daily necessities, he said.

“Consumers are being impacted because they rely on fuel and food and fiber,” Staples said.

Dr. John Nielsen-Gammon, state climatologist and professor of atmospheric sciences at Texas A&M University, said, “It’s the worst one-year drought in the sense that we had so little rain during the winter time (of late 2010 to early 2011) and then the spring and summer. It’s had maximum impact on agriculture—crops are having serious problems throughout the state. Ranchers are cutting back on herds, or some of them are selling off completely. So the timing of this (drought) has made it particularly bad.”

In addition to the lack of rainfall, heat-related records were broken in Texas. The hottest statewide average temperatures for June, July and August were all in 2011. The combined June through August

temperature was one of the hottest ever for any state, breaking a record set by Oklahoma during the Dust Bowl.

“That’s caused primarily by the drought, because if you have less rain, then when the sun hits the ground there’s no water to evaporate; it all goes into heating it, and that then leads to warm temperatures and more evaporation, and the drought becomes that much more severe,” Nielsen-Gammon said.

The excess heat means air conditioners are being set to cooler temperatures, which in turn causes electricity demands to rise. This further stresses water supplies for the power plant cooling towers or even causes power output to shut down.

The current drought is being compared to the drought of record in the 1950s, and thus far each industry, along with the weather, is breaking its own records. The effects are widespread.

### Drought 2011: Setting the tone

“We first started getting concerned about the possibility of a drought back in the summer of 2010 when all signs pointed to a La Niña developing in the Pacific Ocean,” Nielsen-Gammon said. “That’s when water temperatures in the tropical East Pacific are unusually cold, which affects the jet stream pattern and tends to give us a warm and dry winter. So we were alert to that possibility. Starting about October the rain really shut off, and we did have a dry winter and a dry spring—but drier than anyone was expecting.”

While some parts of the state, such as East Texas, were dry during summer 2010, he said, most of the state didn’t have problems until the beginning of 2011. ⇨

Grass that once provided a lush, green pasture for cattle is now brown and crisp. Photo by Danielle Supercinski Kalisek, TWRI/IRNR.





“For the twelve months ending September 30, Texas received a little more than 10 inches of rain on average for the state. This is the driest 12 consecutive months on record; normal would be about 26 inches, so we’re well below 50 percent,” Nielsen-Gammon said.

Other records set so far include the driest year to date, with January through September precipitation being 2.5 inches below the previous record for the state as a whole. Records were also set for the driest seven, eight, nine, 10 and 11 consecutive months.

“The previous record for driest 12 months was set in 1956,” he said. “We haven’t had the really major impacts on water supplies like we saw during the 1950s, but with La Niña conditions back in place, this is looking more and more like a multiyear drought.”

He said this fall brought some hope of rain from tropical storms, depressions or hurricanes, but La Niña conditions have returned and are forecasted to remain for at least several months, which will tilt the odds toward another dry winter.

“Even if we do have another La Niña, I wouldn’t expect precipitation running as far below normal as it has been, because this was a record-setting drought,” Nielsen-Gammon said. “But the difference from this year and last year is last year we were starting off with mostly full reservoirs and plenty of stream flow and plenty of water in aquifers, and this year we’re not. So even a mild precipitation deficit will make next year, especially for water supplies, worse than this year.

“No two years are alike and no two droughts are alike, but I suspect that if the drought continues like it has, sometime next year some places in the

state will exceed their drought of record, and with the increase of population and the increased water use, we’ll start seeing some serious water supply problems.”

### Agricultural crops

When asked what his overall impression of the drought is, Agriculture Commissioner Staples summed it up in one word: “Devastating.”

“Texans are suffering through the worst one-year drought on record, and the calamity is just getting worse by the day,” he said. “The unprecedented lack of rainfall, combined with extremely intense heat and high winds during the year, just crippled agricultural operations across the state.”

Dr. Travis Miller, professor and Texas AgriLife Extension Service program leader for soil and crop sciences at Texas A&M, said as of August, losses were estimated at \$5.2 billion. “That’s a direct loss to ag producers from this drought, and that’s continuing. In other words, as we go weeks and months further into this thing, the loss numbers get higher and higher.”

The biggest crop losses have been in cotton. “We estimated a little over a \$1.8 billion loss in cotton; about 52 percent of the total crop was zeroed out with no yield at all,” he said. “So we planted 7.1 million acres, and we’ll harvest about 3.4 (million acres), maybe. The jury’s still out on some of that.”

Cotton harvest time depends on the location in the state—the Rio Grande Valley begins harvesting in late July to early August, and cotton harvesting wraps up in the High Plains around the first of November through December. However, due to the drought and extreme temperatures, even harvesting times are being affected, which in turn affects yield.

Heavy rains falling on the Colorado River watershed cause the river to crest 11 feet above the Austin Dam, ultimately destroying it.

Houston RR v. East confirms the English law of the rule of capture, which allows landowners to pump as much groundwater as can be used beneficially, regardless of the impact on neighboring wells.

1900

1901

1902

1903

1904

Wheat crops, which are usually harvested in May and June in Texas, were also greatly impacted. Miller said only about 35 percent of the wheat crop was harvested, and harvest totals this year were estimated at 54 million bushels compared to 124 million bushels last year. While not all wheat is normally harvested—a lot of it is grazed by livestock—on average about 55 percent to 60 percent is harvested. Less than half of the normal acres were harvested, and the yields were very low, at about a 26-bushel average compared to about 34 bushels last year, he said.

As the next wheat crop is already being planted, farmers are finding soils that are absolutely dry. He said much of the Texas wheat crop is typically grazed, providing wheat growers with two sources of income and cattlemen with nutritious winter grazing for their herds.

“So it’s potentially a double-whammy loss with loss of the wheat crop and nothing for cattle to graze,” Miller said. “We use that wheat pasture a lot for grazing livestock, and the wheat crop is seriously threatened at this point. The soils are dry. Our chances on our wheat crop are pretty limited.”

He said corn and sorghum and all the other crops, except rice, are affected in the same way with these drought conditions. The corn crop was very short, but the sorghum crop did pretty well, with the Gulf Coast having good numbers with sorghum and cotton, although it was short through the Blacklands.

Rice, on the other hand, had a pretty good crop; however, water suppliers may curtail the ratoon crop water, so chances are the ratoon rice won’t produce, Miller added.

Overall for crops, Miller said, “It’s a pretty gloomy situation.”

### Rangeland and ranching

Rangeland is also being seriously affected by the drought. Dr. Ron Sosebee, professor emeritus with Texas Tech University’s Department of Natural Resources Management and a 40-year expert on battling the brutal effects of Texas’ droughts, said the entire state has been severely affected.

“The pastures and the rangeland look ... I want to say like the dead of winter, but it really looks worse than that,” he said. Sosebee’s area of Lubbock in particular has received about 10 percent of the annual average rainfall to date, or about 1.3 inches since November 2010. And the heat only exacerbated the problem.

Then add livestock and the hay situation into the mix and it gets worse.

“About half of our total agricultural income comes from crops, and about half comes from livestock,” Miller said. “One of the crops we harvest is hay. It’s usually \$750 million, maybe as much as \$1 billion worth of hay; we harvested essentially none, probably less than 5 percent of a normal hay crop. (Hay) feeds our livestock, which means ranchers don’t have any hay to buy, and if they do it’s double or triple the price because it’s being brought in from Louisiana, Missouri, Nebraska and Kansas and other places to the north that got rainfall.”

Miller said hay that normally would have been cut has already all been fed to livestock, and that hay is what ranchers usually use to feed cattle from October through spring when the grass greens up. “So the beef situation is in a very serious mess right now.” ➡

A treaty between the United States and Mexico apportions waters of the Rio Grande above Fort Quitman, Texas, to be used for agricultural irrigation.

1905

1906

1907

1908

1909

Drought

## TIMELINE OF DROUGHTS IN TEXAS



Sosebee added, "The options aren't very many. If we don't move our livestock, they're going to continue eating and damaging the rangeland until there won't be anything left. This year is actually the worst drought year that we have ever had.

"I know the drought of the 1950s is still considered to be the worst drought on record; at least during the 1950s we did get some rain annually, and we could actually get something to grow for grazing, like haygrazer and sometimes wheat. This year we didn't get anything."

The lack of water only adds to the problems.

"The water situation for livestock is very perilous as well," Miller said. "Many traditional sources of water are stock tanks where water collects in our

pastures, and (now) there's no water. So we're selling our herds off as fast as we can sell them—more than 600,000 cows, not calves; in other words, our brood stock that would make next year's calf crop is going."

Due to these conditions, many ranchers started moving cattle this year as early as June and July, and the movement continues to leased pastures in Oklahoma, Montana, the Great Lakes states such as Wisconsin—anywhere they can find grass to lease, or to the auction barn, Sosebee said.

"In fact, one rancher that I know of moved a bunch of cattle to northern Montana, and those cattle will never come back to Texas because he secured a long-term lease, and those cattle will just stay there," Sosebee said. "So whenever this drought

Stock tank levels are decreasing throughout the Lone Star State due to the lack of rainfall during the current drought. The far left photo was taken in 2004 when the tank was full and the land was in pristine condition.

In Post City, near Lubbock, cereal magnate C. W. Post spends four years and \$50,000 on 23 attempts to use explosives to cause rain. He died in 1914 believing that he could "shoot up a rain" whenever he wanted to.



Using the rule of capture, the newly established Texas Board of Water Engineers declares the state's nonappropriated waters to be property of the state and abolishes riparian rights that applied to state land acquired after 1895.

The Paddock Viaduct in Fort Worth is completed.

The Texas Board of Water Engineers produces its first set of rules and regulations.

Drought

1910

1911

1912

1913

1914



The center photo was taken in April 2011 when water levels were noticeably decreasing due to drought. By August 2011, as seen in the right photo, the pier is no longer in the water. This side of the tank is now completely dry. Photo by Danielle Supercinski Kalisek, TWRI/IRNR.

breaks, they will just start all over again here with the herd in Texas.”

In other cases, the only option ranchers have is taking their cattle to auction.

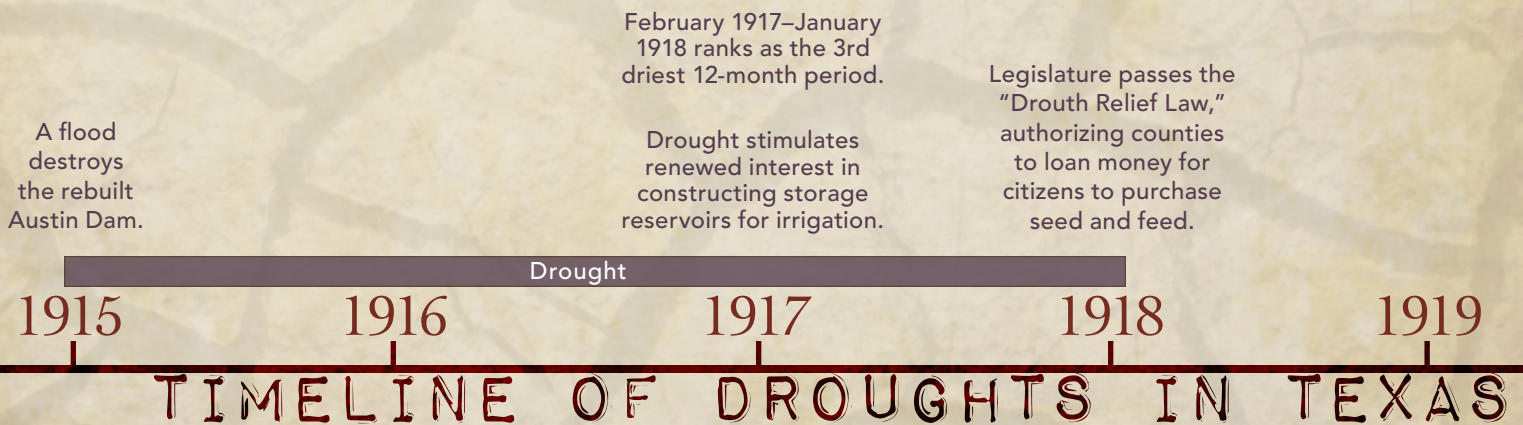
“Auction barns in Abilene, Coleman and that central part of West Texas have been running 48 hours straight selling cattle—people are bringing them in to just get rid of them,” Sosebee said. The same can be said for most auction barns throughout the Lone Star State.

“If we don’t protect our rangeland by moving our livestock, I’m going to suggest that keeping them and feeding them hay is not a very good option,” he said. “They’ll still be trampling the rangelands, and

they’re still going to be eating whatever grass that’s out there because when we come out of the drought, if we maintained our herds by feeding them hay, our pastures and rangelands are going to absolutely suffer immensely.

“Plus the economic side of that is it’s not a very viable option. It doesn’t take that much hay to buy that cow over again.”

Commissioner Staples added, “How much longer these drought conditions continue will be a big factor on how soon we’ll be able to recover. But it will take a while to overcome the reduced beef cattle numbers that are at their lowest point since 1958, nationwide.” ⇨





### Wildfire and wildlife

While mid-July 2010 brought significant rainfall, since then, it has been extremely dry.

"It wound up that we had a lot of moisture (in 2010) on the Gulf Coast, Central Texas, out to West Texas and the High Plains," Miller said. "The fact is about the end of August (2010) we'd had double the normal amount of rainfall in the High Plains, but with this came a lot of summer growth on grasses, much more than normal. Particularly when La Niña moved in during the fall, it just quit raining."

Nielsen-Gammon recalled, "Last year when the drought started, the biggest initial problem was wildfire, especially out in West Texas. The fire danger has moved into central and eastern Texas, where forests have become very dry and tree mortality is increasing.

"Major forest fires such as the early September fires near Bastrop, Linden and Magnolia will continue to be a danger as long as undergrowth remains dry," he said. "Wind speeds normally increase this time of year, and each strong cold front will bring the threat of major fires unless the fronts also bring rain." He added that the longer the drought goes on, the drier the junipers, oaks and pines become, making conditions ripe for crown fires—fire jumping from tree to tree.

"There is more housing encroaching into the Hill Country and the East Texas forests than ever before," Nielsen-Gammon said. "If we don't get rain

this fall, the biggest concern will be a major fire in a major populated area in Central Texas. The Bastrop fire destroyed more homes than any fire in Texas records, but the potential is there for something even worse."

"We have had more than 3.8 million acres burn in Texas, which is phenomenal," said Tom Boggus, Texas Forest Service director. "It is more burned than of any season since we have been keeping records—significant, large amounts of acreage.

"When we get to 2 million acres a year, that is a significant fire season," he continued. "At one time in April we had a million acres on fire in the same week. That shows you how radical and how unusual this fire season is. We are having 35 to 50 fires a day, 150 to 200 fires a week. It just keeps going on. It's all drought-driven."

### Urban consumers

The drought's effects on agriculture, rangeland and livestock and the wildfires seriously impact consumers. Limited crop yields mean less availability and higher prices at the grocery store. The livestock situation means higher prices for beef products.

Dry stock tanks also mean water losses in rivers, lakes, reservoirs and other bodies of water that are sources of drinking water for urban areas. This decrease in water supplies leads to less availability for a growing population and demand.

Development of high-scale irrigation canals begins on the High Plains.

Water power in Texas produces energy for ginning cotton, grinding corn, sawing lumber, and generating electricity.

July 1924–June 1925 ranks as the 4th driest 12-month period.

1920

1921

1922

1923

1924

“What is this going to do to reservoirs where people get drinking water?” Sosebee asked. “Lubbock has just been informed that they will not get any more water from Lake Meredith; we knew that was coming. I understand that Robert Lee is out of water, and Spence is just about dried up, and Midland gets their water from Lake Spence. So what are these people going to do? Now that is a serious situation.”

Water supplies also affect power generation. Declining reservoir levels can mean not enough water for power plant cooling. In these situations power plants might have to shut down completely.

Dr. Michael Webber, associate director of the Center for International Energy and Environmental Policy in the Jackson School of Geosciences and assistant professor of mechanical engineering at The University of Texas at Austin, said the drought and heat wave conditions could cause power plants to cut back power output. If that happens, consumers will experience rolling blackouts, power price spikes or curtailment.

The drought comes around full circle.


“I think consumers need to understand that this type of dire circumstances that our farmers and ranchers are facing affects all Texans and all Americans who rely on what is produced,” Staples said.

He stressed that Texans must understand how important thoughtful water planning is, not only for agriculture but also for Texas’ economy and future jobs.

### What lies ahead

“There’s a lot of speculation about what lies ahead of us,” Miller said. “We know that most of the major drought events we experience are a part of La Niña. With the second La Niña moving in in September 2011, there will likely be another dry winter; we don’t know how dry. It doesn’t look favorable with the dry conditions we’re going into the fall with and the La Niña; it doesn’t look favorable for fall crops or for next spring.”

Staples said, “Droughts of this nature are unplanned, unexpected and unwelcome natural disasters. When a hurricane is bearing down on the Texas coastline, you can take some precautions and mitigate the damage and chaos and start the rebuilding process. With this ongoing drought, it’s something we’re just having to manage our way through.

“These circumstances certainly paint a gloomy picture, but I must point out that Texans are survivors; our farmers and ranchers have the ability to overcome and adapt,” he said. “And don’t forget to pray for rain daily, and thank the good Lord when we get some.” 

The Texas Legislature authorizes the formation of water control and improvement districts.

The Texas Supreme Court, in *Motl v. Boyd*, determines that riparian rights are attached only to the ordinary flow and underflow of rivers.

Legislature creates the Brazos River Conservation and Reclamation District, the first river authority and the first “state agency” in the U.S. created specifically for the purpose of developing and managing the water resources of an entire river basin.

Drought

1925

1926

1927

1928

1929

## TIMELINE OF DROUGHTS IN TEXAS





Lake Austin, 1950s  
LCRA Corporate Archives W00275

The Texas Legislature passes a law designed to prevent artesian water wastage.

Lowest temperature is recorded in Seminole on February 8 at -23°F.

The Dust Bowl stretches from the Panhandle to the Great Plains.

The Lower Colorado River Authority (LCRA) is established and charged with controlling floods, providing water supplies, and generating electricity.

LCRA built 6 dams in the next decade.

Drought

1930

1931

1932

1933

1934