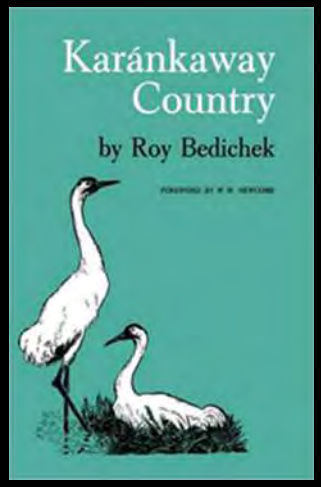
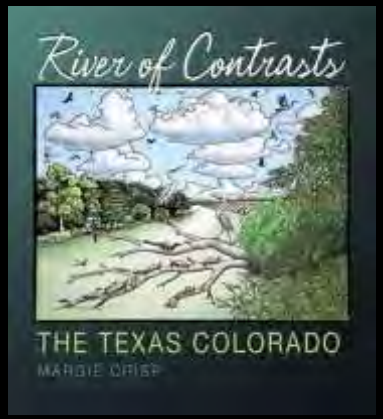
Another Colorado: Rivertown Austin

Kevin M. Anderson Ph. D.

Austin Water Center for Environmental Research






0
200
km
The Colorado River Basin
Lamesa
Big Spring
Brownwood
San Angelo
Brady
Dallas
Fort Worth
Austin
Bastrop
La Grange
Columbus
San Antonio
Bay City
N

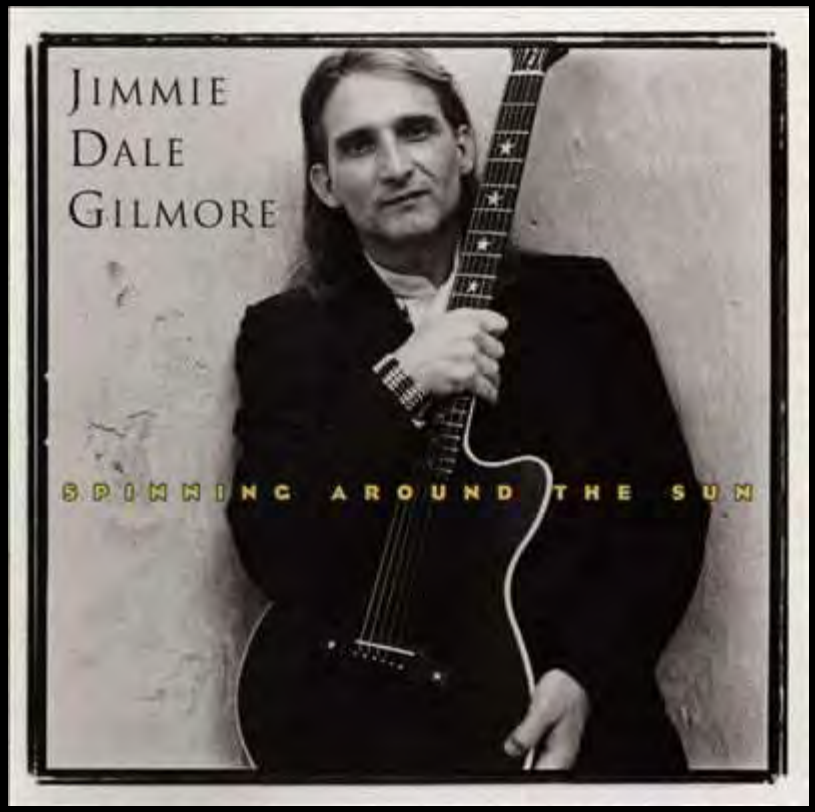
Laketown or Rivertown?

Discovering the Colorado

Another Colorado
Jimmie Dale Gilmore

Down by the banks of the Colorado
My true love and I one night did lie
And we laughed and played and made fun
Of the entire world spinning around the sun
Down by the banks of the Colorado

There is another Colorado
Wise men have told me, wise women too
That I may find sweet El Dorado
Down by the banks of one sweet Colorado…



Texas Rivers and Roy Bedichek (1878-1959)

Chronicler of Texas Natural History. Walter Prescott Webb and J. Frank Dobie arranged for him to spend a year before his retirement writing his first book at Webb's Friday Mountain ranch, about sixteen miles southwest of Austin.

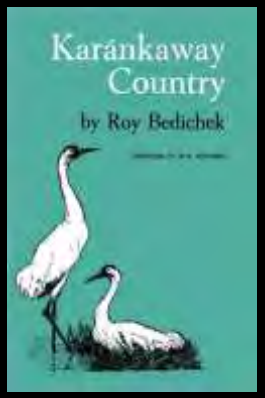
Adventures with a Texas Naturalist (1947)

Karánkaway Country (1950)

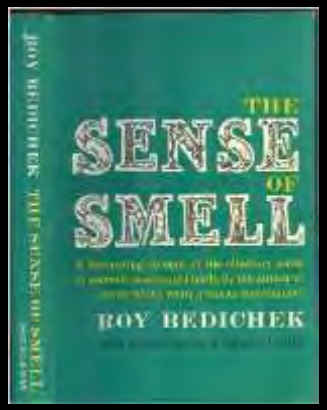
posthumous *The Sense of Smell* (1960).

1947

1950

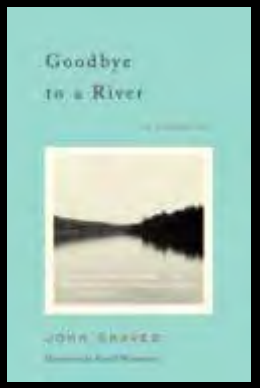


1960



Texas Rivers – Bedichek and Graves

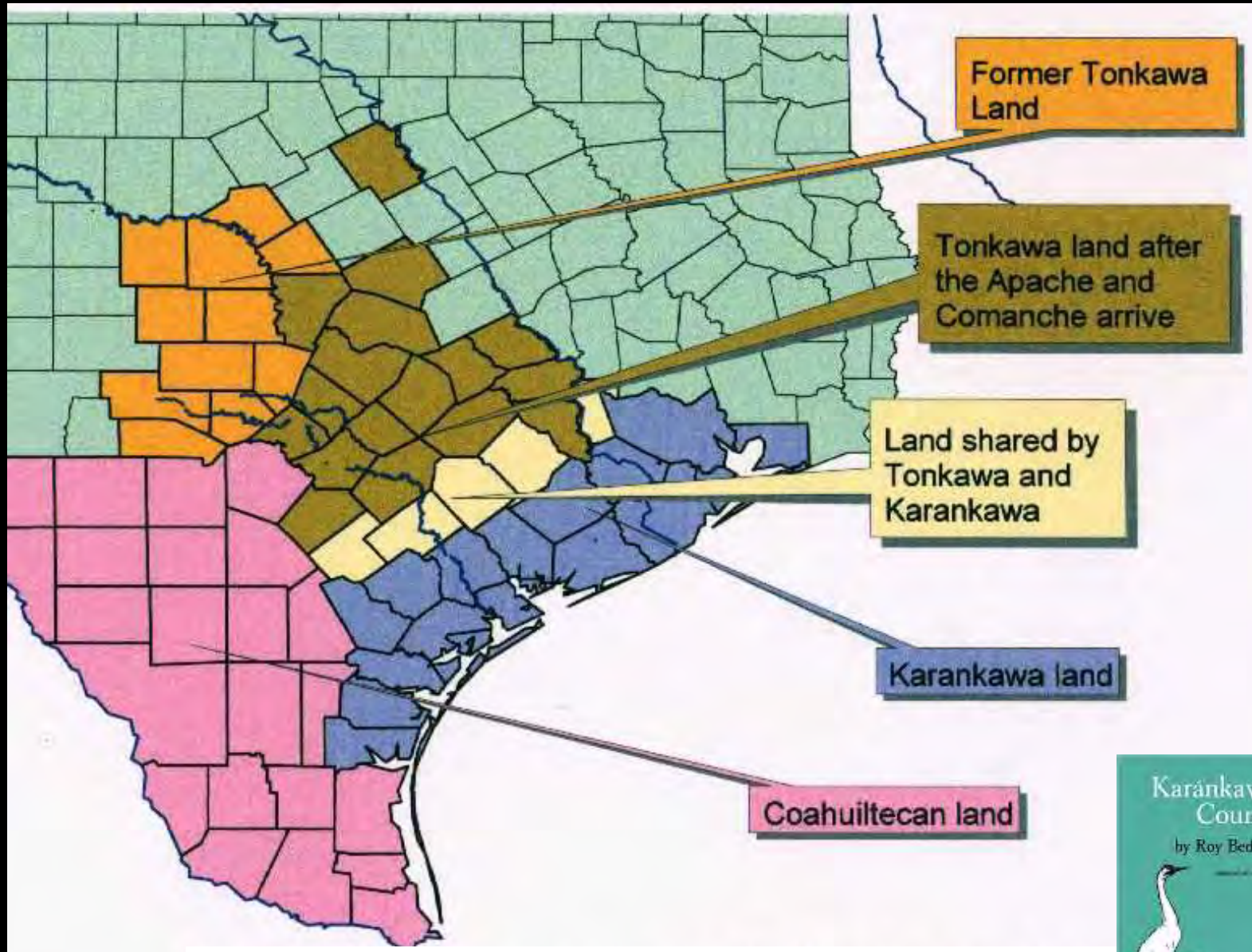
From John Graves, *Myself and Strangers*



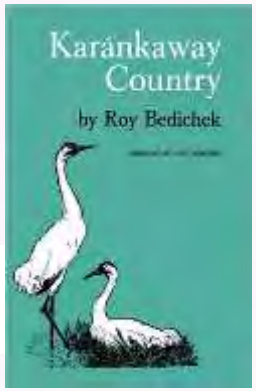
Journal entry Oct 4, 1955

Reading Bedichek, *Adventures with a Texas Naturalist*. A very pleasant hodgepodge. I suppose all nature writers in English are influenced by the same British models in terms of form – White's Selbourne, Lord Grey, etc. – which in some hands becomes license to have no form at all. Bedichek shares many of my own prejudices against nature-destruction and artificiality, but surely he needs to smile when he says that seeing the vermilion flycatcher for the first time is a major event in one's life. It might even be true, but the smile would help.

Altogether, however, he is an even-tempered, sadly amused man of intelligence, taking himself a little seriously, but don't we all?



The Karánkawa Country

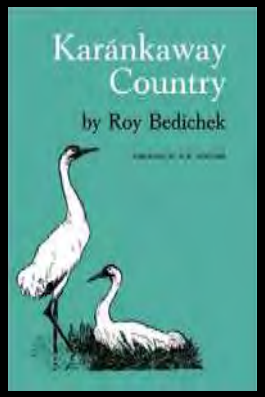


Karánkaway Country

The Colorado and The Brazos

The two longest rivers in Texas empty in the Karánkaway Country only fifty miles apart. Their drainage basins spread out to a width of 250 miles to take in the very heart of the state, and finally come again within shouting distance of each other at their sources, six hundred miles as the crow flies from the Gulf.

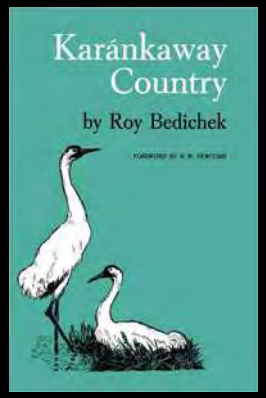
Each delivers an immense burden of silt; and extensive impounding and hydroelectric developments have been completed along their courses, with others in progress, and much more on paper. These are my reasons for selecting this Karánkaway Country for observation…



Sadly amusing?
Problem of river terminology – mouth, head, source

I think that ancient misnomer ‘mouth,’ which we use to designate the place where a river empties, has done the cause of conservation incalculable harm. Our river imagery is muddied at its source. We speak of the head of a river, but there is no mouth in the head. That orifice in our curious anatomy is at the other end. We speak of *the* source of a river, but a river has a thousand sources.

There is no better place than at the so-called ‘mouth’ of a diseased river to diagnose its ailment, for there we find out what it is being fed, whether it is digesting what it is taking in, the condition of its circulatory system, and whether or not its eliminations are normal. By the same token, there is generally no worse place to begin the treatment of the disease after its nature is discovered. 233-4

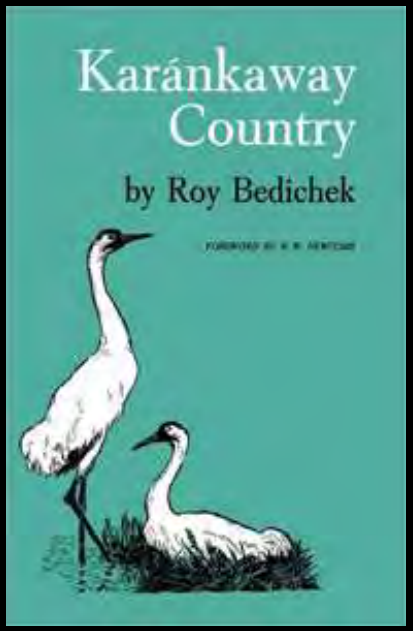


Karánkaway Country - Bedichek and Texas Rivers

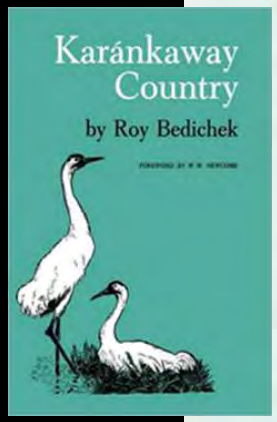
Rivers intrigue me. I can sit on a log and look upon a flowing stream for an hour at a time without feeling those twinges of conscience which come while idling in other environments.

River Ecology

The river is a living organism, or at least it presents characteristics so similar to those of a living organism that to speak of it as such is more than mere metaphor. A river system is one of Nature's units, and it must be dealt with as such if it is to be dealt with successfully for serving human needs.



“Texas has a river unity which invites unified treatment of Texas rivers”



RIVER BASIN MAP OF TEXAS

1996

BUREAU OF ECONOMIC GEOLOGY
THE UNIVERSITY OF TEXAS AT AUSTIN
University Station, Box X
Austin, Texas 78713-8924
(512) 471-1534

Canadian
Red
Trinity
Sabine
Brazos
Neches
Colorado
Rio Grande
San Jacinto
Guadalupe
San Antonio
Lavaca
Nueces
San Antonio-Nueces
Nueces-Rio Grande
Neches - Trinity
Trinity - San Jacinto
San Jacinto - Brazos
Brazos - Colorado
Colorado - Lavaca
Lavaca - Guadalupe

AMARILLO
EL PASO
DALLAS
AUSTIN
HOUSTON
SAN ANTONIO
CORPUS CHRISTI
GULF OF MEXICO

Rainfall (in/yr)
0 to 10
10 to 20
20 to 30
30 to 40
40 to 50
> 50

River basin divide
Annual rainfall
Stream channel

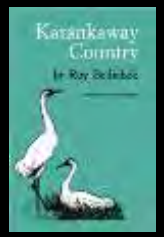
0 50 100 150 200 miles
0 100 200 300 kilometers

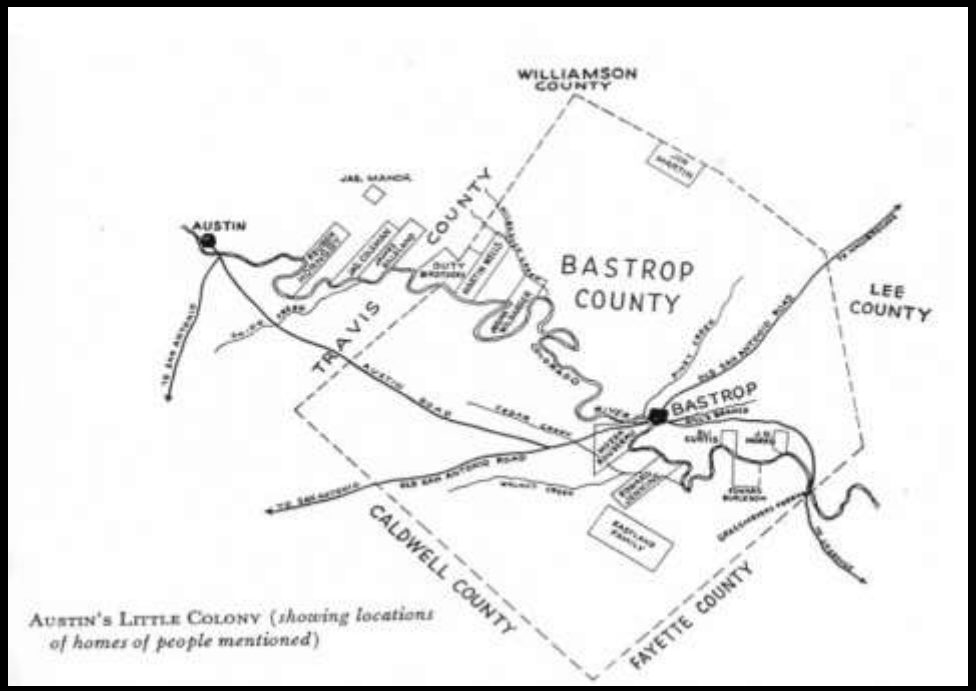
Bedichek, Texas Rivers and 19th Century Settlement

Texas rivers were once truly "rivers of life." As long as Nature was in control, each river system was nourished as an organism, and its business was conducted for all, impartially, on a self-sustaining basis. 244

Stephen F. Austin describing the Colorado River near Bastrop 1821

"Tuesday, August 7 [1821]. Came to the Colorado River – poor, gravelly ridges and near the river heavy pine timber, grapes in immense quantities on low vines, red, large, and well flavored, good for Red wine. The Colorado River is sometimes less than the Brazos, banks very high – generally clear of overflow – bottom and banks gravelly, water very clear and well tasted, current brisk, the river very much resembles Cumberland River, except that there are no rocks and it is some larger.





Austin's Little Colony (*showing locations of homes of people mentioned*)

Bedichek – born 1878

"I have seen in my boyhood days the crown and upper slopes of gentle hills, on which the black soil is mixed with fragmented limestone, produce ninety bushels of oats to the acre. Now many of these slopes are all bleached out, pale as death, and really dead in so far as ability to support vegetable life is concerned. Many old-timers have seen bale-to-the-acre land in 1883 abandoned as worthless in 1903." 279

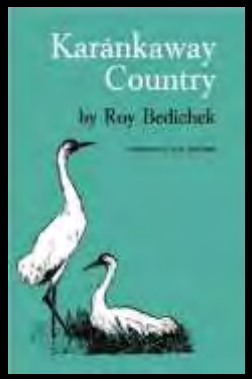
When was the City of Austin founded?

Bedichek - Colorado River Raft

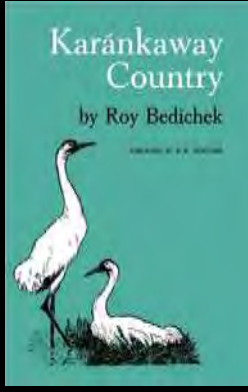
As settlements of whites pushed up these rivers, particularly up the Colorado and its tributaries, slashing the timbre out of the bottoms, tearing from the banks of streams the retarding vegetation Nature had placed there for a purpose, leaving in their greed from more land only a turnrow between cultivated field and river brink – as these characteristic pioneer activities got well under way, an ancient and beneficent clogging of the river it its lower course, known as the 'Colorado River Raft,' became suddenly virulent.

– with the cultivation of the Colorado watershed and the slashing out of the bottoms along the river, this raft grew to enormous proportions, the head of it in 1929 extended forty-five miles from the mouth.

Comer Clay, "The Colorado River Raft," *Southwestern Historical Quarterly* 52 (April 1949).



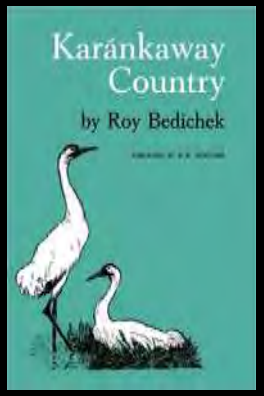
Bedichek – The Brush/Cedar Problem



I hear landlord and lease holder discussing brush clearance and quoting the learned bulletins of agricultural experimental stations, and when I see them readying the terrific machines for action, I can imagine the debouchment areas of the Nueces and of other Texas rivers yawning for the gargantuan mouthfuls of soil which have been detained in their place for the best part of a century by invasion of the despised brush.

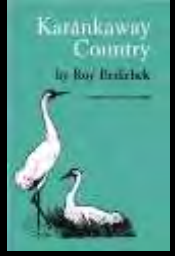
108

Brush, Soil, Rivers, and Watersheds



Ignorance of the conservation function of brush has hung like a pall of smoke over popular thinking since remotest antiquity. Land stripped of forest or of grass seems to know that nakedness is sin. It hastily grabs up anything within reach with which to cover its shame. [Weeds, invading shrubs, vines]…Nature abhors an organic vacuum as much as she does an inorganic one. 110

In spite of its cinema reputation, Texas is not tough, that is, ecologically. It is really a tender land, and cannot stand the buffetings that certain other areas of the world have endured and still support a human population in health and vigor. 278

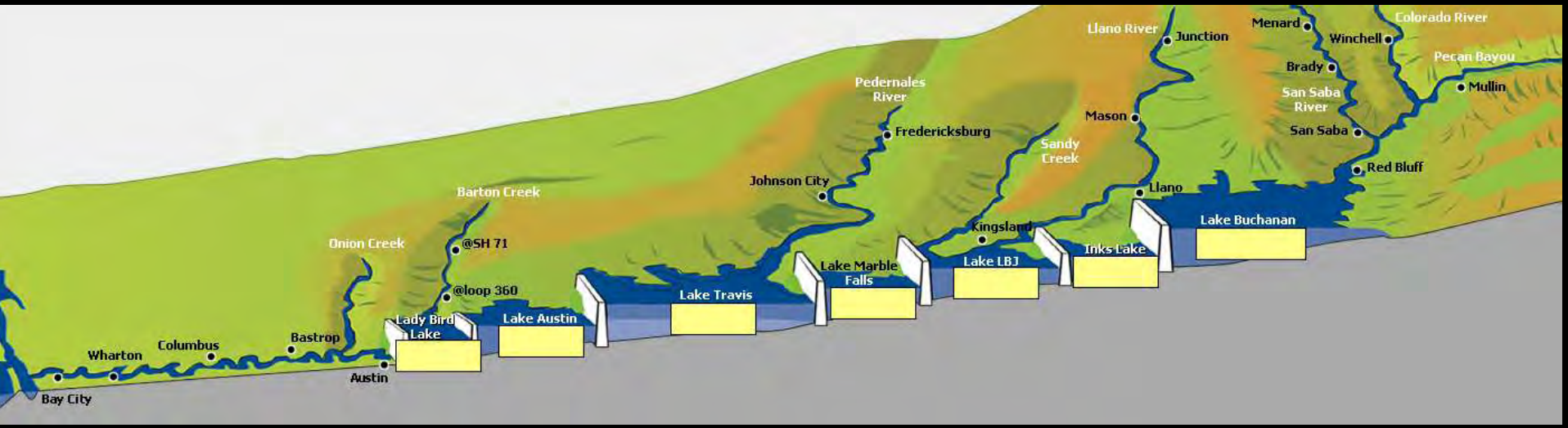


Texas River Management – Flood Control by Dam!

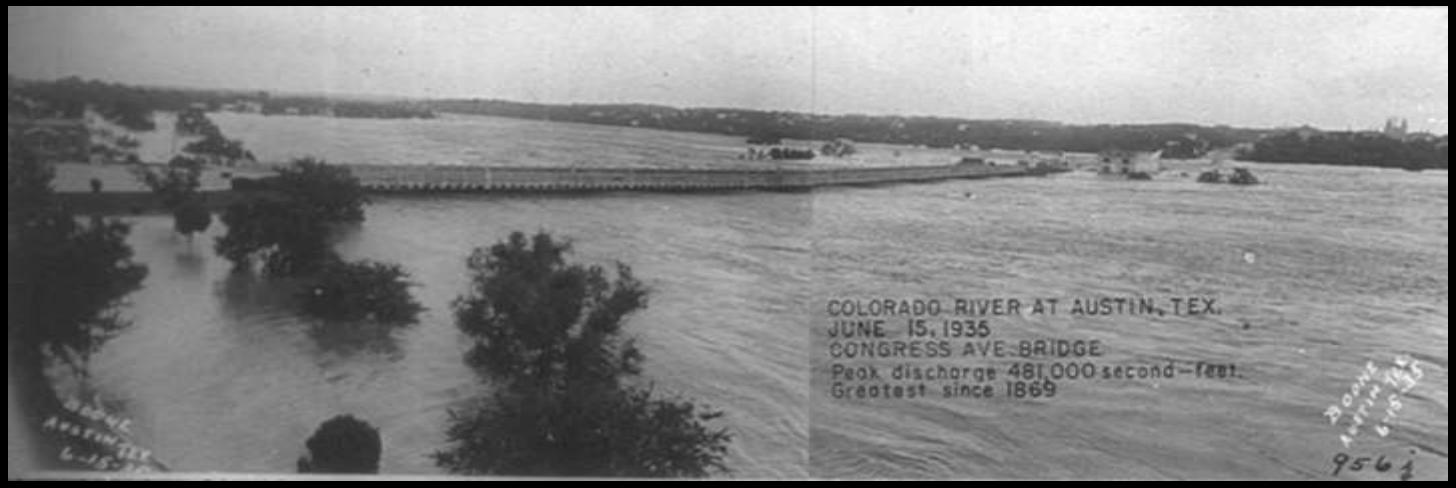
It is a mistake to assume that the big dams catching water from eroded and still eroding watersheds store more than was stored n the days when natural forces detained rainfall in the highlands and let it gradually leak away. Compared with the original uses to which rainfall on Texas watersheds was put, big dams merely salvage rather than conserve. We have relocated the reservoir and changed its character, each for the worse.

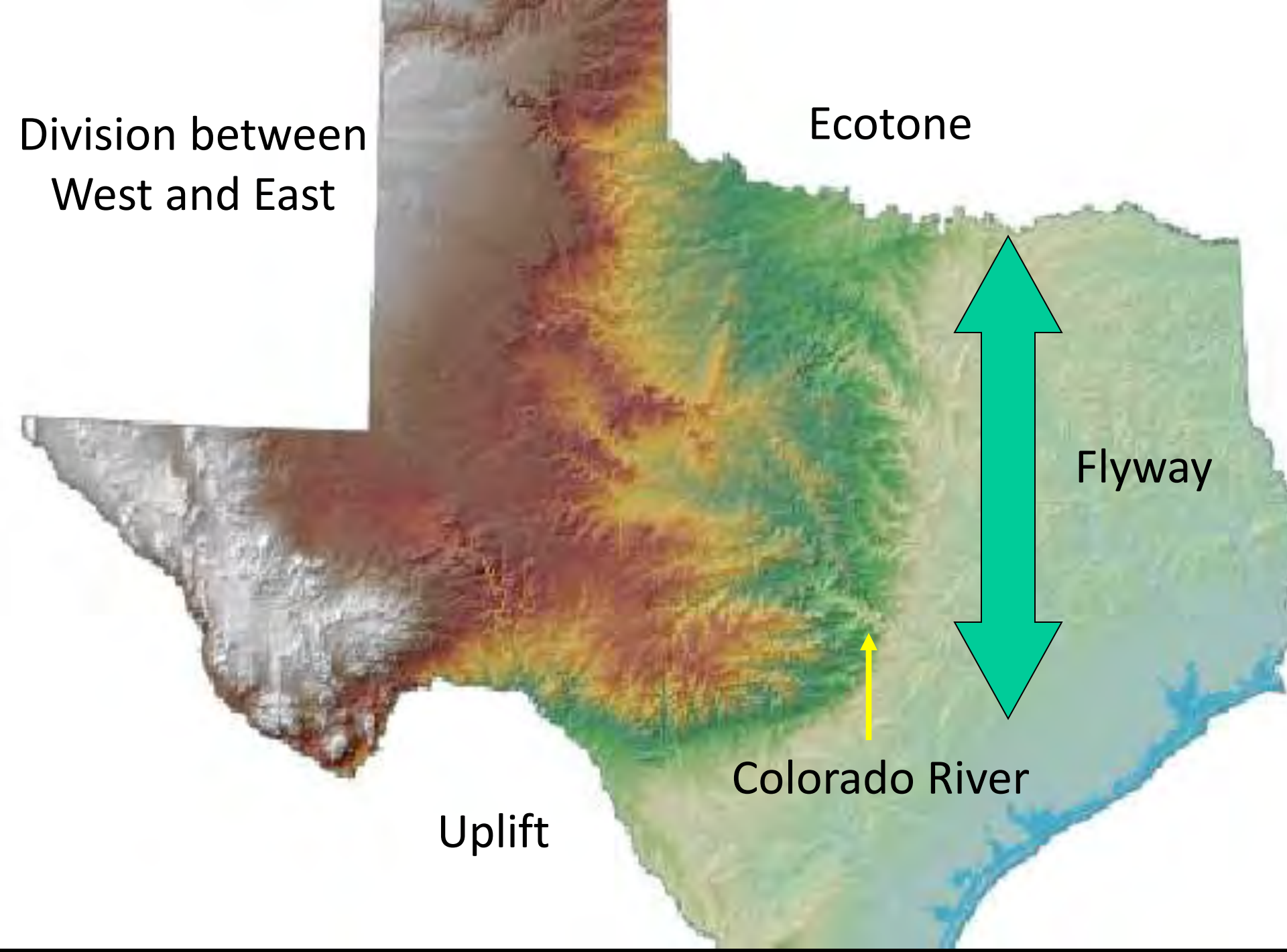
Under natural conditions, the whole expansive watershed was a giant sponge which was pressed by gravity ever so gently, ever so steadily, to drain its life-giving contents…Floods came then as now – ten, fifteen inches of rainfall in a day over limited space – but the soil, well covered, took no pounding, and waterways were lined with vegetation with cushioned the assaults and tamed the rage of plunging waters. 256

A river is not a colt to be "broken," trained, stalled, and depended upon thereafter to do the will of his master. It is eccentric, unaccountable, either has no law of behavior or often keeps it secret from human investigators. Centuries, even, do not delimit its extremes. 244



Drought and Flood




Division between
West and East
Ecotone
Flyway
Colorado River
Uplift

Balcones Escarpment

Mt. Bonnell 780ft

Hornsby Bend 440ft

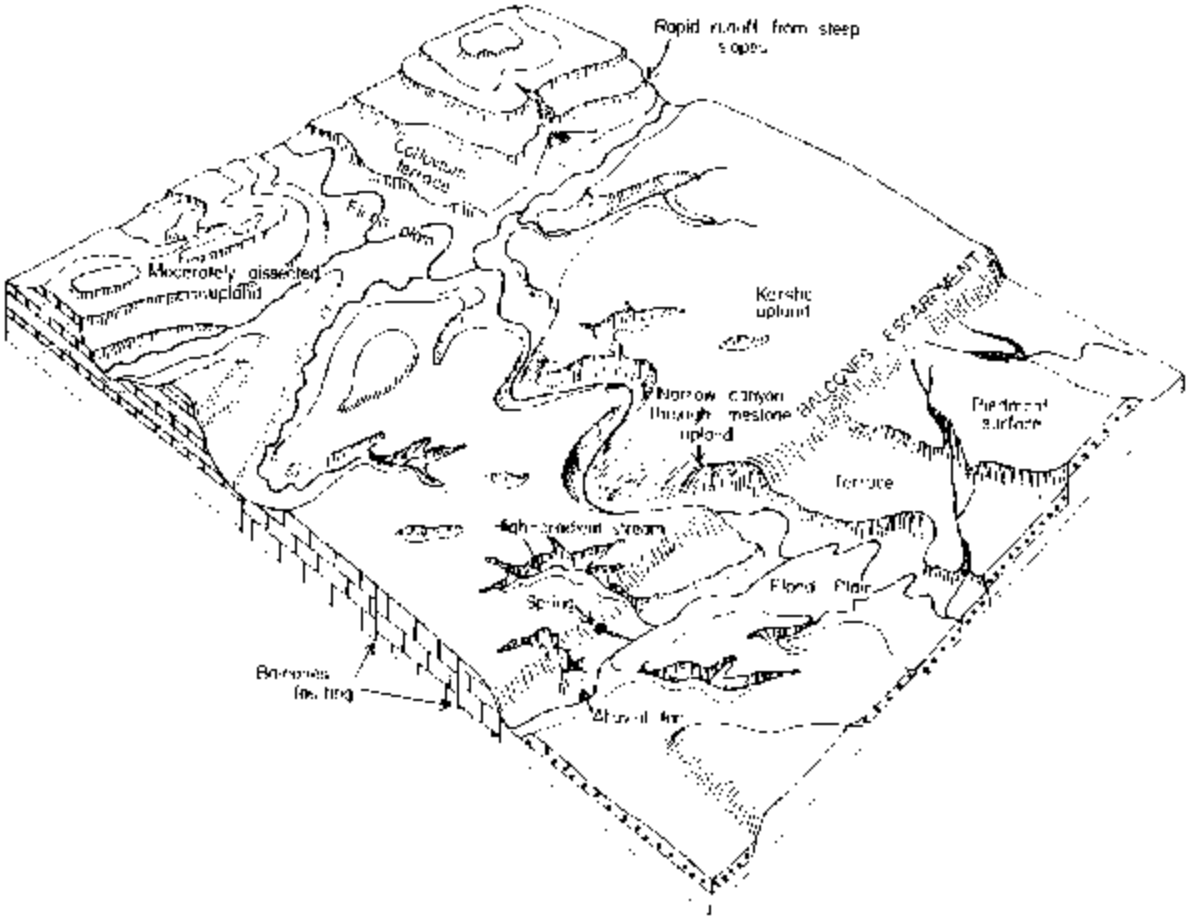
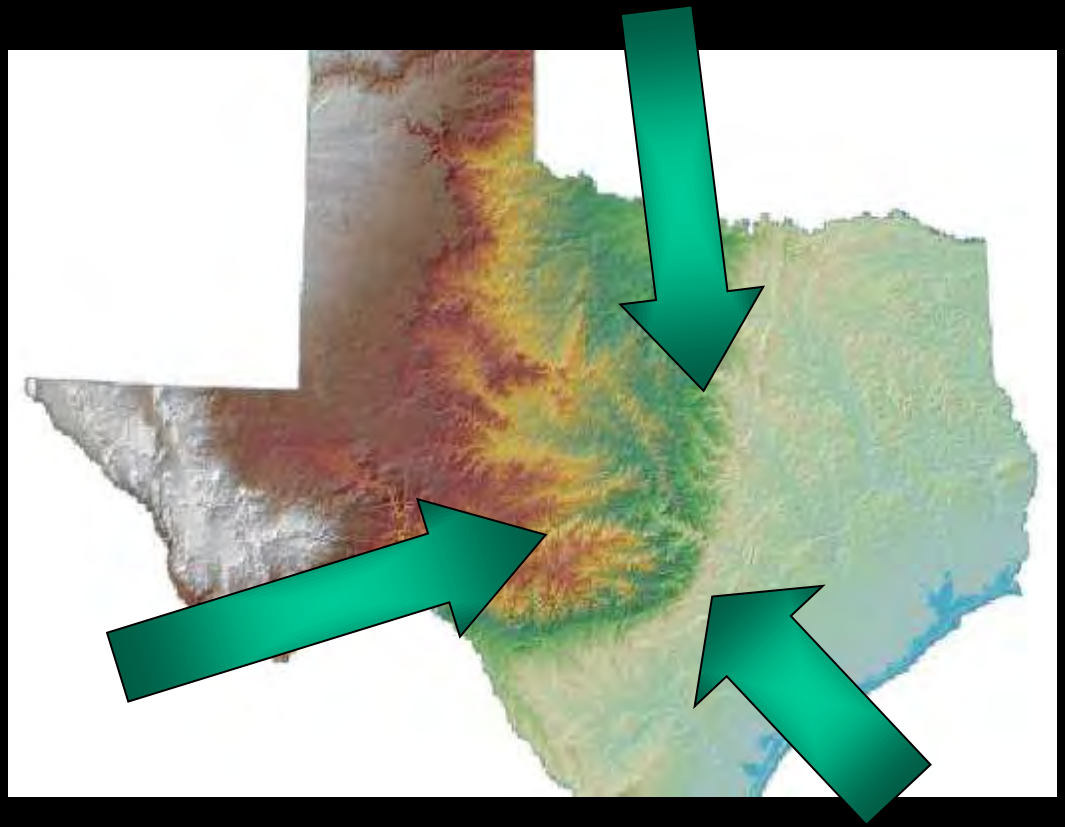
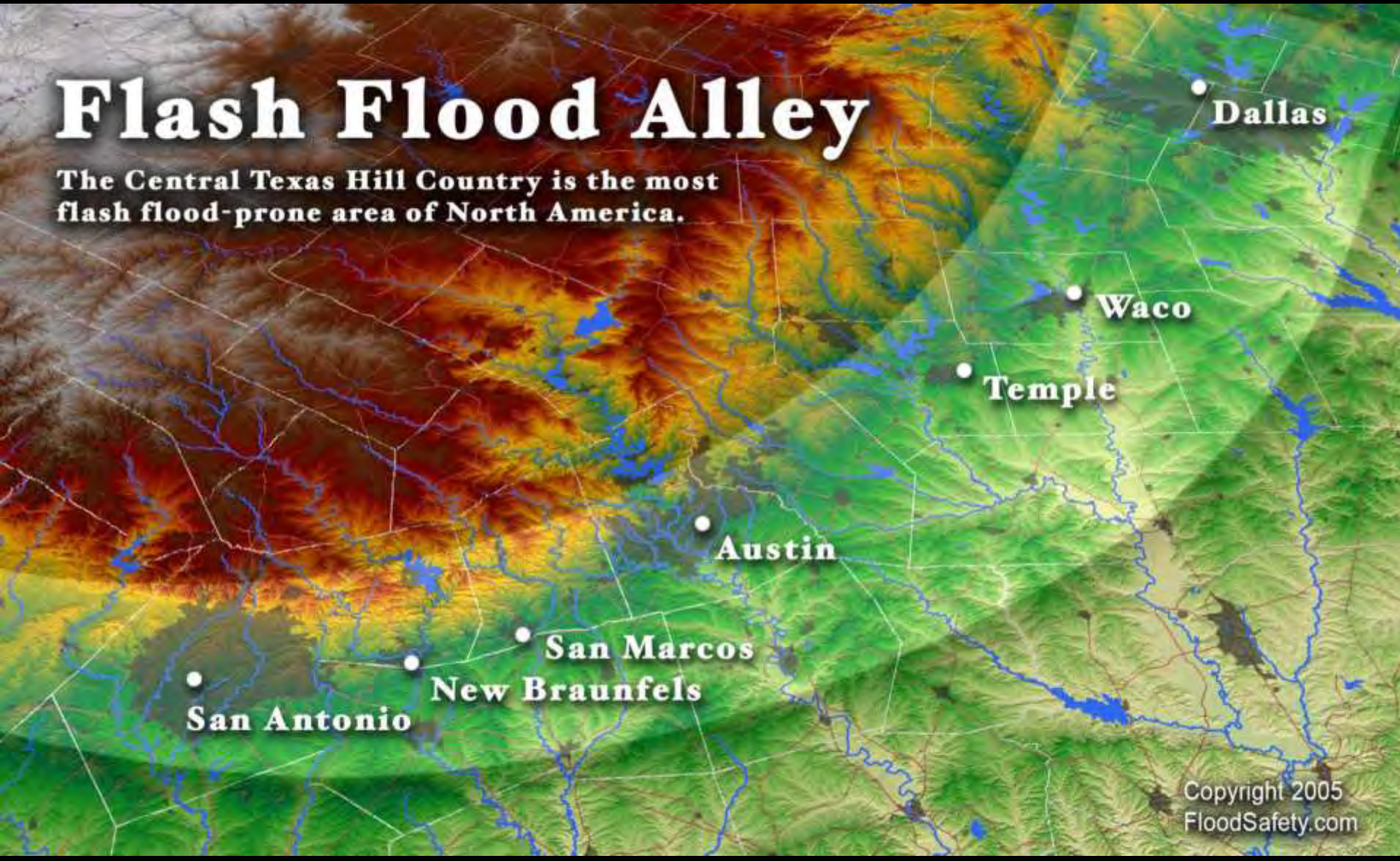
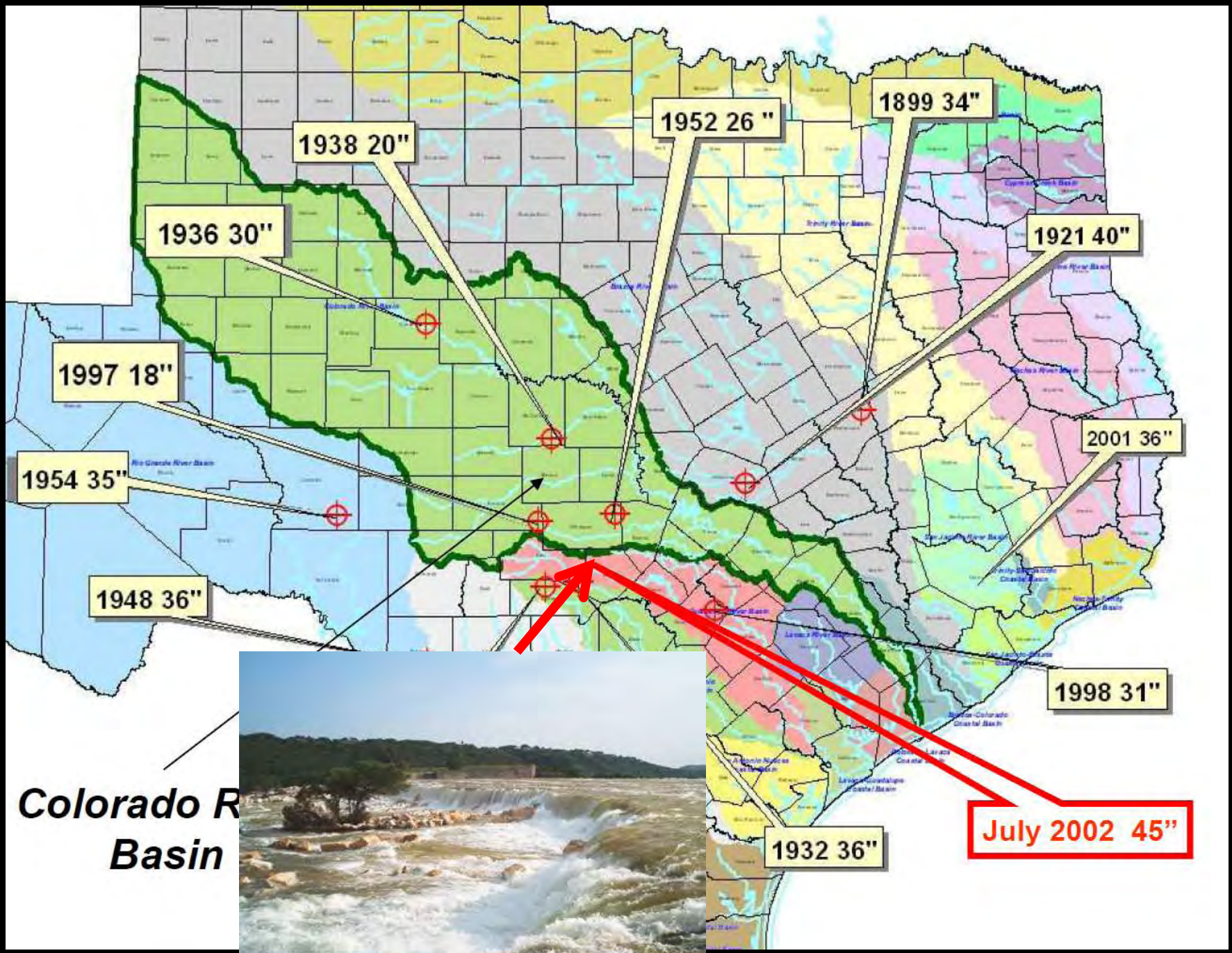


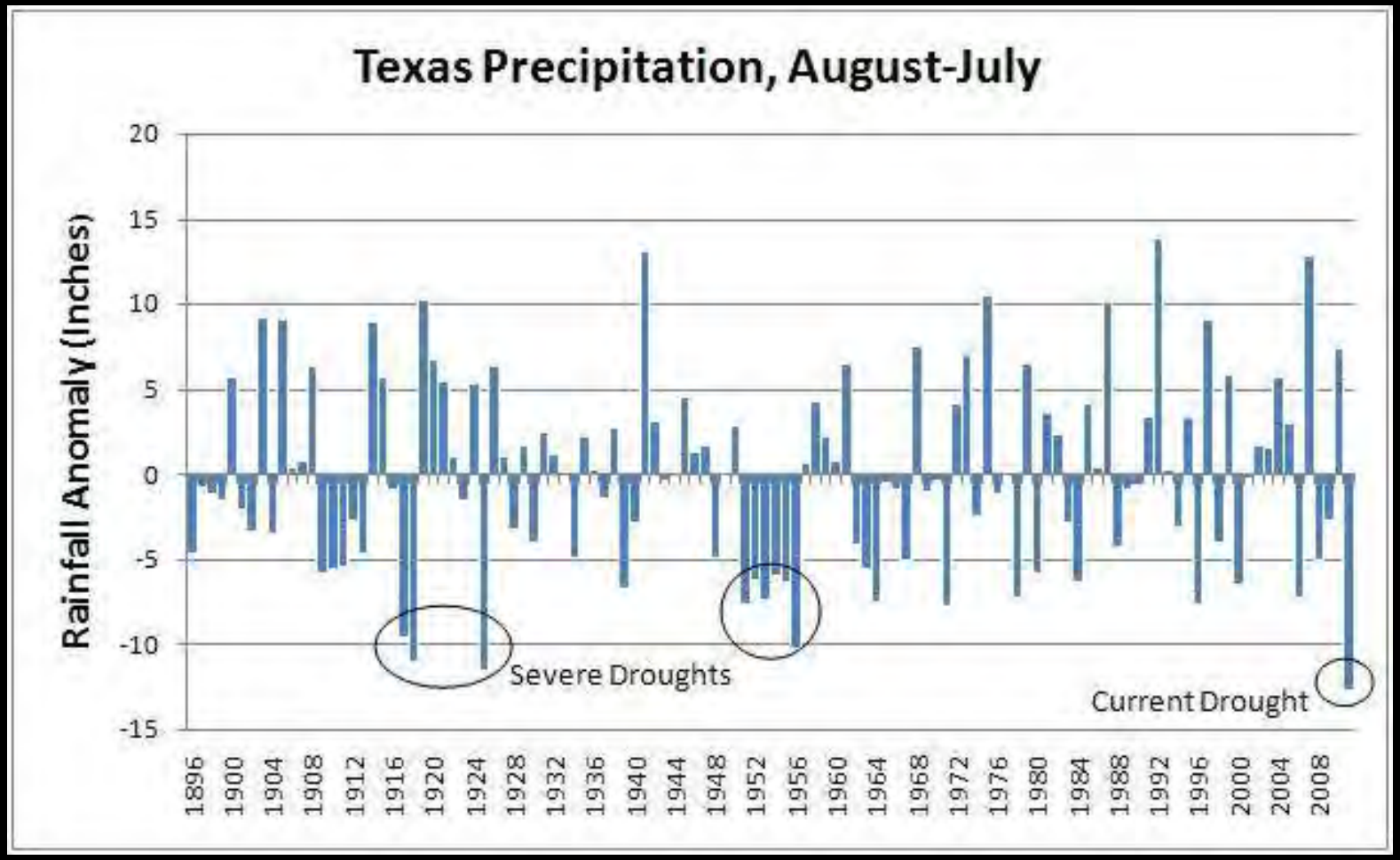
Figure 5. Block diagram representing geomorphic features that affect flood potential in the Balcones Escarpment area. From Baker (1975, fig. 3).

Moisture Sources




Flash Flood Alley
The Central Texas Hill Country is the most flash flood-prone area of North America.
Dallas
Waco
Temple
Austin
San Marcos
New Braunfels
San Antonio
Copyright 2005
FloodSafety.com


1938 20"
1952 26 "
1899 34"
1936 30"
1921 40"
1997 18"
2001 36"
1954 35"
1948 36"
1998 31"
Colorado R
Basin
1932 36"
July 2002 45”


Texas Precipitation, August-July
Rainfall Anomaly (Inches)
20
15
10
5
0
-5
-10
-15
1896
1900
1904
1908
1912
1916
1920
1924
1928
1932
1936
1940
1944
1948
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988
1992
1996
2000
2004
2008
Severe Droughts
Current Drought

Historic Droughts

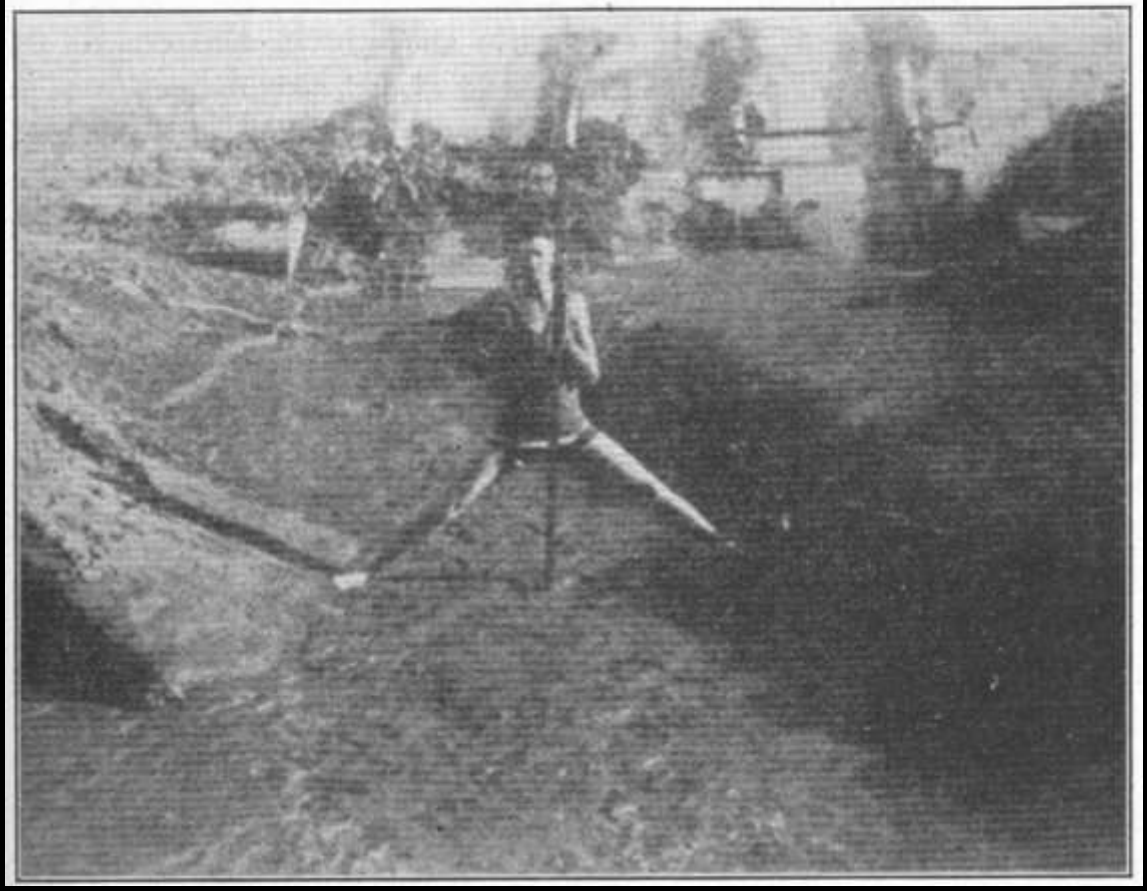
In 1918, the whole current of the river plowed a narrow furrow through the silt above the dam, and the channel was so narrow that it was easy to hop across it at one jump. At this time, the whole discharge of the Colorado River was only nine second-feet immediately above the dam.

University of Texas Bulletin
No. 2439: October 15, 1924

SILTING OF THE LAKE AT AUSTIN, TEXAS

By
T. U. TAYLOR
Professor of Civil Engineering

illustrates the width of the stream where the man in the bathing suit is astride the whole channel of the river, as it flowed along the narrow furrow that it had cut in the silt. The stream at this point was about four feet wide.



Historic Floods

More than 80 flood events have been recorded in the lower Colorado River basin since the 1800s. These events range from isolated floods that affected local areas to basin-wide floods spawned by unusually heavy rainfalls.

February 1843: In the earliest flood for which there is a written account, floodwaters cause the Colorado River to crest at a stage of 36 feet at Austin.

July 1869: In what is considered to be the worst flood on record, the Colorado crests at 51 feet at Austin and produces record crests of 60.3 feet at Bastrop, 56.7 feet at La Grange, 51.6 feet at Columbus, 51.9 feet at Wharton and 56.1 feet at Bay City. Bastrop and La Grange are inundated.

Reports describe rainfall as incessant for 64 hours, the river at Austin more than 10 miles wide, and floating buffalo carcasses in the river (indicating that some of the floodwaters originated in the High Plains). Damage is estimated at $3 million.

April 1900: Flood destroyed the Austin Dam.

June 1913: Flooding over parts of Uvalde County. Montell received 20.6 inches of rain in 24 hours. Flood merged the mouths of the Colorado and adjacent Brazos rivers, forming a lake 65 miles wide.

1915: Floodwaters from storms in April and September severely damage the second Austin Dam, completed in 1912. The structure will lie unrepaired for more than two decades until it is rebuilt by LCRA in the late 1930s.

September 1921 Flood

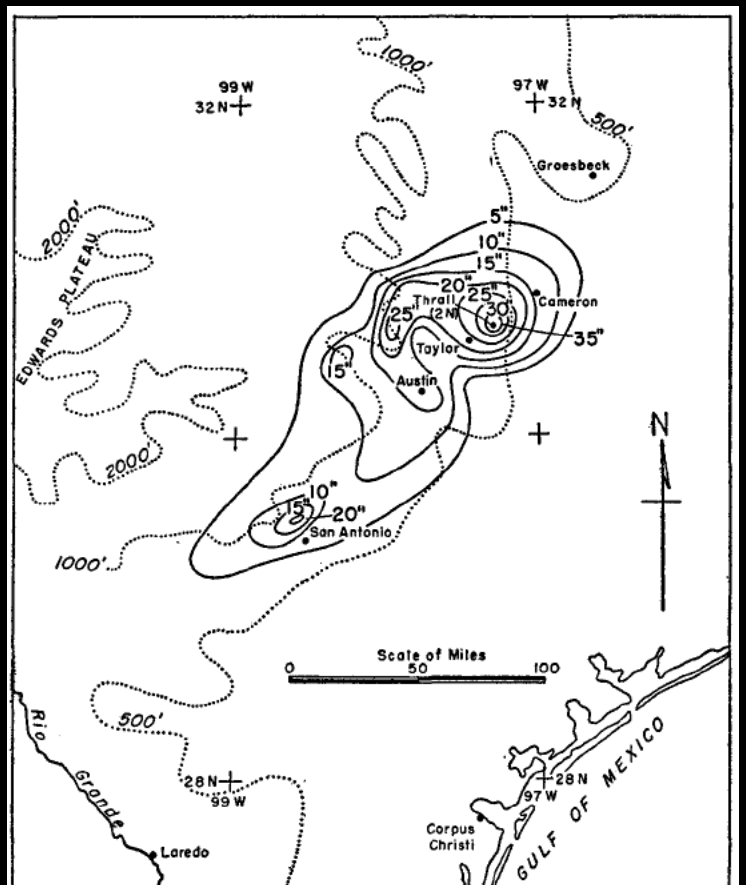
On September 9 and 10, 1921, the remnants of a hurricane moved over Williamson County. The center of the storm became stationary over Thrall, dropping a storm total of 39.7 inches of rain in 36 hours.

The 24-hour rainfall total ending 7 AM on September 10, 1921 (38.2 inches) at a U.S. Weather Bureau station in Thrall.

Eighty-seven people drowned in and near Taylor, and 93 in Williamson County.

Current Record 24 hour total rainfall

On July 25, 1979 Tropical Storm Claudette stalled over Alvin and inundated the region with 45 inches in 42 hours. That total included 43 inches in 24 hours, the maximum 24-hour rainfall in US history.



SAN ANTONIO EVENING NEWS FLOOD EXTRA

VOLUME FOUR—NO. 6. SATURDAY, SEPTEMBER 10, 1921.

38 KNOWN DEAD IN FLOOD

Many Persons Missing Today

BUSINESS SECTION MASS OF WRECKAFE AND STOCKS RUINED

Torrent Rages Through Streets, Carrying Away Houses and Bridges; Paving Uprooted

DEATH LIST

DAVE VARBINDER and wife, JENNIE VARBINDER—116 Cinc Avenue.

GRANDMA VARBINDER and infant, said to be her grandchild found in her arms.

Bodies now at Guerre Undertaking Company.

ELENA Y HERNANDEZ.

ESTELA HERNANDEZ.

AN UNIDENTIFIED BODY OF A MAN.

MARIA RAMANON.

JUANITA ZEPEDA.

ESTELLA ZEPEDA and BABY ZEPEDA. Reside below S. Laredo Street Bridge over Alazan Creek.

RAMON FRAISTO, 6,1319 East Quincy Street.

HORTENSE FRAISTO, 4 months, 1219 East Quincy Street.

BILLIE WEST, 12 years old, 506 Tampico Street.

Unidentified Mexican woman, about 45 years old, at Pablo Erlich Undertaking Company, 513 El Paso Street.

Dead at Kiehe Undertaking Company, North Street:

MRS. FRANCESCA RAMIREZ SATO, 444 Chihuahua Street.

MRS. AMMA GORIN, 345 Fenwick Ave.

MISS IGNACIO LOPEZ, found at Phelps Bank Yards.

N. A. McCALEB.

4 unidentified men.

5 unidentified women.

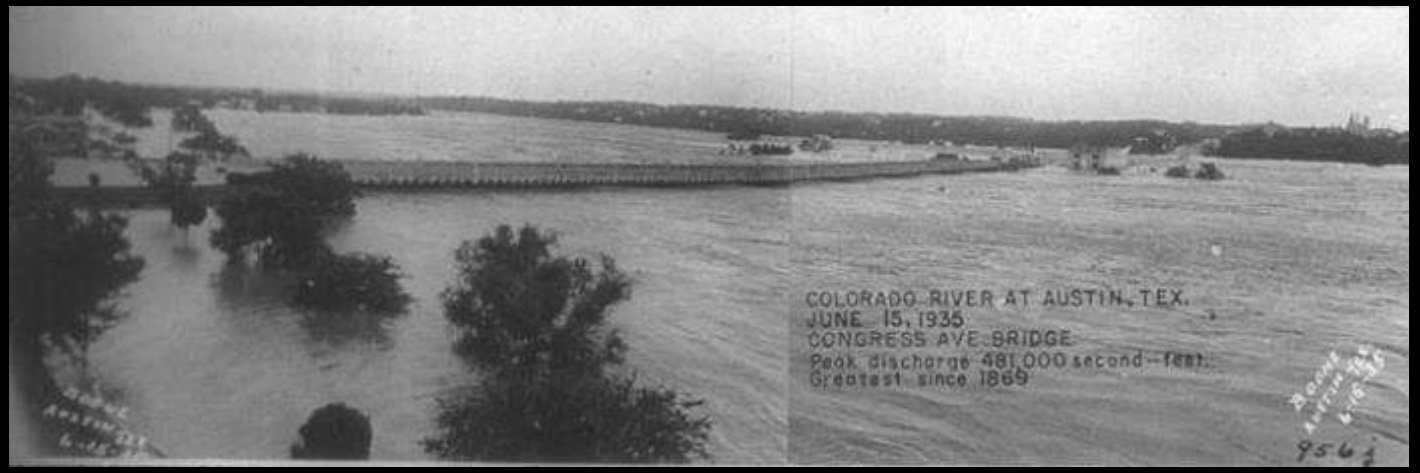
3 unidentified children.

Body of person in tree at Hot Wells.

VIRGINIA CAVAZOS, 10 years old, 322 1-2 South Santa Rosa Street.

Infant child of Mr. and Mrs. Filberto Ca-

June 1935: Floodwaters from heavy Hill Country rains cause the Colorado River in Austin to crest at 50 feet, one foot below the 1869 record. The river overwhelms the Congress Avenue Bridge, cutting Austin in half. The Llano River rises to its highest recorded stage of 41½ feet, streamflow 388,000 cfs.



ELGIN COURIER

BASTROP ADVERTISER

EIGHTY-SEVEN YEAR — THE BASTROP ADVERTISER, BASTROP, TEXAS, THURSDAY, JULY 30, 1936 — VOLUME 88

Raging Colorado Sweeps Bastrop With Most Destructive Flood In History

North and South Ends Under Water; Crops Destroyed
24 Houses Swept Away and 400 More Badly Damaged

Bastrop Bridge Stands But Many Others Topple As Floods Rage Over

Railroad Service Into City Suspended For Four Days.

MAIL MOTORED HERE

Typhoid Warnings Put Out By Doctors To Prevent Epidemic.

HELP THE FLOOD VICTIMS

The Red Cross is active in relief work among the flood sufferers of Bastrop and this vicinity, but they are working under an extreme shortage of funds, according to C. B. Marchand County Chairman.

Mr. Marchand asks that anyone having old clothing of any kind or size, quilts, blankets, sheets, mattresses, old stoves, tables, or about any sort of household goods will please bring them to the building formerly occupied by the H. O. Green Bostwick Produce Company on the east side of Main Street. Some one will be on hand there at all times to receive donations.

L. A. Speer, field representative of the American Red Cross out of St. Louis is in Bastrop now taking charge of all relief measures.

Any cash donations made by organizations, individuals or businesses will be sincerely used and greatly appreciated.

The Red Cross has already spent over $600.00 and have aided 125 families. However a survey of this section revealed close to 100 families who were left absolutely destitute, and dependent only on the Red Cross for assistance.

Most of the losses are falling case of their tenants, and these, of course, will not be expected to do more, as they are contributing a major portion of relief in that respect. But there are many who do not have tenants, who were affected and those are the ones to whom the Red Cross is looking.

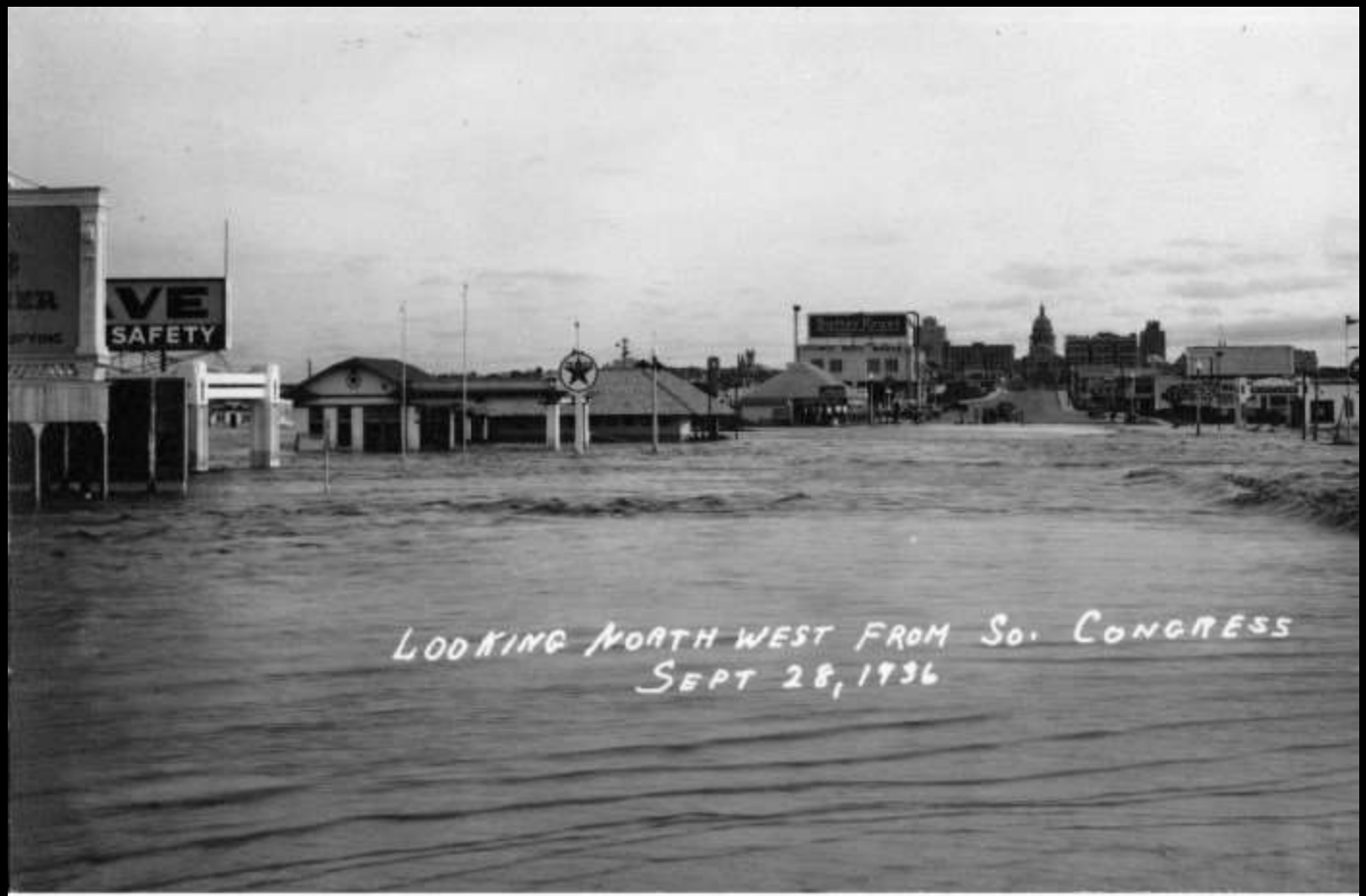
Do your part NOW! Bring your contributions to the local Red Cross headquarters.

CATTLE TUBERCULOSIS TESTS BEGIN IN BASTROP COUNTY

LIGHTS TO BE REPLACED ON THE BASTROP RIVER BRIDGE

Old Files Of Advertiser Recount The Flood That Inundated Valley In 1869

September 1936: The 1936 flood was created by two major storms in summer and early fall totaling 51 inches over the watershed of the Concho River. Floodwaters from heavy rains throughout the basin pour through the Colorado River at Austin for a 20-day period, cresting at 31.4 feet. Earlier, floodwaters from a 30-inch rain on the Concho River had washed away nearly 300 buildings in San Angelo.



PICA 04170, Austin History Center, Austin Public Library

July 1938

Twenty inches of rain over 12 counties pour more than 3 million acre-feet of floodwaters into newly completed Lake Buchanan.

Rains of up to 25 inches over a 10-day period at the storm's center near Brady, upstream of the newly completed Buchanan Dam.

LCRA opened 22 of Buchanan's 37 floodgates (still a record) to pass through the floodwaters.

Basinwide damages totaled roughly $39 million in today's dollars and left more than 4,000 homeless

Harnessing the River

The Lower Colorado River Authority

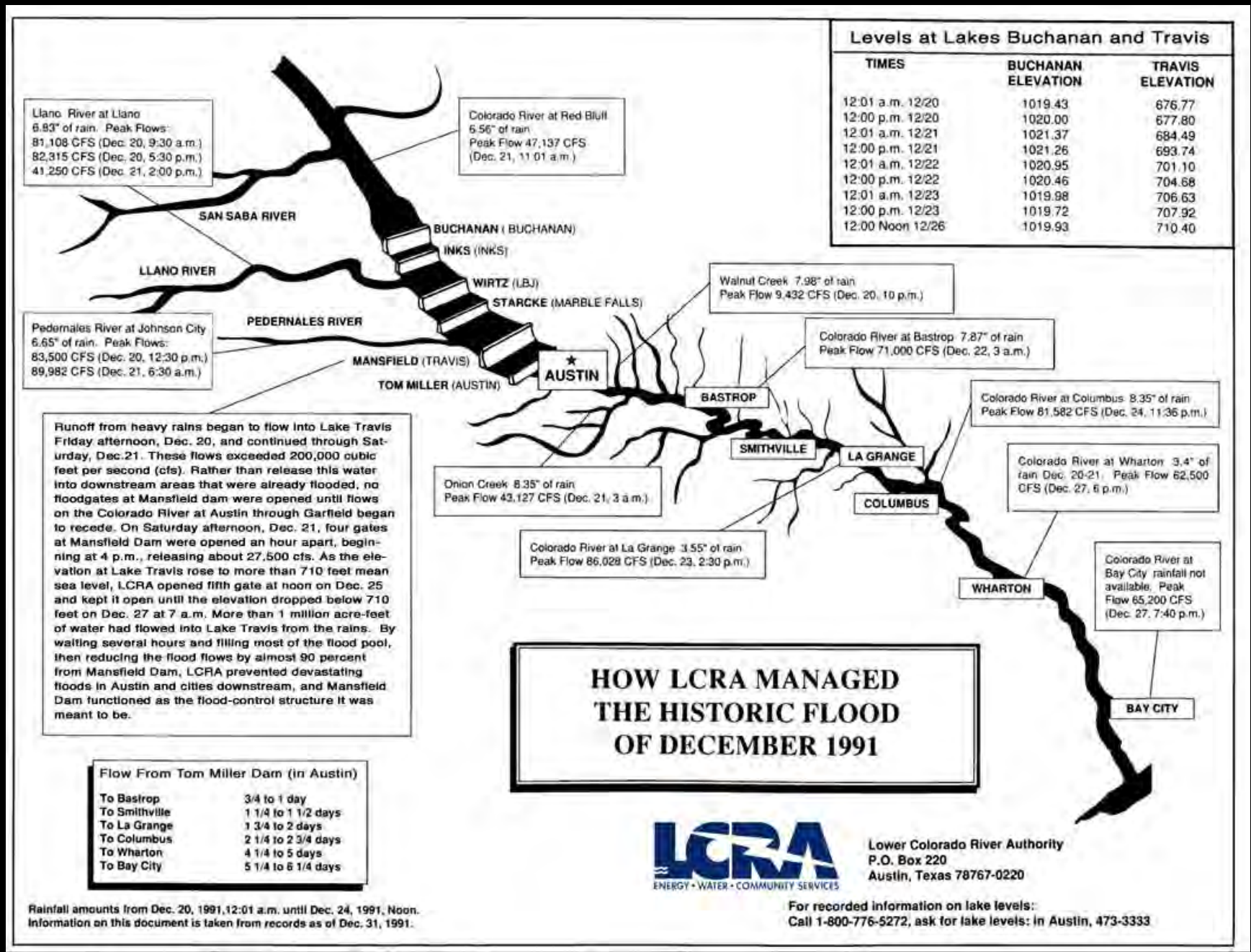
a multipurpose public agency instituted by the Texas legislature in 1934 as a conservation and reclamation district with a statutory authority covering ten counties through which the Lower Texas Colorado River flows. These counties extend from San Saba in Central Texas to Matagorda on the Gulf Coast.

Walter E. Long, *Flood to Faucet* (Austin: Steck, 1956)

LCRA
ENERGY • WATER • COMMUNITY SERVICES

LOWER COLORADO RIVER AUTHORITY
75 years
1935 - 2010

The **"Christmas Flood" of 1991** pushed Lake Travis to its all-time high elevation of 710.4 feet, about 4 feet below the Mansfield Dam spillway.



Future Floods on the Colorado River

The lower Colorado basin has come close in recent years to experiencing floods that would have rivaled those of the 1930s. Massive floods, such as those that devastated communities along the Guadalupe River in 1998 and 2002, could just as easily have occurred in the Colorado River, had the storm's center shifted only 85 miles northwest, into the Hill Country.

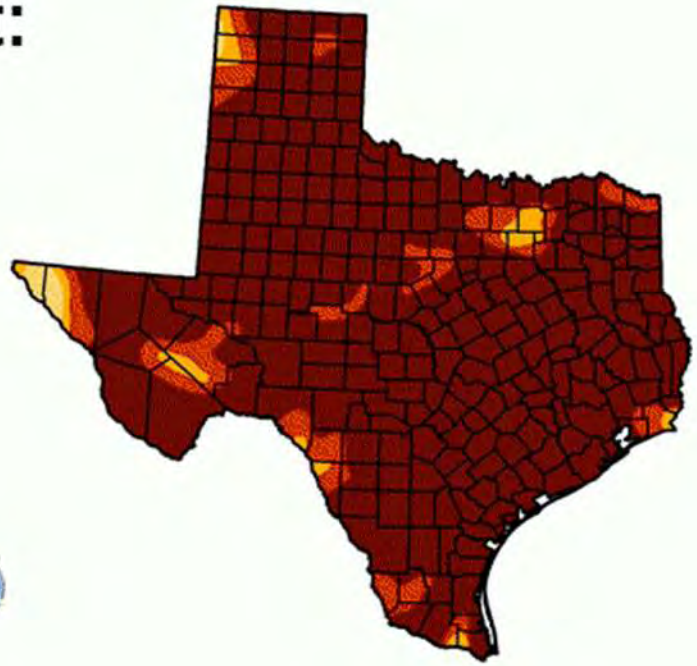
A worse impact would have come from a storm like Tropical Storm Allison, which swamped Houston in 2001 with rains of up to 37 inches.

An LCRA study estimated that a Hill Country storm like Allison would have forced LCRA to open all 24 of Mansfield Dam's floodgates – something that has never happened. (The most that have been opened at one time was six, during a 1957 flood.)

"The flood that occurred in summer 2007 was triggered by a 19-inch rain in the Marble Falls area," LCRA Chief Meteorologist Bob Rose noted.

"If that heavy a rain had fallen over a much wider area of our watershed, it could have resulted in a catastrophic flood approaching those of the 1930s. One day, such a flood will occur, and its impact will be even more devastating to a basin that is much more heavily populated and urbanized than it was seven decades ago."

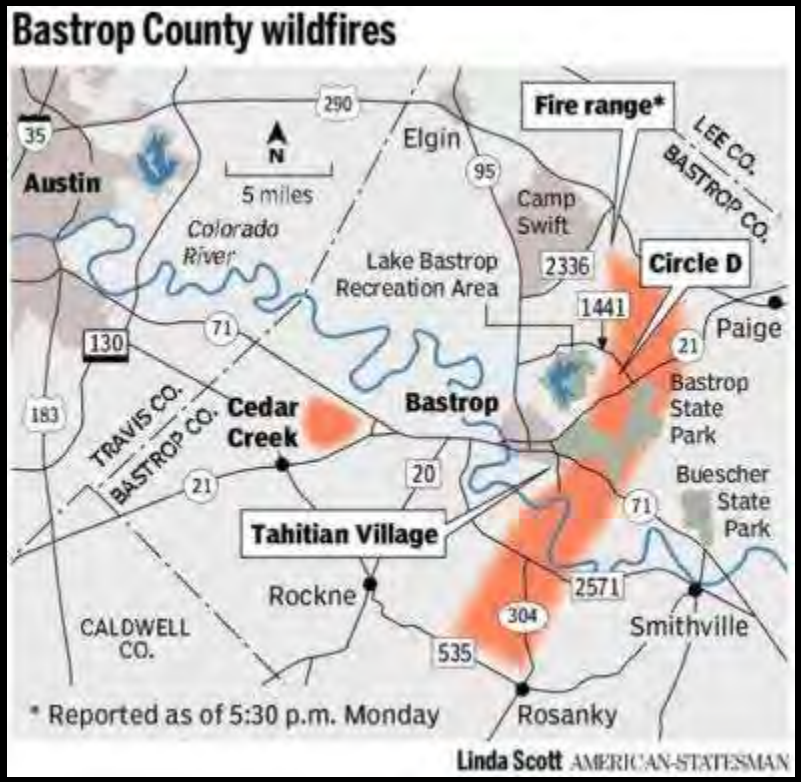
Texas Drought: Oct. 4, 2011



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

USDA



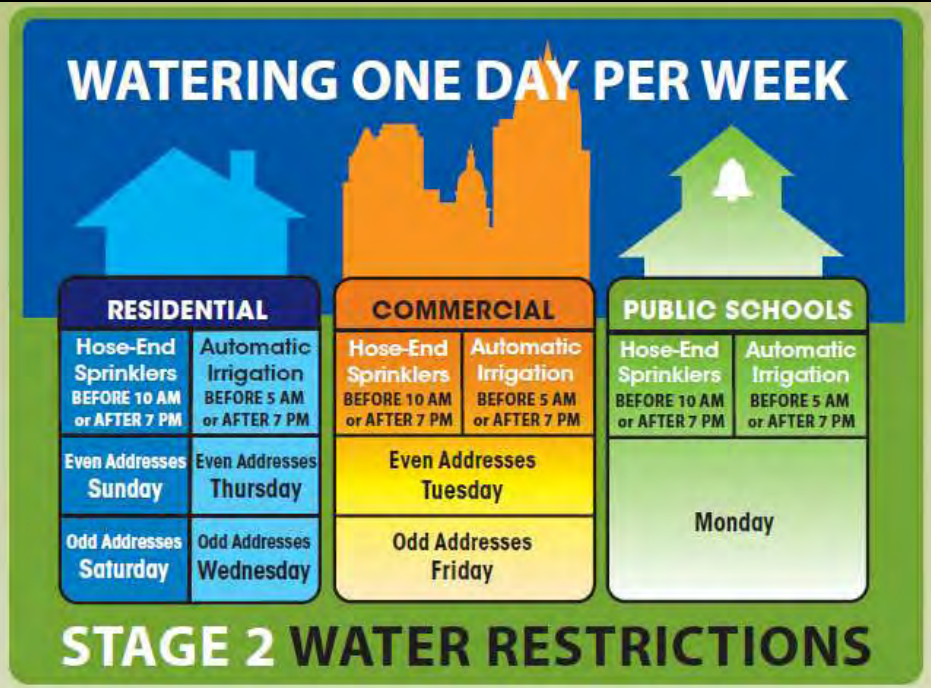
September 2011

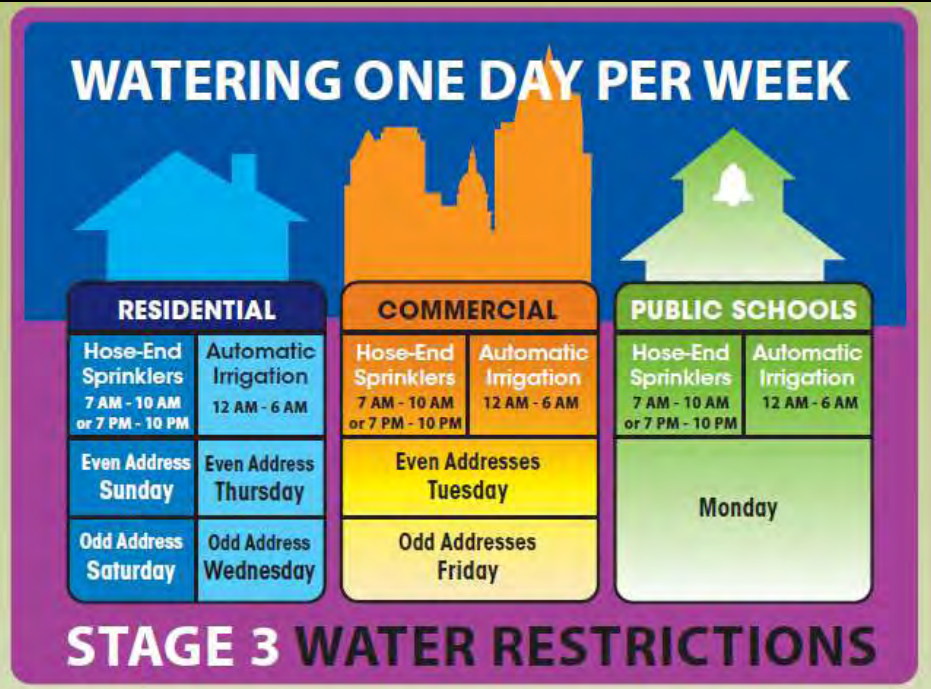
Drought Here To Stay, Could Last Another 15 Years, Says Texas A&M Expert

September 26, 2013

Despite recent rains, the historic Texas drought is still alive and well and about 93 percent of the state remains in drought conditions ranging from dry to exceptionally dry, says a Texas A&M University expert.

John Nielsen-Gammon, professor of atmospheric sciences who also serves as State Climatologist, says, most of Texas is still unusually dry and water levels are below normal.


WATERING ONE DAY PER WEEK
RESIDENTIAL
Hose-End Sprinklers BEFORE 10 AM or AFTER 7 PM
Automatic Irrigation BEFORE 5 AM or AFTER 7 PM
Even Addresses Sunday
Even Addresses Thursday
Odd Addresses Saturday
Odd Addresses Wednesday
COMMERCIAL
Hose-End Sprinklers BEFORE 10 AM or AFTER 7 PM
Automatic Irrigation BEFORE 5 AM or AFTER 7 PM
Even Addresses Tuesday
Odd Addresses Friday
PUBLIC SCHOOLS
Hose-End Sprinklers BEFORE 10 AM or AFTER 7 PM
Automatic Irrigation BEFORE 5 AM or AFTER 7 PM
Monday
STAGE 2 WATER RESTRICTIONS

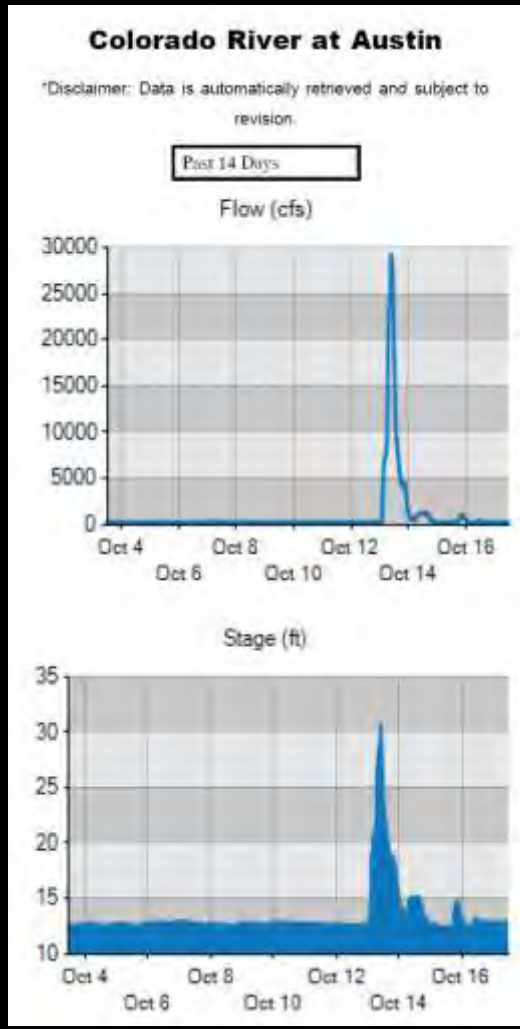

WATERING ONE DAY PER WEEK
RESIDENTIAL
Hose-End Sprinklers 7 AM - 10 AM or 7 PM - 10 PM
Automatic Irrigation 12 AM - 6 AM
Even Address Sunday
Even Address Thursday
Odd Address Saturday
Odd Address Wednesday
COMMERCIAL
Hose-End Sprinklers 7 AM - 10 AM or 7 PM - 10 PM
Automatic Irrigation 12 AM - 6 AM
Even Addresses Tuesday
Odd Addresses Friday
PUBLIC SCHOOLS
Hose-End Sprinklers 7 AM - 10 AM or 7 PM - 10 PM
Automatic Irrigation 12 AM - 6 AM
Monday
STAGE 3 WATER RESTRICTIONS

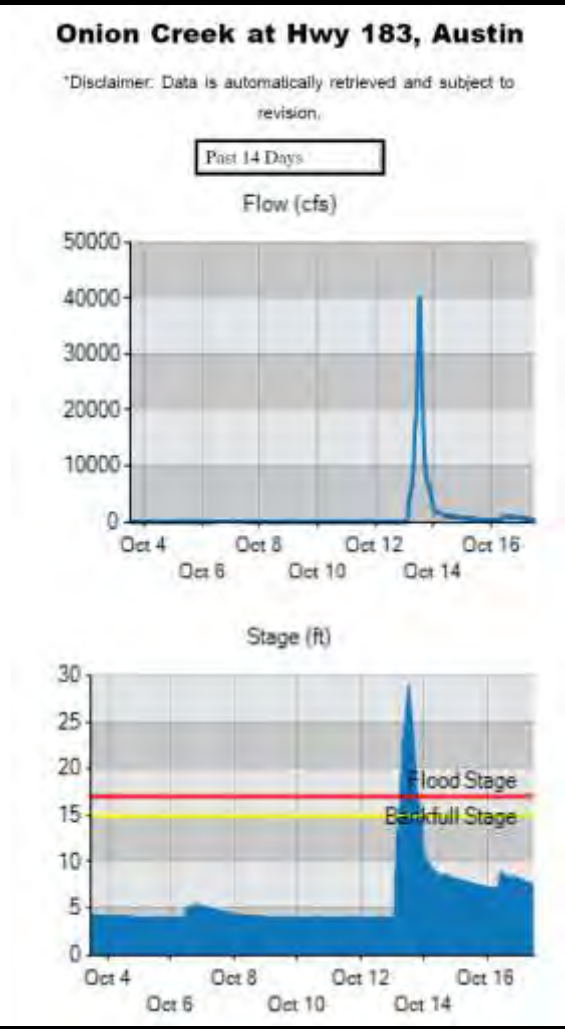

EMERGENCY RESPONSE STAGE 4
NO OUTDOOR WATERING

Barton Creek – Austin City Limits Festival Flood Oct 13, 2013

Over a 12-hour period, the Barton Springs Area got 12.1 inches of rain and downtown Austin received 10.6 inches.

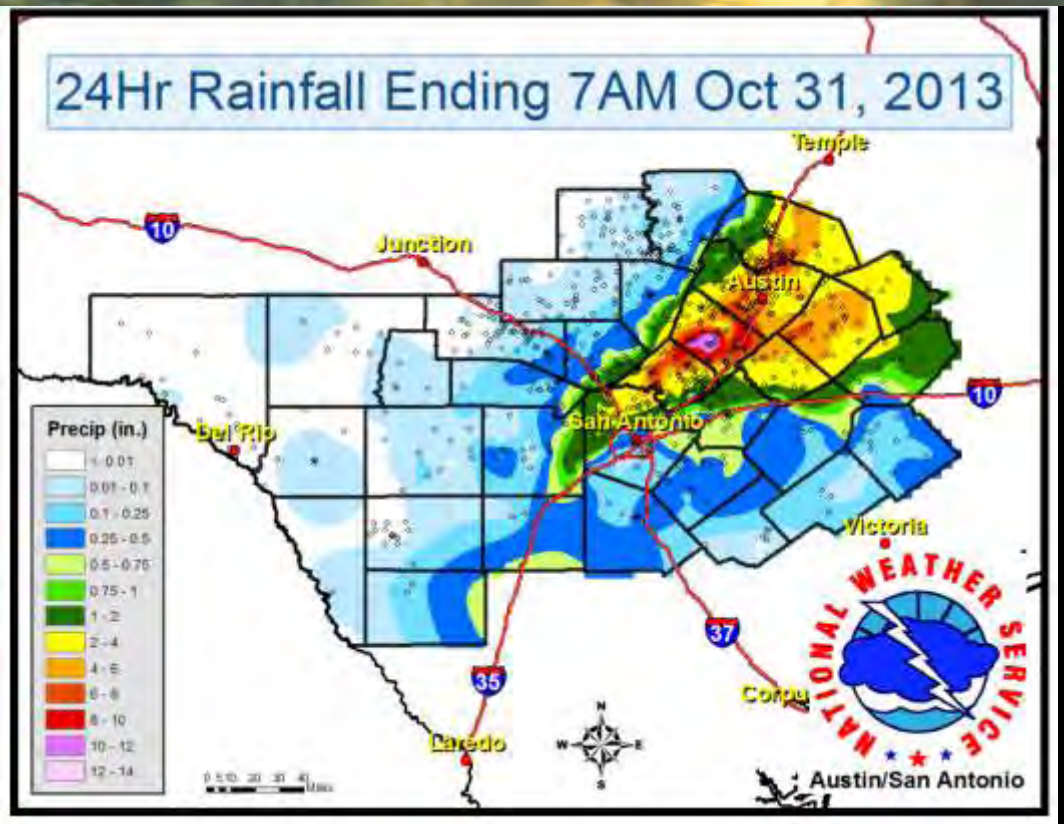
The deluge in Austin forced Austin City Limits Music Festival organizers to cancel the final day of the two-weekend event.





Halloween Flash Flood October 30-31, 2013

A typical, early fall, flood event occurred from the evening of October 30 through late afternoon on October 31, 2013. There was widespread rainfall of 2-4 inches across portions of eight counties; substantial areas of 6-10 inches across Hays, western Comal, and central Travis counties; and a bull's-eye of 12-14+ inches in a narrow swath from Wimberley to Driftwood.

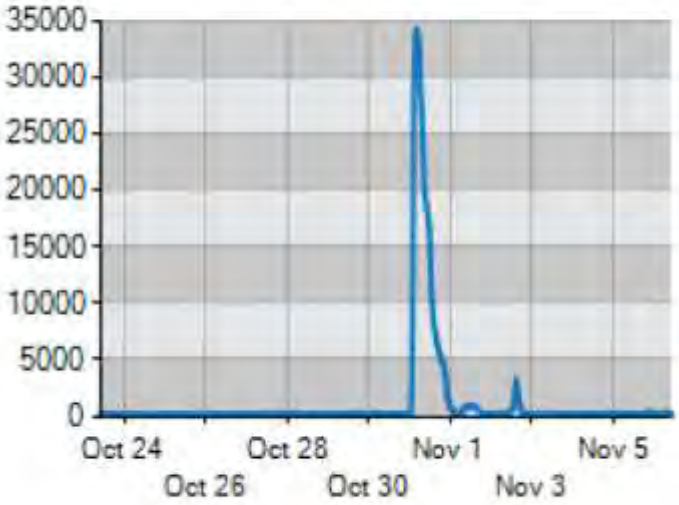


Colorado River at Austin

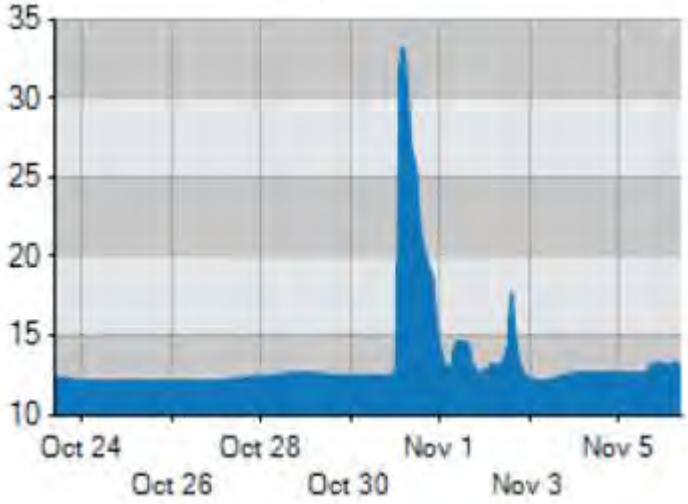
*Disclaimer: Data is automatically retrieved and subject to revision.

Past 14 Days

Flow (cfs)



Stage (ft)



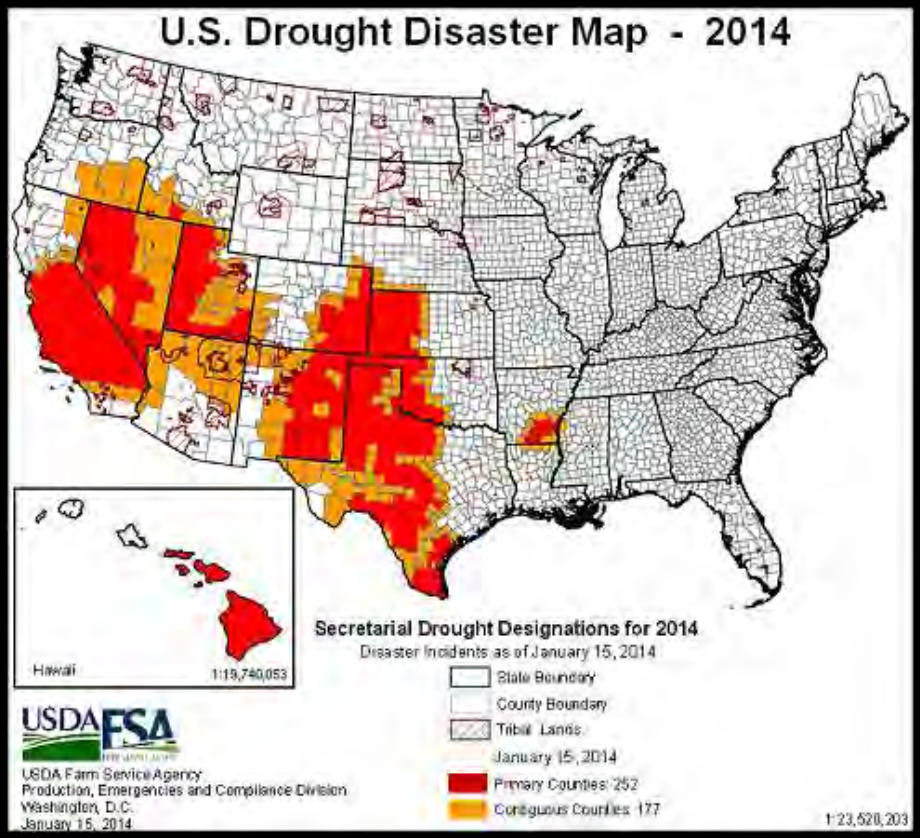
Record flooding was measured at the USGS stream gage on Onion Creek at Highway 183 in Austin, Texas on Halloween morning around 10 a.m.

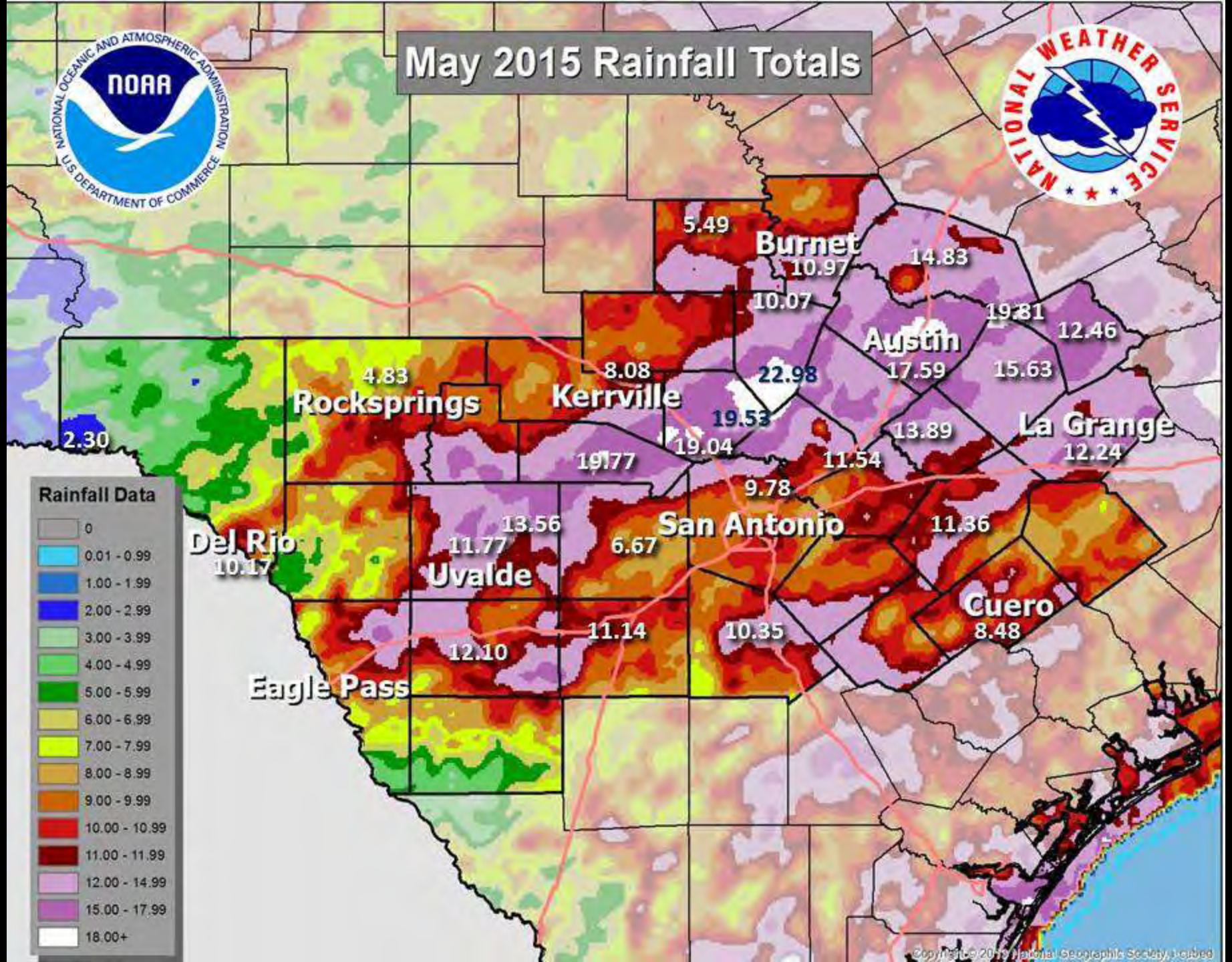
The creek level was measured at 40.97 feet; 36 feet higher than normal levels.

The previous highest measurement of 38 feet occurred more than 90 years ago in 1921.

USGS	08159000	2013-10-31 06:15	CDT	10400	P	21.32	P
USGS	08159000	2013-10-31 06:30	CDT	61700	P	32.32	P:I:T
USGS	08159000	2013-10-31 08:43	CDT	126000	P:*	39.43	P:T:*
USGS	08159000	2013-10-31 09:45	CDT	134000	P:*	40.09	P:h:*
USGS	08159000	2013-10-31 10:00	CDT			40.95	P:h:*
USGS	08159000	2013-10-31 10:07	CDT			40.97	P:h:*
USGS	08159000	2013-10-31 10:20	CDT	130000	P:*	39.76	P:T:*
USGS	08159000	2013-10-31 10:25	CDT	127000	P:*	39.54	P:*
USGS	08159000	2013-10-31 11:15	CDT	107000	P	37.65	P:T
USGS	08159000	2013-10-31 11:18	CDT	110000	P:*	37.95	P:*
USGS	08159000	2013-10-31 11:29	CDT	106000	P:*	37.53	P:*
USGS	08159000	2013-10-31 11:30	CDT	97500	P	36.71	P:D
USGS	08159000	2013-10-31 11:40	CDT	101000	P:*	37.08	P:*


FOR SALE

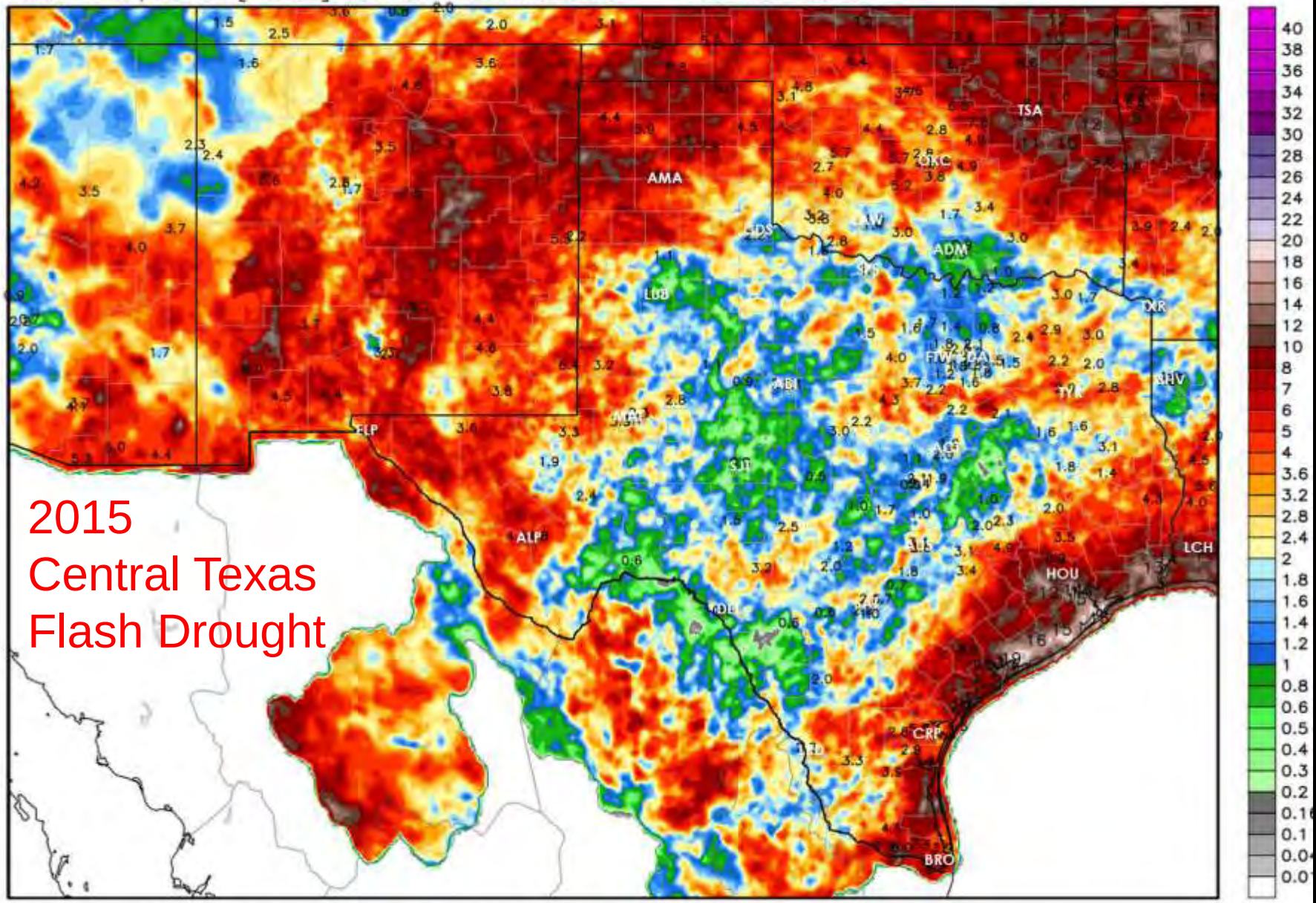

U.S. Drought Disaster Map - 2014
Hawaii
1:19,740,053
Secretarial Drought Designations for 2014
Disaster Incidents as of January 15, 2014
State Boundary
County Boundary
Tribal Lands
January 15, 2014
Primary Counties: 252
Contiguous Counties: 177
1:23,520,203
USDA FSA
USDA Farm Service Agency
Production, Emergencies and Compliance Division
Washington, D.C.
January 15, 2014


May 2015 Rainfall Totals
NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE
NATIONAL WEATHER SERVICE
Rainfall Data
0
0.01 - 0.99
1.00 - 1.99
2.00 - 2.99
3.00 - 3.99
4.00 - 4.99
5.00 - 5.99
6.00 - 6.99
7.00 - 7.99
8.00 - 8.99
9.00 - 9.99
10.00 - 10.99
11.00 - 11.99
12.00 - 14.99
15.00 - 17.99
18.00+
5.49
Burnet
10.97
14.83
10.07
19.81
12.46
Austin
17.59
15.63
4.83
Rocksprings
8.08
Kerrville
22.98
19.53
19.04
13.89
La Grange
12.24
2.30
19.77
11.54
9.78
13.56
San Antonio
11.36
Del Rio
10.17
11.77
6.67
Uvalde
Cuero
8.48
11.14
10.35
12.10
Eagle Pass


HOUSE PARK


BEER
CREEKSIDE
PATIO
SALOON

Accumulated Precipitation from July 19 to September 19

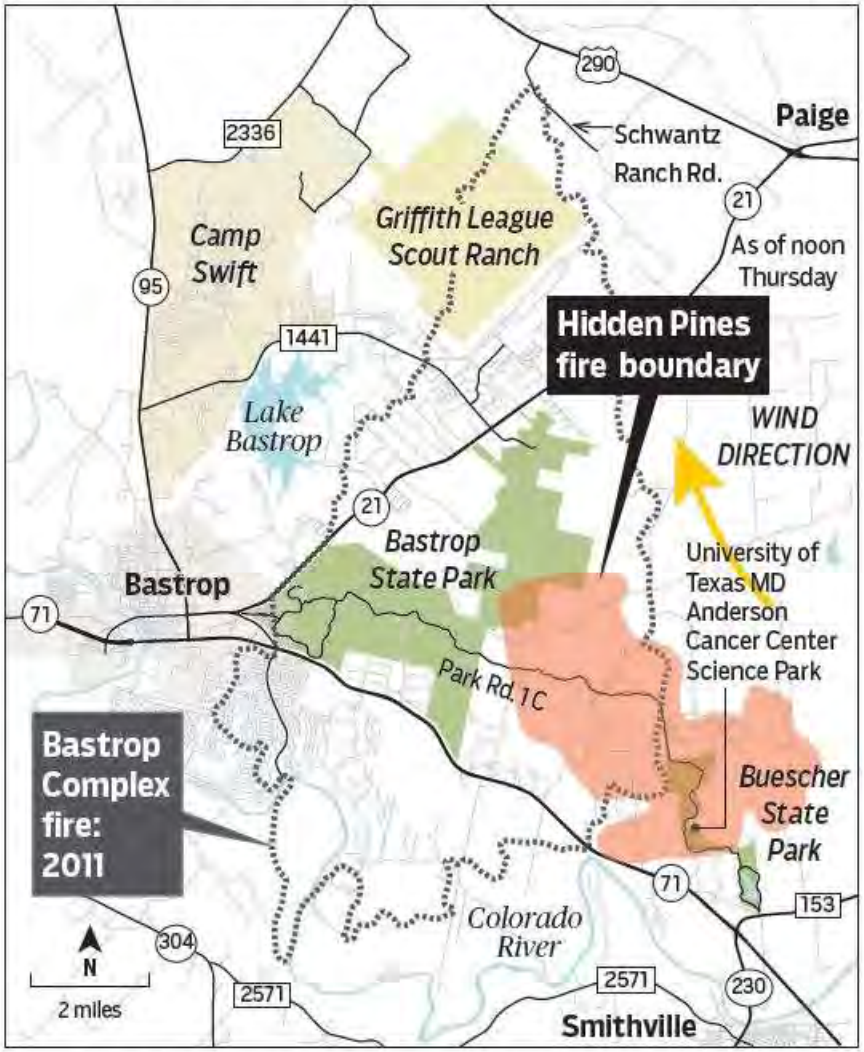


4 km HRAP grid | End of hydrological day at 1200 UTC | http://water.weather.gov/precip

Hidden Pines Fire
Tuesday October 13th, 2015 approx. 12:00 PM
4,582 Acres

Fires in Bastrop County

The Hidden Pines fire near Smithville has burned an area smaller than the Labor Day wildfire of 2011, but it has been growing over the past few days, fueled by dry vegetation and brisk southerly winds.



Source: Texas A&M Forest Service LINDA SCOTT, ROBERT CALZADA / STAFF

El Niño

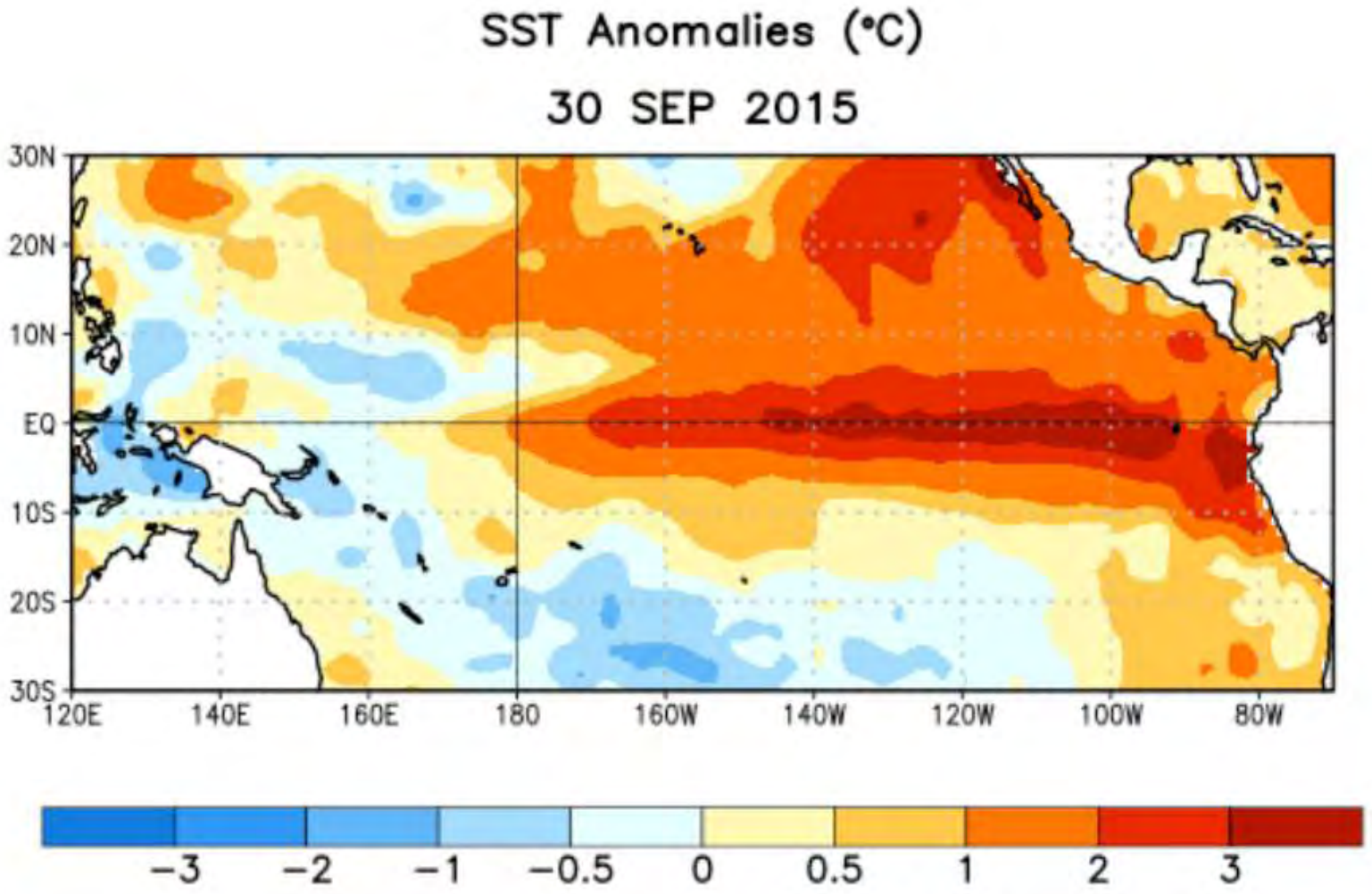
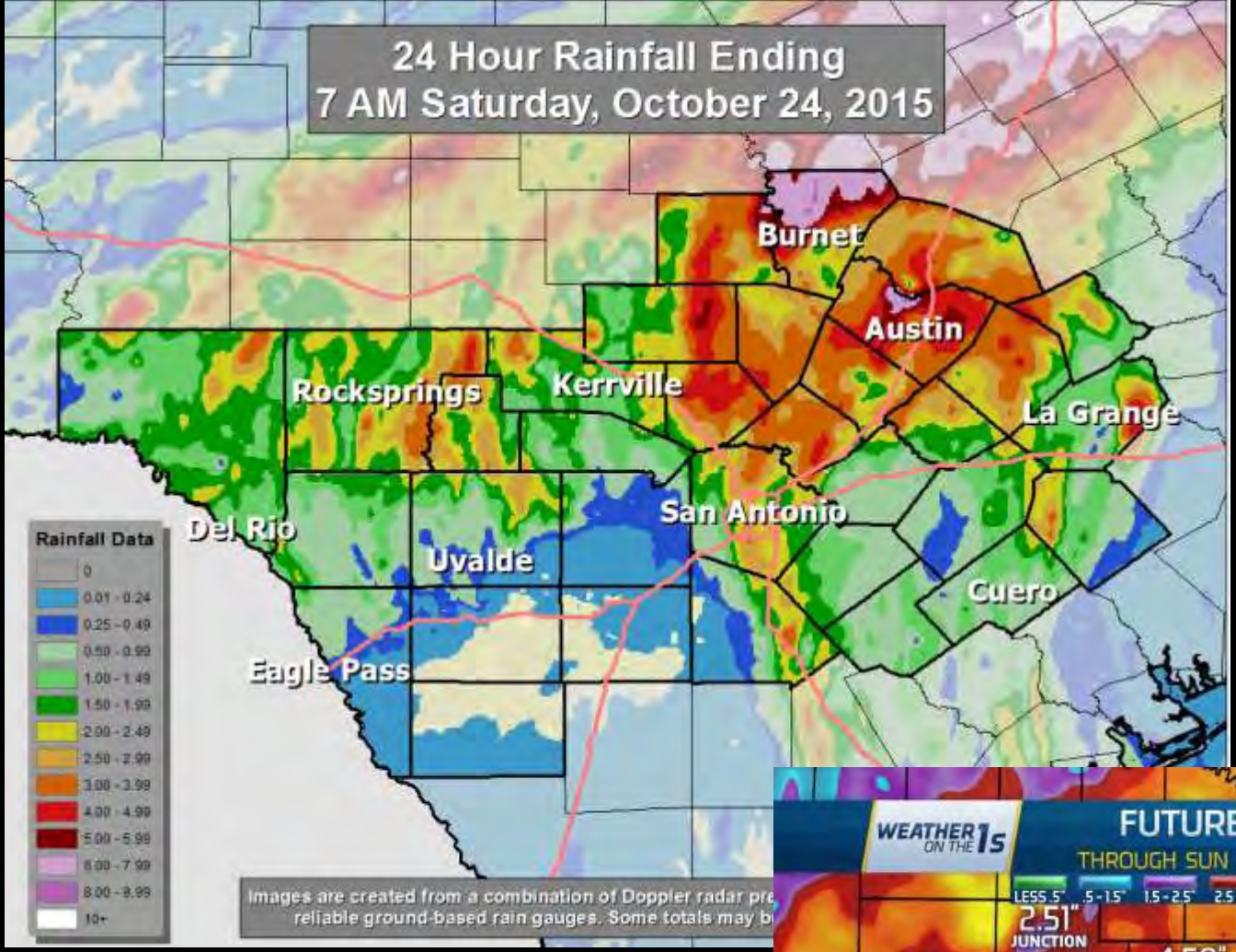
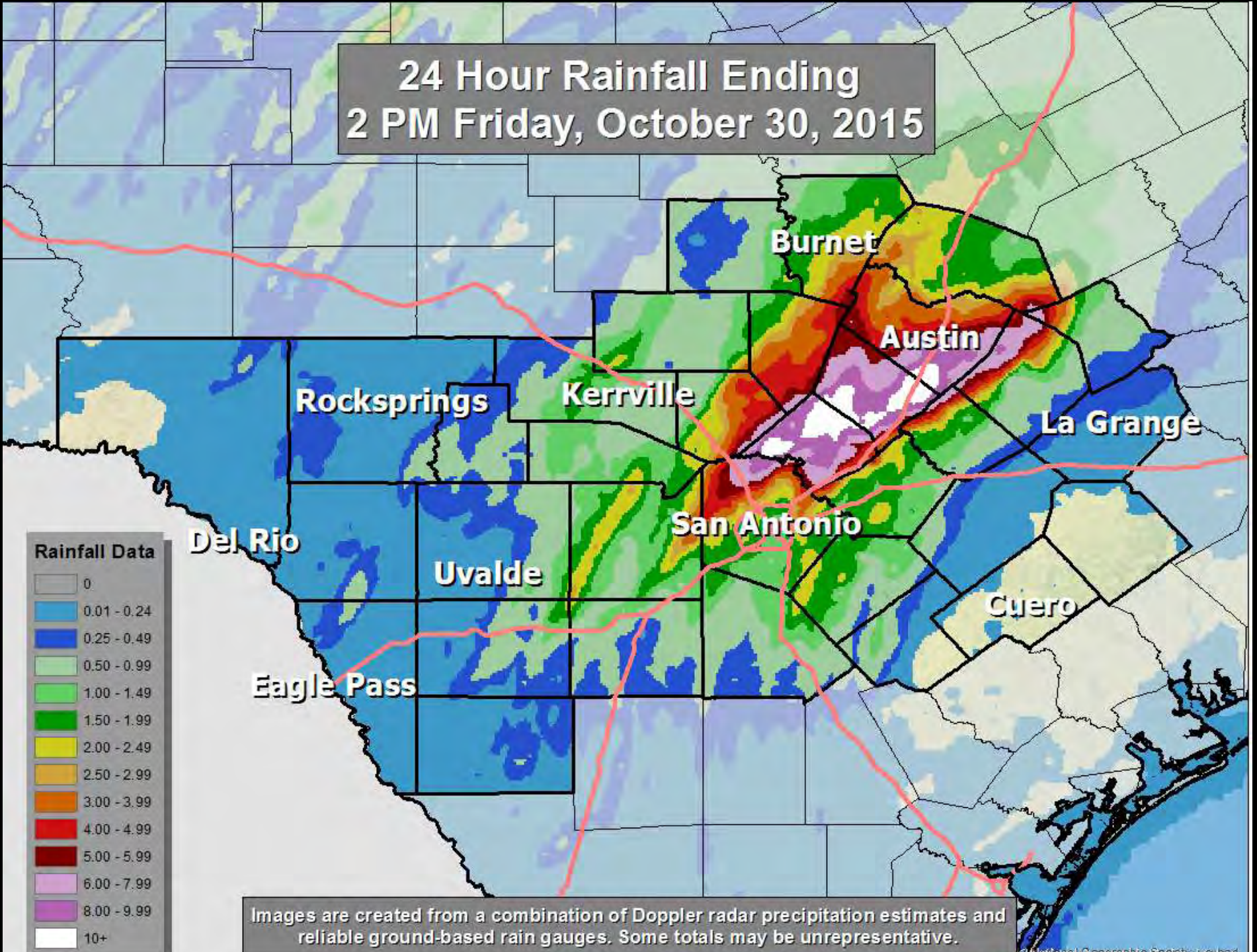
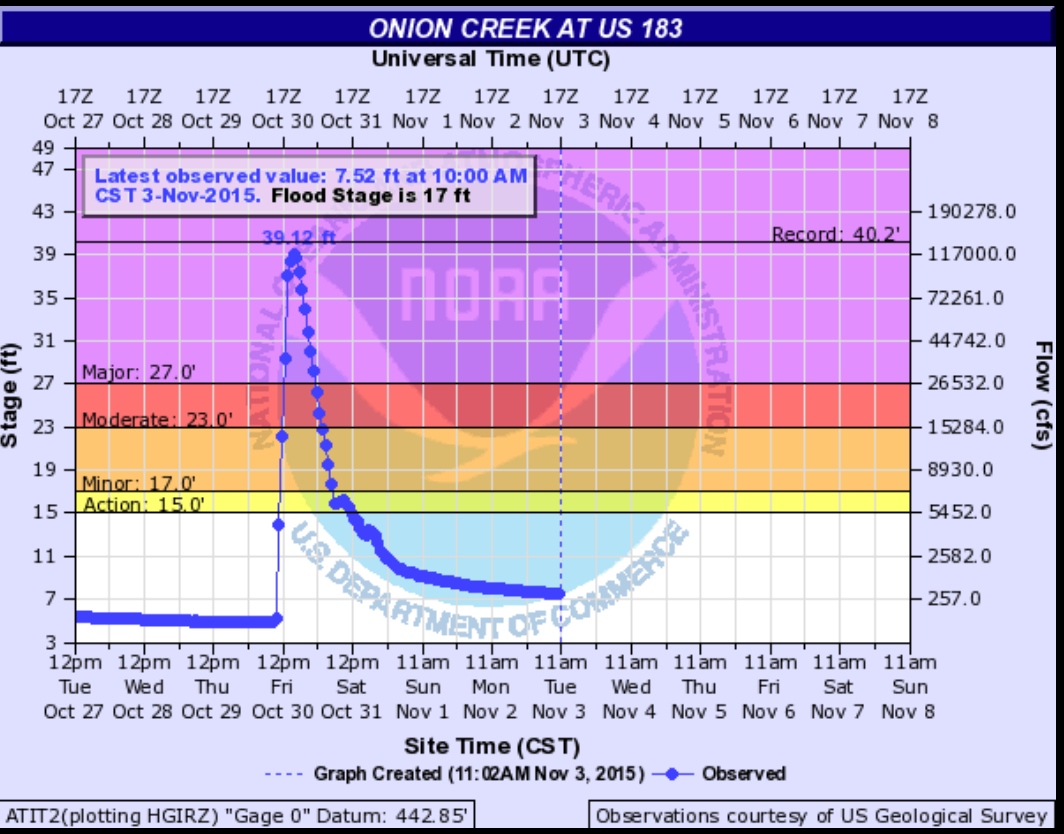


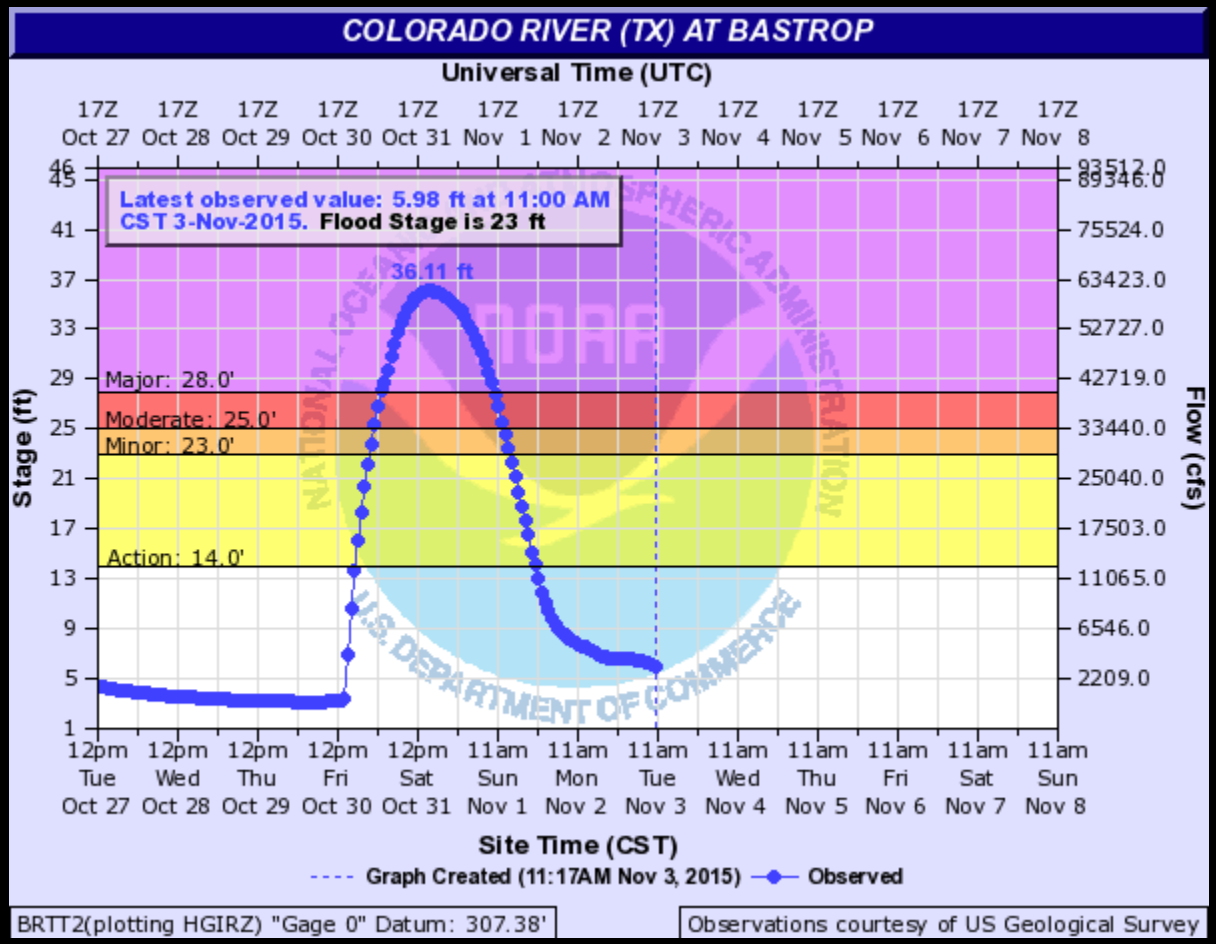
Figure 1. Average sea surface temperature (SST) anomalies (°C) for the week centered on 30 September 2015. Anomalies are computed with respect to the 1981-2010 base period weekly means.


24 Hour Rainfall Ending
7 AM Saturday, October 24, 2015
Burnet
Austin
Rocksprings
Kerrville
La Grange
San Antonio
Del Rio
Uvalde
Cuero
Eagle Pass
Rainfall Data
0
0.01 - 0.24
0.25 - 0.49
0.50 - 0.99
1.00 - 1.49
1.50 - 1.99
2.00 - 2.49
2.50 - 2.99
3.00 - 3.99
4.00 - 4.99
5.00 - 5.99
6.00 - 7.99
8.00 - 8.99
10+
Images are created from a combination of Doppler radar pre
reliable ground-based rain gauges. Some totals may b


WEATHER ON THE 1s
FUTURE RAIN
THROUGH SUN 12:00 AM
LESS 5"
.5 - 1.5"
1.5 - 2.5"
2.5 - 4"
4" +
"RPM" Model
10.31"
KILLEEN
2.51"
JUNCTION
7.77"
BURNET
10.04"
GEORGETOWN
4.28"
COLLEGE STATION
4.50"
FREDERICKSBURG
8.19"
AUSTIN
10.89"
GIDDINGS
8.25"
KERRVILLE
4.89"
BOERNE
6.33"
SAN MARCOS
5.15"
NEW BRAUNFELS
11.33"
GONZALES
9.32"
LA GRANGE
4.39"
SAN ANTONIO
2.38"
UVALDE
1.69"
PLEASANTON
14.39"
VICTORIA


24 Hour Rainfall Ending
2 PM Friday, October 30, 2015
Burnet
Austin
Rocksprings
Kerrville
La Grange
San Antonio
Del Rio
Uvalde
Cuero
Eagle Pass
Rainfall Data
0
0.01 - 0.24
0.25 - 0.49
0.50 - 0.99
1.00 - 1.49
1.50 - 1.99
2.00 - 2.49
2.50 - 2.99
3.00 - 3.99
4.00 - 4.99
5.00 - 5.99
6.00 - 7.99
8.00 - 9.99
10+
Images are created from a combination of Doppler radar precipitation estimates and reliable ground-based rain gauges. Some totals may be unrepresentative.


ONION CREEK AT US 183
Universal Time (UTC)
17Z Oct 27 17Z Oct 28 17Z Oct 29 17Z Oct 30 17Z Oct 31 17Z Nov 1 17Z Nov 2 17Z Nov 3 17Z Nov 4 17Z Nov 5 17Z Nov 6 17Z Nov 7 17Z Nov 8
Latest observed value: 7.52 ft at 10:00 AM CST 3-Nov-2015. Flood Stage is 17 ft
39.12 ft
Record: 40.2'
Major: 27.0'
Moderate: 23.0'
Minor: 17.0'
Action: 15.0'
Stage (ft)
Flow (cfs)
49 47 43 39 35 31 27 23 19 15 11 7 3
190278.0 117000.0 72261.0 44742.0 26532.0 15284.0 8930.0 5452.0 2582.0 257.0
12pm Tue Oct 27 12pm Wed Oct 28 12pm Thu Oct 29 12pm Fri Oct 30 12pm Sat Oct 31 11am Sun Nov 1 11am Mon Nov 2 11am Tue Nov 3 11am Wed Nov 4 11am Thu Nov 5 11am Fri Nov 6 11am Sat Nov 7 11am Sun Nov 8
Site Time (CST)
Graph Created (11:02AM Nov 3, 2015)
Observed
ATIT2(plotting HGIRZ) "Gage 0" Datum: 442.85'
Observations courtesy of US Geological Survey



LCRA adds 5 river gauges along Colorado River near Bastrop

AUSTIN (KXAN) — In order to improve flood preparedness along the Colorado River in Travis and Bastrop county, the Lower Colorado River Authority is adding five new river gauges at the cost of $300,000. Three of the new gauges will be installed between Austin and Bastrop, and two will be placed between Bastrop and Smithville.

Austin, Texas

Population - Austin—MSA

1,990,593 (2015)

Austin Area Population Histories and Forecasts

Year	City of Austin Total Area Population	Annualized Growth Rate	City of Austin Full Purpose Population	City of Austin Limited Purpose Population	Travis County	Annualized Growth Rate	Five County MSA(1)	Annualized Growth Rate
1940	87,930				111,053		214,603	
1950	132,459	4.2%			160,980	3.8%	256,645	1.8%
1960	186,545	3.5%			212,136	2.8%	301,261	1.6%
1970	251,808	3.0%			295,516	3.4%	398,938	2.8%
1980	345,890	3.2%			419,573	3.6%	585,051	3.9%
1990	465,622	3.0%			576,407	3.2%	846,227	3.8%
2000	**656,562**	**3.5%**	**639,185**	**17,377**	**812,280**	**3.5%**	**1,249,763**	**4.0%**
2001	669,693	2.0%	654,019	15,674	830,150	2.2%	1,314,344	5.2%
2002	680,899	1.7%	667,705	13,194	844,263	1.7%	1,353,122	3.0%
2003	687,708	1.0%	674,382	13,326	856,927	1.5%	1,382,675	2.2%
2004	692,102	0.64%	678,769	13,333	874,065	2.00%	1,419,137	2.6%
2005	700,407	1.20%	687,061	13,346	893,295	2.20%	1,464,563	3.2%
2006	718,912	2.64%	707,952	10,960	920,544	3.05%	1,527,040	4.3%
2007	735,088	2.25%	724,117	10,971	948,160	3.00%	1,592,590	4.3%
2008	750,525	2.10%	739,543	10,982	978,976	3.25%	1,648,331	3.5%
2009	774,037	3.13%	765,957	8,080	1,008,345	3.00%	1,706,022	3.50%
2010	**790,390**	**2.11%**	**777,953**	**12,437**	**1,024,266**	**1.58%**	**1,716,289**	**0.60%**
2011	812,025	2.74%	799,578	12,447	1,049,873	2.50%	1,763,487	2.75%
2012	832,326	2.50%	819,866	12,459	1,076,119	2.50%	1,811,983	2.75%
2013	855,215	2.75%	842,743	12,472	1,108,403	3.00%	1,870,872	3.25%
2014	878,733	2.75%	866,249	12,484	1,141,655	3.00%	1,930,740	3.20%
2015	900,701	2.50%	888,204	12,497	1,173,051	2.75%	1,990,593	3.10%
2016	920,967	2.25%	908,458	12,509	1,205,310	2.75%	2,050,311	3.00%
2017	941,689	2.25%	929,167	12,522	1,238,456	2.75%	2,111,820	3.00%
2018	960,523	2.00%	947,988	12,534	1,269,417	2.50%	2,175,175	3.00%
2019	977,332	1.75%	964,785	12,547	1,301,152	2.50%	2,240,430	3.00%
2020	991,992	1.50%	979,432	12,559	1,333,681	2.50%	2,307,643	3.00%
2025	1,068,657	1.50%	1,056,038	12,618	1,508,938	2.50%	2,675,191	3.00%
2030	1,151,247	1.50%	1,138,616	12,631	1,707,225	2.50%	3,063,825	2.75%
2035	1,225,021	1.25%	1,212,378	12,644	1,908,127	2.25%	3,466,436	2.50%
2040	1,287,510	1.00%	1,274,853	12,656	2,106,726	2.00%	3,921,955	2.50%
2045	1,353,186	1.00%	1,340,517	12,669	2,269,543	1.50%	4,330,155	2.00%

SOURCE: Ryan Robinson, City Demographer, Department of Planning, City of Austin. January 2015.

River of Contrasts

THE TEXAS COLORADO

MARGIE CRISP