Waters the Land: Texas Rivers

Kevin Anderson, Ph.D.

Austin Water - Center for Environmental Research

“The Texas Rivers Song”

Lend me your hand
Li, li, li, le, le, le
Lend me your hand
Li, li, li, le, le, le
Lend me your hand
There's many a river
That waters the land

Now the fair Angelina
Runs glossy and gliding
The crooked Colorado
Runs weaving and winding
The slow San Antonio
Courses the plain
But I never will walk
By the Brazos again

She kissed me and she hugged me
And she called me her dandy
The Trinity's muddy
But the Brazos quick sandy
She kissed me and she hugged me
And she called me her own
But down by the Brazos
She left me alone

Now the girls of Little River
They're plump and they're pretty
The Sabine and the Sulphur
Hold beauties a'many
The banks of the Neches
There are girls by the score
But down by the Brazos
I'll wander no more

We crossed the wild Pecos
We forded the Nueces
We swum the Guadalupe
And we followed the Brazos
Red River runs rusty
The Wichita clear
But down by the Brazos
I courted my dear

Now the fair Angelina
Runs glossy and gliding

The crooked Colorado
Runs weaving and winding

The slow San Antonio
Courses the plain

The Trinity's muddy

We crossed the wild Pecos

We forded the Nueces

We swum the Guadalupe

Red River runs rusty

The Wichita clear

But down by the Brazos
I courted my dear

Ain't no more cane on the Brazos
Oh, oh, oh, oh...
Its all been ground down to molasses
Oh, oh- oh, oh- oh...

You shoulda been on the river in 1910
They were driving the women just like they drove the men.
Go down old Hannah, don'cha rise no more
Don't you rise up til judgment day's for sure

Ain't no more cane on the Brazos
Its all been ground down to molasses

Captain, don't you do me like you done poor old shine
Well ya drove that bully til he went stone blind
Wake up on a lifetime, hold up your own head
Well you may get a pardon and then you might drop dead

Ain't no more cane on the Brazos
Its all been ground down to molasses.

John A. Lomax (1867-1948) and, his sons, John Jr. and Alan Lomax

Angelina River
Aransas River
Blanco River
Bosque River
Brazos River
Colorado River
Concho River
Canadian River
Comal River
Devils River
Frio River
Guadalupe River
James River
Lampasas River
Lavaca River
Leon River
Little River
Llano River
Medina River
Navidad River
Navasota River
Neches River
Nolan River
Nueces River
Paluxy River
Pease River
Pecos River
Pedernales River
Prairie Dog Town Fork
Red River
Rio Grande
Sabine River
Sabinal River
San Antonio River
San Bernard River
San Gabriel River
San Jacinto River
San Marcos River
San Saba River
Sulphur River
Trinity River

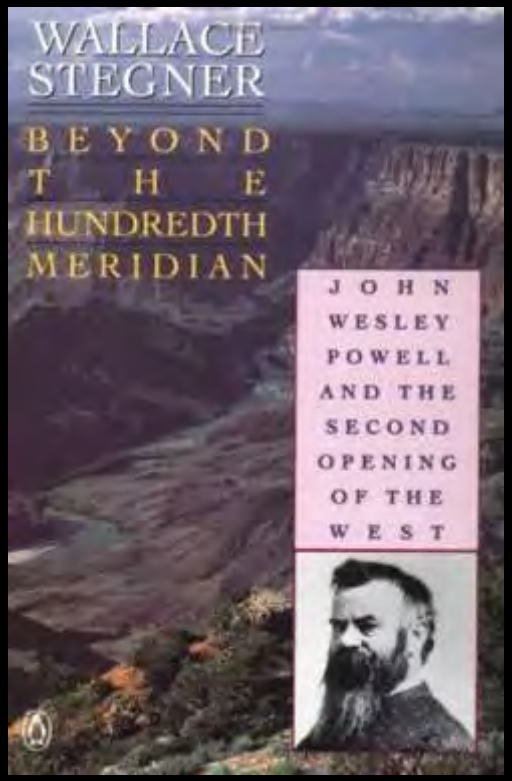
The Regional Context of Texas Rivers

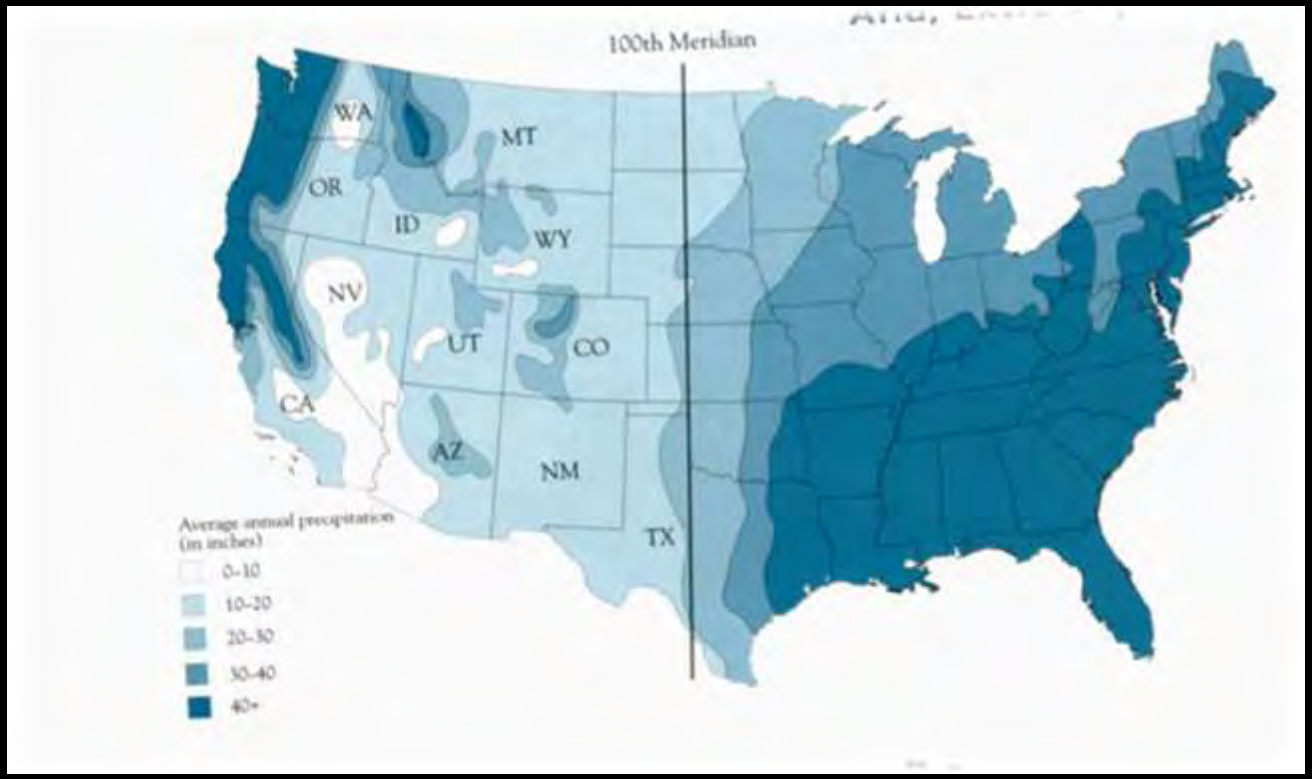
Central Drainage to Gulf of Mexico


ALBERTA
SASKATCHEWAN
MONTANA
NORTH DAKOTA
MINNESOTA
SOUTH DAKOTA
WYOMING
NEBRASKA
IOWA
WISCONSIN
MICHIGAN
NEW YORK
PENNSYLVANIA
OHIO
INDIANA
ILLINOIS
COLORADO
KANSAS
MISSOURI
WEST VIRGINIA
VIRGINIA
KENTUCKY
OKLAHOMA
ARKANSAS
TENNESSEE
NORTH CAROLINA
NEW MEXICO
TEXAS
MISSISSIPPI
ALABAMA
GEORGIA
SOUTH CAROLINA
LOUISIANA
Milk
Missouri
Yellowstone
Little Missouri
Grand
Tongue
Bighorn
Wind
Cheyenne
Niobrara
James
Minnesota
Big Sioux
Mississippi
Wisconsin
Des Moines
Iowa
North Platte
South Platte
Platte
Loup
Republican
Smoky Hill
Kansas
Arkansas
Neosho
Canadian
Red
Illinois
Kaskaskia
Kankakee
Wabash
Ohio
Scioto
Allegheny
Monongahela
Kanawha
Green
Kentucky
Holston
Cumberland
Tennessee
White
Black
Ouachita
Yazoo
Atchafalaya
Billings
Minneapolis
Omaha
Lincoln
Des Moines
Chicago
Peoria
Denver
Kansas City
Springfield
Topeka
St. Louis
Evansville
Indianapolis
Cincinnati
Columbus
Pittsburgh
Lexington
Tulsa
Oklahoma City
Memphis
Baton Rouge
New Orleans
About 2,000 miles (3,219 km) across


0 200 400
Miles
0 500 1,000
Kilometers
Average Flow in cubic feet per second (cfs):
1,000 2,500 10,000 50,000 250,000 650,000
Vancouver
Seattle
Missouri
Lake Winnipeg
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
Montréal
Toronto
Detroit
Chicago
Boston
New York
Philadelphia
Washington
San Francisco
Los Angeles
Arkansas
Colorado
Dallas
Houston
Atlanta
Miami
Gulf of Mexico
BAHAMAS
Havana
UNITED STATES
MEXICO

Beyond the 100th Meridian and The Great American Desert





Powell' s expeditions led to his belief that the arid West was not suitable for agricultural development, except for about 2% of the lands that were near water sources.

His *Report on the Lands of the Arid Regions of the United States* proposed irrigation systems and state boundaries based on watershed areas (to avoid squabbles).

For the remaining lands, he proposed conservation and low-density, open grazing.

“Rain follows the plow"

Railroad companies, who owned vast tracts of lands granted in return for building the lines, did not agree with his opinion.

They aggressively lobbied Congress to reject Powell's policy proposals and to encourage farming instead, as they wanted to develop their lands. The politicians agreed and developed policies that encouraged pioneer settlement based on agriculture.

They based such policy on a theory developed by Professor Cyrus Thomas and promoted by Horace Greeley. He suggested that agricultural development of land causes arid lands to generate higher amounts of rain - “Rain follows the plow"

At an 1883 irrigation conference, Powell would remark: "Gentlemen, you are piling up a heritage of conflict and litigation over water rights, for there is not sufficient water to supply the land.“

Powell's recommendations for development of the West were largely ignored until after the Dust Bowl of the 1920s and 1930s, resulting in untold suffering associated with pioneer subsistence farms that failed due to insufficient rain.

Walter Prescott Webb 1888-1963

Webb maintains that the Great Plains stand as a distinct environmental entity radically different from the wet timbered areas of the East.

Three characteristics differentiated the Plains from the East:

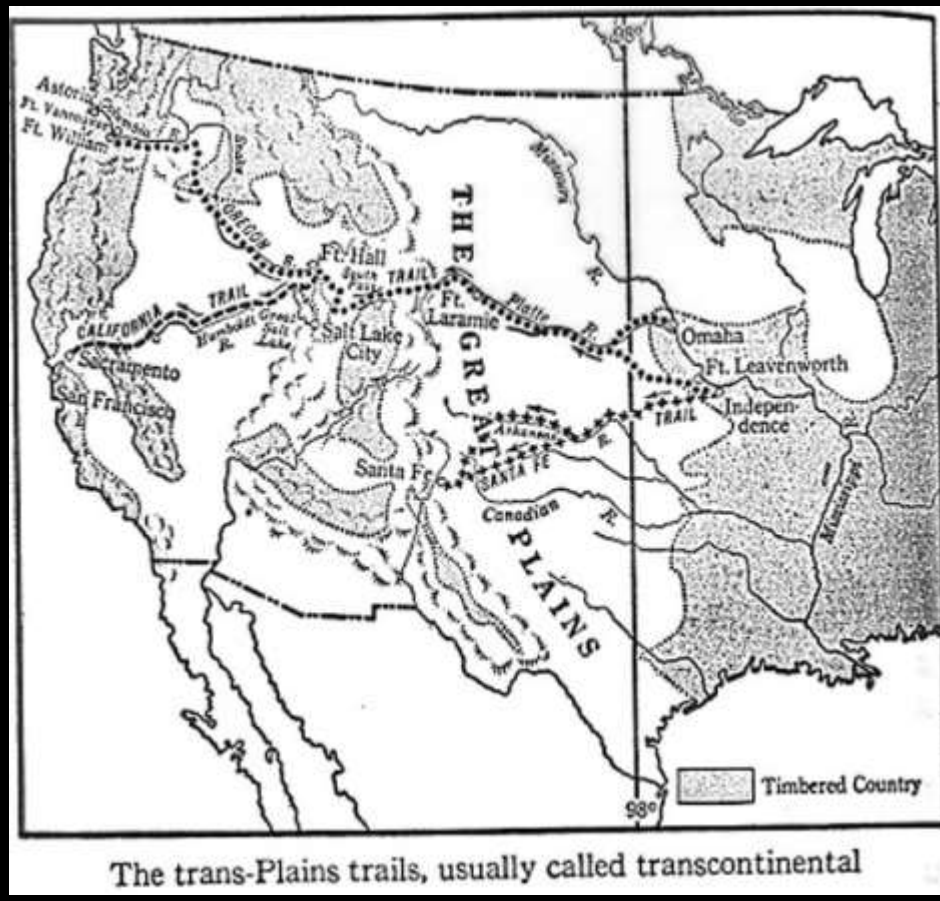
1. their level nature,
2. the scarcity of timber,
3. their semi-arid climate.

Webb argues that between the 98th meridian and the western slope of the Rocky Mountain system from Canada to Mexico the two most important elements of life in the eastern United States - abundant rainfall or available water and large stands of timber - were missing.

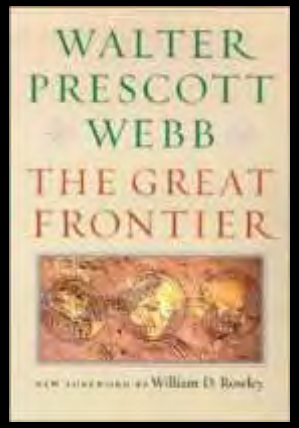
This environment was absolutely foreign to the citizen of the United States, who found the Plains impossible to cope with for a long period of time.

Settlement, therefore, jumped from the wet forests of the East to the Western Pacific Slope of California and Oregon.

Thus, for a period of time, the United States was a two-ocean land mass with an enormous corridor known as the "Great American Desert" that lay uninhabited and undeveloped by the citizens of the nation.



The trans-Plains trails, usually called transcontinental

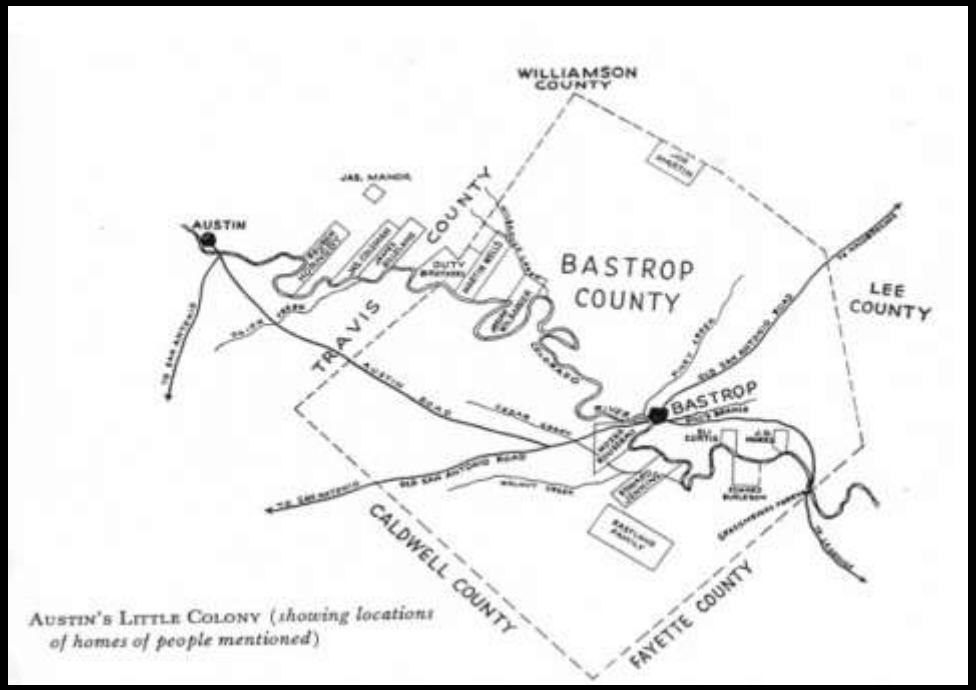


Texas Rivers and 19th Century Settlement

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.

The bottomland where the road crosses is about five miles, mostly prairie, clear of overflow, land rich, timber Pecan, Ash, Oak, Cedar, abundance of fish."

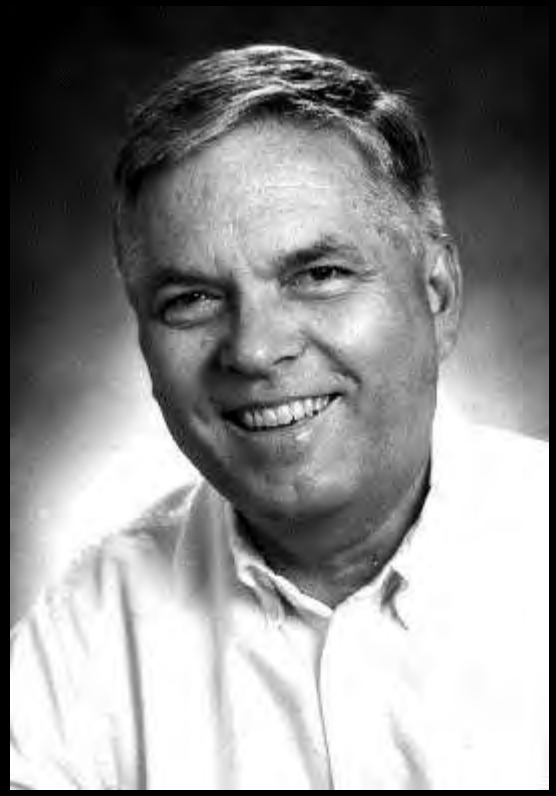


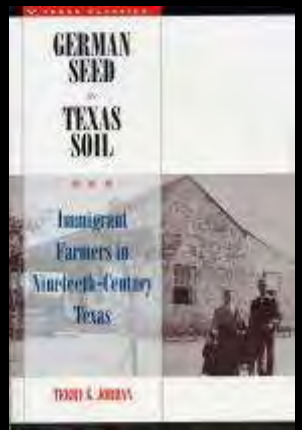
Austin's Little Colony (*showing locations of homes of people mentioned*)

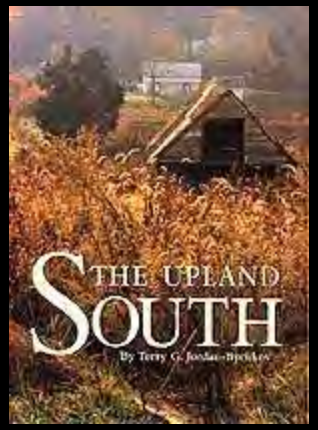
ANTECEDENTS OF THE LONG-LOT IN TEXAS*

TERRY G. JORDAN

ABSTRACT. Riverine long-lot original surveys were employed in many parts of Texas for about 150 years, beginning in the Spanish period and extending well into the era of statehood. No precedent for the use of long-lots was found either in Spain or New Spain. The evidence suggests that long-lots were diffused to Texas from Central Europe, by way of northern France, Québec, and the French colonies in Missouri and Louisiana. Long-lot survey left an imprint in cadastral, road, and street patterns which is still observable. KEY WORDS: *Cultural landscape, Long-lots, Survey patterns, Texas.*

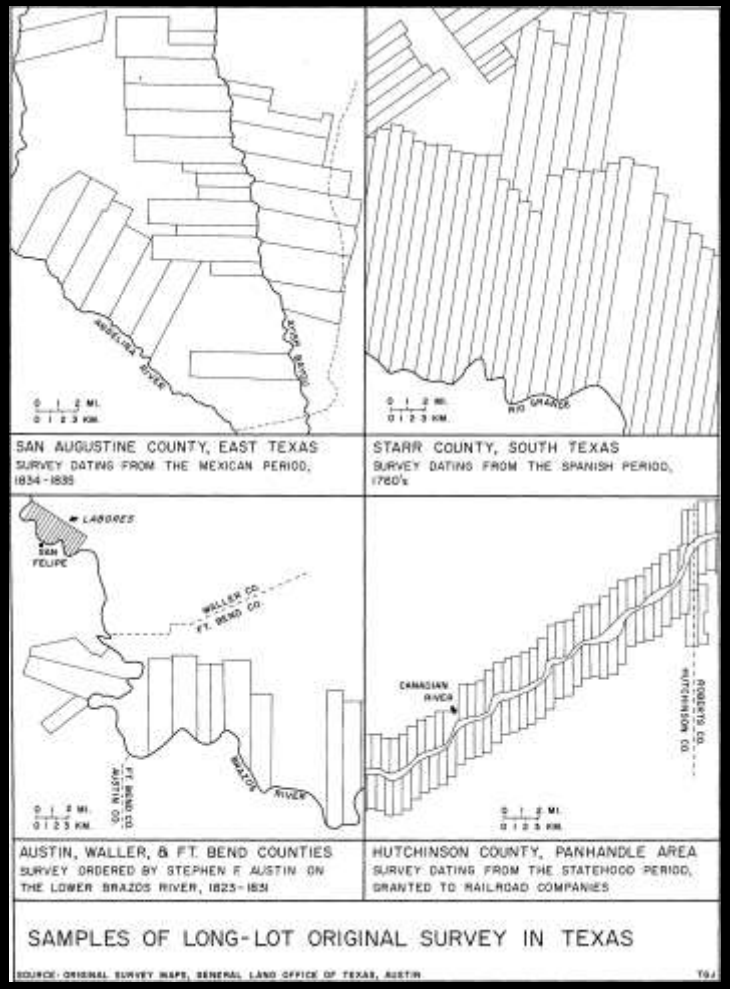






Terry G. Jordan 1938 – 2003

Terry G. Jordan held the Walter Prescott Webb Chair in History and Ideas in the geography department at The University of Texas at Austin.

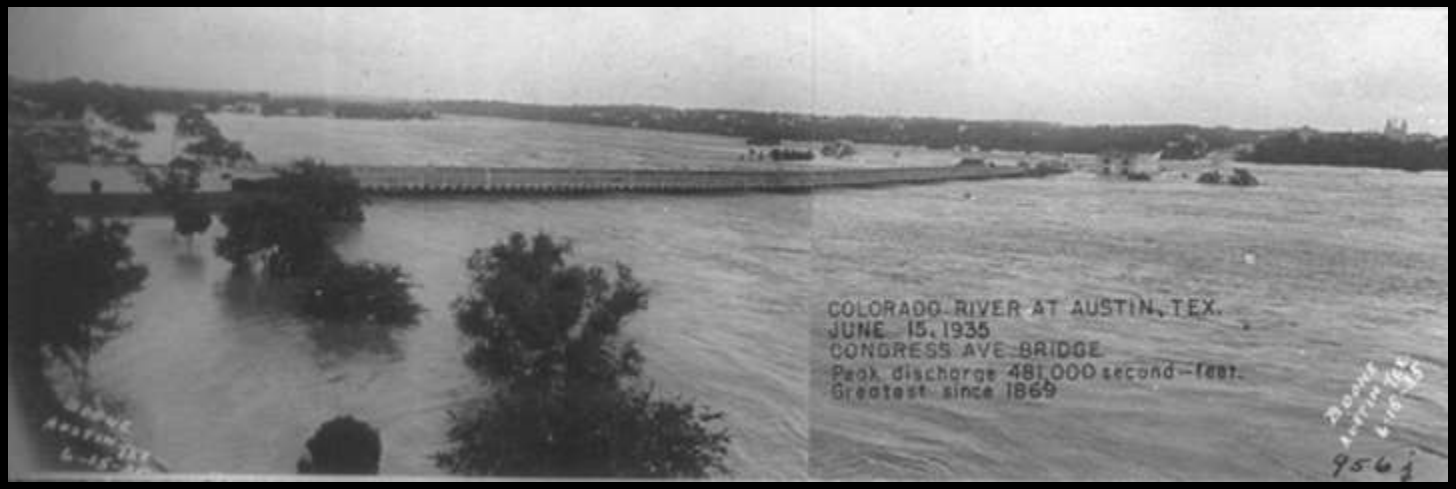


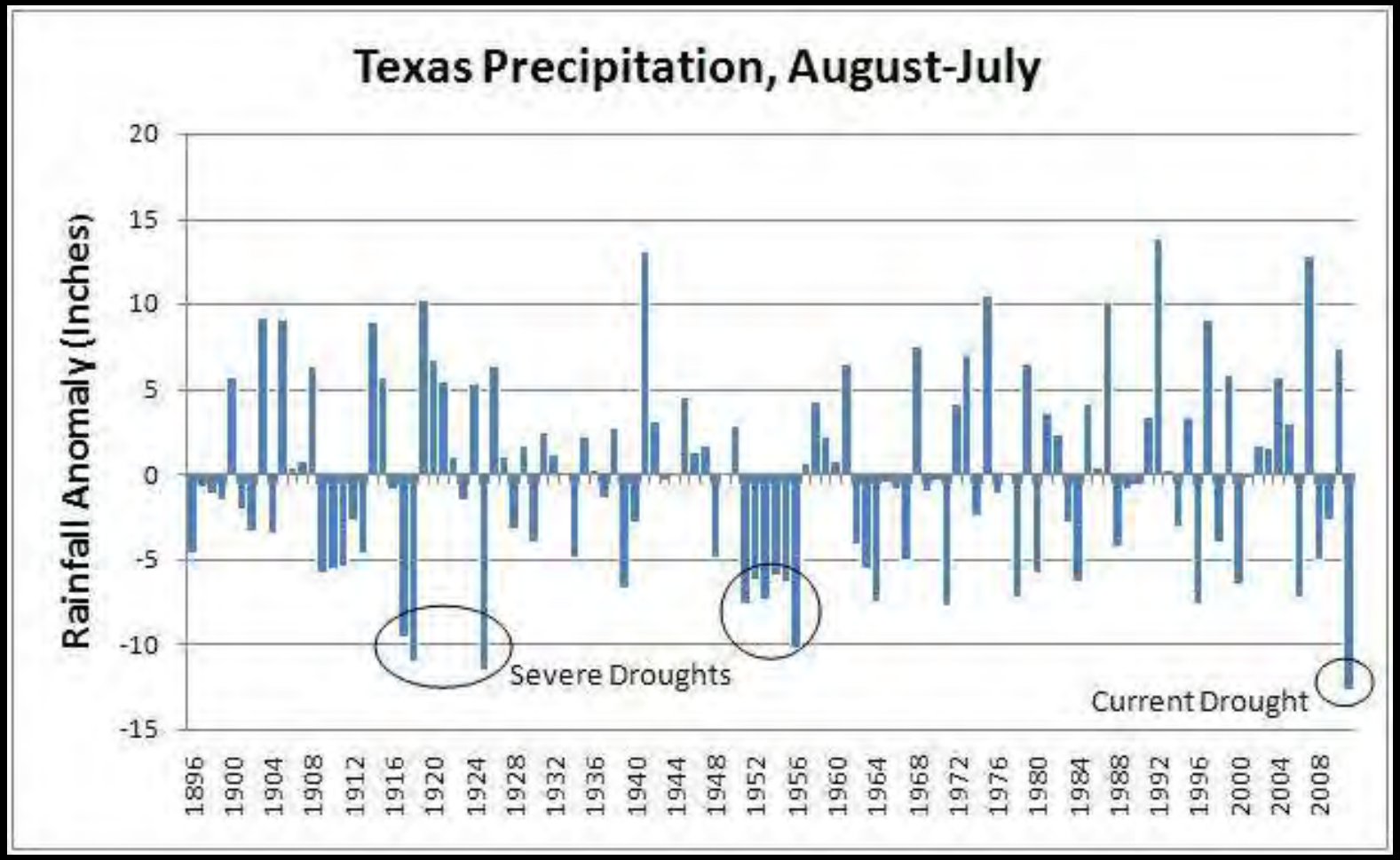
Transformation 1850-1950

Agriculture – Cattle and Crops

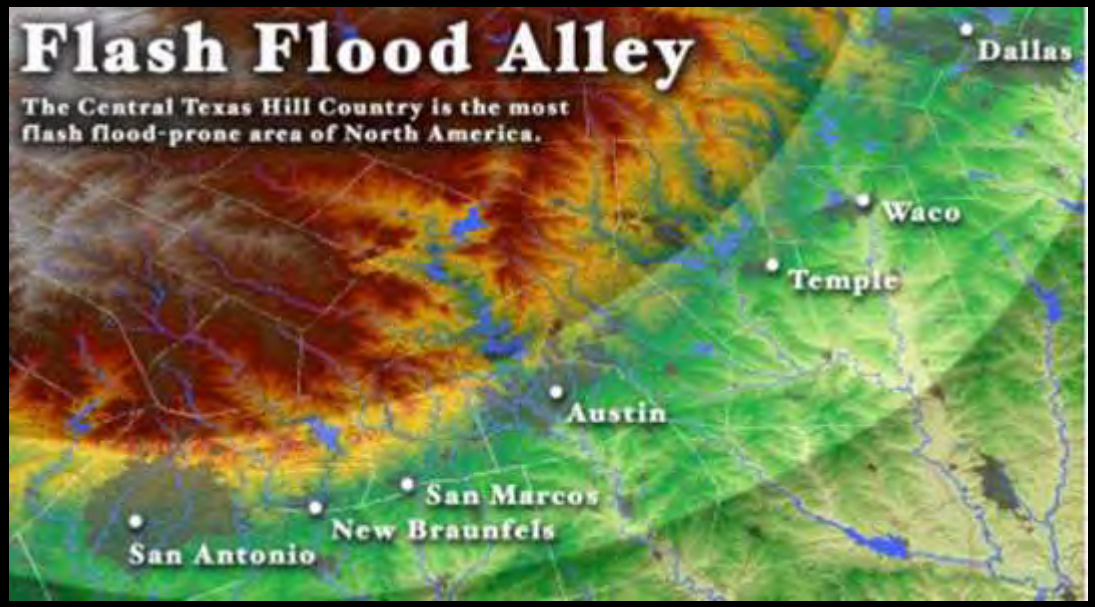
Texas Rivers

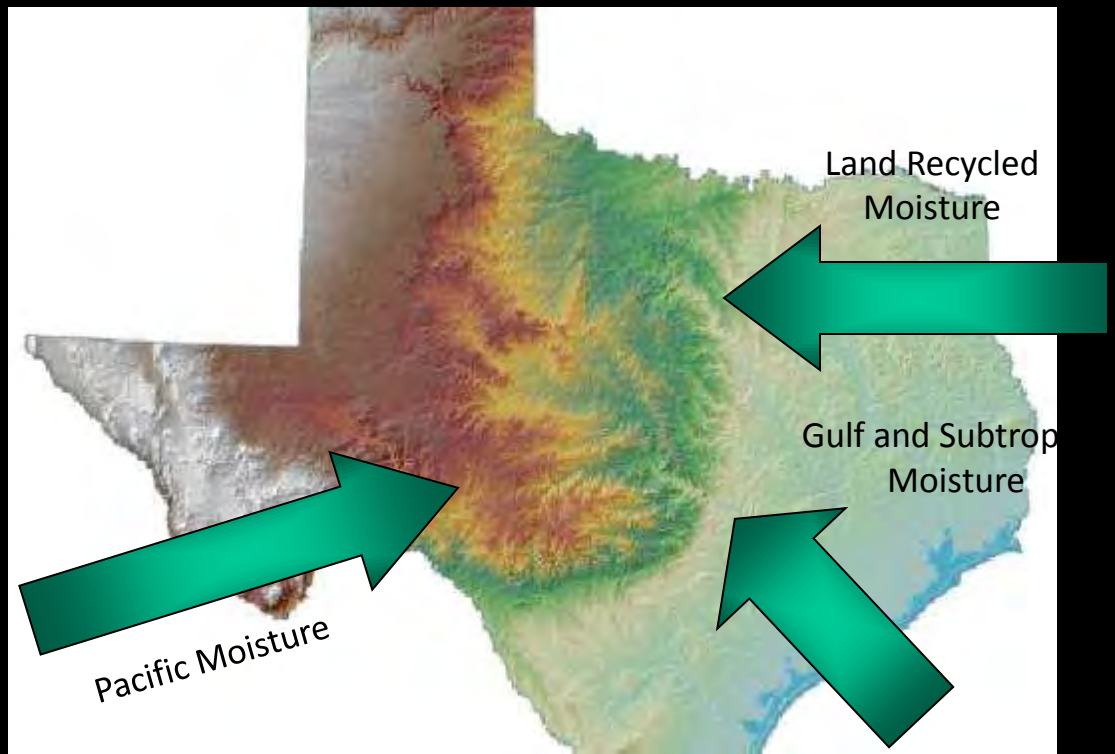
Drought and Flood




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

Texas Climate



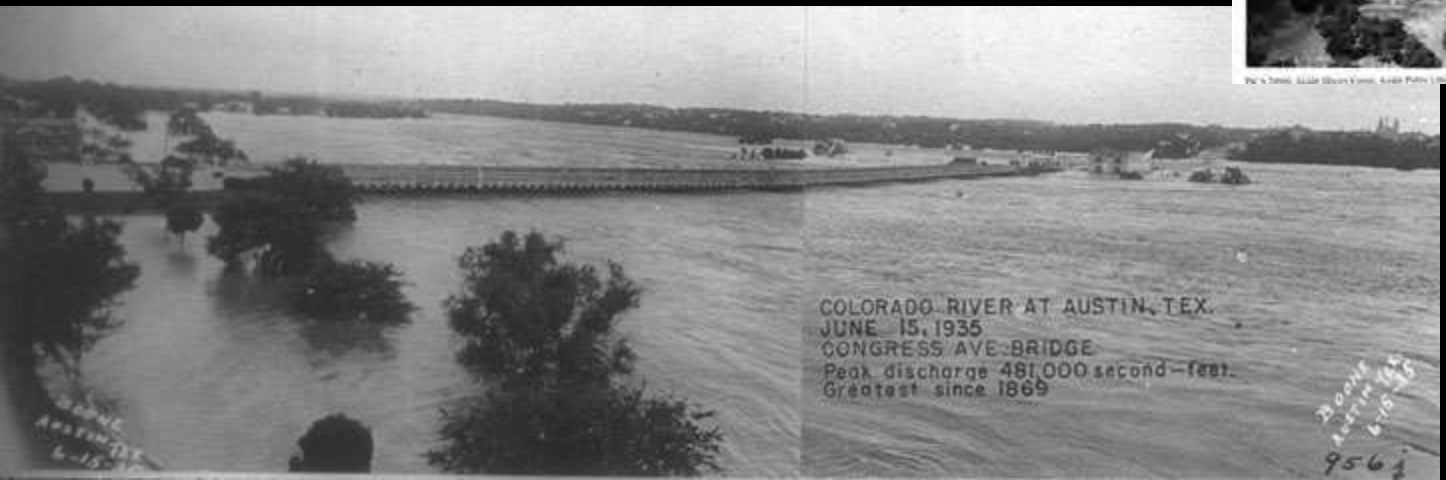


June 1935: Floodwaters from heavy Hill Country rains cause the Colorado River in Austin to crest at 50 feet, one foot below the 1869 record. The river overwhelms the Congress Avenue Bridge, cutting Austin in half. The Llano River rises to its highest recorded stage of 41½ feet, streamflow 388,000 cubic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

September 1936: 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.

July 1938: Twenty inches of rain over 12 counties pour more than 3 million acre-feet of floodwaters into newly completed Lake Buchanan, forcing LCRA to open 22 of Buchanan Dam's 37 floodgates.

C08484-A Austin History Center, Austin Public Library



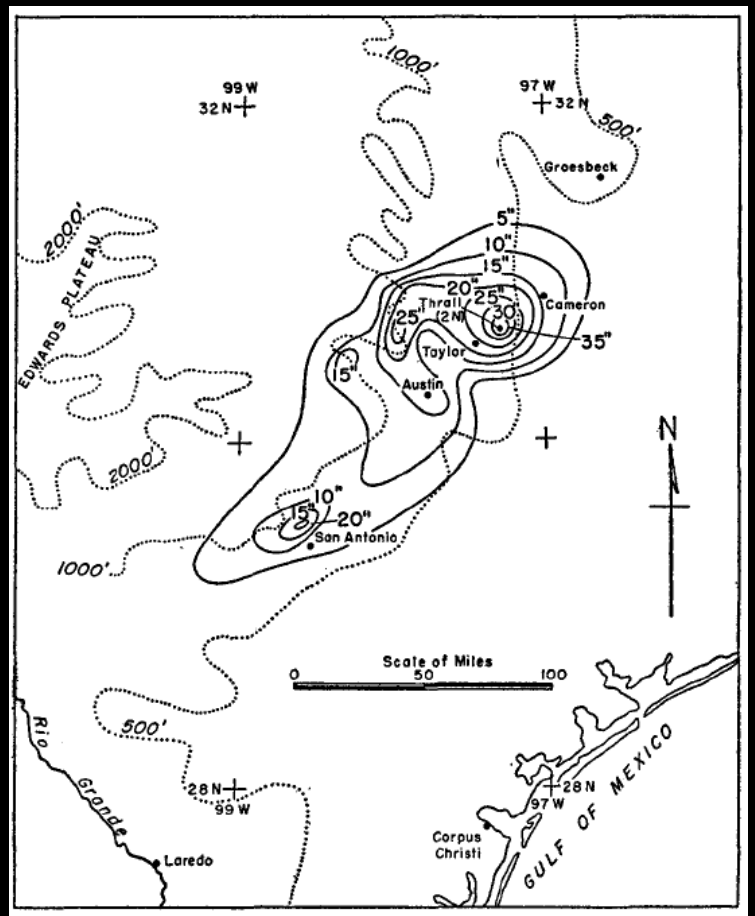


FIGURE 2.—Generalized isohyetal pattern (solid lines, in inches) for the Thrall, Tex., rainstorm, covering the period noon Sept. 8 to noon Sept. 10 (local time), 1921, superimposed on the ground contours (dotted lines, in feet). The intense rain fell in two bursts which traveled from the southwest to the northeast.

Thrall Flood 1921

This storm caused the most deadly floods in Texas, with a total of 215 fatalities.

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.

Marble Falls 2007 18 Inches in 9 hours, 9 inches in 1 hour

Dangerous flash flood threatens Austin
Tropical Storm Hermine drops 10-15 inches of rain
Wednesday, 8 September 2010

AUSTIN (KXAN) - An incredible flash flood developed early Wednesday morning in Central Texas as Tropical Depression Hermine lifted slowly northward from the Hill Country into the Big Country.

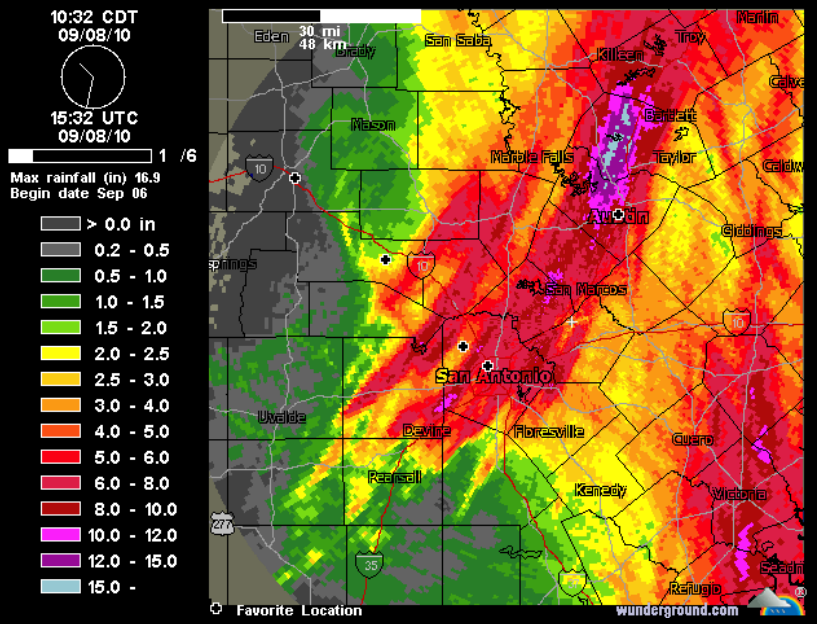
Some 6- to 15 inches of rain were reported in many locations from San Antonio to Killeen, including most of Hays, Travis and Williamson counties.

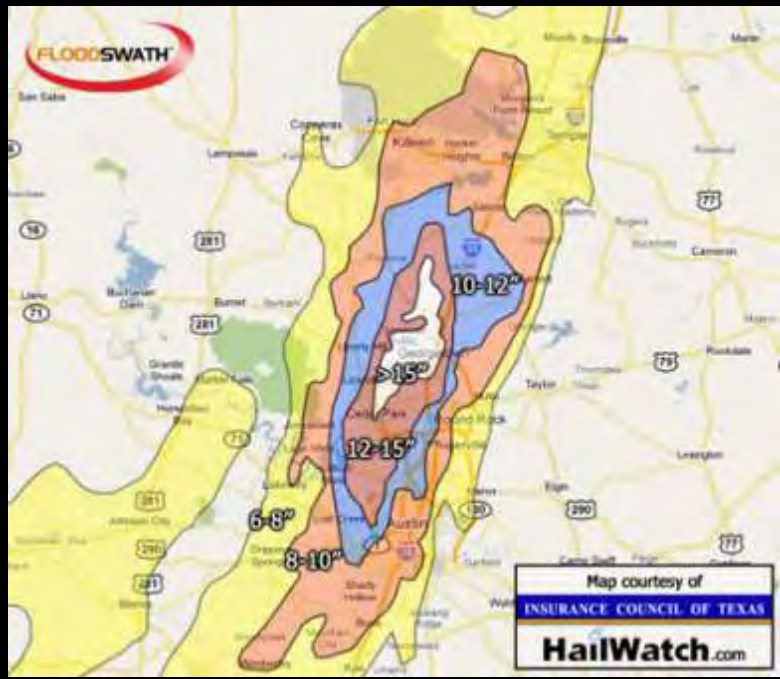
Numerous water rescues were reported overnight. Many roads were closed, and some evacuations were ordered, particularly in Williamson County.

Brushy, Onion and Barton creeks and the Colorado River were all under Flood Warning early Wednesday.

Very heavy rain fell directly into Lake Austin, with more than 12 inches recorded at Mansfield Dam. Runoff from Bull Creek also flowed into the lake, forcing the LCRA to open flood gates on Tom Miller Dam.

As a result, the level of Lady Bird Lake was rising, causing minor flooding in low lying areas along Cesar Chavez and Austin High School.





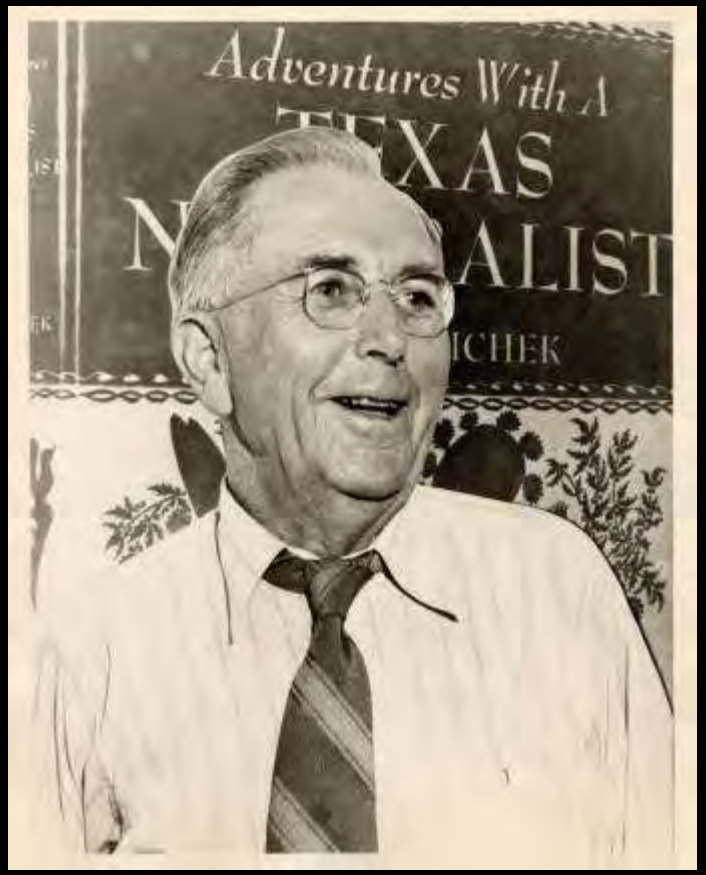
Texas – Rivers, Water, and Management

Roy Bedichek

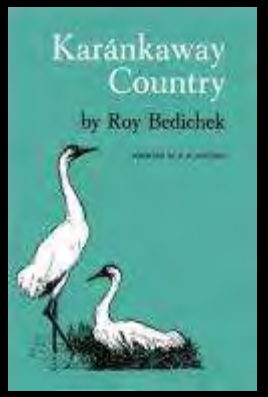
1878-1959

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.

1947

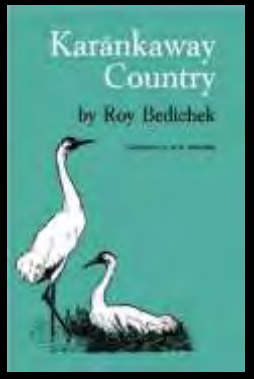


1950



Bedichek – Environmental Transformation

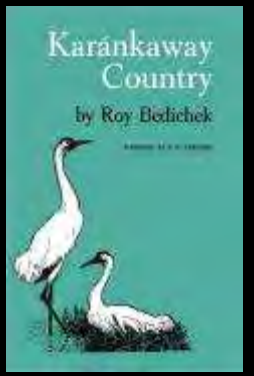
I have seen in my boyhood days the crown and upper slopes of gentle hills, on which the black soil is mixed with fragmented limestone, produce ninety bushels of oats to the acre. Now many of these slopes are all bleached out, pale as death, and really dead in so far as ability to support vegetable life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



Bedichek – 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.

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.

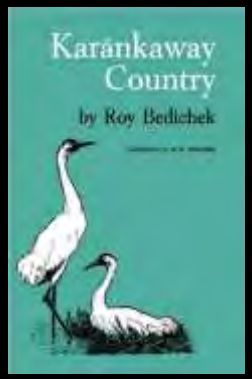


Bedichek - Colorado River Raft

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).



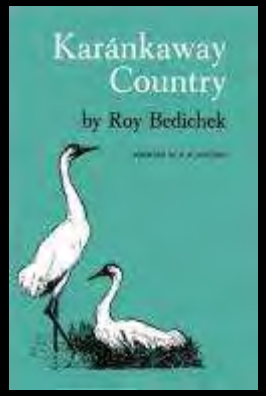
Bedichek - The Little Waters

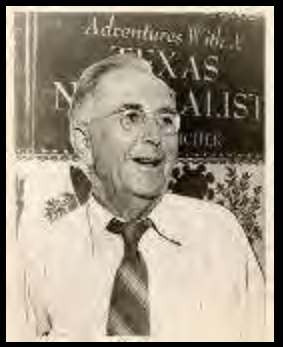
Formerly, timbered bottoms, brushy hillsides, and wide grasslands, thickly sodded, soaked up rain water like a sponge.

It seeped into the subsoil and eventually filled sandy underground strata from which it found its way by devious paths into bubbling springs at lower levels, trickling off to join other trickles to form [on still lower levels] streamlets whose confluence made streams – all moving unhurried in a widespread network toward the river channel…

Nature was not interested in turning turbines or floating barges, but in producing just as much vigorous, varied, and abundant life as possible, dispersed along the way from plains to sea.

Some think this is a dream. Not so: the overwhelming proof lies in the land richness and life richness which we found here…Under natural conditions, the whole expansive watershed was a giant sponge.



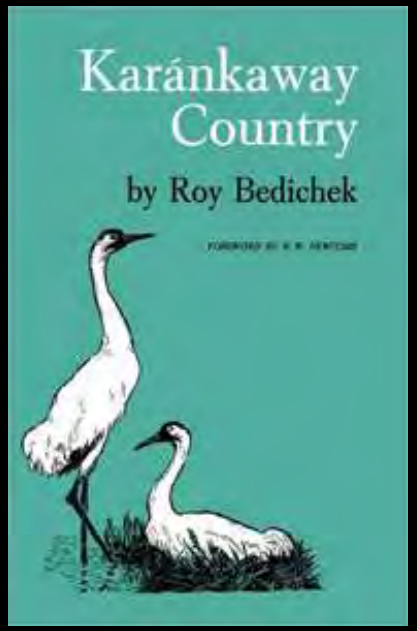


Rivers as Living Organisms

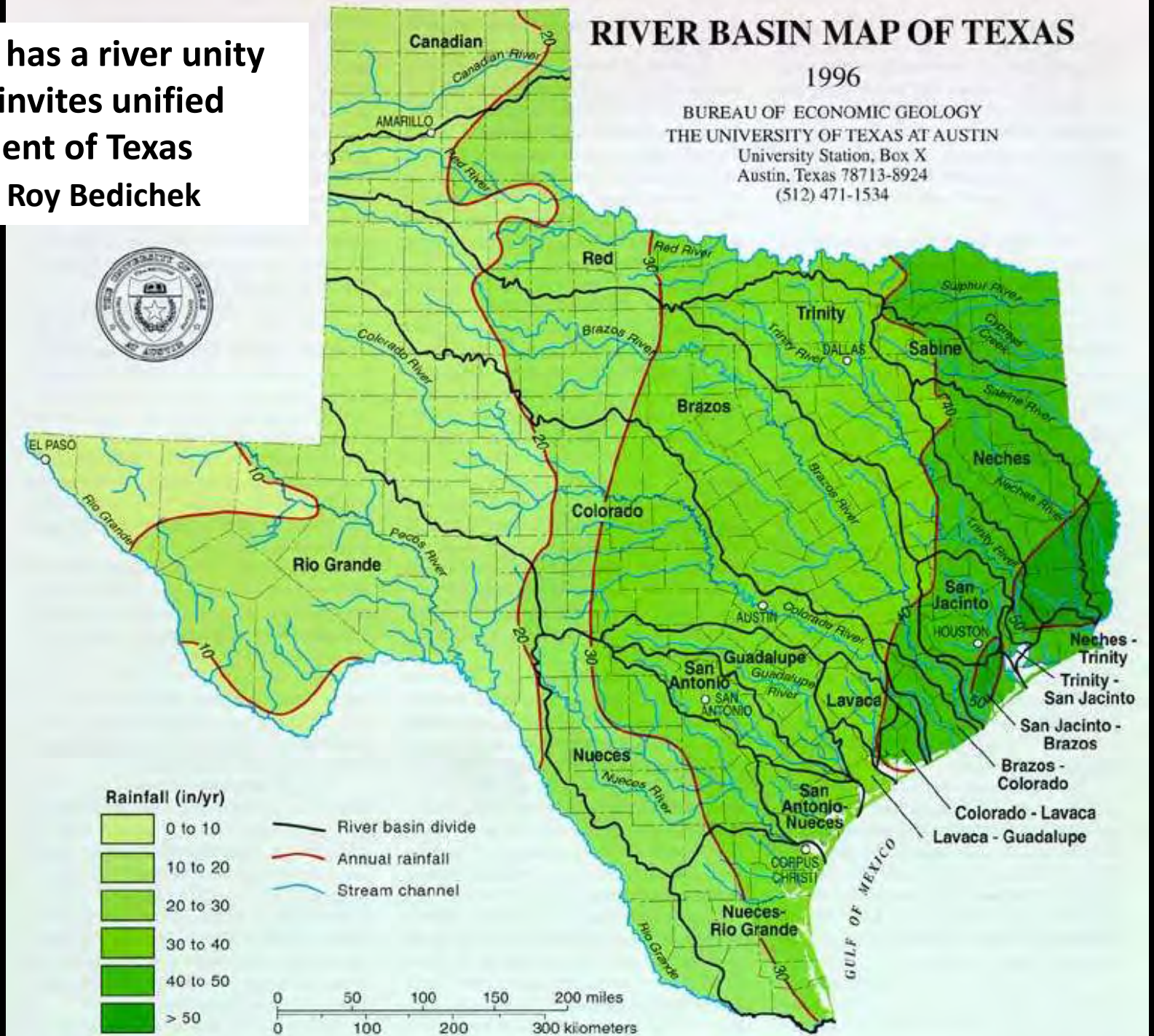
The river is a living organism, or at least it presents characteristics so similar to those of a living organism that to speak of it as such is more than mere metaphor. A river system is one of Nature's units, and it must be dealt with as such if it is to be dealt with successfully for serving human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

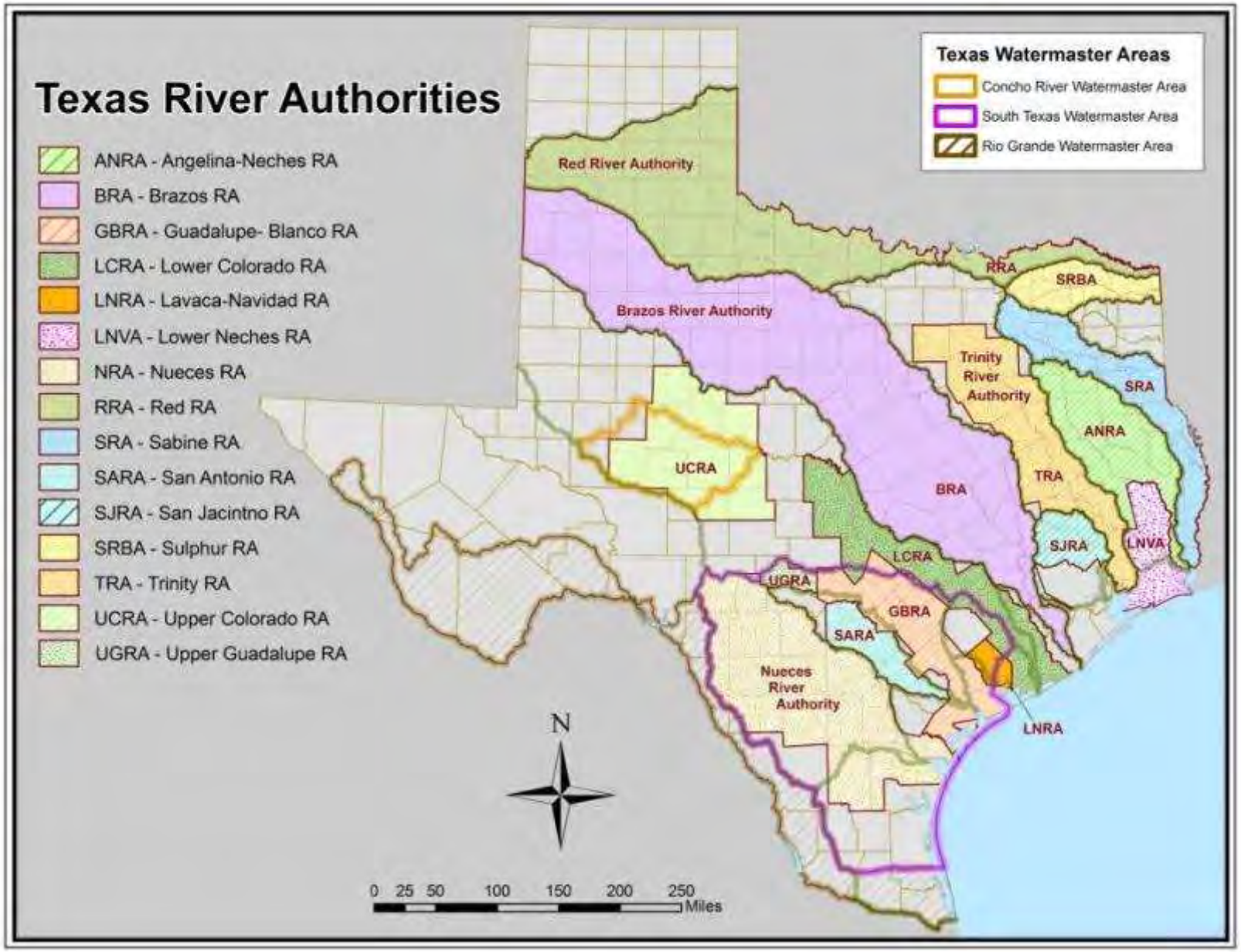
Texas rivers were once truly "rivers of life." As long as Nature was in control, each river system was nourished as an organism, and its business was conducted for all, impartially, on a self-sustaining basis.

Texas has a river unity which invites unified treatment of Texas rivers.



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

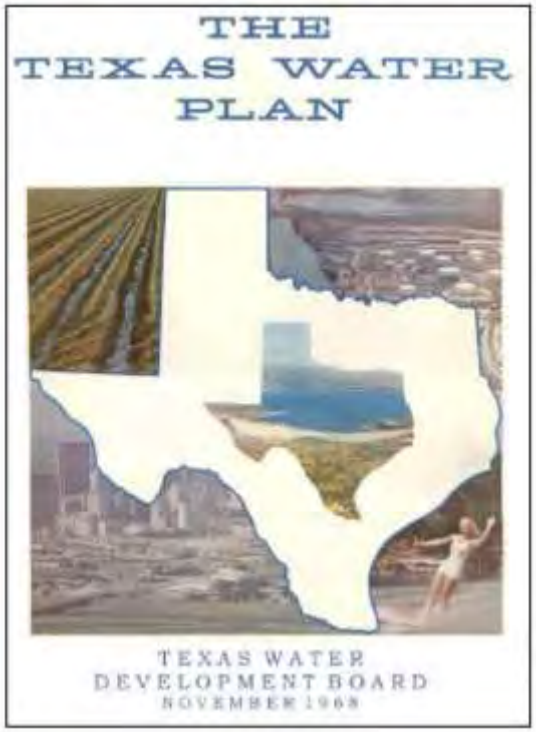


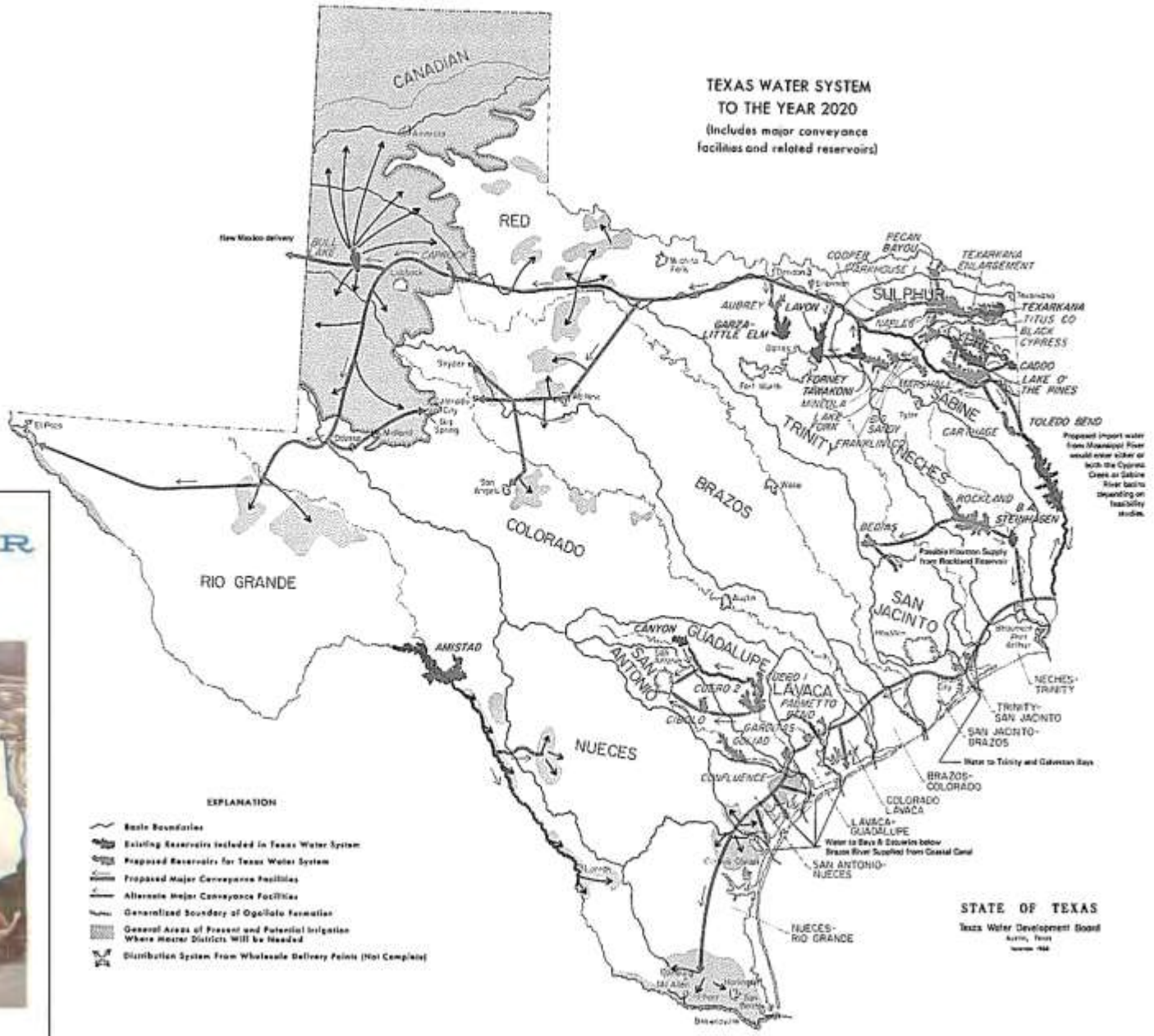

Texas River Authorities
ANRA - Angelina-Neches RA
BRA - Brazos RA
GBRA - Guadalupe- Blanco RA
LCRA - Lower Colorado RA
LNRA - Lavaca-Navidad RA
LNVA - Lower Neches RA
NRA - Nueces RA
RRA - Red RA
SRA - Sabine RA
SARA - San Antonio RA
SJRA - San Jacintno RA
SRBA - Sulphur RA
TRA - Trinity RA
UCRA - Upper Colorado RA
UGRA - Upper Guadalupe RA
Texas Watermaster Areas
Concho River Watermaster Area
South Texas Watermaster Area
Rio Grande Watermaster Area
Red River Authority
Brazos River Authority
Trinity River Authority
Nueces River Authority
RRA
SRBA
SRA
ANRA
TRA
BRA
UCRA
LCRA
SJRA
LNVA
UGRA
GBRA
SARA
LNRA
N
0 25 50 100 150 200 250
Miles


Panhandle (A)
Llano Estacado (O)
Region B
North East Texas (D)
Region C
Brazos G
Region F
East Texas (I)
Lower Colorado (K)
Region H
Far West Texas (E)
Plateau (J)
South Central Texas (L)
Lavaca (P)
Coastal Bend (N)
Rio Grande (M)

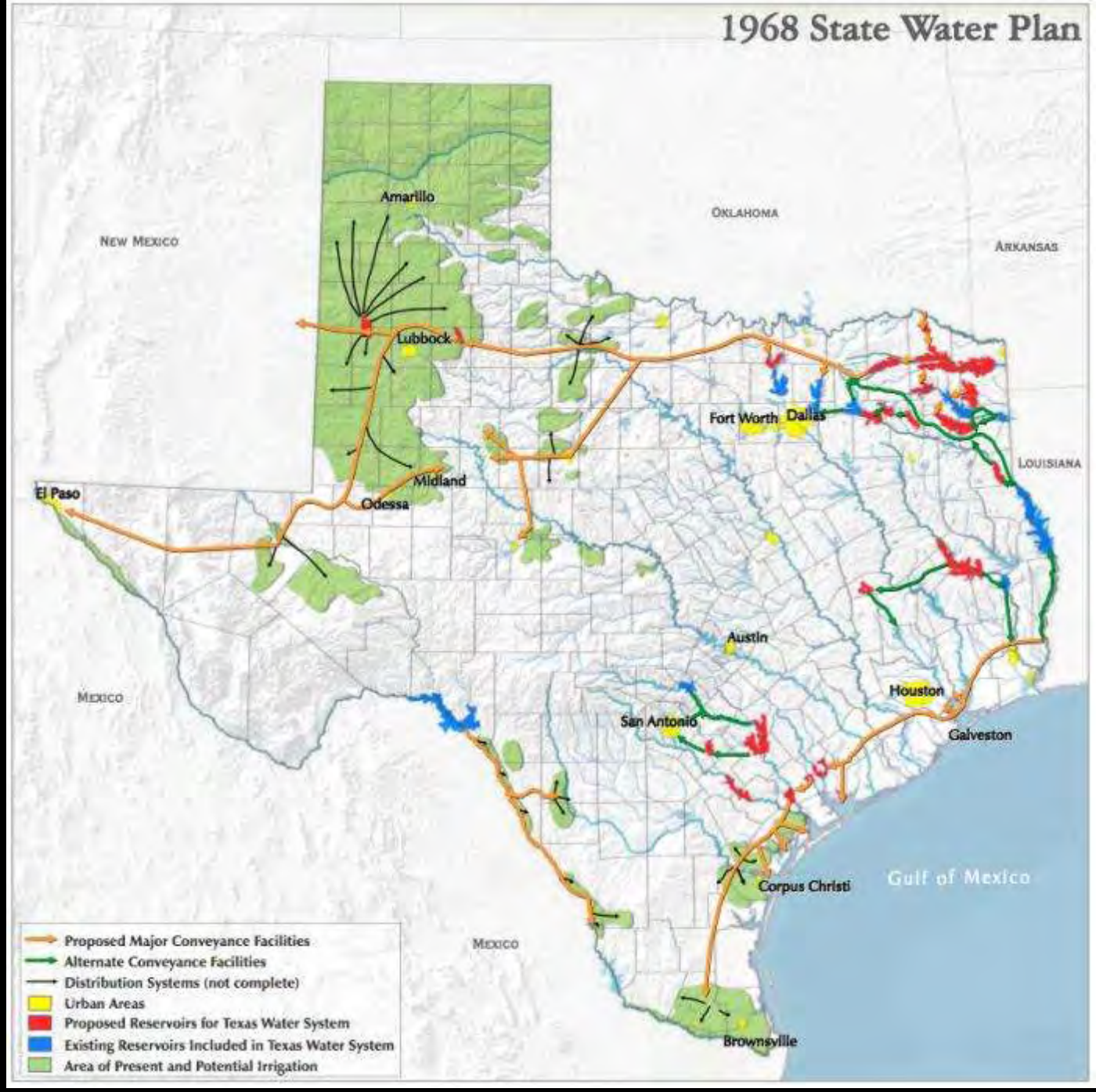
Water 1960s

In 1968 the Texas Water Development Board put forward the Texas Water Plan to prepare for water requirements projected for the year 2020.

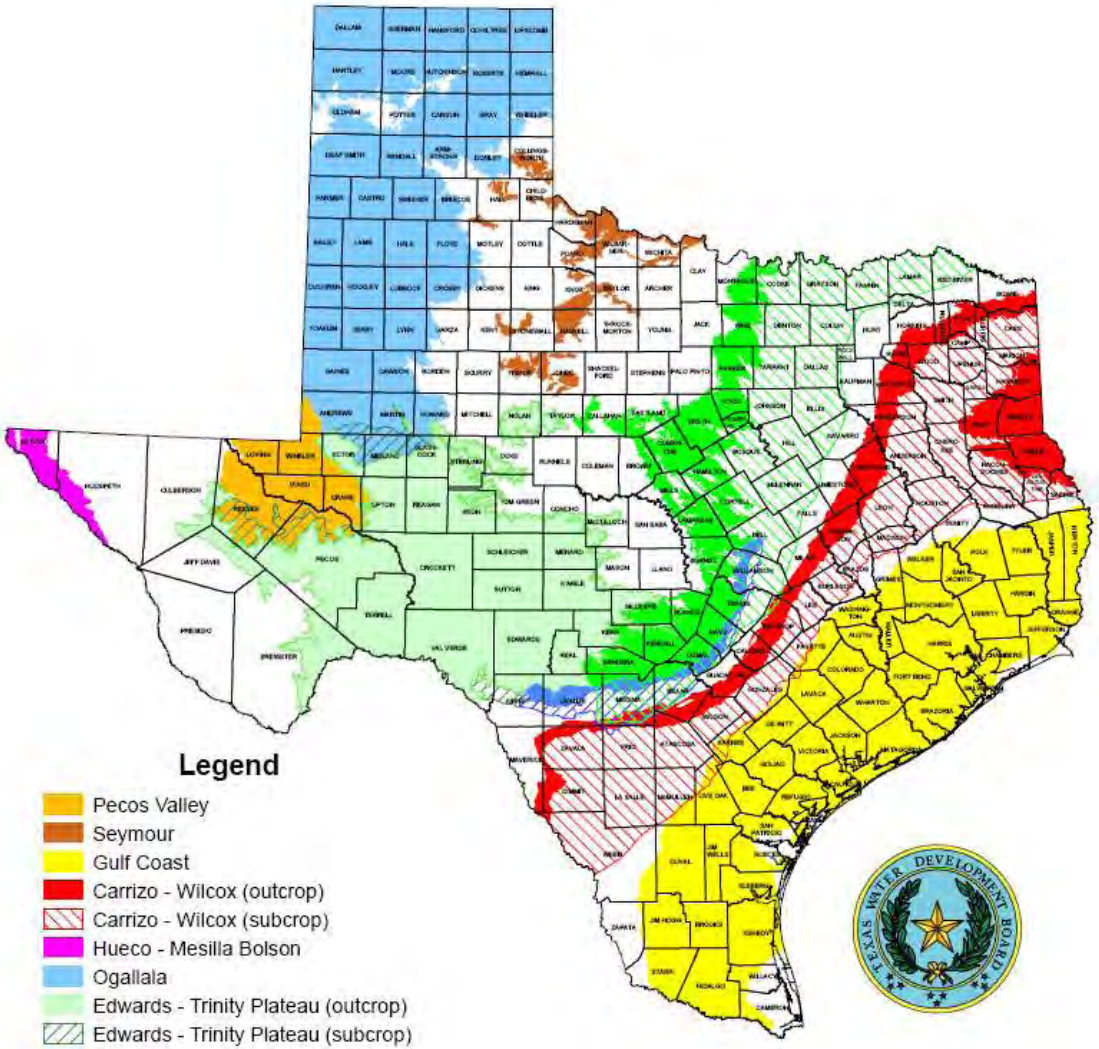




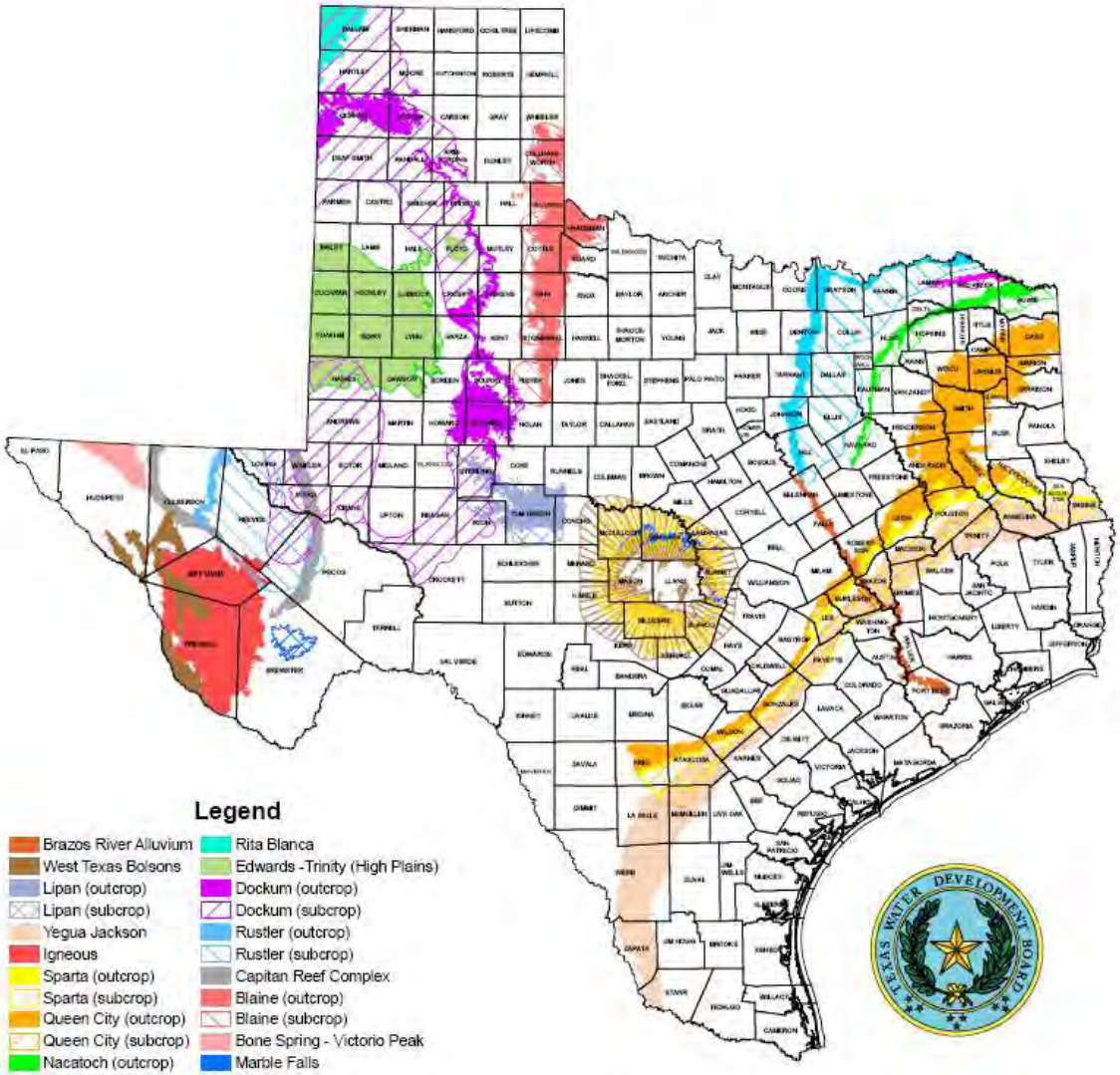
A major obstacle to the plan's implementation was a report issued by the Bureau of Reclamation and the Mississippi River Commission in 1973. The report found that excess water is available from the Mississippi River, but concluded that "while it is Engineeringly feasible to divert water from the Mississippi River to the High Plains, the cost of moving the water would be very high and the environmental impacts to the Gulf area and along the diversion route could be significantly adverse."



Major Aquifers of Texas



Minor Aquifers of Texas



Legend

- Brazos River Alluvium
- West Texas Bolsons
- Lipan (outcrop)
- Lipan (subcrop)
- Yegua Jackson
- Igneous
- Sparta (outcrop)
- Sparta (subcrop)
- Queen City (outcrop)
- Queen City (subcrop)
- Nacatoch (outcrop)
- Nacatoch (subcrop)
- Blossom (outcrop)
- Blossom (subcrop)
- Woodbine (outcrop)
- Woodbine (subcrop)
- Rita Blanca
- Edwards -Trinity (High Plains)
- Dockum (outcrop)
- Dockum (subcrop)
- Rustler (outcrop)
- Rustler (subcrop)
- Capitan Reef Complex
- Blaine (outcrop)
- Blaine (subcrop)
- Bone Spring - Victorio Peak
- Marble Falls
- Marathon
- Ellenburger - San Saba (outcrop)
- Ellenburger - San Saba (subcrop)
- Hickory (outcrop)
- Hickory (subcrop)

NOTE: Chronology by Geologic age.

OUTCROP (portion of a water-bearing rock unit exposed at the land surface)

0 50 100 150 200 Miles

DISCLAIMER
This map was generated by the Texas Water Development Board using GIS (Geographic Information Systems) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of all mapped data are approximate.

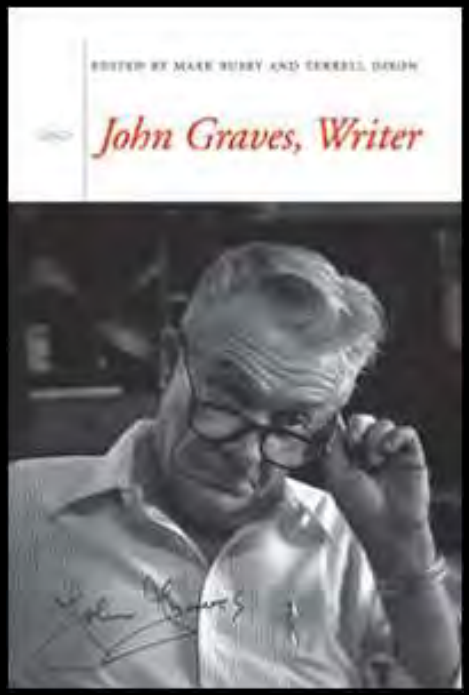
Texas River Protection

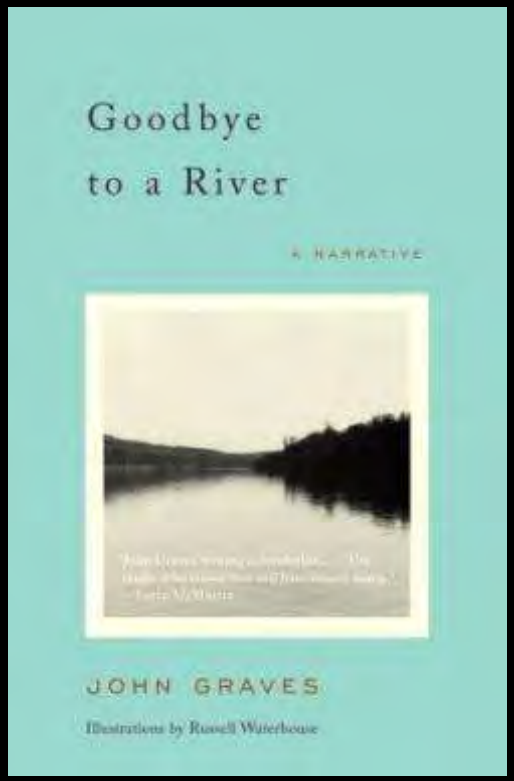
John Graves
1920 - 2013
Goodbye to a River (1960)

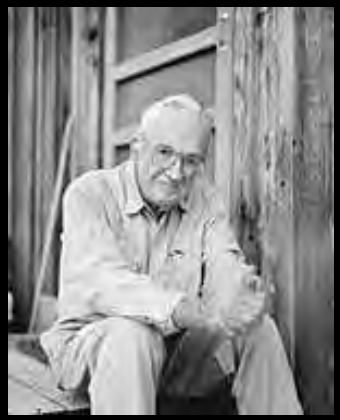
In the spring of 1957 Graves returned home to help care for his gravely ill father. In November of that year, Graves completed a three-week canoe trip down part of the Brazos River that he feared was about to be changed forever by dams.

His narrative chronicle of the trip was first published as a magazine article in *Holiday*, and later Graves added history, philosophy and folklore which resulted in his first major book, *Goodbye to a River* (1960). The book attracted national attention and critical praise for its original style.

One river, seen right, may well be all rivers that flow to the sea…

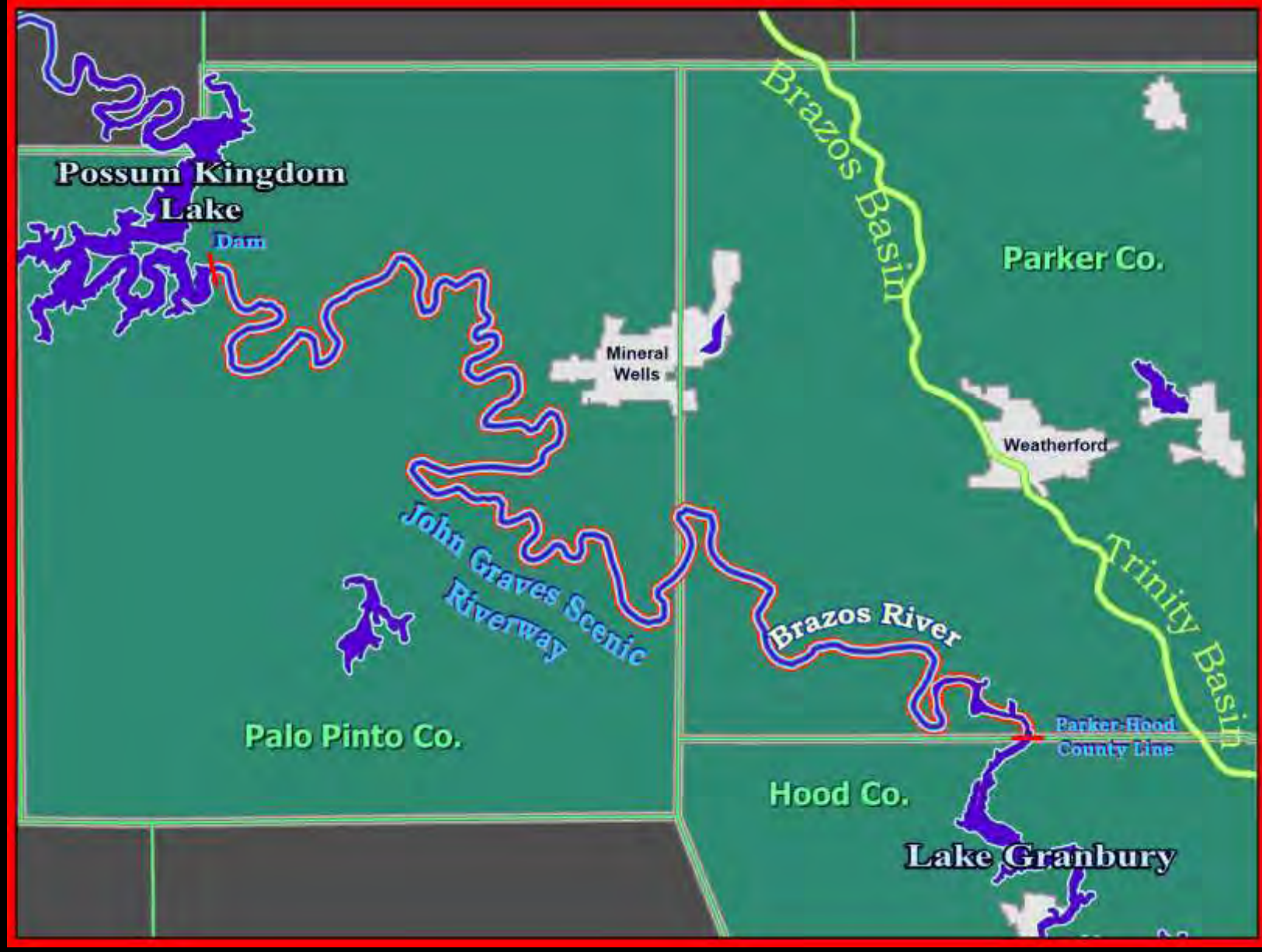






SUMMARY OF FAILED TEXAS RIVER PROTECTION BILLS

Proposed Legislation	# of River Segments Designated	Classification System	Prohibited Uses of Designated Rivers	Riparian Land Protection Mandated	Riparian Landowner Incentives	Funding Mechanisms
1969 Natural Rivers Act	16	All segments designated as natural river areas	Dams and other projects	Yes	Tax incentives for easements	Donations, appropriations
1971 Natural Rivers Act of Texas	1	All segments designated as natural rivers	Not specified in the legislation	Yes	Tax incentives for easements	Gifts, grants
1973 Natural and Scenic Rivers Act	0	All segments designated as natural and scenic rivers	Channelization, clearing/snagging, reservoirs, channel realignment	Not specifically required, but condemnation authorized	Normal riparian activities not affected- no incentives	Gifts, grants
1973 Texas Public Rivers Act	Generally applicable to all navigable inland waterways	Not specified in the legislation	Construction of navigation barriers	Not specifically required, but condemnation authorized	Landowner rights not affected- no incentives	Not specified
1987 Texas Rivers Conservation Act	13	Segments designated as wild, scenic or recreational	Channelization, clearing/snagging, reservoirs, channel realignment	No	Landowner rights not affected- no incentives	Texas rivers conservation fund, donations, watercraft tag fees
1989 Texas Rivers Protection Act	3 with 4 more potential segments to be studied	All segments designated as protected river segments	Channelization, reservoirs, channel realignment	No	Landowner rights not affected- no incentives	Not addressed
1991 Texas Rivers Protection Act	2	All segments designated as protected river segments	Channelization, reservoirs, channel realignment	No	Landowner rights not affected- no incentives	Grants, donations
1993 San Marcos River Protection Act	1	Not specified in the legislation	Channelization, reservoirs, channel realignment	No	Landowner rights not affected- no incentives	Grants, donations
1995 San Marcos River Protection Act	1	Not specified in the legislation	Large scale channelization	No	Landowner rights not affected- no incentives	Grants, donations



113-mile segment of the Brazos River between Possum Kingdom Lake and Lake Granbury

2002

The Real Whole River

A whole river is mountain country and hill country and flat country and swamp and delta country, is rock bottom and sand bottom and weed bottom and mud bottom, is blue, green, red, clear, brown, wide, narrow, fast, slow, clean, and filthy water, is all kinds of trees and grasses and all the breeds of animals and birds and men that pertain and have ever pertained to its changing shores, is a thousand differing and not compatible things in-between that point where enough of the highland drainlets have trickled together to form it, and the wide, flat, probably desolate place where it discharges itself into the salt of the sea.

It is also an entity, one of the real wholes, but to feel the whole is hard because to know it is harder still.