



# Center for Environmental Research at Hornsby Bend



## MISSION

### Urban Ecology and Sustainability

- Community
- Education
- Research

## PARTNERS

- Austin Water Utility
- University of Texas
- Texas A&M University

## RESEARCH AREAS

- Soil Ecology, Sewage Recycling and Reuse
- Hydrogeology of the Alluvial Aquifer
- Riparian Ecology and Restoration
- Avian Ecology



50 YEARS OF BIRDING



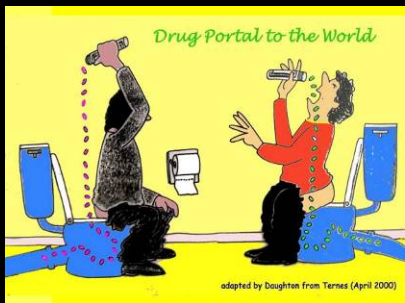
AUSTIN TEXAS  
*Hornsby Bend*  
1959 2009

## Center for Environmental Research at Hornsby Bend



### RESEARCH AREA

- Soil Ecology, Sewage Recycling and Reuse



### RESEARCH AREA

- Avian Ecology



**Hornsby Bend Bird Observatory**  
**2009 Monthly Bird Survey Data**  
 Order available monthly survey data:  
 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009

**Most recent survey:**  
 The April monthly survey on April 11th featured an energetic crew of birders who were rewarded with a nice variety of birds (113 species) throughout the day. Frustrated participants in the morning covered all areas and found 113 species while working thru overcast skies and cooler than expected temperatures. I remained on the property all day and then was joined in the afternoon session by one other birder and we were able to add a few additions (Downy Woodpecker, Sandpiper, 2 Barned Oats, Summer Tanager) to the morning list before getting interrupted by a brief downpour that cut our Phalt Lane/River Trail walk a bit short.

The change of seasons was noted with a few of our winter residents missing or notably lower in numbers, contrasting with the rise in numbers/variety of migrating shorebirds and several newly-arrived summer residents. There were no insect care finds but highlights would have to include: 18 Neotropical Cormorants, 2 Barn Oats, plus a surprising Winter Wren and Spotted Towhee.

The complete list follows:  
 Bill Cooper

### 50 YEARS OF BIRDING



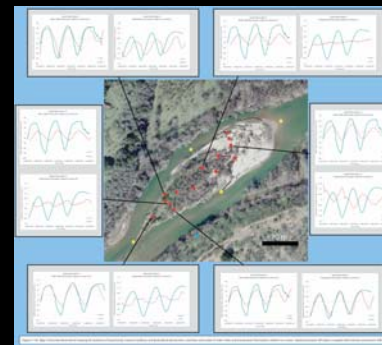
AUSTIN TEXAS  
 Hornsby Bend  
 1959 2009

### RESEARCH AREA

- Hydrogeology of the River and Alluvial Aquifer



Dr. Bayani Cardenas and Dr. Jack Sharp



HYDROLOGICAL PROCESSES  
 (Peer-Review, 2009)  
 Published online in Wiley InterScience  
<http://www.interscience.wiley.com/DOI/10.1002/hyp.7524>

#### Impact of dam operations on hyporheic exchange in the riparian zone of a regulated river

Andrey Hicks Sawyer,<sup>1\*</sup> M. Bayani Cardenas,<sup>2</sup> Ashleigh Bomar,<sup>2</sup> and Meredith Mackey<sup>2</sup>

<sup>1</sup> Department of Geological Sciences, University of Iowa, Austin, TX, USA  
<sup>2</sup> Elbert National Science Program, University of Iowa, Austin, TX, USA

**Abstract:**  
 Dam operations commonly cause large, frequent fluctuations in river stage, which persist for long distances downstream. The stage fluctuations force river water into and out of the banks, defining lateral hyporheic exchange paths. To evaluate the processes, distance and rates of dam-induced hyporheic exchange, we measured water-table elevation, temperature, and specific conductivity along a transect perpendicular to the Colorado River (Austin, Texas, USA), 15 km downstream of the Longhorn dam. Stage fluctuates daily by almost a meter. The daily hyporheic exchange volume per meter of bank is 1.0 m<sup>3</sup>. Dam-induced hyporheic exchange penetrates several meters into the riparian aquifer, while water table fluctuations propagate 70 m into the riparian aquifer. Water chemistry and temperature fluctuate near the channel in response to the flow oscillations. In the absence of dam operations, groundwater would flow steadily through the riparian aquifer towards the river, laterally limiting hyporheic exchange and stabilizing temperature and water chemistry near the channel. Therefore, dam operations fundamentally change the hydrological, thermal, and geochemical dynamics of riparian aquifers and their hyporheic zones. Copyright © 2009 John Wiley & Sons, Ltd.

### RESEARCH AREA

- Riparian Ecology and Restoration

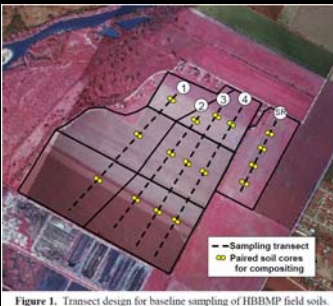
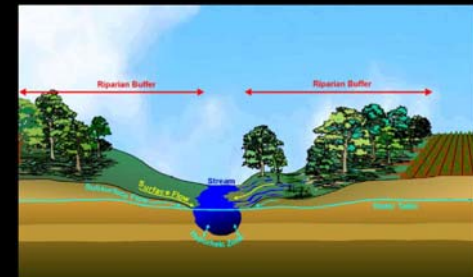


Figure 1. Transect design for baseline sampling of HBBMP field soils.





# Center for Environmental Research at Hornsby Bend



## AWU-CER Lunchtime Lectures May - August 2011

Each talk begins AT NOON Waller Center [625 East 10th Street – between I-35 and Red River] Room 104

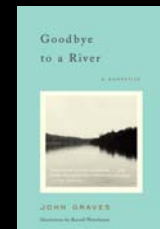
The 1<sup>st</sup> Wednesday of the Month! Free and Open to the Public – bring a lunch and learn

### Rivers: Myth, Meaning and Culture in America

Over the next four months, I will put on my Cultural Geographer's hat and draw on my English major to look at the meaning of rivers and waterways in American and Texan literature. The four lectures will descend in scale from an overview of American rivers and American literature to Texas and finally to Austin. Join me for a journey down rivers through literature, the first Wednesday of every month.

May 4 Noon-1pm

The Myth of the River: American Rivers and American Art



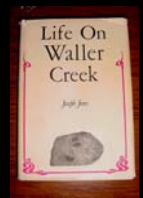
June 1 Monday Noon-1pm

Texas Rivers: On the Brazos with John Graves and "Goodbye to a River"



July 6 Monday Noon-1pm

Texas Rivers: On the Colorado with Roy Bedichek and "Karankaway Country"



August 3 Monday Noon-1pm

Life On Waller Creek – The Legacy of Joseph Jones

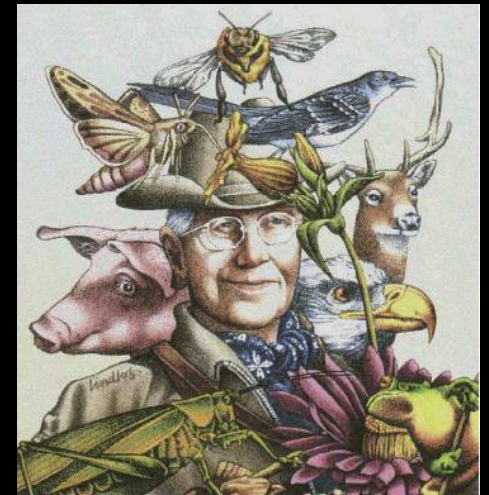
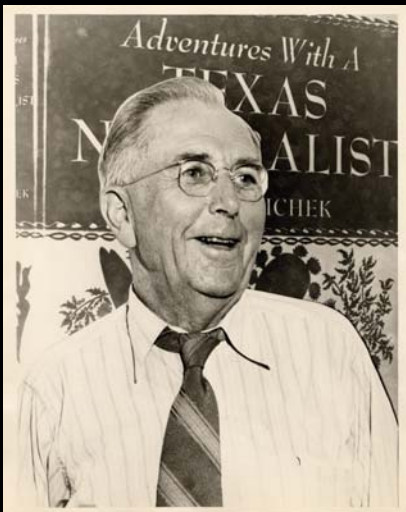
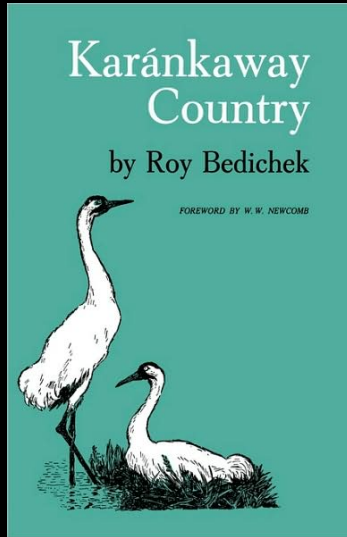


# On the Colorado with Roy Bedichek "Karankaway Country"

Kevin M. Anderson

Austin Water Utility

Center for Environmental Research



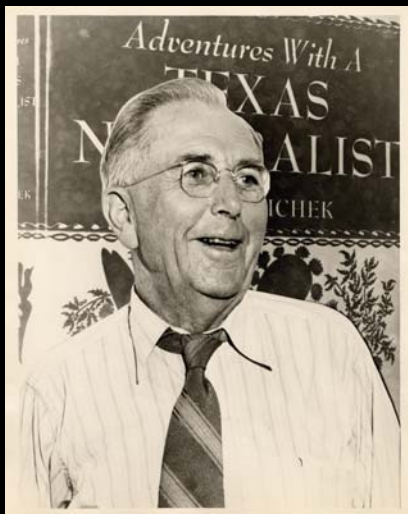


From John Graves, *Myself and Strangers*

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?



## Who was Roy Bedichek?

Born in 1878 as the frontier dissolved and buffalo almost disappeared, during his lifetime he experienced the great unraveling of Texas ecosystems and the growth of urban Texas.

Born in a log cabin in Illinois, he moved when he was five to his father's homestead in Eddy, Texas. In 1897 he became a student at the University of Texas. In 1903 he received a B.S. degree and in 1925 an M.A. He was a reporter for the Fort Worth *Record* (1903-04) and taught in high schools in Houston (1904-05) and San Angelo (1905-08). In 1908 he homesteaded 320 acres in New Mexico. He served as secretary of the Deming, New Mexico, Chamber of Commerce (1908-13) and edited the *Deming Headlight* (1910-12).

He married a student he met at U.T., Lillian Greer, in 1910. In 1914 he began working for the University Interscholastic League in the Extension Division on the Little Campus, serving as Director from 1922 to 1948.





He shared a love of Texas with two faculty members, **J. Frank Dobie** of the English Department, and **Walter Prescott Webb** of the History Department. "Dobie writing of its folklore, Webb of its frontier history, and Bedichek of its birds, its animals and native plants, and of the way of life of its people"





## PHILOSOPHERS' ROCK

Philosophers' Rock, or "Bedi's Rock", was the name given to a shelf of limestone that once rose out of the glittering water at the edge of Barton Springs. It was here, on hot summer days, that the naturalist ROY BEDICHEK and the chronicler and folklorist J. FRANK DOBIE sat in the sun and talked for hours about everything from classic works of literature to tall tales of lost Spanish treasure. Their great friend, the historian WALTER PRESCOTT WEBB, was not a swimmer, but he would often join in the talk. These three—Dobie, Bedichek, and Webb—strove to create a vibrant and distinctive intellectual climate in Texas, and their influence reached far beyond the state. This monument has been erected to celebrate their friendship, their enlightened spirit, and their love for Barton Springs.

*Sculpture by Glenna Goodacre*

*Site setting by Stephen K. Domigan*

Presented to the citizens of Austin, Texas, on  
November 21, 1994, by Capital Area Statues, Inc.

C. A. S. T. Board of Directors

Marcia Ball

Amon Burton

Mary Margaret Farabee

Evelyn Sierra Hammond

Stephen Harrigan

Bill Wittliff

Lawrence Wright



I wish you might be here and go with me on a sunny afternoon to Mt. Bonnell or up Barton Creek. Everywhere it is beautiful. I think we could settle most of the world's problems to our satisfaction. And a thousand years from now friends such as we will wander over these same hills inhaling the same scents and feasting their eyes upon the same beauty, and maybe the identical matter that composes our bodies now will nourish the worm that feeds the mockingbird whose songs will go thrill out over the green fields.

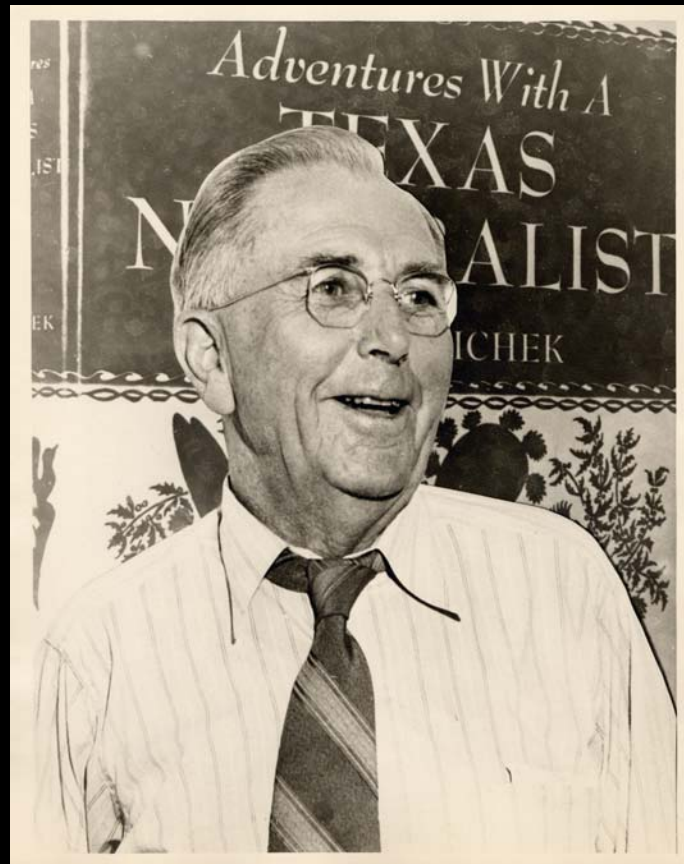
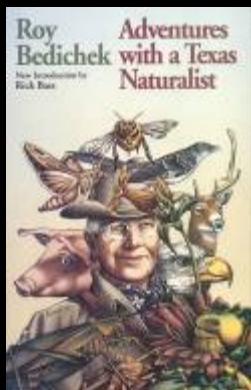
Roy Bedichek, 1878-1959



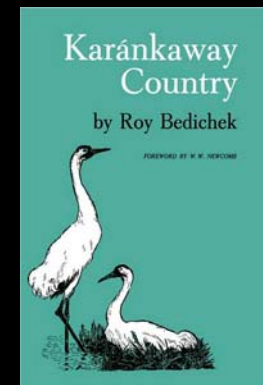


All his books were written at the end of his life. Webb and Dobie arranged for him to spend a year before his retirement writing his first book at Webb's Friday Mountain ranch, about sixteen miles southwest of Austin. That book, *Adventures with a Texas Naturalist*, was published a year later (1947), followed by *Karánkaway Country* (1950) posthumous *The Sense of Smell* (1960).

**1947**



**1950**





Without ever having been seriously ill, he died suddenly of heart failure on May 21, 1959.

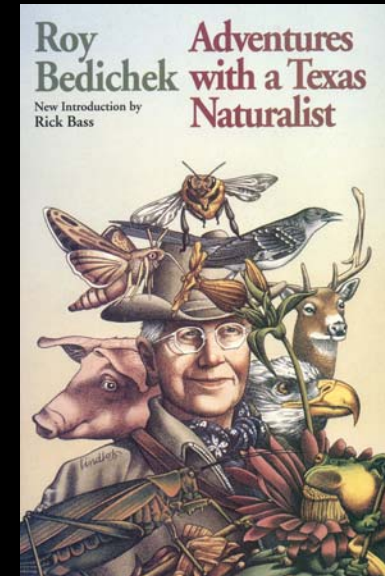


## Roy Bedichek's Vanishing Frontier

Rob Tranchin, Co-Producer/Writer/Director

Tranchin is an executive producer at KERA, where he is also a national Emmy Award-winning producer, writer and director.

Tranchin wrote, produced and directed *Roy Bedichek's Vanishing Frontier*, a one-hour documentary about the life of a Texas naturalist that aired nationally on PBS in April 2003.





## *Karánkaway Country* - An Exposition of a Conservationist Philosophy

### Questions for Literary ones

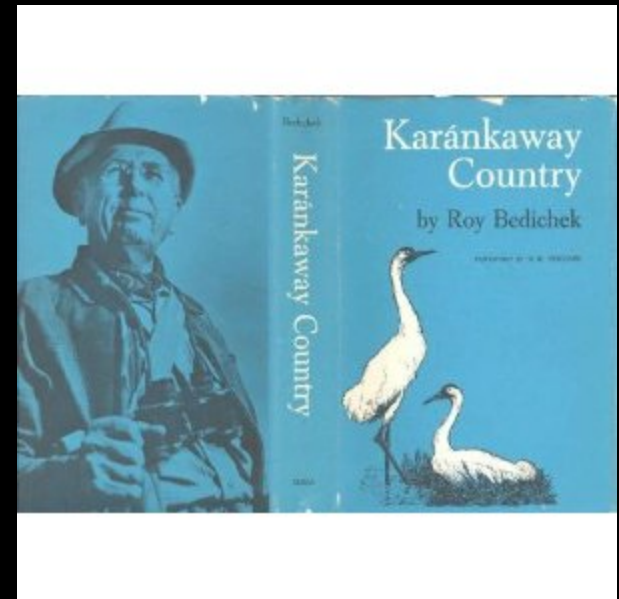
- What kind of book is this?
  - Nature writing?
  - Natural Philosophy?

### Questions for Philosophical/Geographical crowd

- What is our proper relationship to Nature?
- What does it mean to “know” Nature?
- Is science the best way to understand Nature?

### Questions about Natural Resource Management and Rivers

- Is “scientific” management the best kind of management?
- What is the proper unit for river management? Part or Whole?



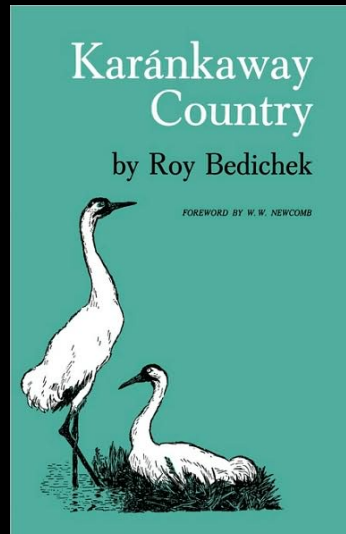
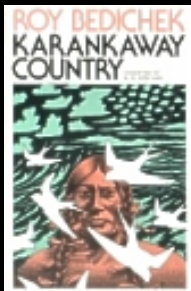
## *Karánkaway Country* - An Exposition of a Conservationist Philosophy

Principle – the proper relationship between humans and the rest of nature [Nature] is collaboration

Principle – Nature is about biodiversity - humans have an obligation to the rest of nature to protect its diversity

Principle – natural systems [rivers, prairies, etc.] should be managed as wholes and not piecemeal [holistic resource management]

Principle – land is held only in usufruct by the living





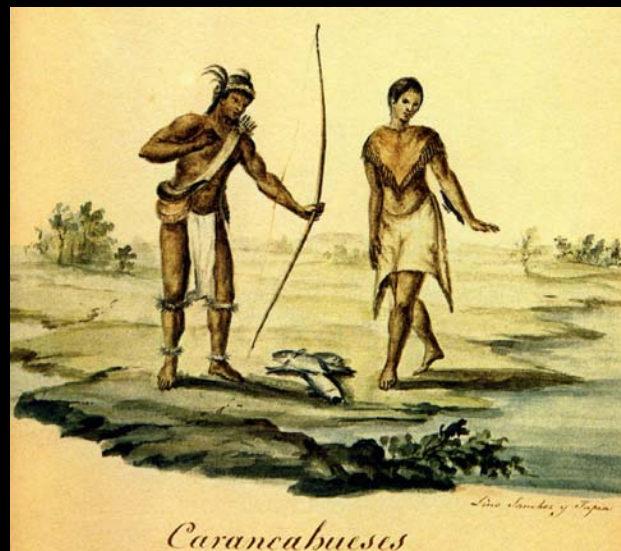
## Karánkawa Indians

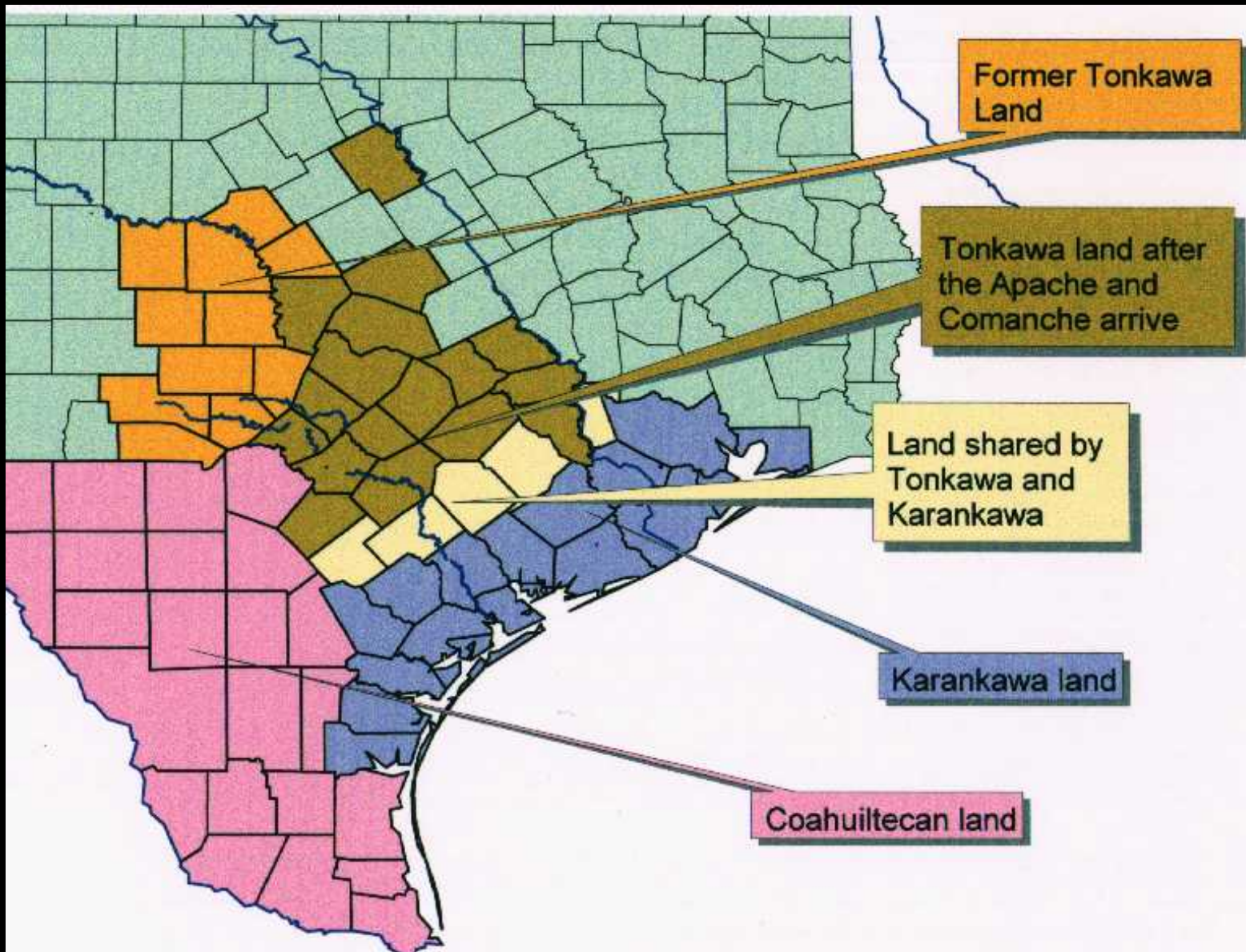
They inhabited the Gulf Coast of Texas from Galveston Bay southwestward to Corpus Christi Bay. All spoke a little-known language called Karánkawa, and only about 100 words of that language have been preserved. The significance of the name Karánkawa has not been definitely established, although it is generally believed to mean "dog-lovers" or "dog-raisers." That translation seems plausible, since the Karánkawas reportedly kept dogs that were described as a fox-like or coyote-like breed.



### Bedichek

“The Karánkaways are gone. Only bitter memories of them remain. In the minds of our people they are eternally damned, largely because they refused a culture we offered...We won the material war, exterminating the enemy. We also won the war of words, that is the propaganda war, establishing them as fiends in human form and ourselves in posture of nobly extending a succoring hand which they obstinately refused.” 17





**The Karánkawa Country**



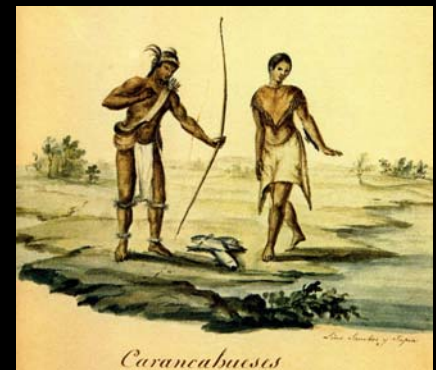
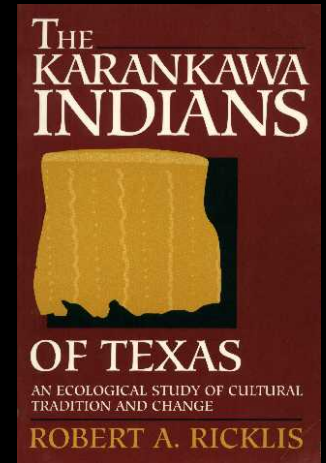
Contrary to popular myth, the Karankawas were not savage cannibals and scavengers. In fact, they met both early French and Spanish explorers and colonists in a friendly manner (though were quick to retaliate when they were attacked), and had an intimate knowledge of their environment and its resources.

Early records about the Karankawa are in many ways sketchy, but enough was written down to give a general picture of the native lifeway. These Indians lived in large fishing camps of several hundred people during the fall and winter, and broke up into small bands of 50 or so people who set up camps along rivers and creeks during the spring-summer season (Ricklis 1992, 1996).

The bays and lagoons of the coast offered a rich harvest of fish to the Karankawa, and large huts were devoted to storage of fish. The abundance of fish provided the economic basis for the congregation of large groups of people during the fall and winter.

Indian houses were dome-shaped, pole-frame structures covered with hides or mats. Dugout canoes were made for transportation on the rivers, bays and lagoons behind the barrier islands, but were unsuited for travel in the open sea. Hunting, and even some fishing, was with carried out with the bow and arrow (Newcomb 1983).

Ricklis, R. A. 1996. *The Karankawa Indians of Texas: An Ecological Study of Cultural Traditions and Change*. Austin, TX: University of Texas Press.







## A Book of Natural Philosophy

- Bedichek's questions about knowledge and proper ways of "dwelling"

Attitude toward science – nature lover, against nature faking

- Throughout the book, an ambiguous use of science – his own observations of nature and culture but then the slide into a scientific argument for river "system" management at the end of the book

- "...I think it is never amiss to observe a little on one's own account, and apply common sense to a given situation, no matter what Science, pure or applied, may say." 58

Walt Whitman

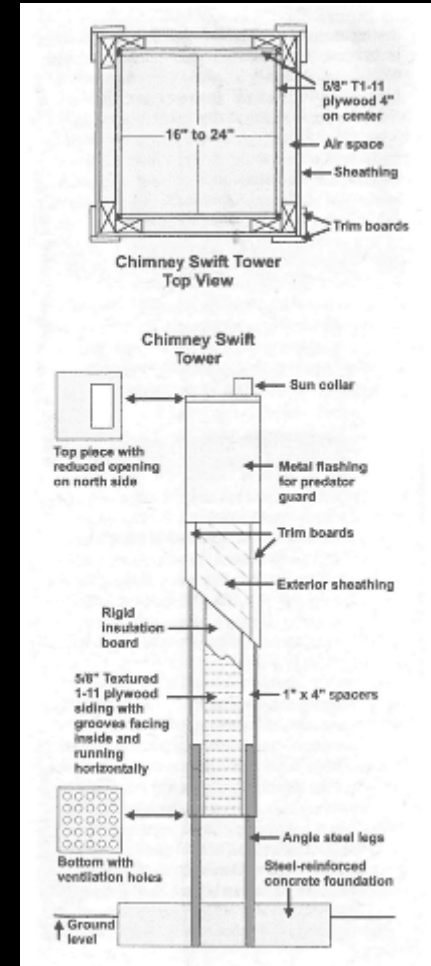
Gentlemen, to you the first honors always!  
Your facts are useful, and yet they are not my dwelling,  
I but enter by them to an area of my dwelling.

The Question of proper Dwelling – engaging the world



# Birds

- Whooping cranes, Attwater's Prairie chicken, Scissor-tailed flycatcher, Chimney swift, meadow lark
- chimney swift towers
- Austin moonlight towers kill birds
- Migration
- The first nesting chimney swifts in Austin 1924 at UT football stadium 188





## A Wildlife refuge – examines defects of the nature refuge/preserve and our Idea of Nature

I found a generous naturalist here who was quite disturbed over trapping, shooting, and otherwise interfering with what he chose to call, with great reverence, “the balance of nature.” The trouble is that the “balance of nature” is a false figure of speech, and we find little in reality corresponding to the popular conception of “a balance.”

Nature red in tooth and claw, that is, competitive; or Nature at peace, that is co-operative; or Nature in alternating moods, or, at one and the same time, competitive and co-operative (her normal condition), is only in rare instances in balance for any extended period. 41

Once man enters, there is no such thing as letting “Nature take her course.” 72

Denevan, William M., *The Pristine Myth: The Landscape of the Americas in 1492*.  
*Annals of the Association of American Geographers*, Vol. 82, No. 3. (Sep., 1992), 369-385.

Worster, Donald. *Nature's Economy: A history of ecological ideas*. Cambridge: Cambridge Univ. Press. 1977.



## Karánkawa Country - An outdoor book

Camping, living, waste...



In a 1931 automobile Bedichek drives 10,000 miles a year, sleeping out, cooking his meals over an open fire. When not on the move, he holes up in his Friday Mountain hermitage and writes about birds.

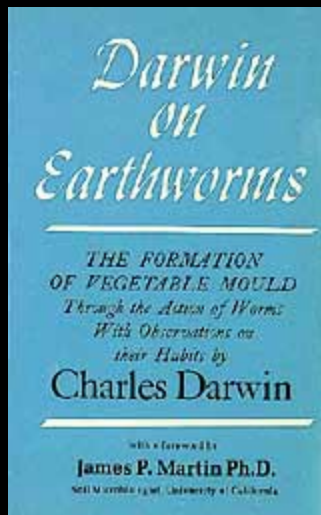
From the Saturday Evening Post October 1948 "The Lively Hermit of Friday Mountain"



Waste is no longer “waste” as it joins the current of all natural things, entering upon that joyous alchemic process by which natural forces transmute your most scorned offscourings into the gold of new life. Shallow internment in the sand is far better than burning and better than burying so deep as to be out of immediate reach of those agencies which are busy with the important work of manufacturing humus.

Also, the beneficent worms rejoice; and remember that in each consecrated spot which receives your refuse, next spring’s vegetation will look up with a greener, healthier visage. “I sometimes think that never blows so red the rose,” et cetra.

You may say that your camp castings are but mites lost in an infinitude of sterility. But not so fast. Darwin himself computed the castings of earthworms at six hundred pounds per acre, and so why scorn one’s own contribution, certainly mammoth by individual comparison. Besides, this procedure may be tested and approved by Kant’s famous principle, which is made by him the very bedrock foundation of morality: *Act only on that maxim whereby thou canst at the same time will that it should become a universal law.*



We look with unjustified scorn upon the use of “night soil” by “inferior people” in the fields and gardens, but ignore the pollution to no purpose of our own rivers with millions of tons of sewage, and smell without any conviction of sin the city incinerator doing its deadly work. “How canst thou say, Brother, let me pull out the mote that is in thine own eye, when thou thyself beholdest not the beam that is in thine own eye?”

Every citizen knowing the polluting destiny of city sewage and its general annihilation as fertilizer should have a feeling of guilt that the monstrous system is perpetuated without his own loud and insistent protest.

All this, of course, is for the consumption of the camper during his catechumenate.

pp. 115-6



In a 1931 automobile Bedichek drives 10,000 miles a year, sleeping out, cooking his meals over an open fire. When not on the move, he holes up in his Friday Mountain hermitage and writes about birds.





## Bedichek on Natural Resource Management

Principle – the proper relationship between humans and the rest of nature [Nature] is collaboration

Principle – Nature is about biodiversity - humans have an obligation to the rest of nature to protect its diversity

Principle – natural systems [rivers, prairies, etc.] should be managed as wholes and not piecemeal [holistic resource management]



18

SHEEP AND GOAT RAISERS' MAGAZINE



A typical sheep shearing scene in West Texas. The shearer is a twenty drop machine, ten drops on each side. Photo taken on E. F. Noelke's ranch not far from San Angelo.

## Land management – 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

known as wolf-proof pastures, dispensing with the uncertain and unsatisfactory help of Mexican herders, and reducing the expense of caring for their flocks and herds by a very large sum.

**Wolf-Proof Fences Very Essential.**


It has been demonstrated that sheep and goats turned loose in wolf-proof pastures do better in every way, raise better crops of lambs and kids, and are heartier and thriftier, than where they have been herded on the

mercial enterprise, as well as others which are growing up in connection therewith.

### San Angelo As a Sheep and Goat Market

By S. W. MARCH, of March Bros.

As San Angelo is conceded to be the greatest inland



**The Highest priced West Texas Angora goat ever sold in the Southwest. It is registered and brought \$3,480 at the annual convention of the Sheep and Goat Raisers' Association of Texas, held in Del Rio, June, 1921. Mr. Bob Martin of Del Rio, Mr. Bob Davis of Rio Frio and Mr. John A. Ward of Sonora are the gentlemen in the picture.**

range, as was the former custom, and during late years, it has been the effort of every sheep and goat man to provide this safeguard of wolf-proof fences and pastures; and by so doing, they are enabled to increase their flocks in numbers, reduce the expense of caring for the same, and increase the profits to be derived therefrom in proportion as the expense is reduced.

The time is coming, in my opinion, when San Angelo will be a much larger and more fruitful concentration

wool and mohair market in the United States, if not in the world. It follows as a natural sequence that it is the central West Texas shipping market for sheep and goats.

The dominant stock element on the large and small ranches, which lie within the trade territory of San Angelo, is sheep and goats. Here, over this broad area of pasturage, can be found many different breeds of sheep and goats, the Delaine and Rambouillet predominating among the sheep, while the Angora is supreme among









## After several Centuries -Timgad failed



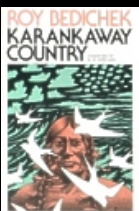
Figure 9. The ruins of Timgad—an ancient Roman city built during the first century A.D. The few huts seen in the center background now house about 300 inhabitants, which is all the eroded land will support. Note that the eroded hills in the background are almost as desolate as the ruins of the city.

Lost topsoil and water supply

## Scientific Management and Nature – Wildlife Refuge, 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 and 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





## Bedichek - Colorado River Raft

“As settlements of whites pushed up these rivers, particularly up the Colorado and its tributaries, slashing the timber out of the bottoms, tearing from the banks of streams the retarding vegetation Nature had placed there for a purpose, leaving in their greed for 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 in 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.” 233

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



## Soil – dust and silt

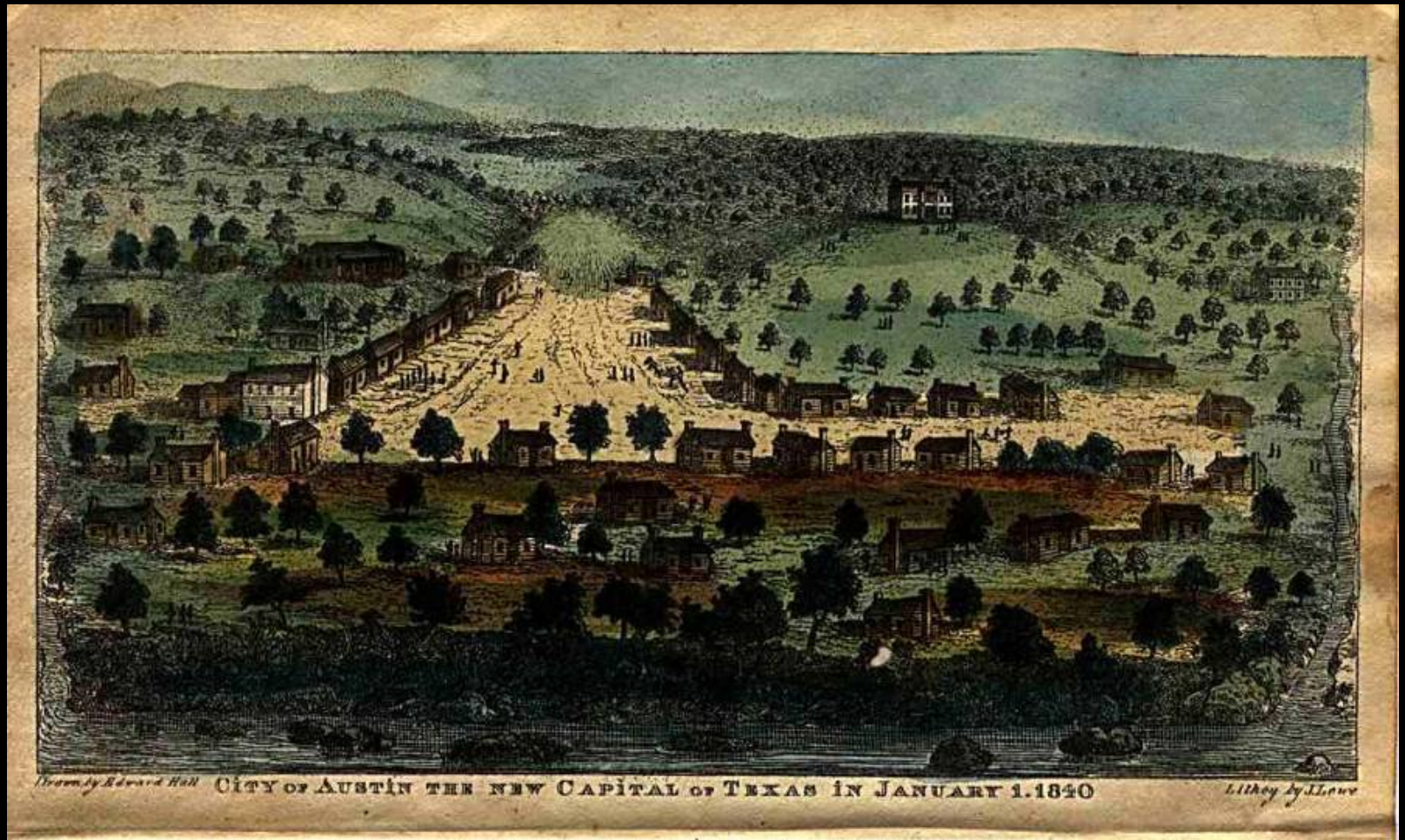
### Chapter 4 - Dust from plowing and clearing on the west Texas plains



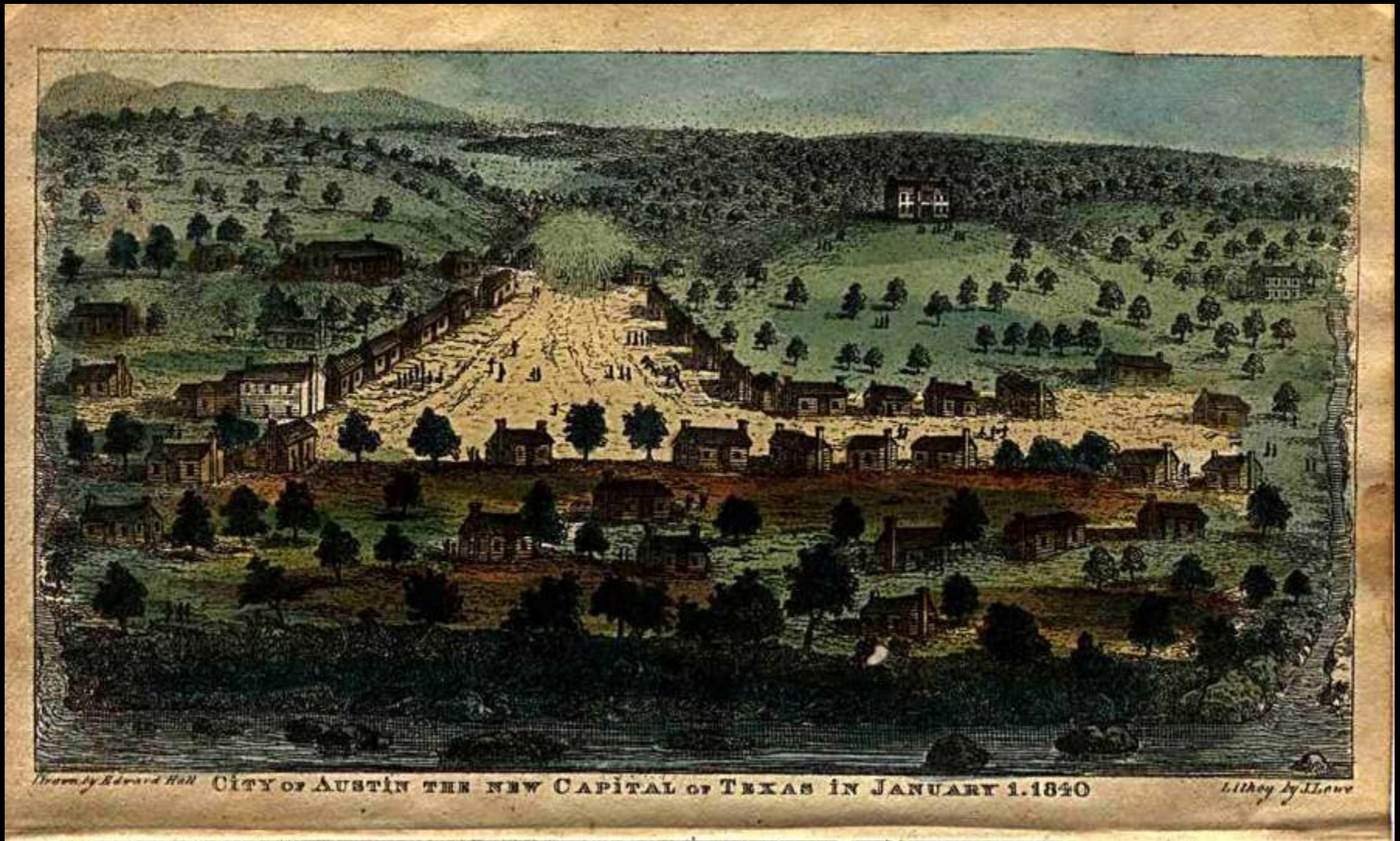
Silt is soil in suspension usually on its way to where it has no business. 244

## A Cultural Landscape - Anglo Settlement along the Colorado

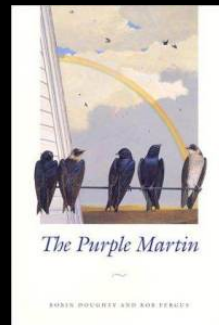
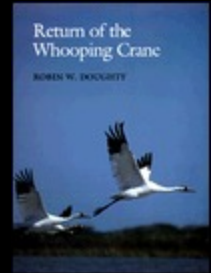
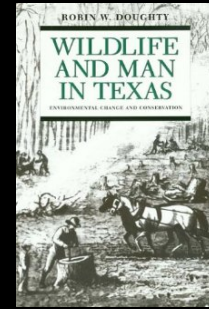
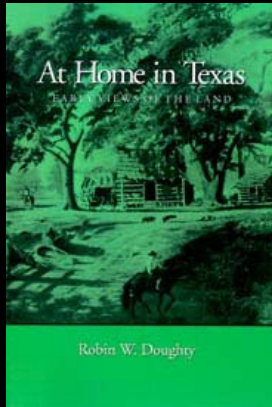
Transforms the landscape both real and imagined





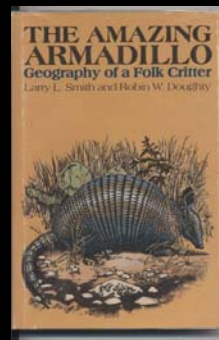
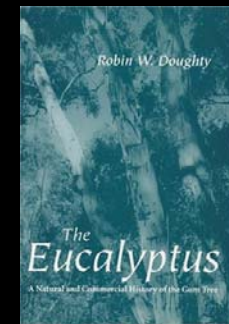


From wilderness to garden – Central Texas as the “middle ground” of Texas – a Mediterranean parkland  
Robin Doughty, At Home In Texas: Early Views of the Land Texas A&M Press, 1987.



Robin Doughty is a professor of geography at the University of Texas at Austin, where he teaches and researches in the areas of cultural geography, historical ecology, biogeography, endangered species.

He has also been a prolific author about the Texas environment, writing such books as The Purple Martin, Return of the Whooping Crane, Endangered Wildlife in Texas, The Mockingbird, At Home in Texas: Early Views of the Land, The Amazing Armadillo: Geography of a Folk Critter, Wildlife and Man in Texas.

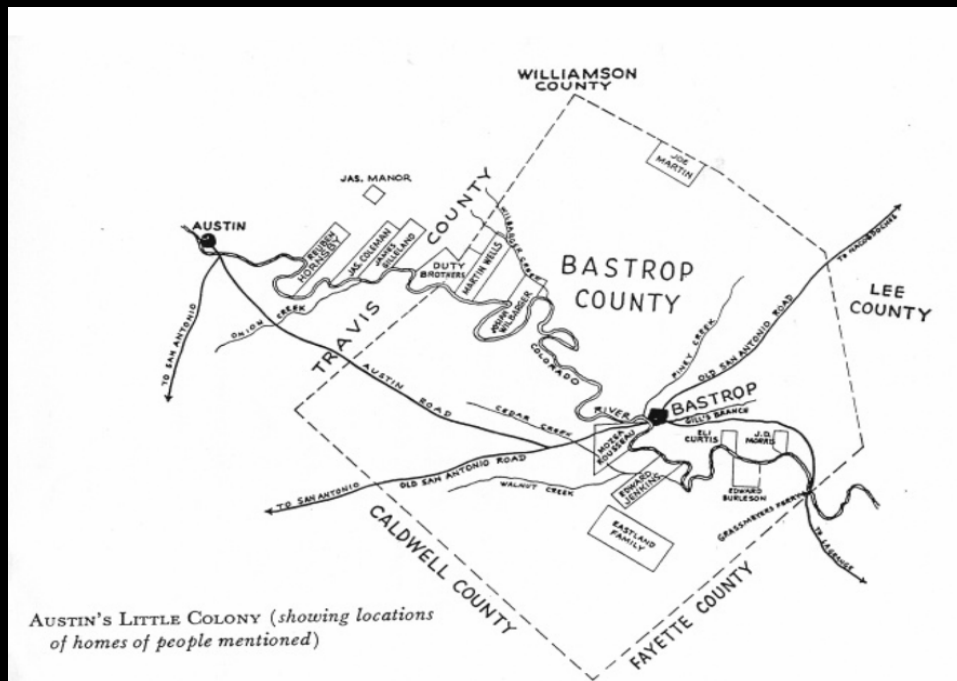




## Stephen F. Austin describing the Colorado River near Bastrop 1821

“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.”

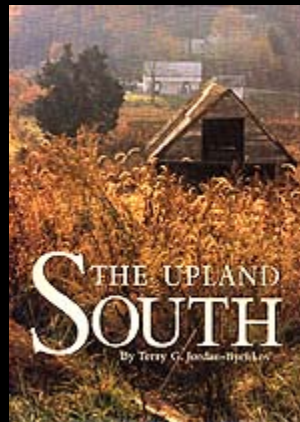
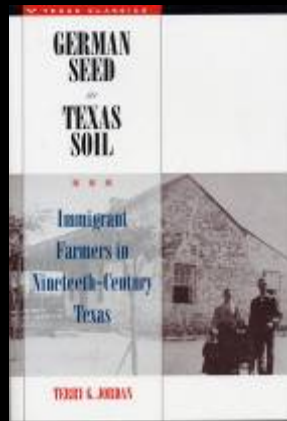




# ANTECEDENTS OF THE LONG-LOT IN TEXAS\*

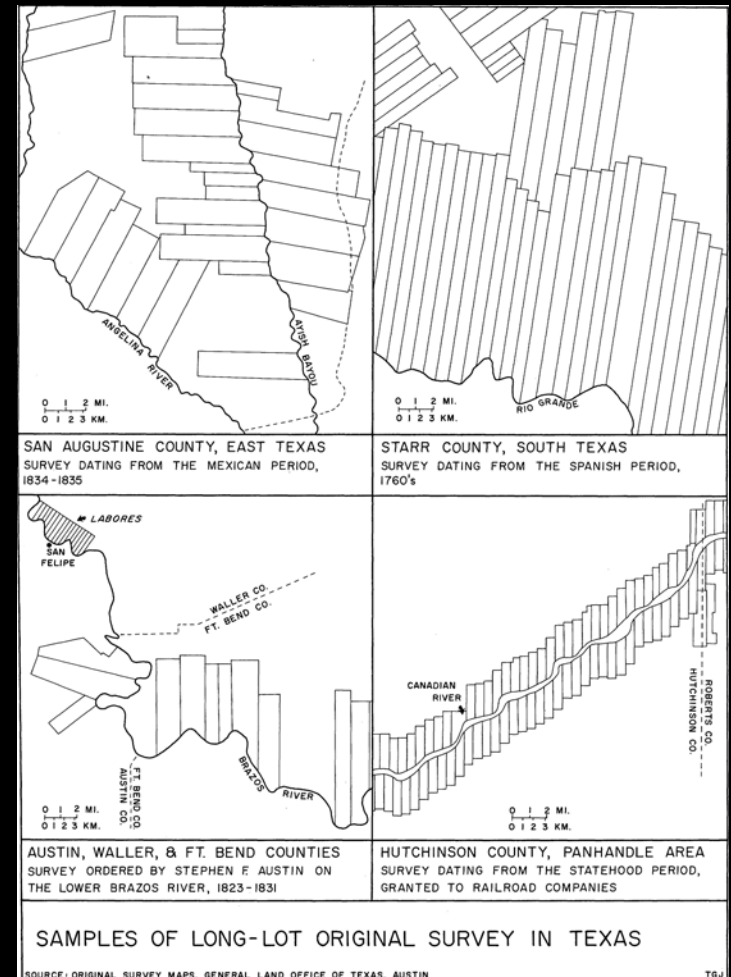
TERRY G. JORDAN

**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.*



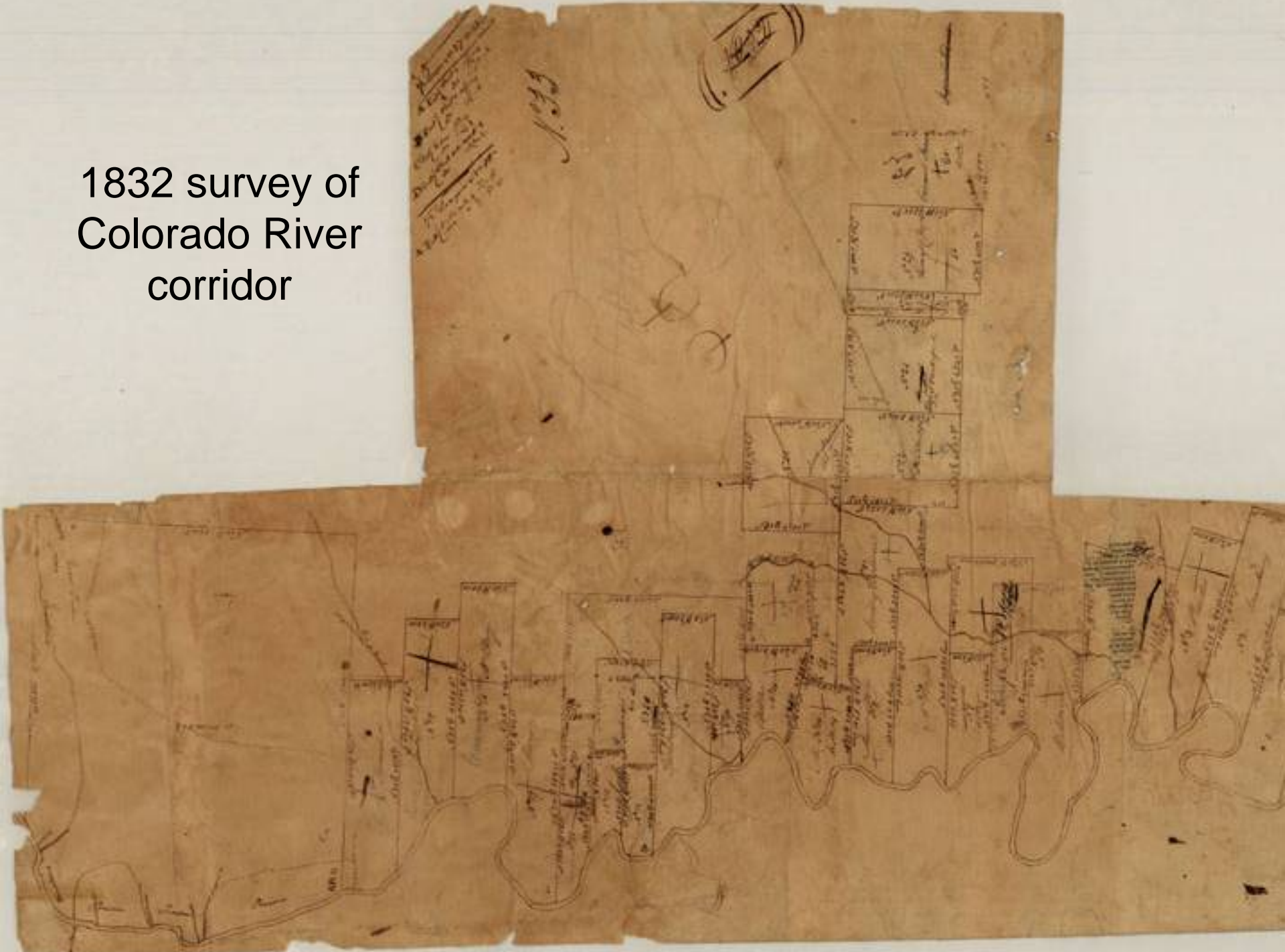
# Terry G. Jordan 1938 – 2003

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





1832 survey of  
Colorado River  
corridor





## Bedichek and the Colorado River

“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.” 18

He loved the river ever since as a little boy of the blackland prairies, he made a covered wagon trip with his family for a month every summer to camp on the tree-covered hills along the Colorado River west of Lampasas.



Problem of river terminology – mouth of the river, head of a river

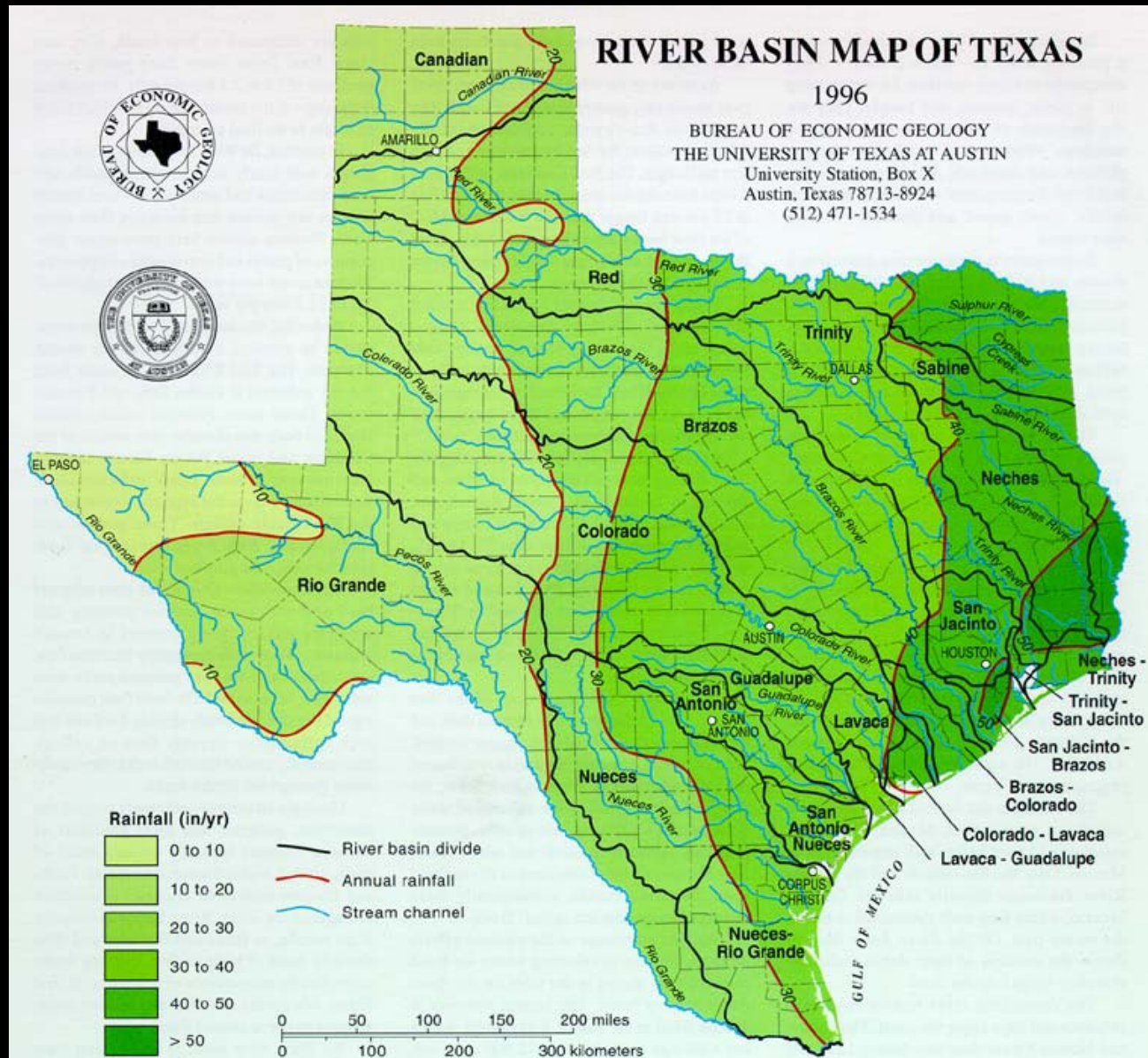
“I think that ancient misnomer ‘mouth,’ which we use to designate the place where a river empties, has done the cause of conservation incalculable harm. Our river imagery is muddled at its source. We speak of the head of a river, but there is no mouth in the head. That orifice in our curious anatomy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

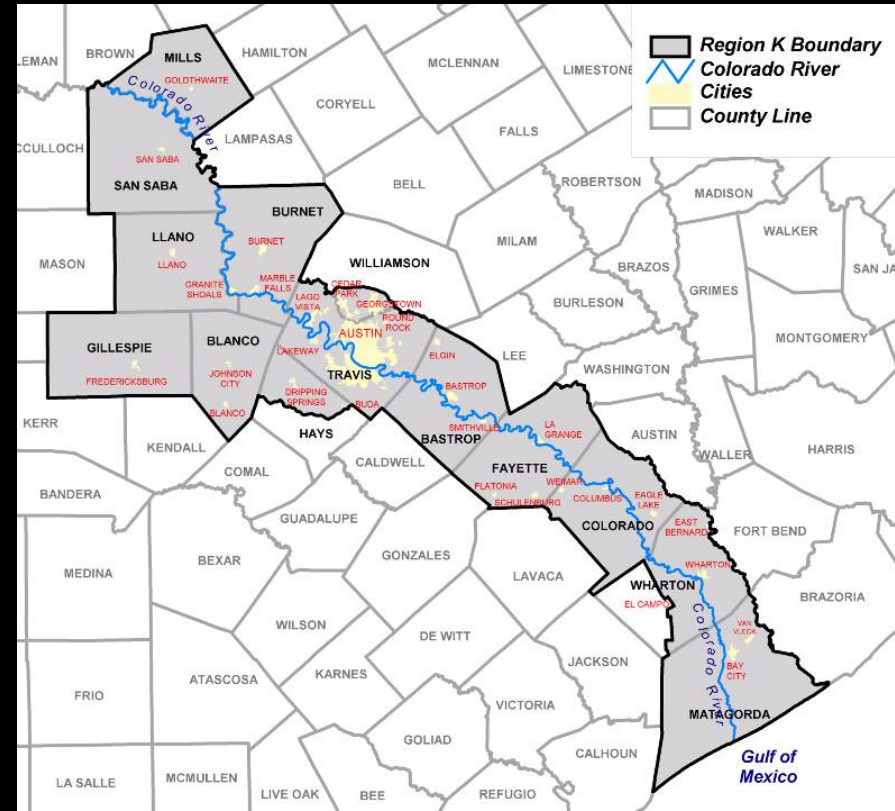
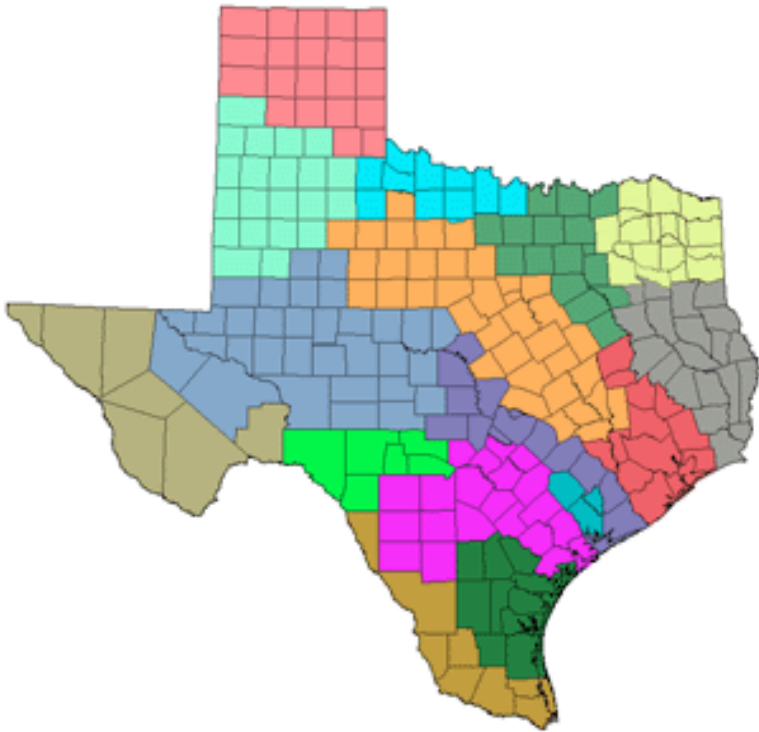
233-4





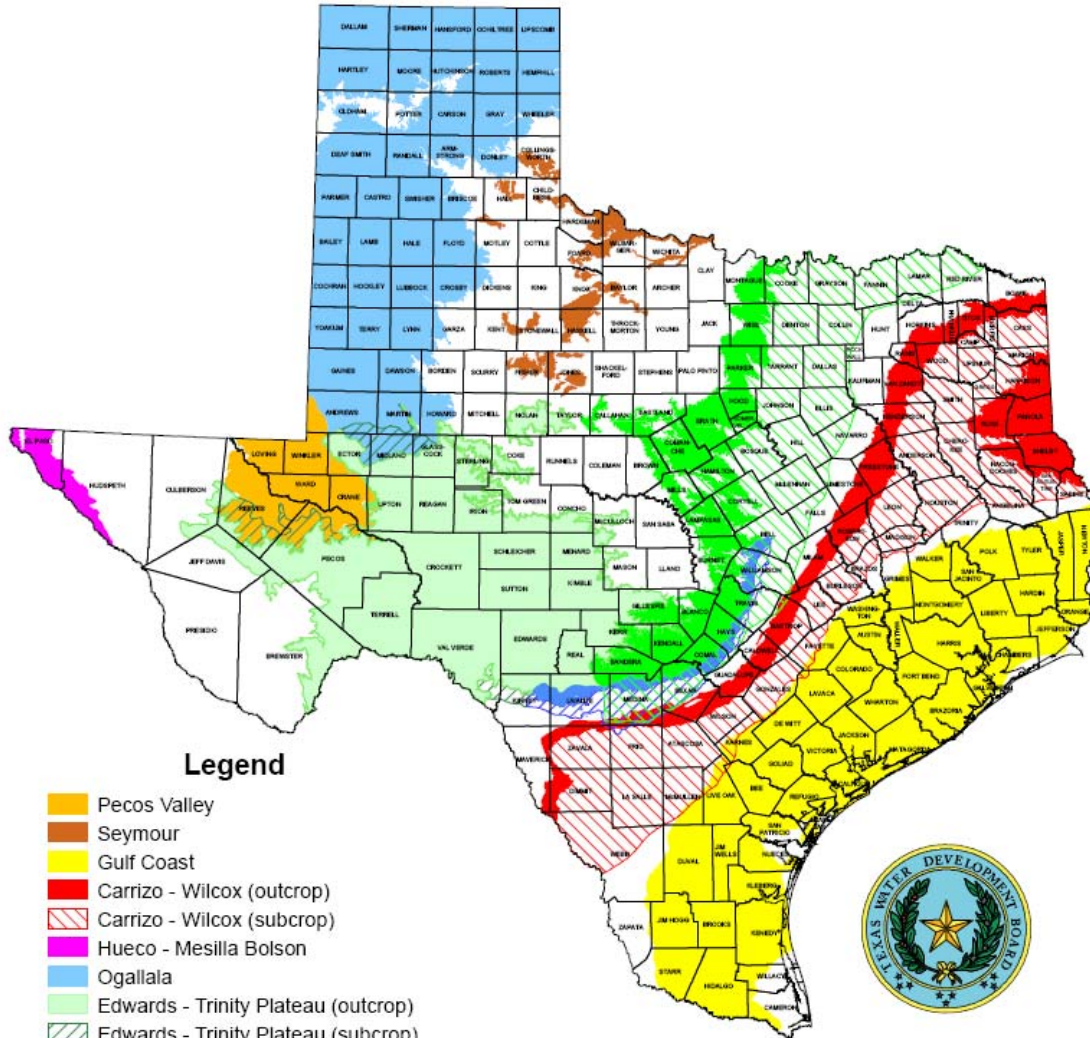


## Texas Regional Water Planning areas





# Major Aquifers of Texas



## Legend

- Pecos Valley
- Seymour
- Gulf Coast
- Carrizo - Wilcox (outcrop)
- Carrizo - Wilcox (subcrop)
- Hueco - Mesilla Bolson
- Ogallala
- Edwards - Trinity Plateau (outcrop)
- Edwards - Trinity Plateau (subcrop)
- Edwards BFZ (outcrop)
- Edwards BFZ (subcrop)
- Trinity (outcrop)
- Trinity (subcrop)

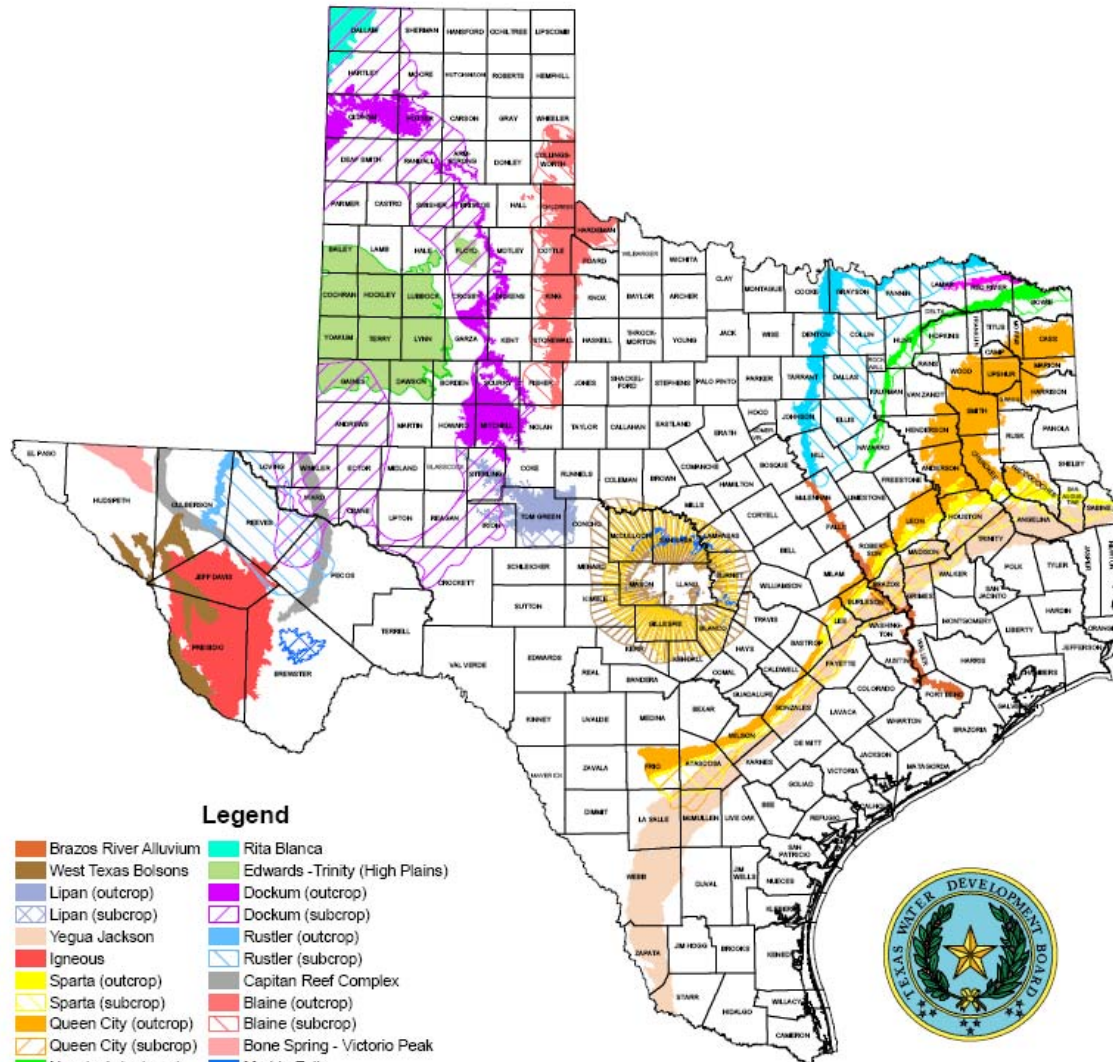
NOTE: Chronology by Geologic age.

OUTCROP (portion of a water-bearing rock unit exposed at the land surface)  
 SUBCROP (portion of a water-bearing rock unit existing below other rock units)



**DISCLAIMER**  
 This map was generated by the Texas Water Development Board using GIS (Geographic Information System) 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.

# Minor Aquifers of Texas



## Legend

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

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

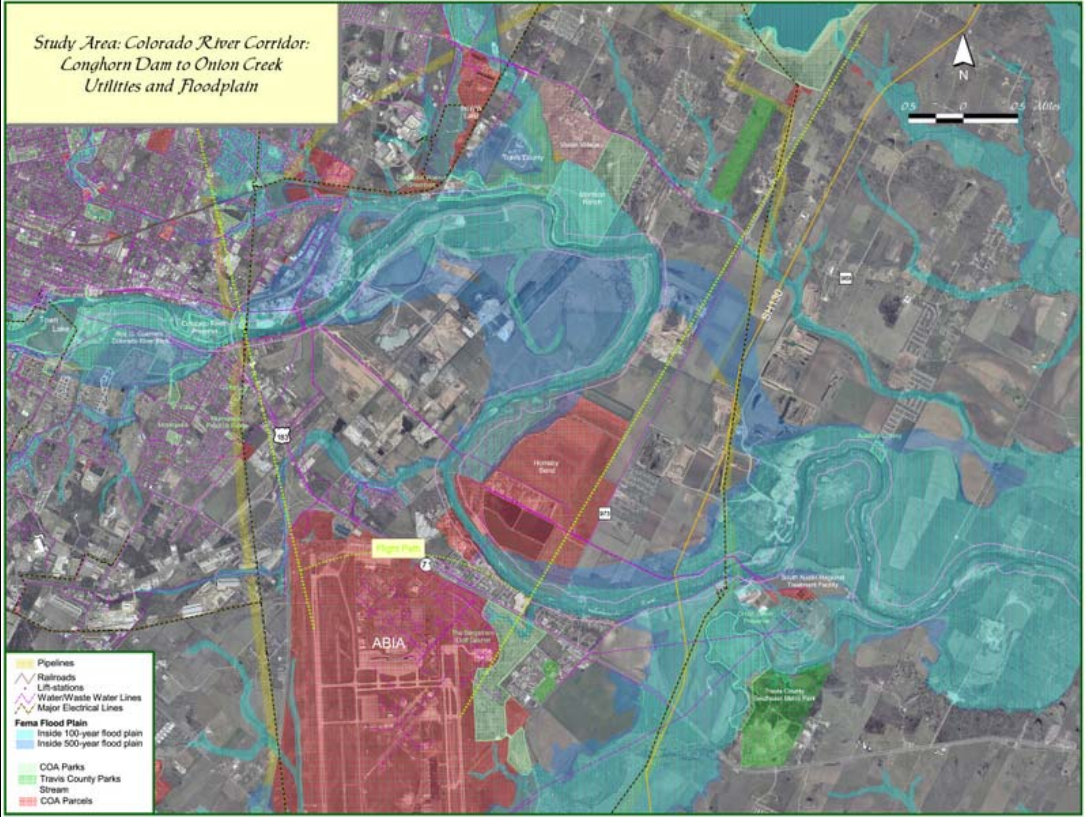


C08484-A Austin History Center, Austin Public Library





Study Area: Colorado River Corridor:  
Longhorn Dam to Onion Creek  
Utilities and Floodplain



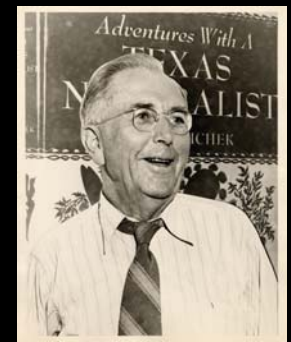
## The Little Waters

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. 256



A rural landscape featuring a fence made of wooden posts and wire. The foreground is dominated by tall, dry, golden-brown grass. In the background, there are several bare, leafless trees under a pale, overcast sky. The overall scene suggests a dry or late autumn environment.

The Little Waters

Water Shed

Water Catchment

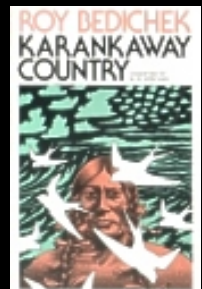


## Solutions and Frustrations

The book ends with a discussion of how to manage Texas rivers – and the realization that this proper management [Proper Dwelling] would probably not happen

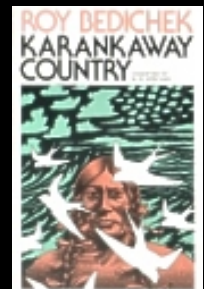
“I have seen in my boyhood days the crown and upper slopes of gentle hills, on which the black soil is mixed with fragmented limestone, produce ninety bushels of oats to the acre. Now many of these slopes are all bleached out, pale as death, and really dead in so far as ability to support vegetable life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

“The attack upon river systems embodied in some of the ‘conservation’ plans represents the typical attitude of the white man toward his natural environment, hostile and arrogant rather than gentle and cooperative...Texas rivers were once truly ‘rivers of life.’” 278



## 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”. 242
- Whole systems – “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.” 278

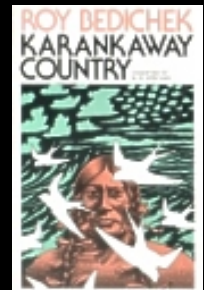


## Environmental Ethics - Land Ethic

“Land belongs in usufruct to the living.” This principle permits taking from the land the *increase* and no more, and directs that its productive capacity remain unimpaired in trust for succeeding generations. Under this principle proved abuse of the soil is held to cancel the obligation of society to the owner. 209

### Christian Tradition

- Thomas Jefferson
- Aldo Leopold *Sand County Almanac*
- Wendell Berry *The Unsettling of America*





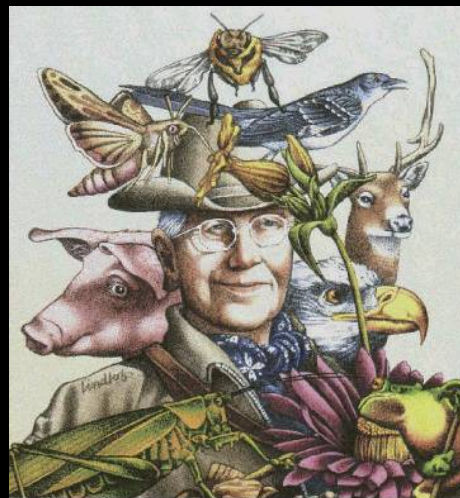
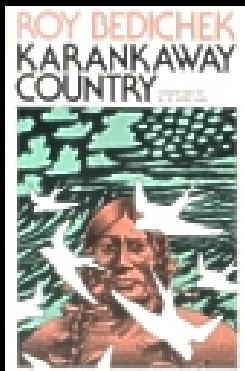
## *Karankaway Country* - An Exposition of a Conservationist Philosophy

Principle – the proper relationship between humans and the rest of nature [Nature] is collaboration

Principle – Nature is about biodiversity - humans have an obligation to the rest of nature to protect its diversity

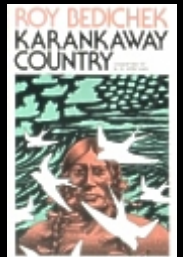
Principle – natural systems [rivers, prairies, etc.] should be managed as wholes and not piecemeal [holistic resource management]

Principle – land is held only in usufruct by the living



## Bedichek and Plato on dogs

“Plato’s Socrates, speaking in half-humorous vein, makes the dog out to be a true philosopher because he growls suspicion and hatred at the presence of a stranger (i.e. against that of which he is ignorant), and beams love and affection upon his acquaintances (i.e. upon that which he knows): ergo, the dog obviously love knowledge and hates ignorance, the first mark of the true philosopher.” 47





# Questions?







# Center for Environmental Research at Hornsby Bend



## AWU-CER Lunchtime Lectures May - August 2011

Each talk begins AT NOON Waller Center [625 East 10th Street – between I-35 and Red River] Room 104

The 1<sup>st</sup> Wednesday of the Month! Free and Open to the Public – bring a lunch and learn

### Rivers: Myth, Meaning and Culture in America

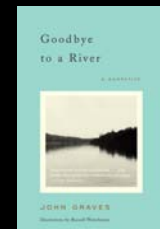
Over the next four months, I will put on my Cultural Geographer's hat and draw on my English major to look at the meaning of rivers and waterways in American and Texan literature. The four lectures will descend in scale from an overview of American rivers and American literature to Texas and finally to Austin. Join me for a journey down rivers through literature, the first Wednesday of every month.

May 4 Noon-1pm

The Myth of the River: American Rivers and American Art

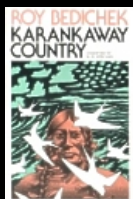
June 1 Monday Noon-1pm

Texas Rivers: On the Brazos with John Graves and "Goodbye to a River"



July 6 Monday Noon-1pm

Texas Rivers: On the Colorado with Roy Bedichek and "Karankaway Country"



August 3 Monday Noon-1pm

Life On Waller Creek – The Legacy of Joseph Jones

