

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

City of Austin



Austin Water Utility



Center for Environmental Research at Hornsby Bend

AWU-CER Lunchtime Lectures January – April 2011

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

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

Austin and the Colorado River Corridor

We begin 2011 by exploring the ecology and geography of the Colorado River Corridor. The first four Lunchtime Lectures focus on different aspects of the Colorado River – ecological, cultural, historical, and biological.

Wednesday, January 5

The Forgotten Habitat: the Biogeography of the Colorado River Bottomlands

Wednesday, February 2

Changes in the Land: The Cultural Landscape of the Colorado River Corridor

Wednesday, March 2

Discovering the Colorado: The Austin-Bastrop River Corridor Partnership 2003-2011

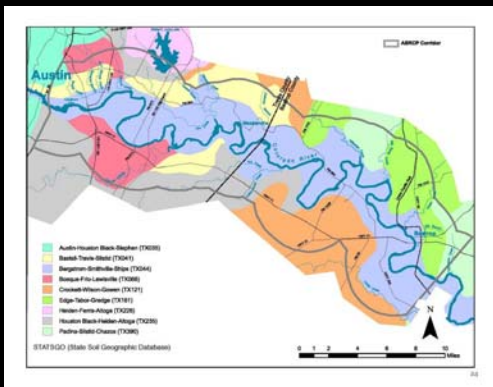
Wednesday, April 6

The Nature of the River: The Flora and Fauna of the Colorado River Corridor

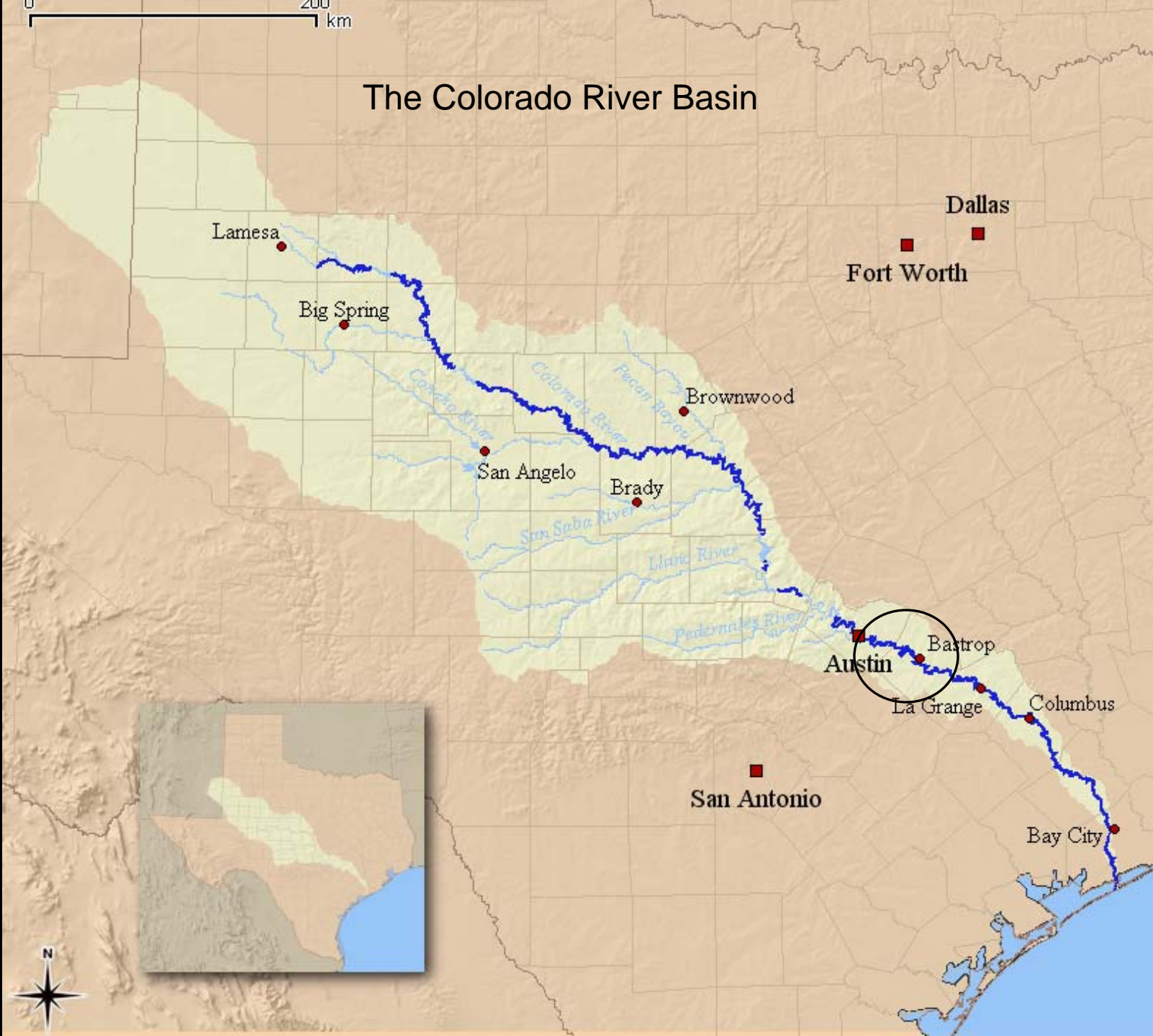
The Forgotten Habitat: the Biogeography of the Colorado River Bottomlands

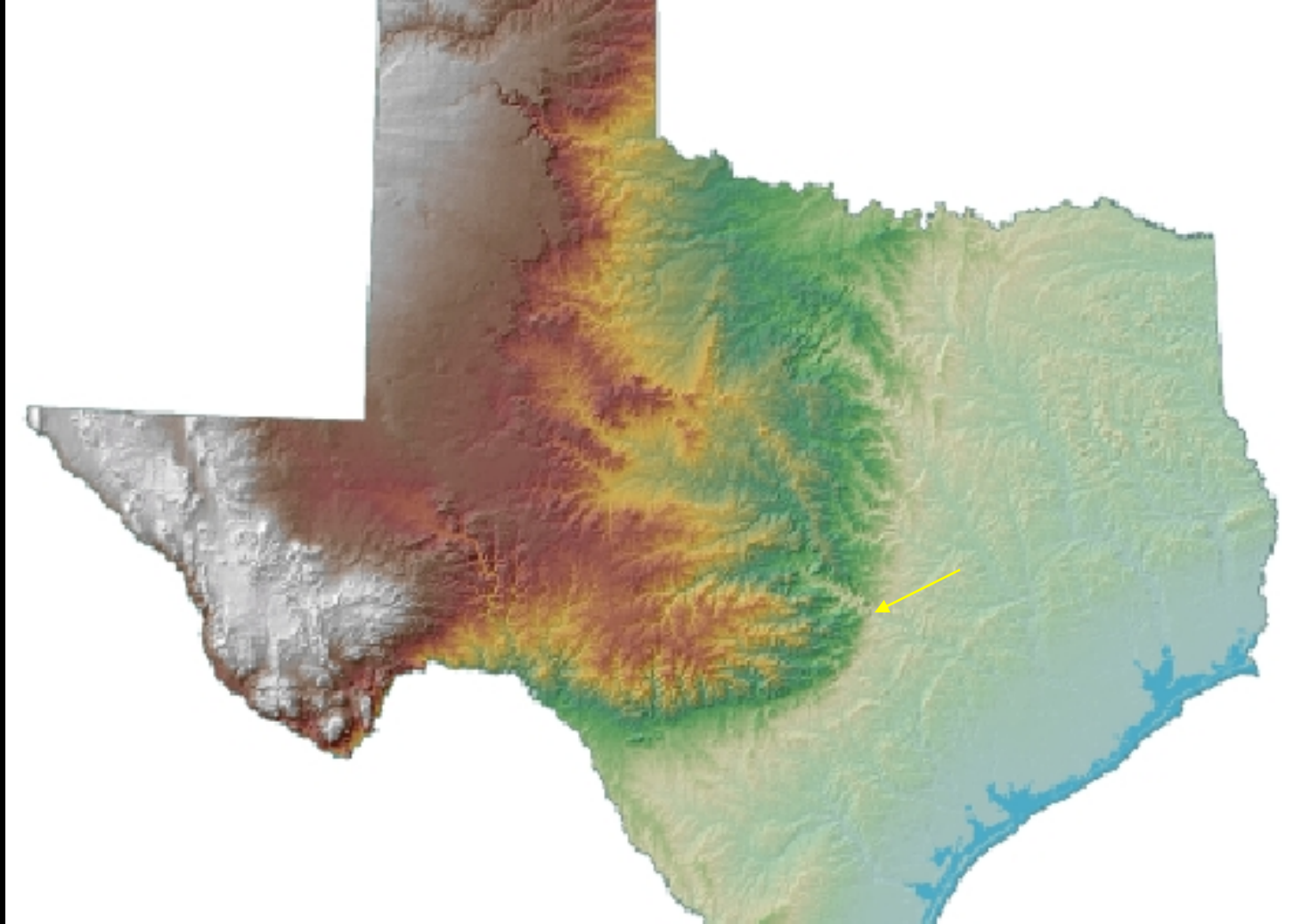
Kevin M. Anderson, Coordinator

Austin Water Utility - Center for Environmental Research



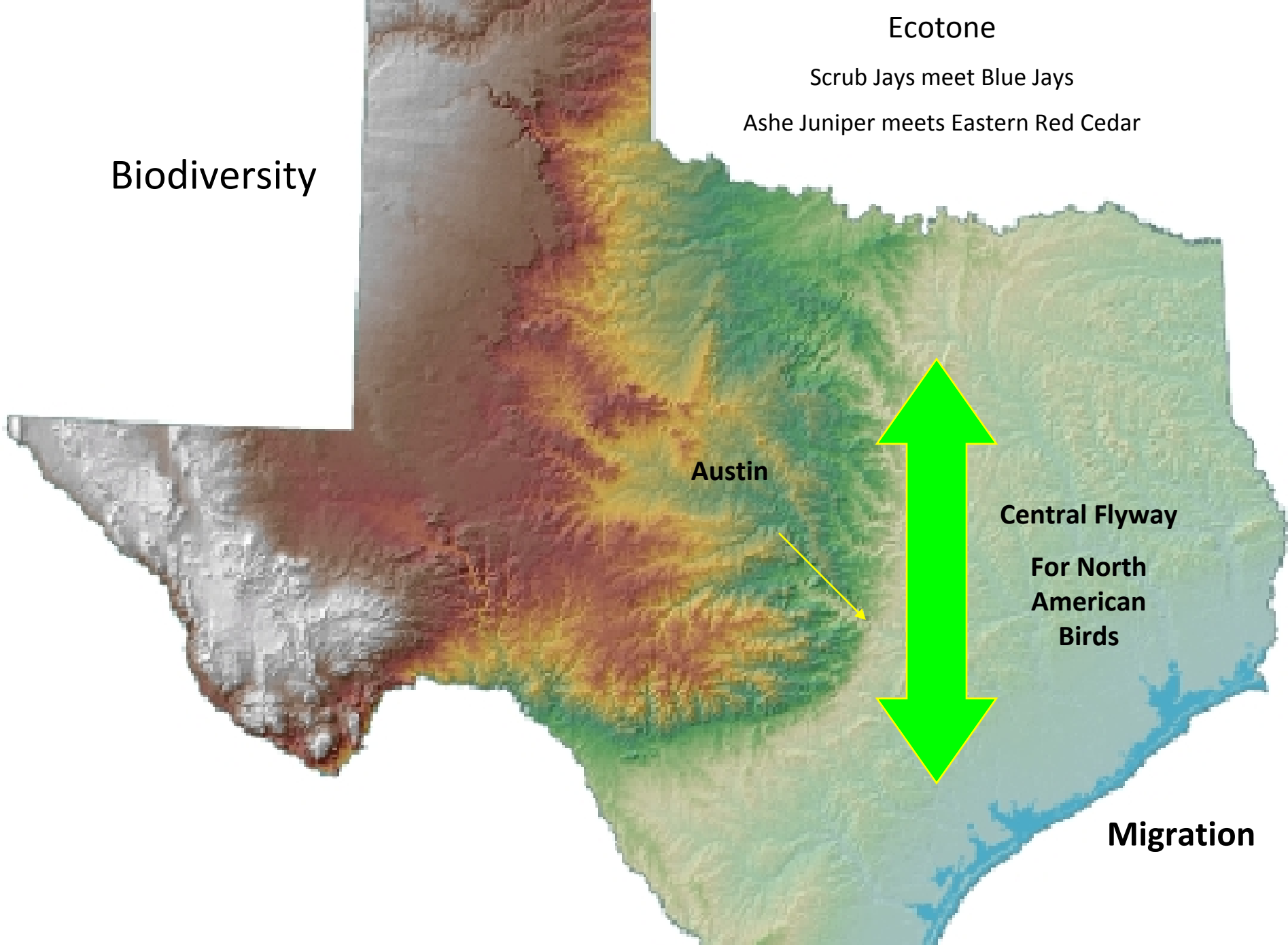
The Colorado River Basin





From wilderness to garden – the “middle ground” of Texas – parkland

Robin Doughty, [At Home In Texas: Early Views of the Land](#)



Ecotone

Scrub Jays meet Blue Jays

Ashe Juniper meets Eastern Red Cedar

Biodiversity

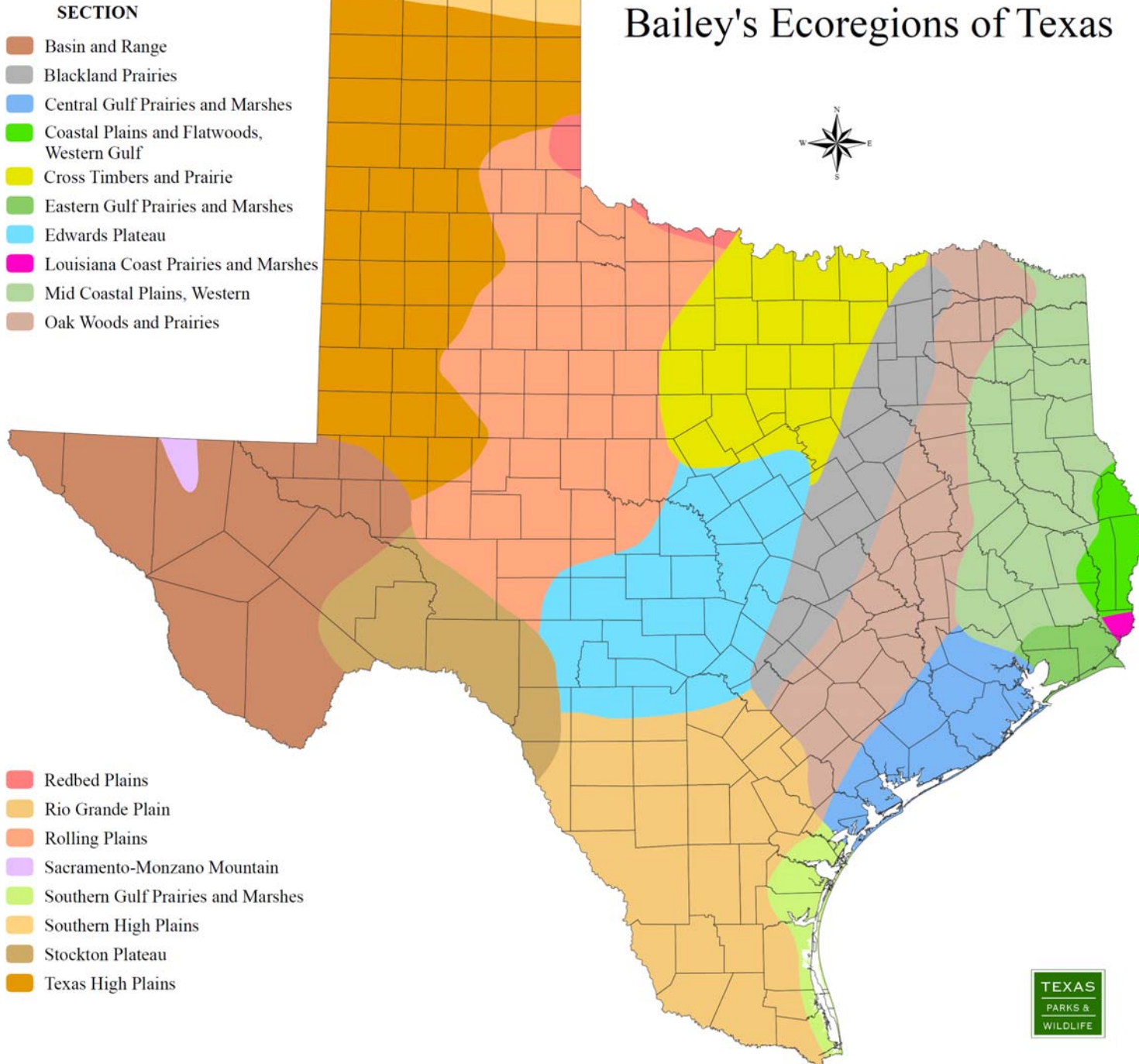
Austin

Central Flyway

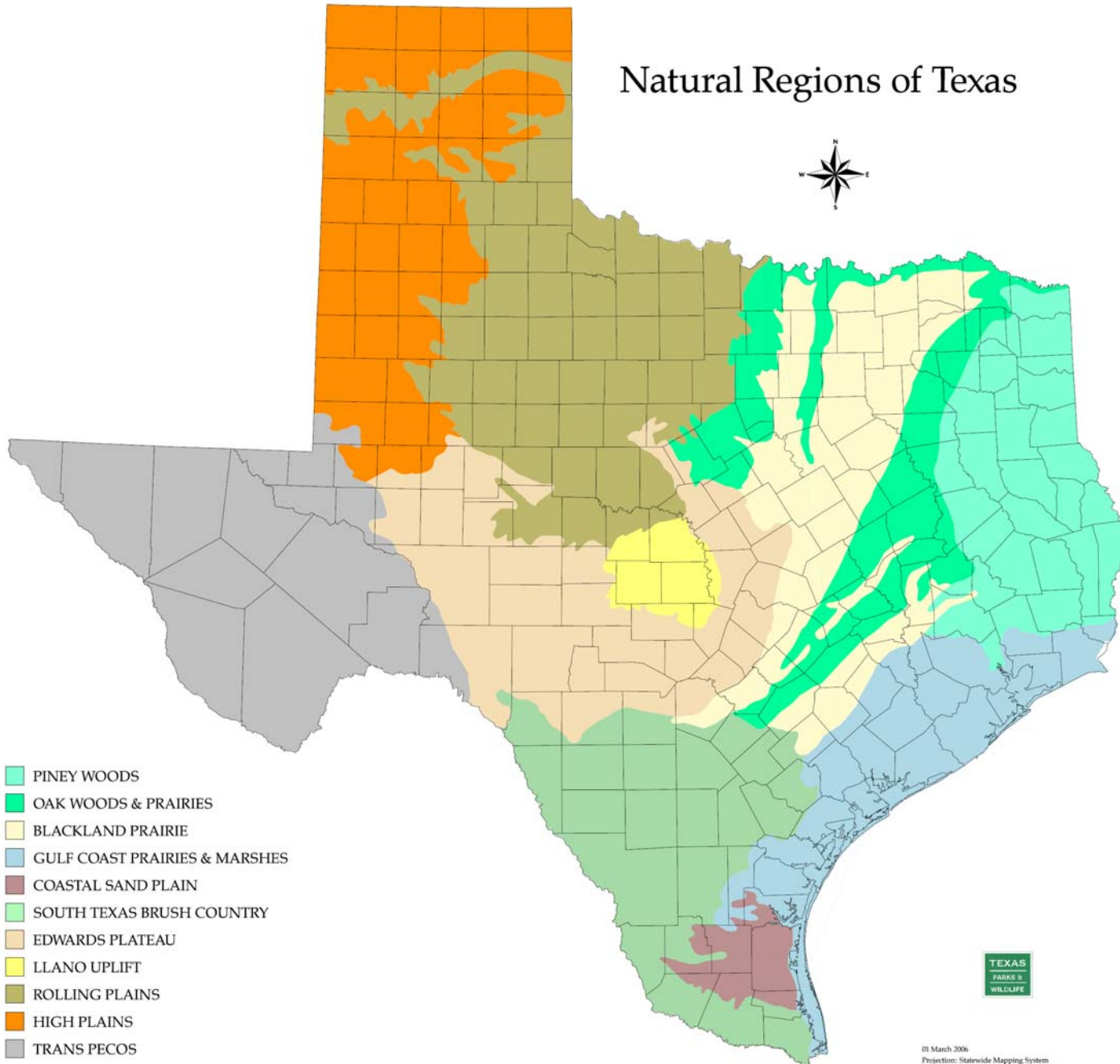
For North
American
Birds

Migration

Bailey's Ecoregions of Texas

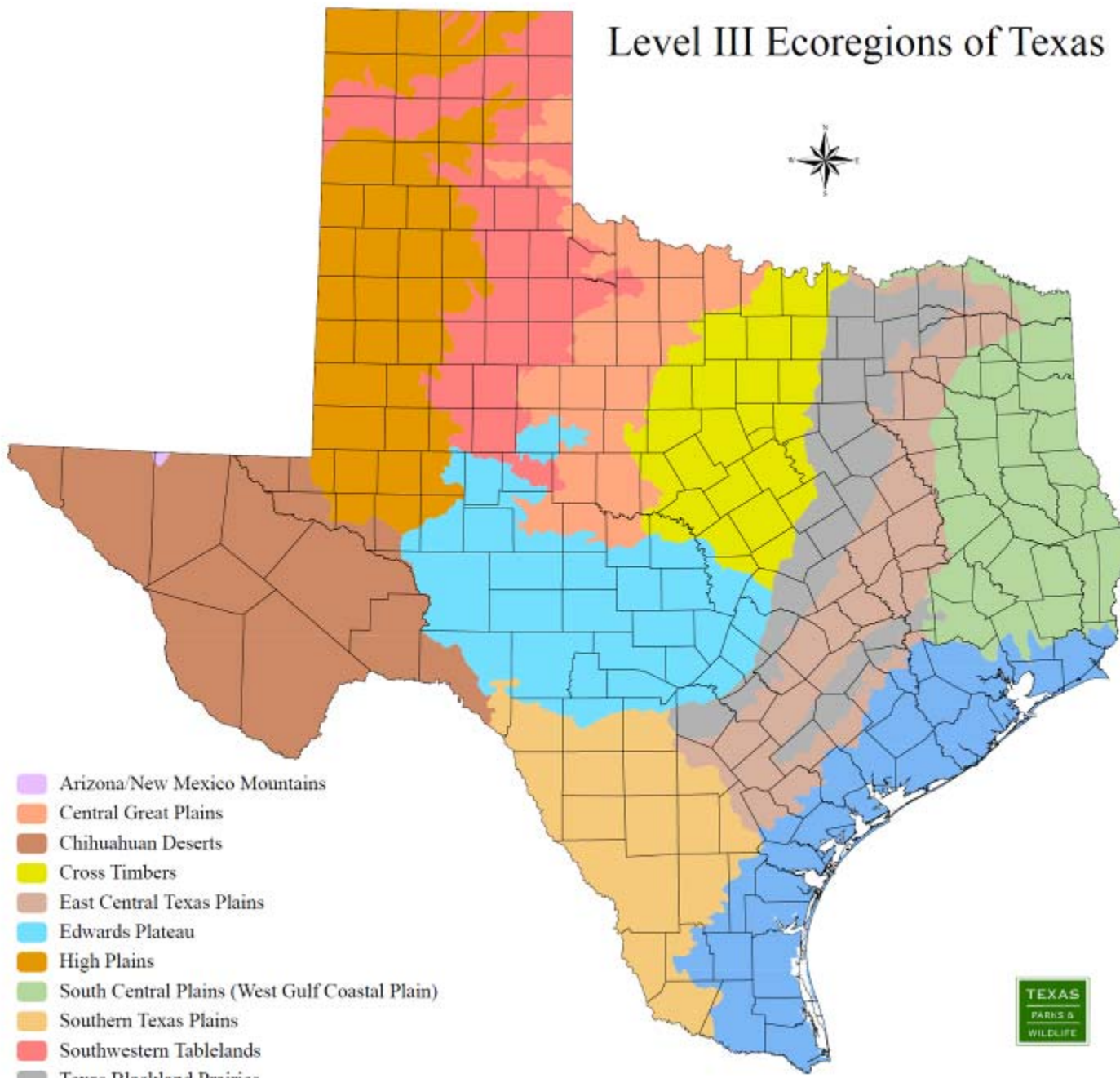


Natural Regions of Texas



01 March 2006
Projection: Statewide Mapping System
Map compiled by the Texas Parks & Wildlife Department
GIS Lab. No claims are made to the accuracy of the data
or to the suitability of the data to a particular use.

Level III Ecoregions of Texas



Source: Level III Ecoregions of the continental United States,
US Environmental Protection Agency 2004. Revision of Omernik 1987.
Names in () are alternatives included for consistency with other TPWD initiatives.

01 September 2010
Projection: Texas Statewide Mapping System
Map compiled by the Texas Parks & Wildlife Department
GIS Unit. The data are made to the accuracy of the data
as to the availability of the data to a particular user.



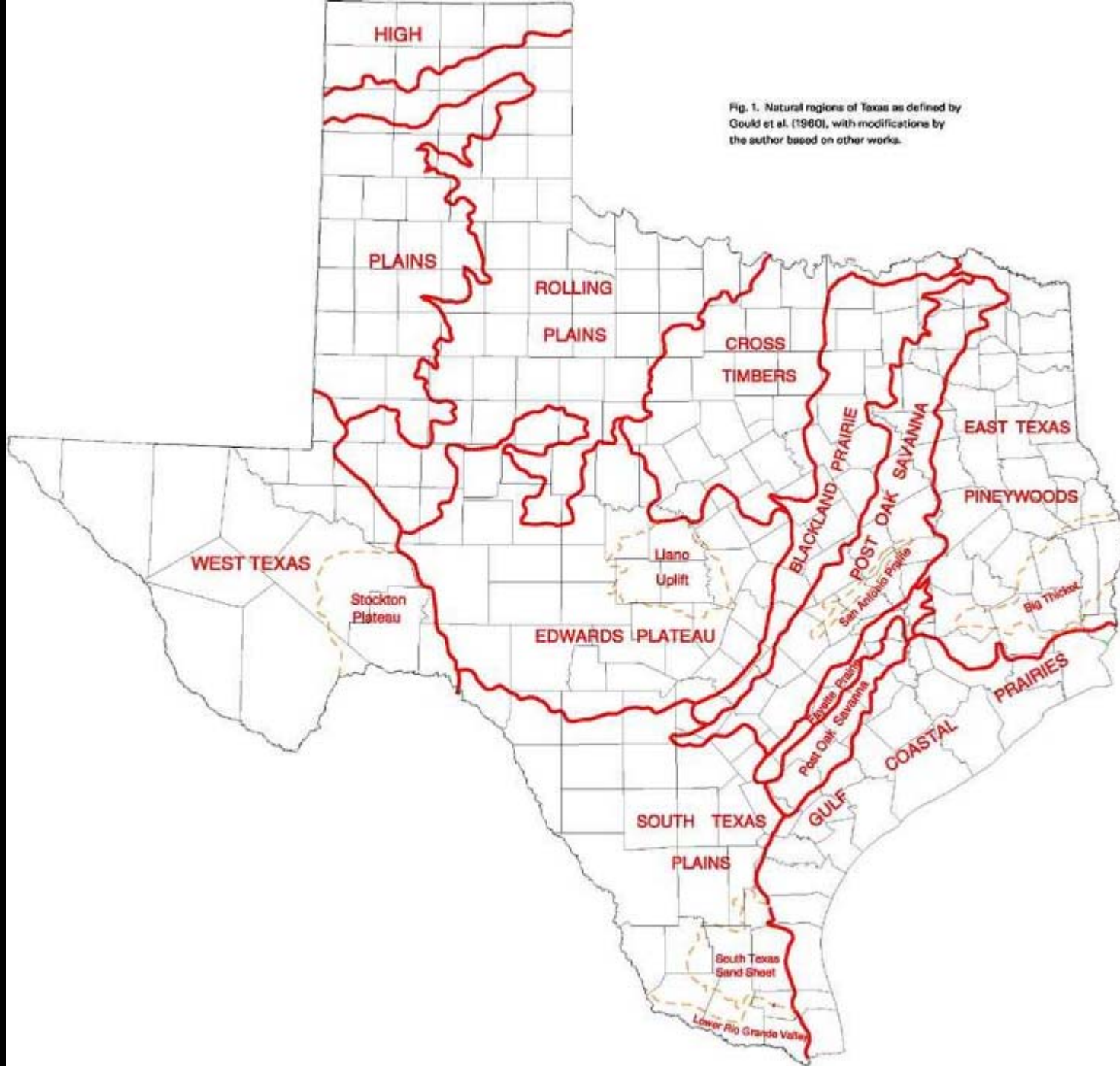
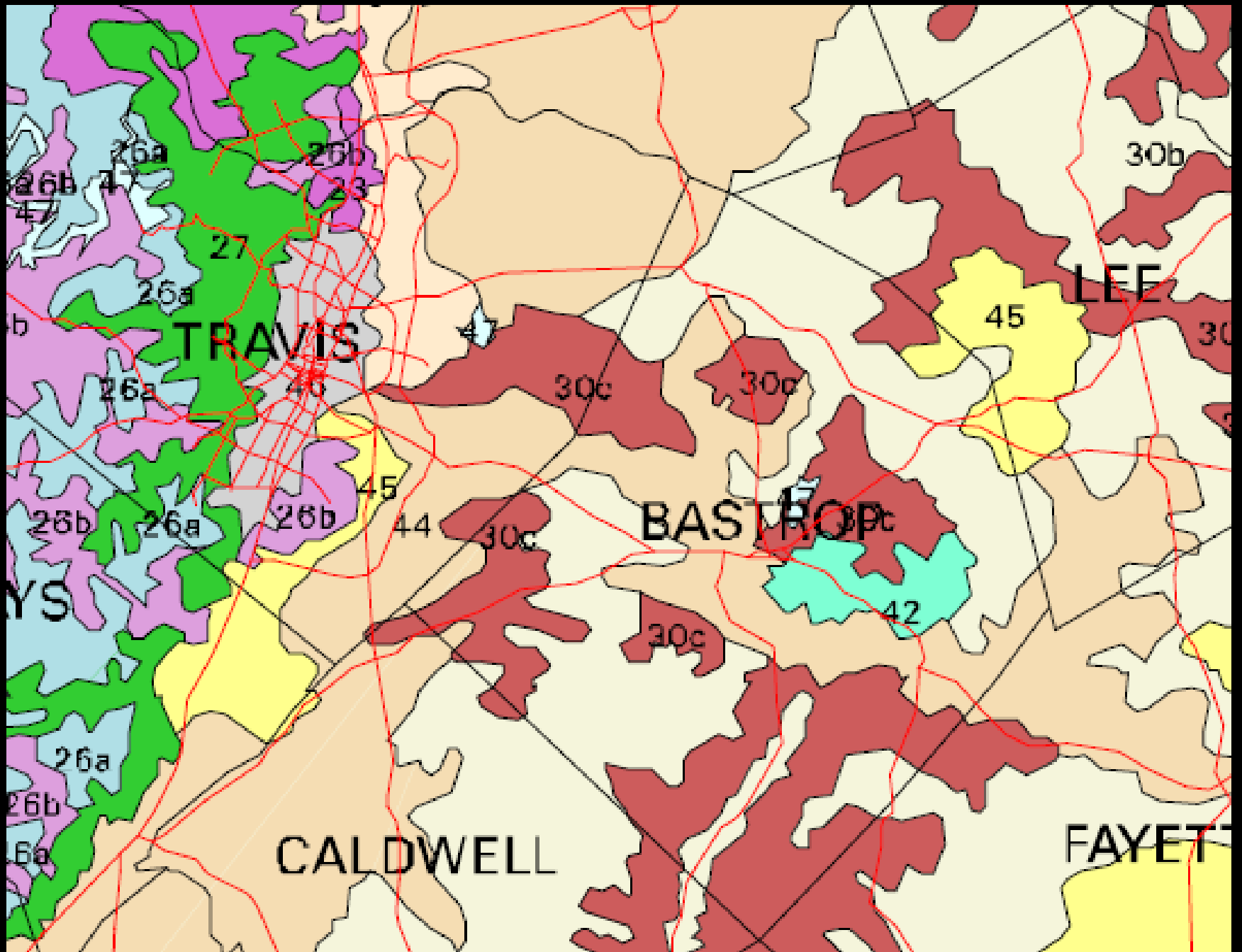


Fig. 1. Natural regions of Texas as defined by Gould et al. (1960), with modifications by the author based on other works.



The Forgotten Habitat of the Colorado River

The Vegetation Types of Texas

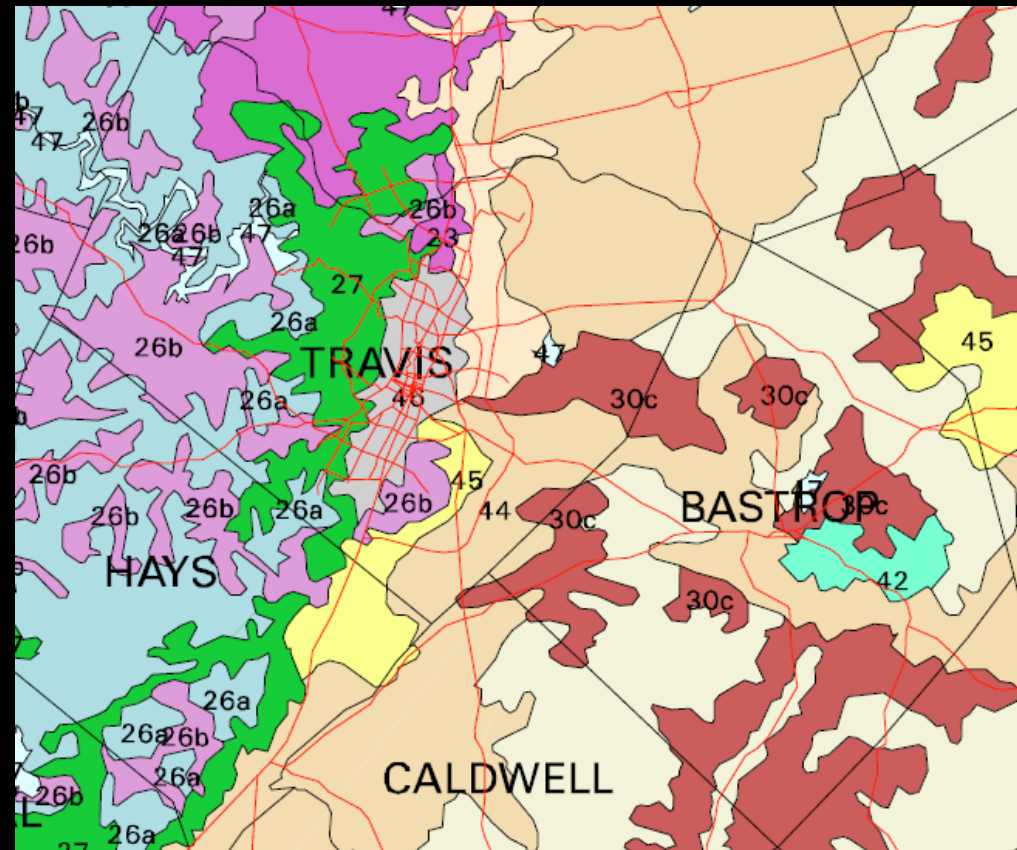


- 26a Live Oak - Ashe Juniper Parks
(*Quercus virginiana* - *Juniperus ashei*)
- 26b Live Oak - Mesquite - Ashe Juniper Parks
(*Quercus virginiana* - *Prosopis glandulosa* - *Juniperus ashei*)
- 27 Live Oak - Ashe Juniper Woods
(*Quercus virginiana* - *Juniperus ashei*)

- 30a Post Oak Parks/Woods
(*Quercus stellata*)
- 30b Post Oak Woods, Forest, and Grassland Mosaic
- 30c Post Oak Woods/Forest

- 42 Pine - Hardwood Forest

- 44 Crops
- 45 Other Native and/or Introduced Grasses
- 46 Urban

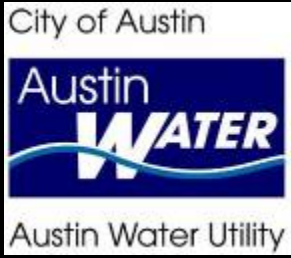


Blackland Prairie Grassland and Post Oak Savannah




Live Oak-Juniper Forest







Water Quality Protection Lands

City of Austin Wildland Conservation Division


 City of Austin owned and managed Balcones Canyonlands Preserve properties

13,577 acres


 Balcones Canyonlands Preserve properties owned and managed by BCCP Partners

 Fee-Simple Water Quality Protection Lands

9,050 acres

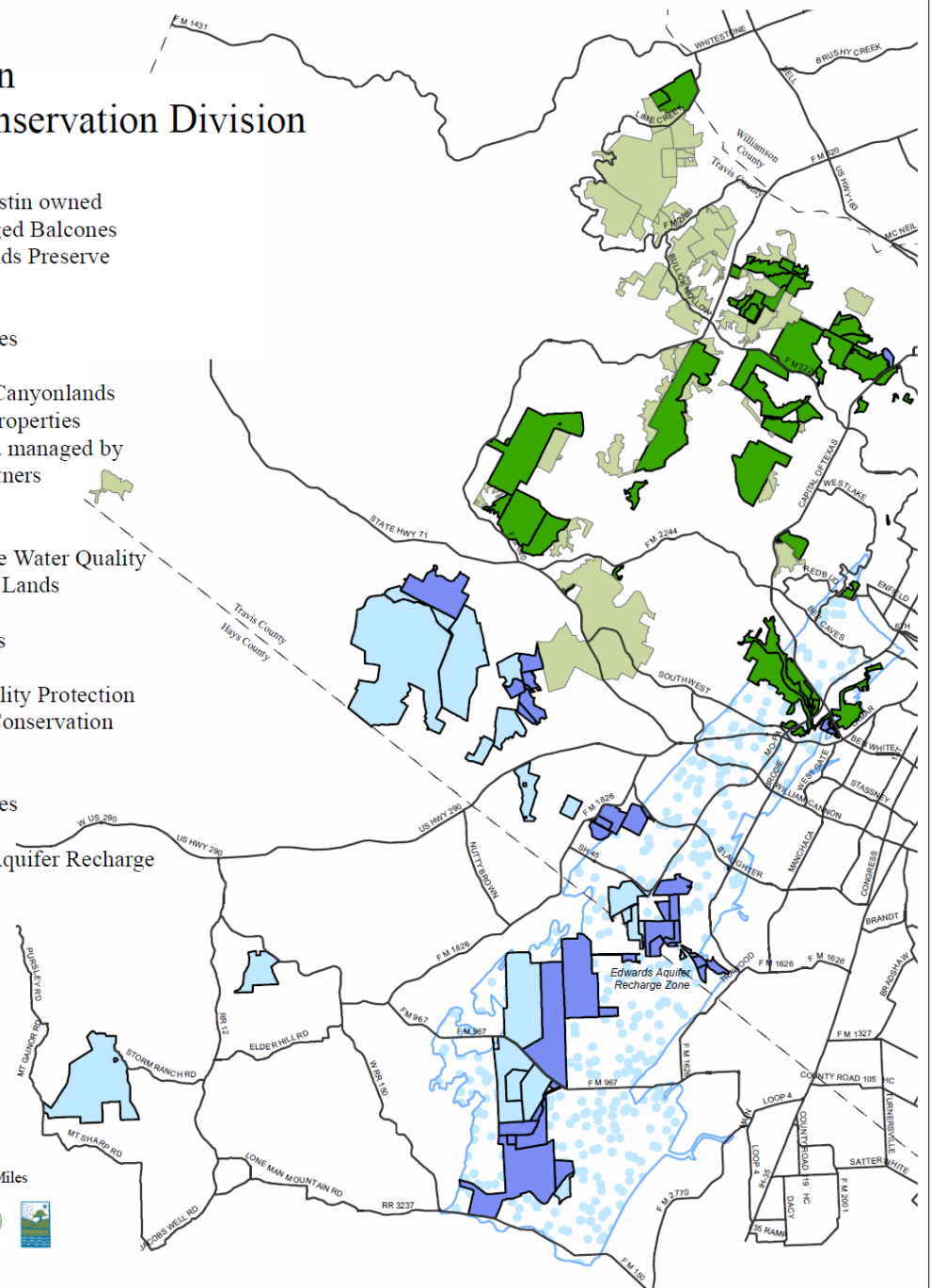
 Water Quality Protection Lands in Conservation Easements

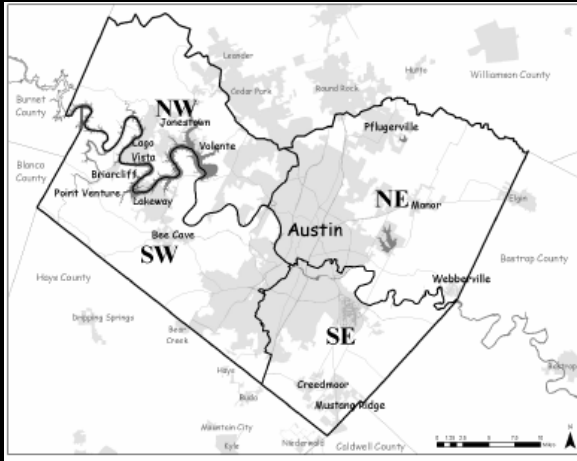
14,527 acres

 Edwards Aquifer Recharge Zone



0 0.5 1 2 3 4 5 Miles





Travis County and City of Austin Money spent and acreage acquired park and open space land with bond money 1993-2005

NORTHWEST TRAVIS COUNTY/COA

5,795 ACRES

\$23,021,609

SOUTHWEST TRAVIS COUNTY/COA

23,869 ACRES

\$109,282,453

TOTAL \$ FOR WEST

\$132,304,062

TOTAL ACRES FOR WEST

29,664

NORTHEAST TRAVIS COUNTY/COA

1,121 ACRES

\$18,787,968

SOUTHEAST TRAVIS COUNTY/COA

463 ACRES

\$3,448,667

TOTAL \$ FOR EAST

\$22,236,635

TOTAL ACRES FOR EAST

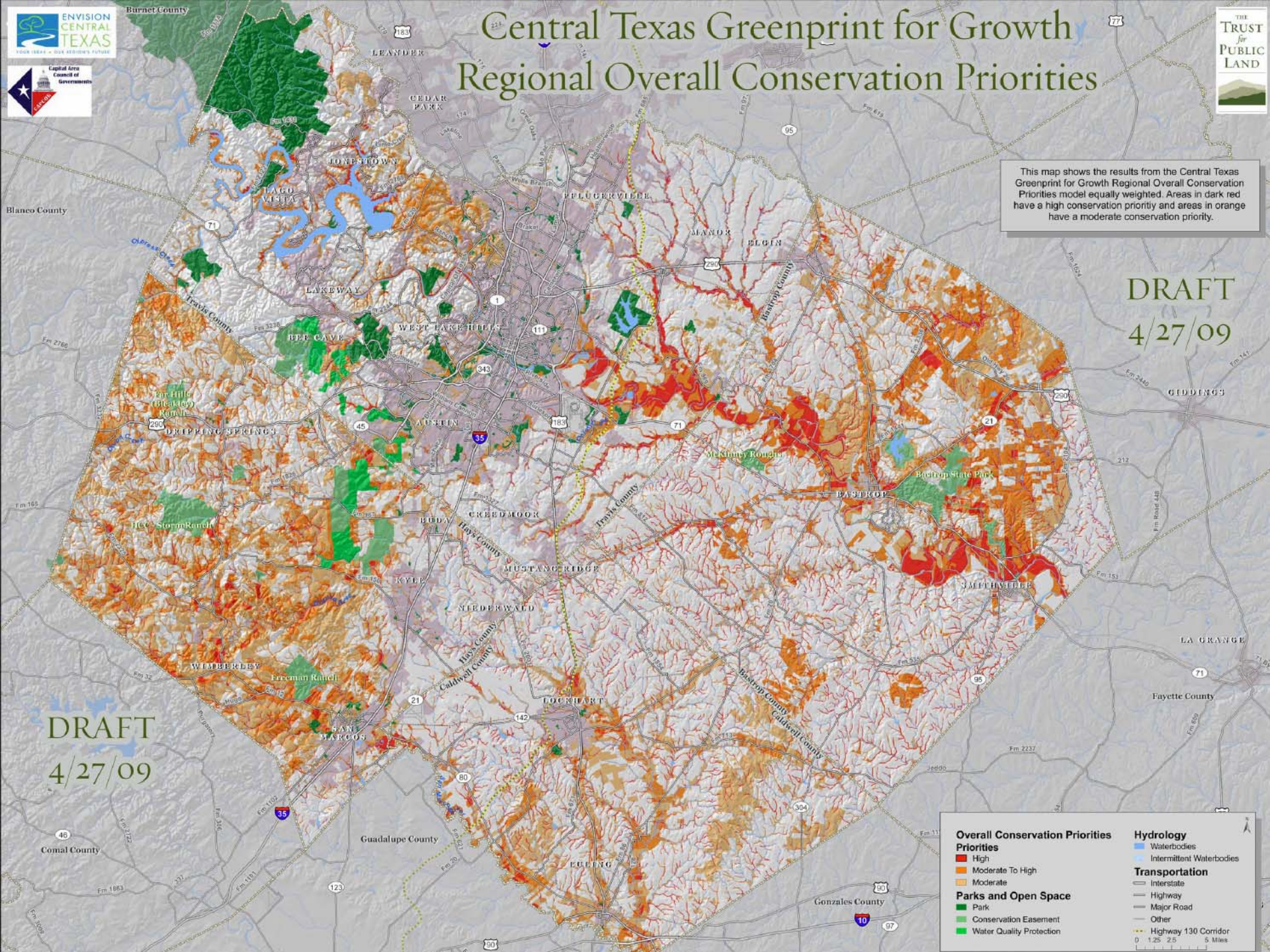
1584

Central Texas Greenprint for Growth Regional Overall Conservation Priorities

This map shows the results from the Central Texas Greenprint for Growth Regional Overall Conservation Priorities model equally weighted. Areas in dark red have a high conservation priority and areas in orange have a moderate conservation priority.

DRAFT
4/27/09

DRAFT
4/27/09



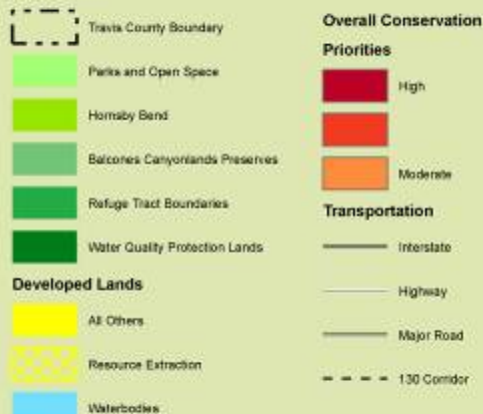
Overall Conservation Priorities	Hydrology
<ul style="list-style-type: none"> High Moderate To High Moderate 	<ul style="list-style-type: none"> Waterbodies Intermittent Waterbodies
Parks and Open Space	Transportation
<ul style="list-style-type: none"> Park Conservation Easement Water Quality Protection 	<ul style="list-style-type: none"> Interstate Highway Major Road Other Highway 130 Corridor
<p>0 1.25 2.5 5 Miles</p>	

Travis County, TX Greenprint

Overall Conservation Priorities

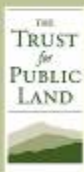
This map shows the Travis County, TX Greenprint and the overall conservation priorities. Areas in orange have a moderate conservation priority and areas in dark red have a high conservation priority.

Legend



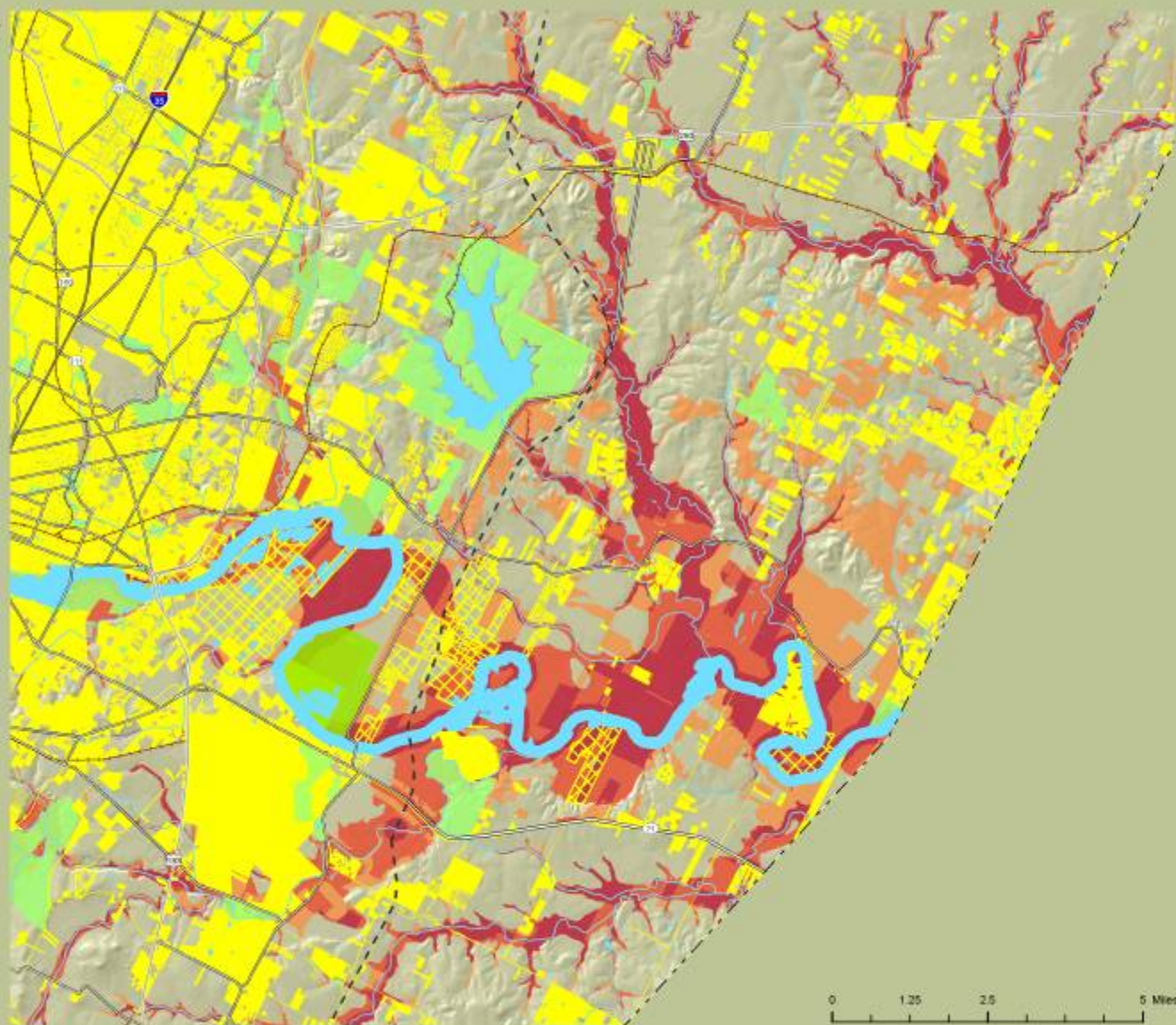
Special thanks to the following data providers:
 City of Austin, Travis County, University of Texas at Austin, Texas Parks and Wildlife, Texas Historical Commission, CAPCOG, USGS

Map created by The Trust for Public Land on October 4, 2006



Created in ESRI ArcMap 9.1®
 Map Projection: NAD 1983 State Plane
 Texas Central FIPS 4203

TPL, The Trust for Public Land, and The Trust for Public Land logo are trademarks of The Trust for Public Land. Copyright © 2006 The Trust for Public Land.

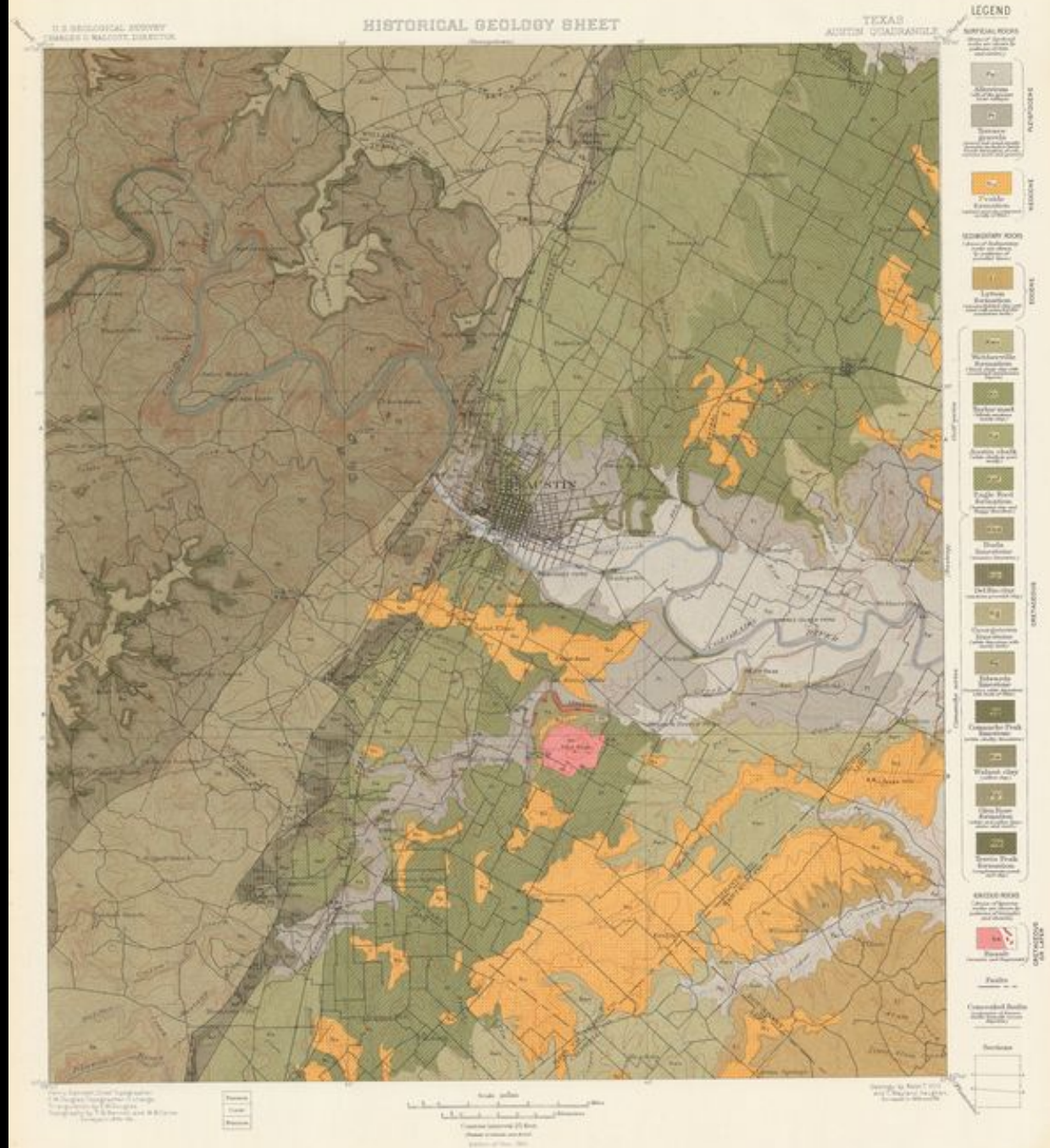


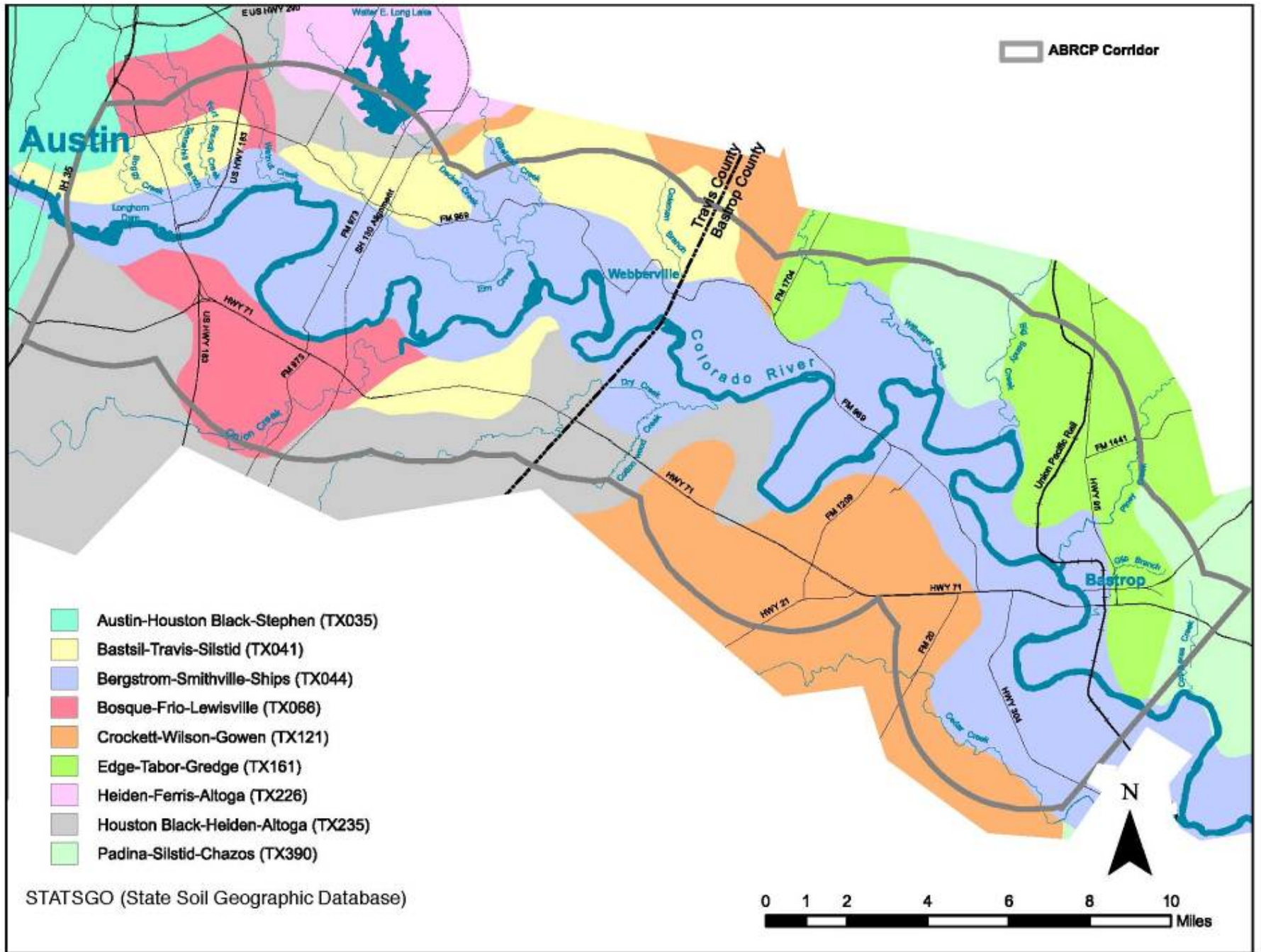
Geological Map

USGS Folio

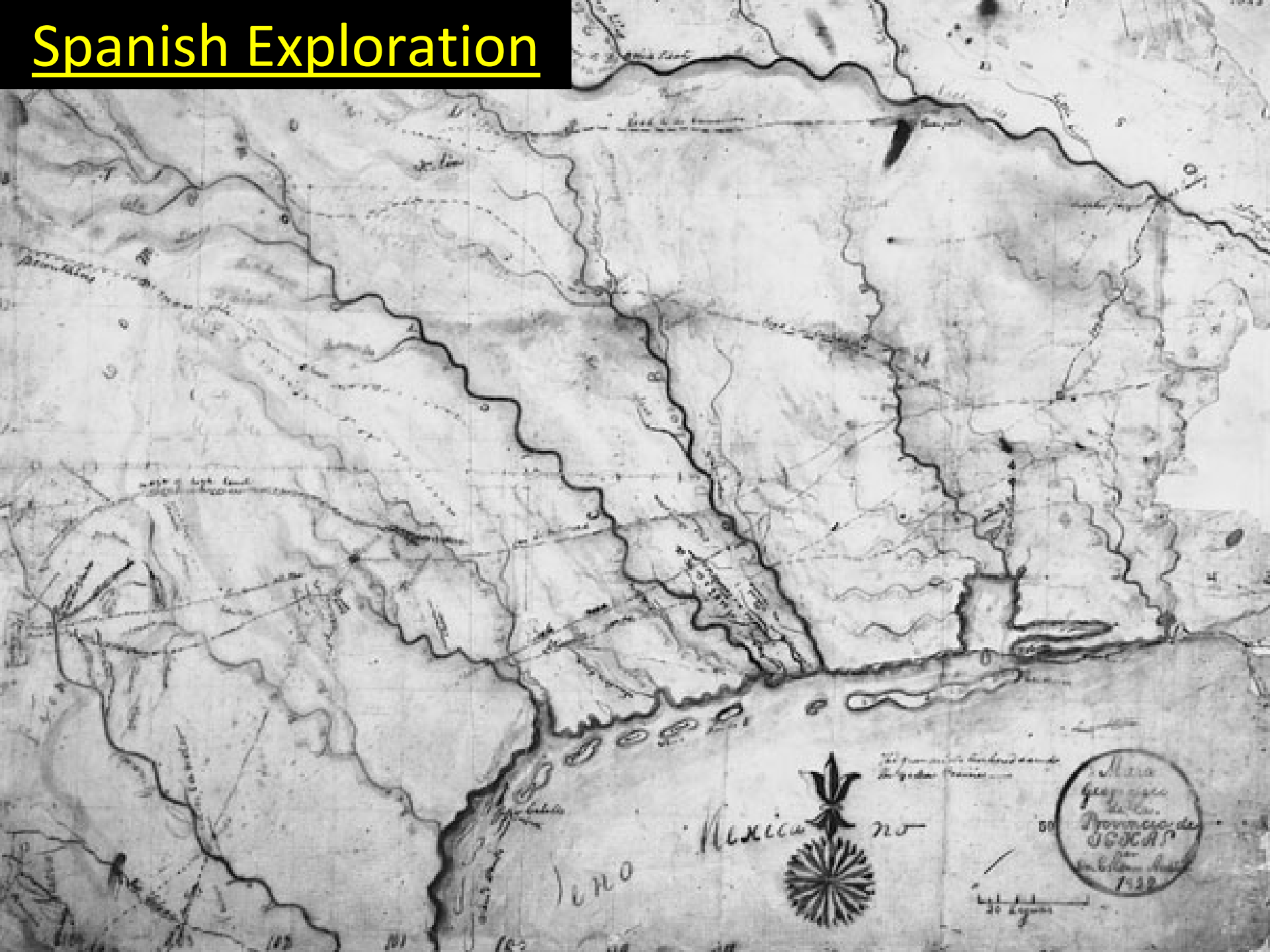
1902

Division between
West and East





Spanish Exploration



The Bottomland Forest

El Monte Grande [del Diablo]

Monte – a sizable almost impenetrable forest – a thicket



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.”



The Forgotten Bottomland Forest



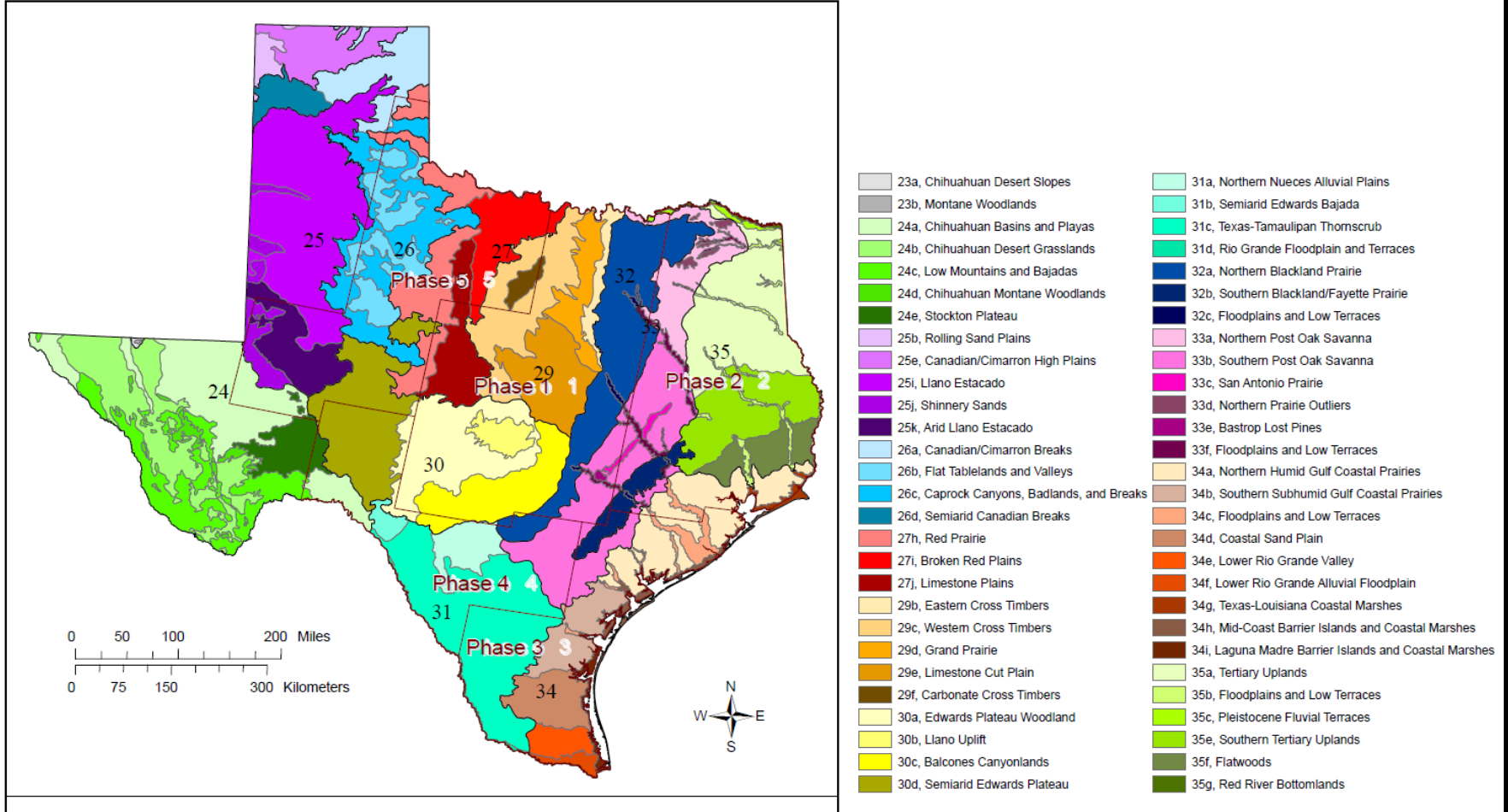


Figure 1. Texas Ecological Systems Mapping project phase map. Outlines of the phases correspond with the footprints of satellite scene data. The project will be completed in the early fall of 2012.

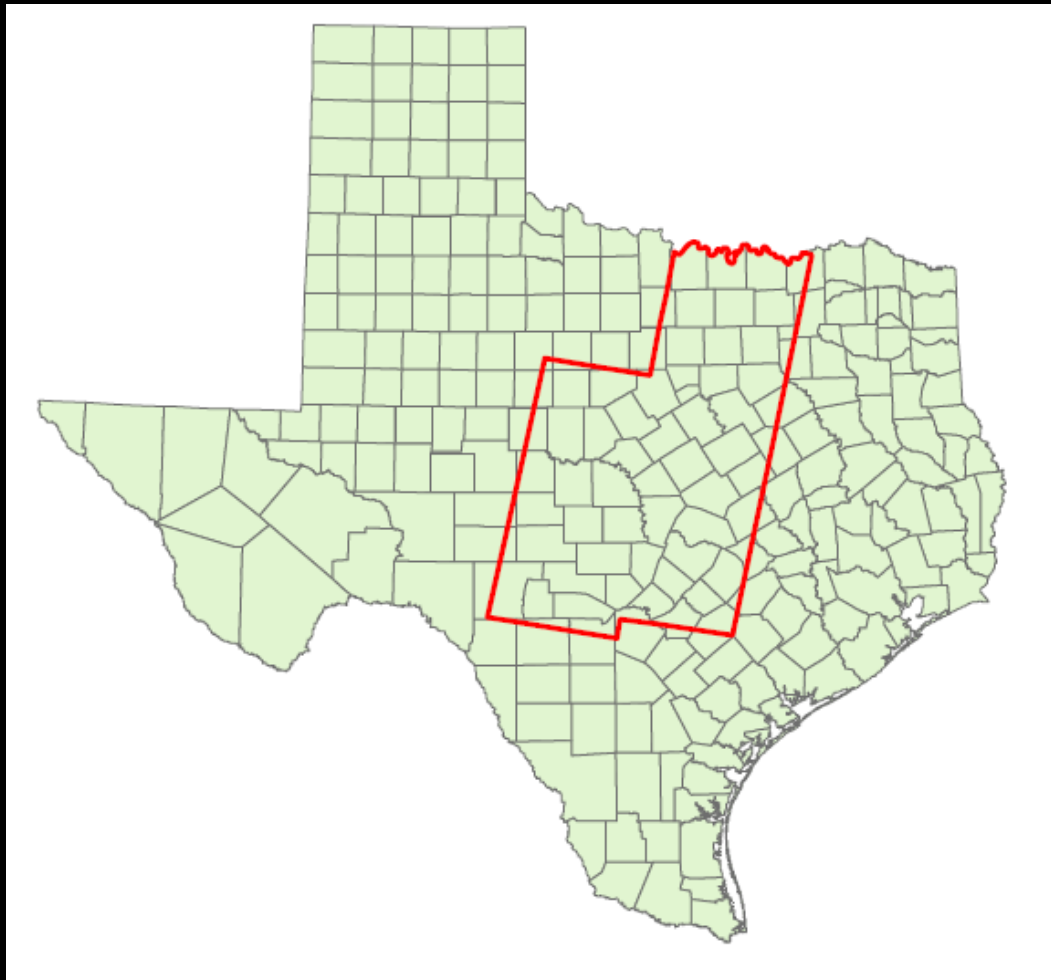
Texas Ecological Systems Project

The Texas Parks and Wildlife Department is cooperating with private, state, and federal partners to produce a new land cover map for Texas, using an expansion and modification of the original NatureServe Ecological System Classification System.

The resulting Mapping Subsystems are essentially land cover types within more broadly-defined ecological systems, which represent groups of related plant communities affected by similar processes, and occurring together within larger landscapes. Human-related cover types such as urban, row crops and native invasive vegetation types are also mapped.

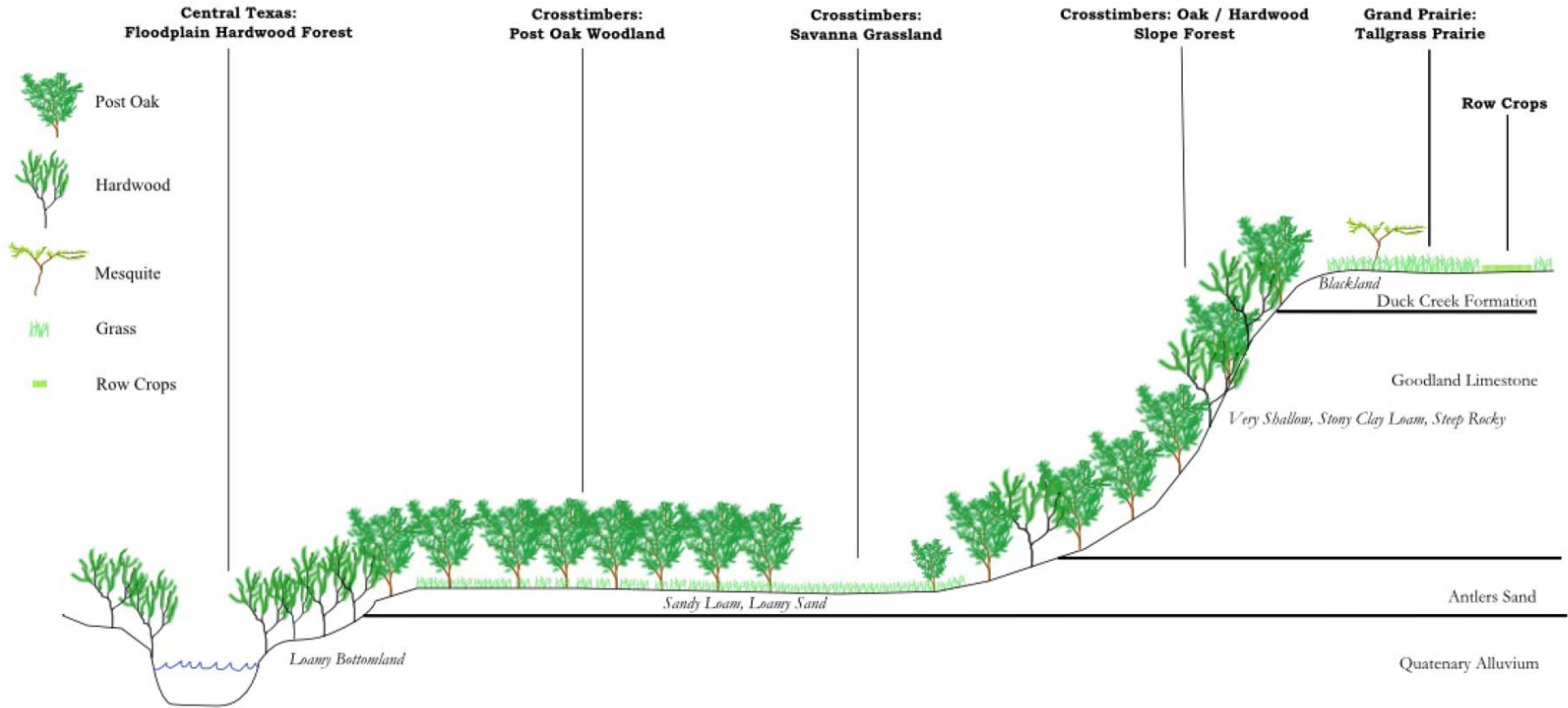
Texas Ecological Systems Project: Phase 1

Phase 1 of a five-year project, and circumscribes Central Texas, from the Red River south through Dallas and Austin into the northern part of San Antonio, west to near San Angelo and east to Bastrop.



TESP Mapped Vegetation Types Descriptions

Representative Crosstimber/Grand Prairie Mapped Vegetation



Southern Blackland Tallgrass Prairie

Only remnants of this system exist, with most of the historical distribution replaced by crop production or improved pasture, usually dominated by *Cynodon dactylon*, *Bothriochloa ischaemum* var. *songarica*, *Panicum coloratum* and *Paspalum notatum*. Remnants of the system are dominated by *Schizachyrium scoparium*, *Andropogon gerardii* and *Sorghastrum nutans*. Other species include *Bouteloua curtipendula*, *Carex microdonta*, *Sporobolus compositus*, *Nassella leucotricha*, *Bothriochloa laguroides* spp. *torreyana*, *Eriochloa sericea*, *Paspalum floridanum*, and *Tridens strictus*. Forbs include *Symphyotrichum ericoides*, *Stenaria nigricans* var. *nigricans*, *Helianthus maximiliani*, *Rudbeckia hirta*, *Bifora americana*, *Acacia angustissima* var. *hirta*, *Desmanthus illinoensis*, and many more. Swales are dominated by *Tripsacum dactyloides* and *Panicum virgatum*. A relatively unique type occurring on low pH Alfisols is dominated by *Sporobolus silveanus*, *Carex meadii*, and *Fimbristylis puberula*.

East-Central Texas Plains Post Oak Savanna and Woodland

This system represents a transition from the woodlands and forests of East Texas to the Blackland Prairie. Savannas and woodlands are typically dominated by *Quercus stellata*, *Quercus marilandica*, and *Carya texana*. Other species, such as *Quercus incana*, *Quercus fusiformis*, *Ulmus alata*, *Juniperus virginiana*, and *Prosopis glandulosa*, can also be present. In the south, *Quercus fusiformis* may co-dominate. Shrub species include *Hex vomitoria*, *Callicarpa americana*, *Vaccinium arboreum*, *Sideroxylon lanuginosum*, and *Symphoricarpos orbiculatus*. Mid- and tallgrass species including *Schizachyrium scoparium*, *Sorghastrum nutans*, and *Panicum virgatum* are frequent in the understory, and also form prairie patches within the savanna. Other grasses include *Andropogon gerardii*, *Bothriochloa laguroides* ssp. *torreyana*, and *Sporobolus cryptandrus*. Non-native grass species such as *Bothriochloa ischaemum* var. *songarica*, *Paspalum notatum*, and *Cynodon dactylon* often dominate sites.

Bastrop Lost Pines Forest and Woodland

This system is dominated by *Pinus taeda*, often with *Quercus stellata* and *Quercus marilandica* present to codominant. *Quercus incana*, *Carya texana*, *Ulmus crassifolia*, *Celtis* spp., and *Juniperus virginiana* may also be present. *Vaccinium arboreum* is a frequent shrub component of the system. Other shrub and woody vine species include *Sideroxylon lanuginosum*, *Callicarpa americana*, *Ilex vomitoria*, and *Smilax bona-nox*. A grassy herbaceous layer may be present with *Schizachyrium scoparium*, *Andropogon gerardii*, *Nassella leucotricha*, *Sporobolus junceus*, and *Aristida* spp. Forbs are conspicuous and include *Heterotheca subaxillaris*, *Euphorbia corollata*, *Monarda citriodora*, *Liatris aspera*, and others. This system bears some resemblance to pine woodlands and forests further to the east, and may represent a western outlier of these systems.

Southeastern Great Plains Floodplain Forest

Dominant communities within this system range from floodplain forests to wet meadows to gravel/sand flats; however, they are linked by underlying soils and the flooding regime. Canopy dominants include *Carya illinoensis*, *Fraxinus americana*, *Quercus nigra*, *Ulmus crassifolia*, *Celtis laevigata*, *Ulmus americana*, *Quercus fusiformis* or *Q. virginiana*, *Platanus occidentalis*, *Acer negundo*, *Quercus macrocarpa*, *Morus rubra*, *Fraxinus pennsylvanica*, and *Sapindus saponaria* var. *drummondii*. Shrub species include *Callicarpa americana*, *Ilex decidua*, *Ilex vomitoria*, *Sideroxylon lanuginosum*, *Diospyros virginiana*, *Vaccinium arboreum*, *Juniperus virginiana*, *Cornus drummondii*, and *Viburnum rufidulum*. Herbaceous cover includes *Elymus virginicus*, *Verbesina virginica*, *Chasmanthium latifolium*, *Tripsacum dactyloides*, *Panicum virgatum* and *Carex* spp.. Non-native grasses that may dominate these sites include *Cynodon dactylon* and *Sorghum halepense*.

Southeastern Great Plains Riparian Forest

This system occupies the upper reaches of streams in the region. Trees present in this system include *Celtis laevigata*, *Ulmus crassifolia*, *Platanus occidentalis*, *Populus deltoides*, *Juglans major*, *Quercus fusiformis*, *Quercus nigra*, *Sapindus saponaria* var. *drummondii*, *Salix nigra*, *Fraxinus americana*, *Fraxinus pennsylvanica*, *Gleditsia triacanthos*, and *Carya illinoensis*. The shrub layer development is variable, sometimes with *Amorpha fruticosa*, *Forestiera acuminata*, *Ilex decidua*, *Ilex vomitoria*, *Sideroxylon lanuginosum*, *Juniperus virginiana*, *Diospyros virginiana*, *Cornus drummondii*, and *Viburnum rufidulum*. Herbaceous cover is also variable and may include *Elymus virginicus*, *Verbesina virginica*, *Chasmanthium latifolium*, *Chasmanthium sessiliflorum*, *Tripsacum dactyloides*, *Panicum virgatum*, and *Carex* spp. Non-native grass species that may be dominant include *Cynodon dactylon* and *Sorghum halepense*. The environment and characteristics of the vegetation of this system become drier to the west.

East-Central Texas Plains Post Oak Savanna and Woodland

-  Post Oak Savanna: Live Oak Motte and Woodland
-  Post Oak Savanna: Post Oak / Redcedar Motte and Woodland
-  Post Oak Savanna: Post Oak Motte and Woodland
-  Post Oak Savanna: Post Oak / Yaupon Motte and Woodland
-  Post Oak Savanna: Savanna Grassland
-  Post Oak Savanna: Redcedar Slope Forest
-  Post Oak Savanna: Oak / Redcedar Slope Forest
-  Post Oak Savanna: Oak / Hardwood Slope Forest








Bastrop Lost Pines Forest and Woodland

-  Bastrop Lost Pines: Loblolly Pine Forest
-  Bastrop Lost Pines: Loblolly Pine / Oak Forest
-  Bastrop Lost Pines: Loblolly Pine Slope Forest
-  Bastrop Lost Pines: Loblolly Pine / Oak Slope Forest
-  Bastrop Lost Pines: Hardwood Slope Forest


Southeastern Great Plains Riparian Forest


-  Central Texas: Riparian Juniper Forest
-  Central Texas: Riparian Live Oak Forest
-  Central Texas: Riparian Hardwood / Evergreen Forest
-  Central Texas: Riparian Hardwood Forest
-  Central Texas: Riparian Evergreen Shrubland
-  Central Texas: Riparian Deciduous Shrubland
-  Central Texas: Riparian Herbaceous Vegetation

Southeastern Great Plains Floodplain Forest


-  Central Texas: Floodplain Juniper Forest
-  Central Texas: Floodplain Live Oak Forest
-  Central Texas: Floodplain Hardwood / Evergreen Forest
-  Central Texas: Floodplain Hardwood Forest
-  Central Texas: Floodplain Evergreen Shrubland
-  Central Texas: Floodplain Deciduous Shrubland
-  Central Texas: Floodplain Herbaceous Vegetation

East-Central Texas Plains Xeric Sandyland


 Post Oak Savanna: Sandyland Woodland and Shrubland

 Post Oak Savanna: Sandyland Grassland


Southern Blacklands Tallgrass Prairie

 Blackland Prairie: Disturbance or Tame Grassland

Southeastern Great Plains Tallgrass Prairie

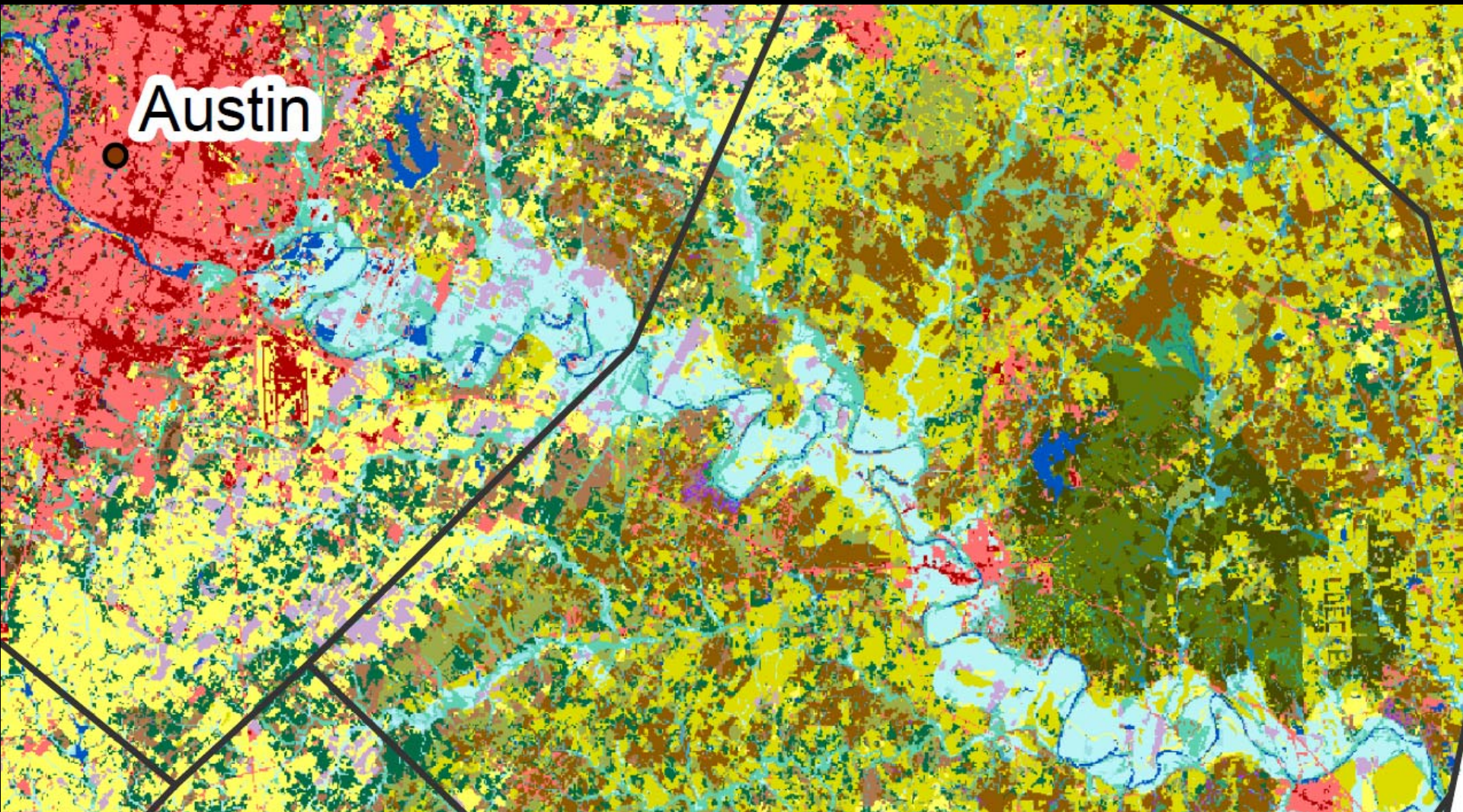
 Grand Prairie: Tallgrass Prairie

Central Mixedgrass Prairie

 Rolling Plains: Mixedgrass Prairie



Austin



Bottomland Vegetation



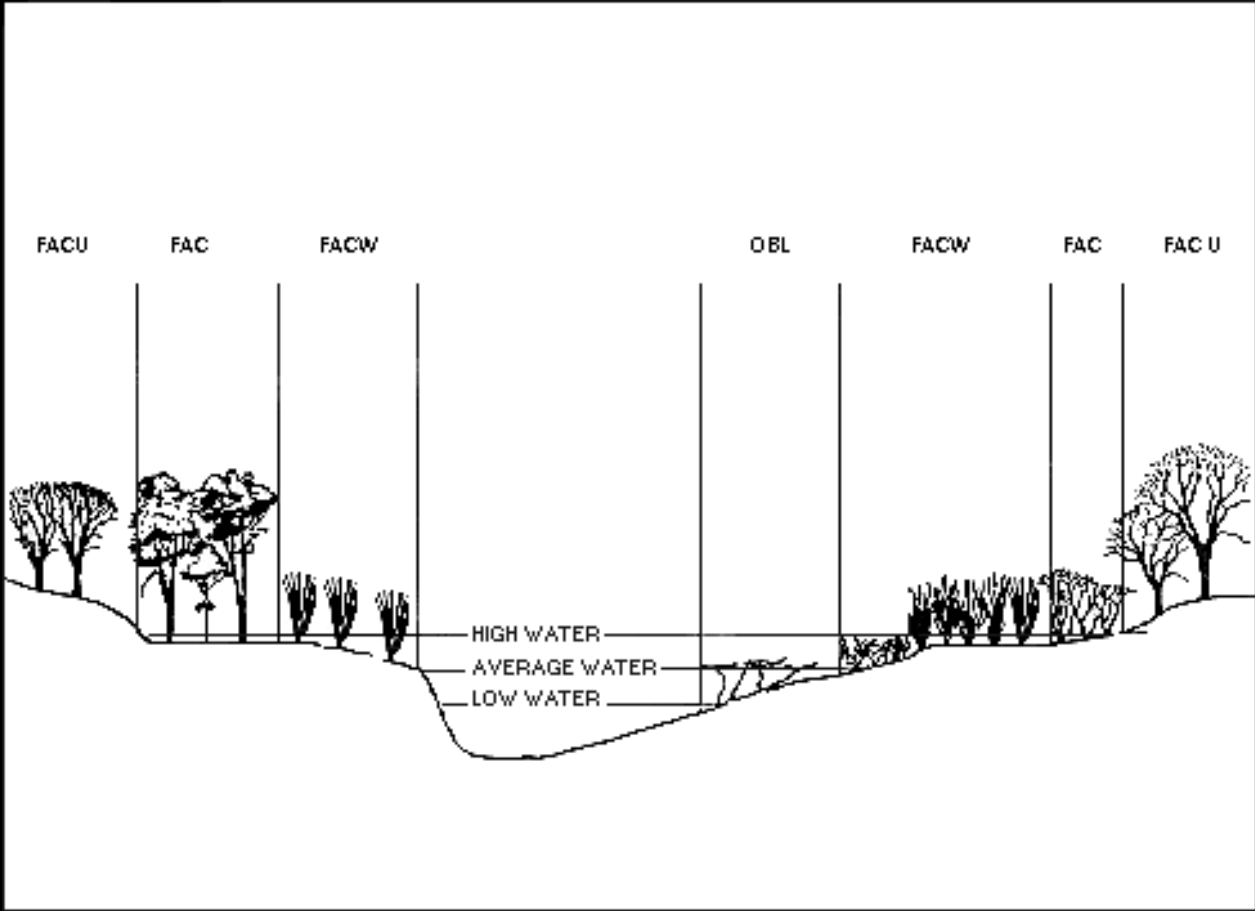
Image Archive of Central Texas Plants

http://www.sbs.utexas.edu/bio406d/PlantPics_archive.htm



Plant community structured by hydrology

Hydric Soils



Bottomland Vegetation

Above Permanent Waterline

American Elm

Honey Locust

Roughleaf dogwood

Eve's Necklace

Box elder

Buttonbush

Green ash

Baccharis

Black willow

Western soapberry

Pecan

Bur oak

Cottonwood

Sycamore

Little walnut

False indigo

Wafer ash (Hop tree)

Live oak

Mulberry

Black Hickory

Yaupon

Switchgrass

Eastern gamagrass

Big bluestem

Indiangrass

Little bluestem

Virginia wildrye

Texas bluegrass

Purpletop

Inland sea-oats

Texas wintergrass

Maximilian sunflower

Illinois bundleflower

Dogbane

Buffalograss

Herbaceous mimosa

Redbud

Gum Bumelia



Vertical structure – groundcover, understory, canopy

At Permanent Waterline, not saturated yearlong

Elder berry

Southern wildrice (Zizaniopsis)

Buttonbush

Texas Sophora (Eve's Necklace)

Dwarf willow

Cattails

Sandbar willow

Switchgrass

Black willow

Horsetail (Scouring rush)

Box elder

Soft rush

Sycamore

Bulrushes

False indigo

Sedges

Roughleaf dogwood

Bushy bluestem

Bald cypress

Smartweed

Baccharis

Cattails

Colorado River Hemp [Sesbania]

Spikerushes



In the water, or permanently saturated:

Bald Cypress

Bulrushes

Horsetail

Soft rush

Reeds

Cattails

Spikerushes

Ludwigia

Yellow Stargrass



Types of Vegetation:

Colonizers

Stabilizers

Woody

Nonequilibrium dynamics

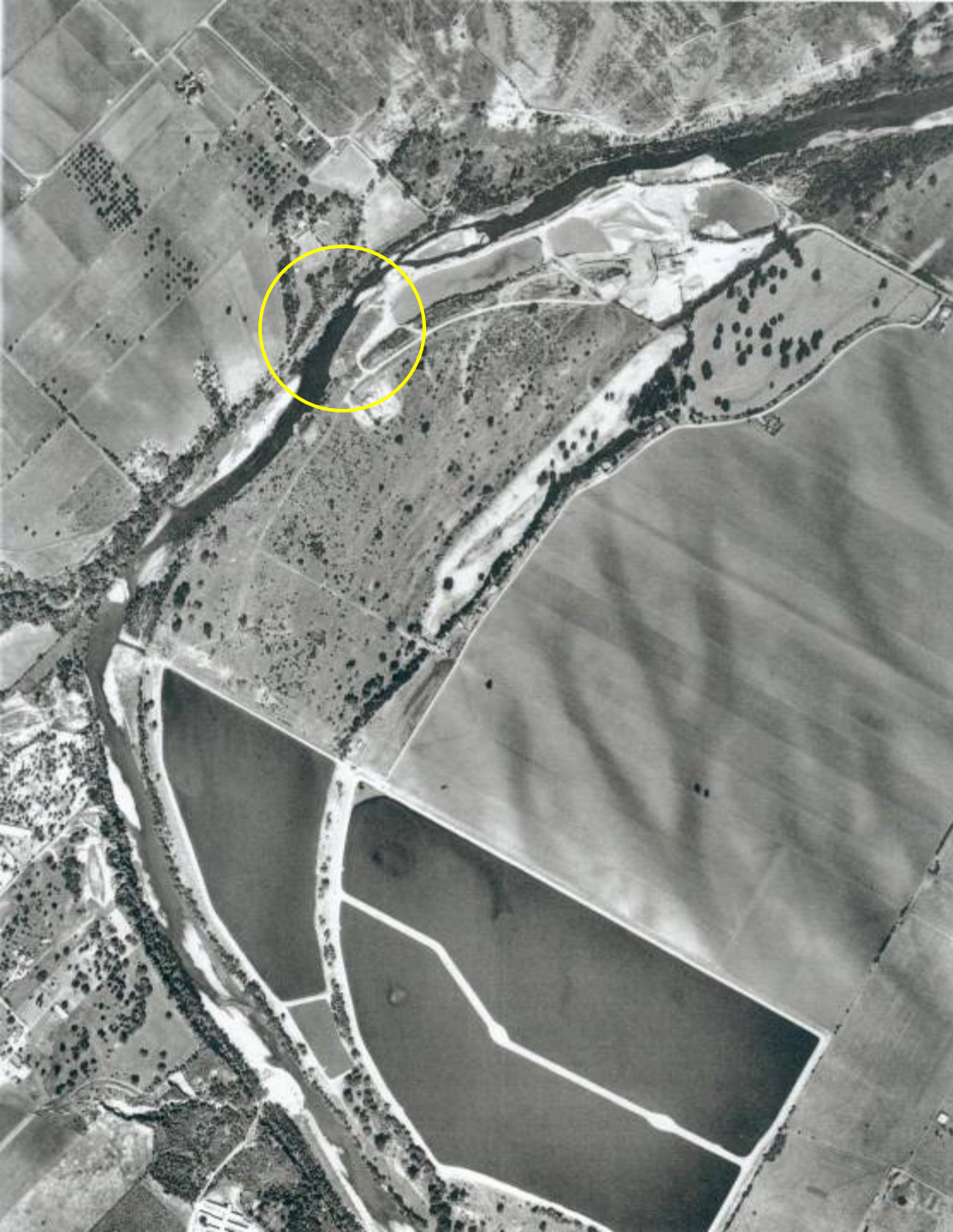






Hornsby Bend

1950



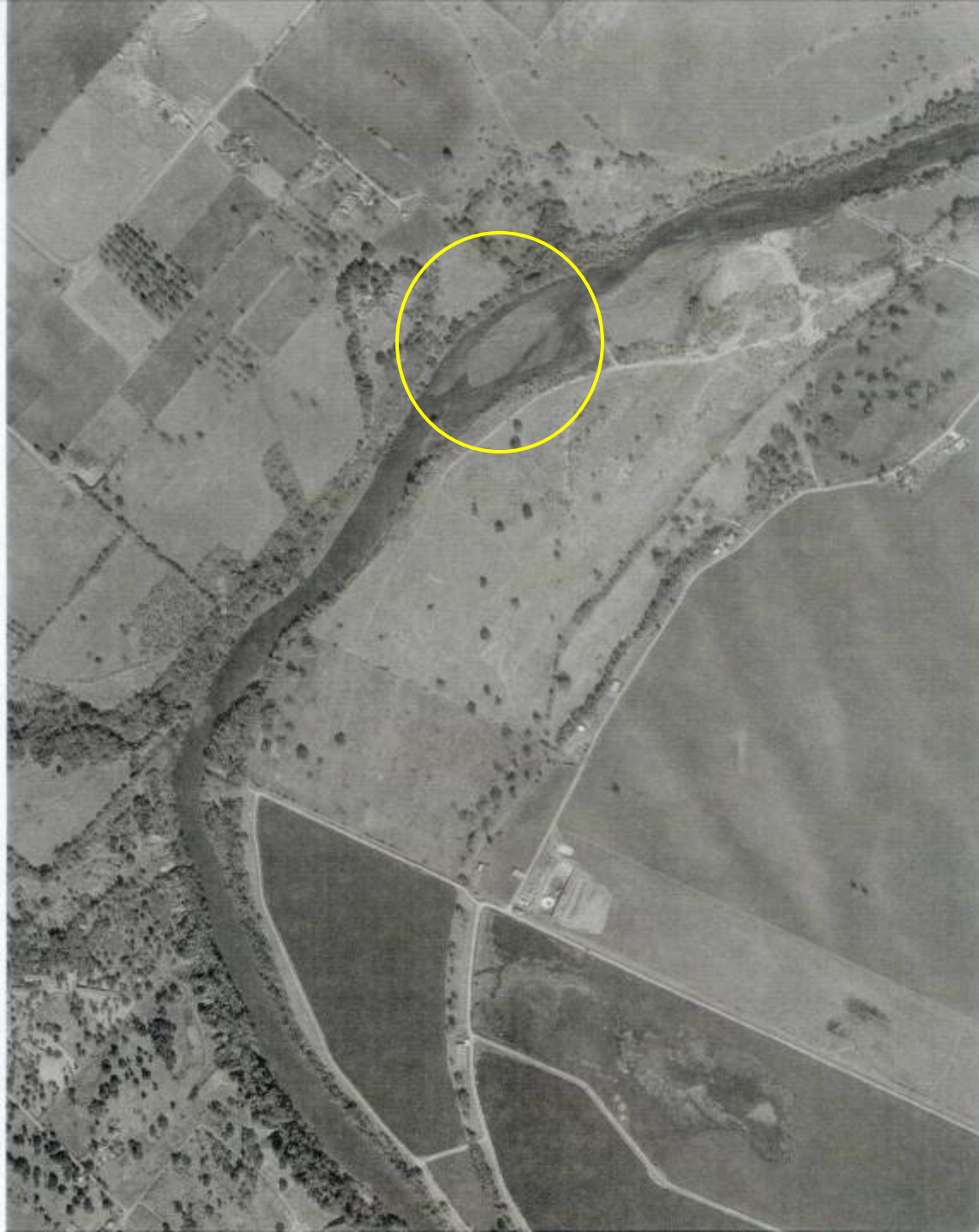
Hornsby Bend

1964



Hornsby Bend

1970



Hornsby Bend

1980



Hornsby Bend

1985

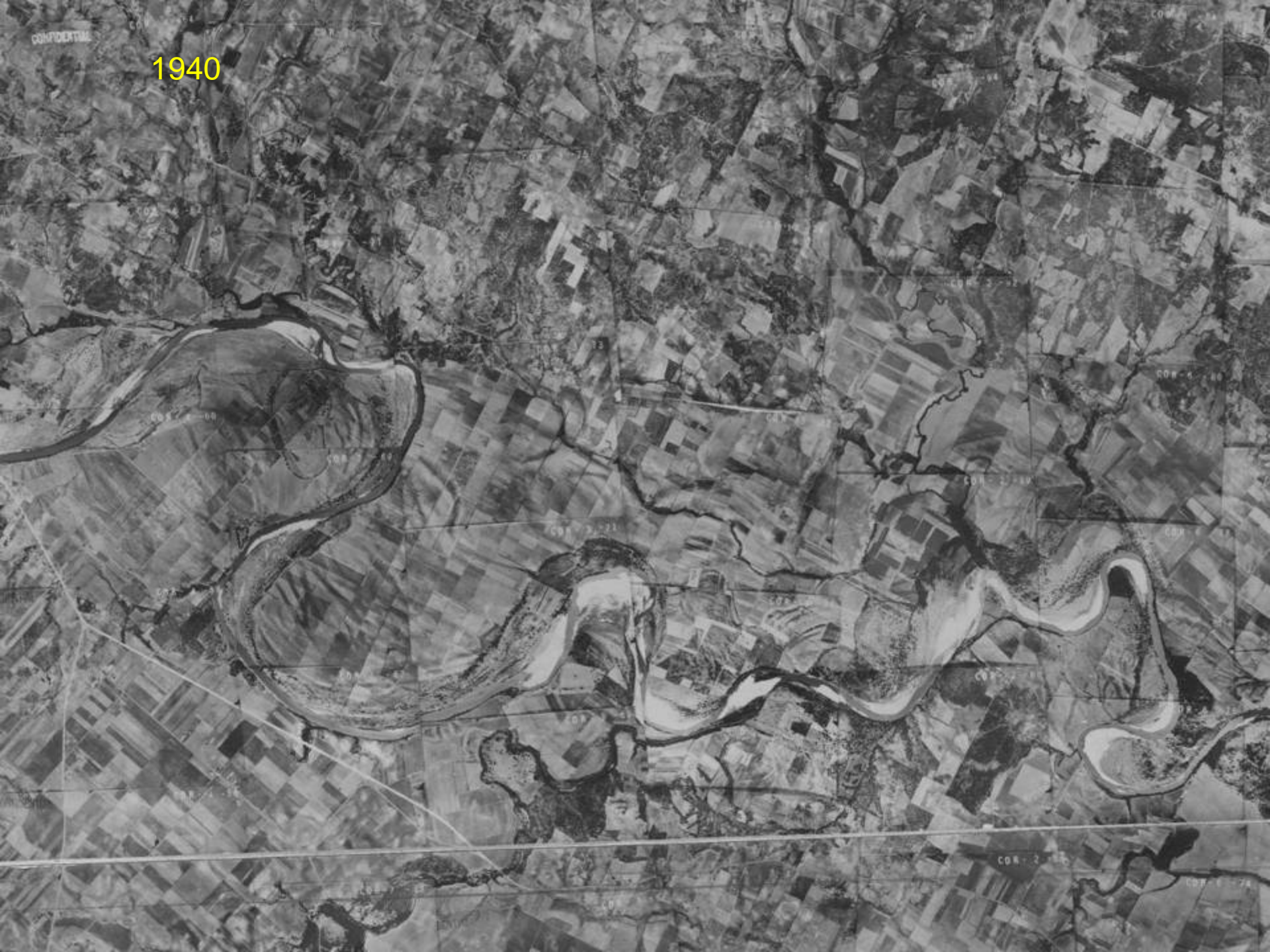


1998



CONFIDENTIAL

1940



2006



2008





1964



1983



1983



Breach

1996



2006



2006



2003



2006

2003 to 2006 Channel Movement

80 feet

130 feet

Breach

Mining Pit

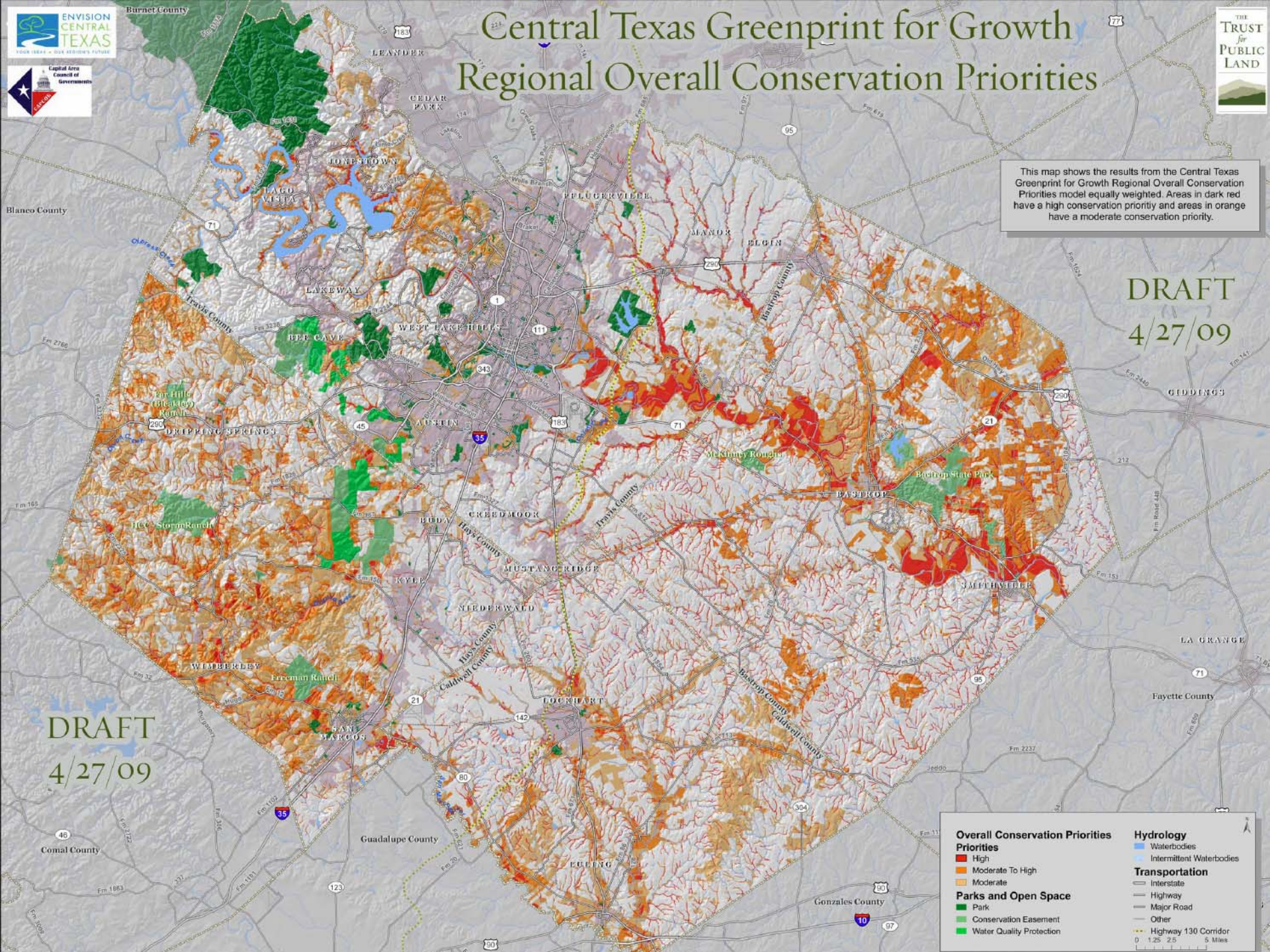


Central Texas Greenprint for Growth Regional Overall Conservation Priorities

This map shows the results from the Central Texas Greenprint for Growth Regional Overall Conservation Priorities model equally weighted. Areas in dark red have a high conservation priority and areas in orange have a moderate conservation priority.

DRAFT
4/27/09

DRAFT
4/27/09



Overall Conservation Priorities	Hydrology
High	Waterbodies
Moderate To High	Intermittent Waterbodies
Moderate	Transportation
Parks and Open Space	Interstate
Park	Highway
Conservation Easement	Major Road
Water Quality Protection	Other
	Highway 130 Corridor

0 1.25 2.5 5 Miles

The Forgotten Bottomland Forest



City of Austin



Austin Water Utility



Center for Environmental Research at Hornsby Bend

AWU-CER Lunchtime Lectures January – April 2011

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

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

Austin and the Colorado River Corridor

We begin 2011 by exploring the ecology and geography of the Colorado River Corridor. The first four Lunchtime Lectures focus on different aspects of the Colorado River – ecological, cultural, historical, and biological.

Wednesday, January 5

The Forgotten Habitat: the Biogeography of the Colorado River Bottomlands

Wednesday, February 2

Changes in the Land: The Cultural Landscape of the Colorado River Corridor

Wednesday, March 2

Discovering the Colorado: The Austin-Bastrop River Corridor Partnership 2003-2011

Wednesday, April 6

The Nature of the River: The Flora and Fauna of the Colorado River Corridor



Applause!

Questions?



City of Austin



Austin Water Utility



Center for Environmental Research at Hornsby Bend

CER Monthly Activities 2011

Join us – free events – all are invited!

River Monitoring Trip- Travis County

1st Saturday of Every Month - All day [meet at CER 8am]

HBBO Bird Survey

2nd Saturday of Every Month 7am-11am and 4pm-dark

Birding Field Trip - Travis Audubon Society

3rd Saturday of Every Month 7:30am-11am

River Monitoring Trip – Bastrop County

3rd Saturday of Every Month - All day [meet at CER 8am]

Lunchtime Lecture Series – a free monthly public lecture about different aspects of Austin’s ecology, the 1st Wednesday of the month at Waller Center 625 East 10th Street between Red River and I-35, Room 104 NOON-1PM – bring a lunch and learn!

Ecological Literacy Days – three hours of outdoor volunteer work and an hour of ecological education on the last Saturday of every month at Hornsby Bend [9am-1pm]