

Texas Ecoregion Puzzle



Grades: 4-8, Biology, Environmental Systems, Aquatic Science

TEKS:

- 4: 1A & C-G, 3A-C, 5A & D & F-G, 11A-B, 13A
- 5: 1A & C-G, 3A-C, 5A & D & F-G, 11, 12A & C, 13A
- 6: 1A & C-G, 3A-C, 5A & D & F-G, 11A & B
- 7: 1A & C-G, 3A-C, 5A & D & F-G, 11B
- 8: 1A & C-G, 3A-C, 5A & D & F-G, 12C
- BIO: 1A & C-G, 3A-C, 4A, 13D
- ES: 1A & C-G, 3A-C, 4A, 5A, 11A-B
- AS: 1A & C-G, 3A-C, 4A, 10A, 14D

Topics:

- Adaptations
- Biodiversity
- Agriculture
- Habitats and Ecosystems
- Human Activity/Environmental Impacts
- Landforms
- Natural Resources
- Plants
- Renewable/Non-renewable
- Soil
- Wildlife

Methodologies:

- Poster/Visual Aid
- Research

Setting: Classroom

Activity Time: 45-60 minutes

Additional Subjects: Art, ELAR, Social Studies

Objective:

Students will identify animals, plants, and habitats that exist among the ecoregions of Texas. Ecoregion biodiversity will provide reasons for making good choices regarding stewardship practices.

Materials:

Provided

- Gould Ecoregions of Texas* map
- Ecoregion Cutouts (10)
- Ecoregion Fact Sheets (10)
- C.A.R.E. Acronym page

Not Provided

- Pencils
- Crayons or markers
- Research materials

Vocabulary:

adaptation, caretaker, conservation, biodiversity, ecoregion, ecosystem, habitat, native, non-renewable, renewable



Texas Ecosystem Puzzle

Background:

Texas is divided into 10 natural ecoregions that provide great biodiversity throughout the state, with each ecoregion having its own distinctive characteristics. An ecoregion consists of a recurring pattern of ecosystems associated with combinations of landforms, wildlife, and plants that characterize that region. Each ecosystem is made up of living (biotic) and nonliving (abiotic) things in an area. Through researching and studying similarities and differences between each ecoregion, students can discover how nature and human impact have shaped our state.

Texas is quite unique from most states because of its size and geographic location. Covering 266,807 square miles, its large land area has major differences in rainfall, climate, and habitat biodiversity. Southern habitats are subtropical whereas those to the north are temperate. Rainfall varies from an average of 8 inches in West Texas to about 56 inches per year in East Texas. In addition, our state has vast topographical biodiversity with 91 mountain peaks that average a mile or more in height.

Texas' ecoregions are the Pineywoods, the Gulf Prairies and Marshes, the Post Oak Savannah, the Blackland Prairies, the Cross Timbers, the South Texas Plains, the Edwards Plateau, the Rolling Plains, the High Plains, and the Trans-Pecos.

Activity Preparation:

- Make one copy of each of the provided *Ecoregion Cutouts* (10 in total).
- Post the provided *Ecoregions of Texas* map in the classroom or project it onto a screen or wall.
- Post the provided C.A.R.E. Stewardship Acronym page.

Procedure:

Discussion

1. Engage students by telling them to think of the posted map of Texas as a giant puzzle. Provide some information from the background section and explain that watching the following video will help them understand how diverse the ecoregions of Texas are. This YouTube video explores the last “wild” places in Texas and why they must be preserved, as it briefly discusses regions of Texas. [Keep Texas Wild: Introduction - Texas Parks and Wildlife](#) (2:54)
2. Discuss how the video talked about the importance of conserving and protecting our wildlife and their habitats. Introduce or review the term “steward” as a person who is responsible for taking care of or protecting something.
3. Post the provided stewardship acronym, C.A.R.E. Go over each letter to give students examples of actions we can all do to be good land stewards.

- C Care for the protection of wildlife and their habitats.
- A Act to become a caretaker or steward of water, land, and animals.
- R Represent stewardship by being a positive role model for others.
- E Educate others about stewardship and conservation.

4. Ask students how they could be stewards toward the wildlife, such as the deer, bird, prairie dog, or even the plants they saw in the video. Point out that wildlife consists of plants or animals that live in nature and do not have caretakers.

What might they do to help others understand why it is important to be a steward?

Activity

1. Arrange students into 10 groups, one group for each ecoregion.
2. Assign each group an ecoregion and give each the provided *Ecoregion Cutout* of their region. Students are to think of the cutout as a piece of a puzzle that fits on the posted map of Texas.

Grades 4-8 – Provide each group with the aligning Fact Sheet for their ecoregion.

3. Students will illustrate their cutout, by identifying characteristics that exist with each ecoregion. Allow each group to select 3-6 items from the list below to include and illustrate on their ecoregion cutouts, or select the preferred information ahead of time.

Grades 4-8 – Each group will use the provided fact sheet for reference.

High School – Each group will conduct its own research.

- Average rainfall, temperature, and elevation
- One plant and animal that is native to Texas, including their habitats and adaptations needed to survive within that ecoregion
- Soil types
- Agricultural crops
- Rivers, lakes, mountains, valleys, woods, swamps, canyons, marshes, plains, deltas, sand dunes, prairies, wetlands, etc.
- Renewable and nonrenewable resources

4. Give each group enough time to prepare their cutout and to plan a presentation to share with the class, including why it is important to act as stewards for their specific ecoregion.

If desired, the following Texas Parks and Wildlife YouTube videos can be viewed by individual groups or as a class to discover more about ecoregions. Note: Not all Texas Ecoregions have a corresponding video.

- [Keep Texas Wild: Pineywoods - Texas Parks and Wildlife](#) (8:23)
- [Keep Texas Wild: Gulf Coast - Texas Parks and Wildlife](#) (6:05)
- [Keep Texas Wild: Blackland Prairie - Texas Parks and Wildlife](#) (5:23)
- [Keep Texas Wild: Edwards Plateau - Texas Parks and Wildlife](#) (8:47)
- [Keep Texas Wild: South TX Plains - Texas Parks and Wildlife](#) (7:52)
- [Keep Texas Wild: Panhandle - Texas Parks and Wildlife](#) (7:43)
- [Keep Texas Wild: Trans-Pecos - Texas Parks and Wildlife](#) (6:46)

5. As each group presents its cutout, one group member will place their ecoregion piece amongst the others on the wall to create a complete Texas ecoregion map. Once complete, have students identify the ecoregion where their school is located.

6. Introduce or review the term “biodiversity” as the variety of life in the world or in a particular habitat or ecosystem. Ask students the following questions:
- How does your cutout provide an example of biodiversity?
 - How does your cutout serve as an example of the stability and health of the biotic and abiotic things within the ecosystem?
 - Can you predict how the effects of human activity, such as building highways, housing developments, and shopping centers have caused changes in these ecoregions, regarding urban development and the future of native wildlife?
 - a. How might these activities impact water bodies that eventually empty into the Gulf of Mexico?
 - b. What might animals (biotic) be forced to compete for with other animals to survive? What abiotic factor might the same animals be forced to compete for to survive?

High School – If desired, ask students to evaluate the effects human activities have had on their assigned ecoregion by assigning at least one of the following topics to each group. Allow time for further research and for student findings.

Question: How have these activities changed the environment, including native wildlife?

- Habitat restoration projects
- Species preservation efforts
- Nature conservancy groups
- Hunting
- Fishing
- Ecotourism
- All-terrain vehicles
- Small personal watercraft

Wrap-up

After the last group has presented, show the following YouTube video to students as a conclusion to the lesson. It briefly describes the statewide Conservation Action Plan for the future mentioned in the introductory video.

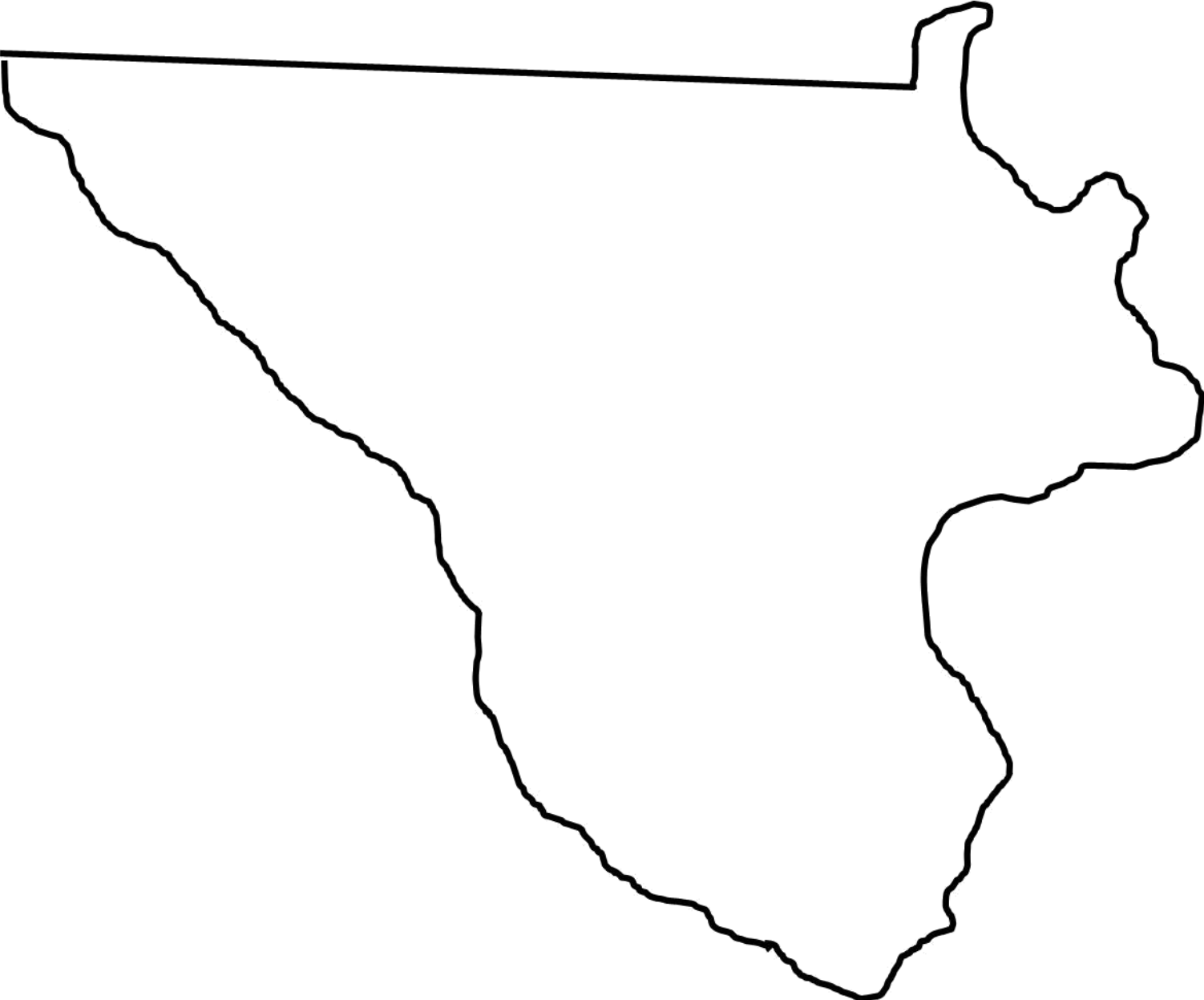
[Keep Texas Wild: Conclusion – Texas Parks and Wildlife](#) (2:00)

After the video, facilitate a discussion about good stewardship within our ecoregions. Ask students to talk among themselves and to share with the class things they could do as good acts of stewardship, regardless of the ecoregion they live in.

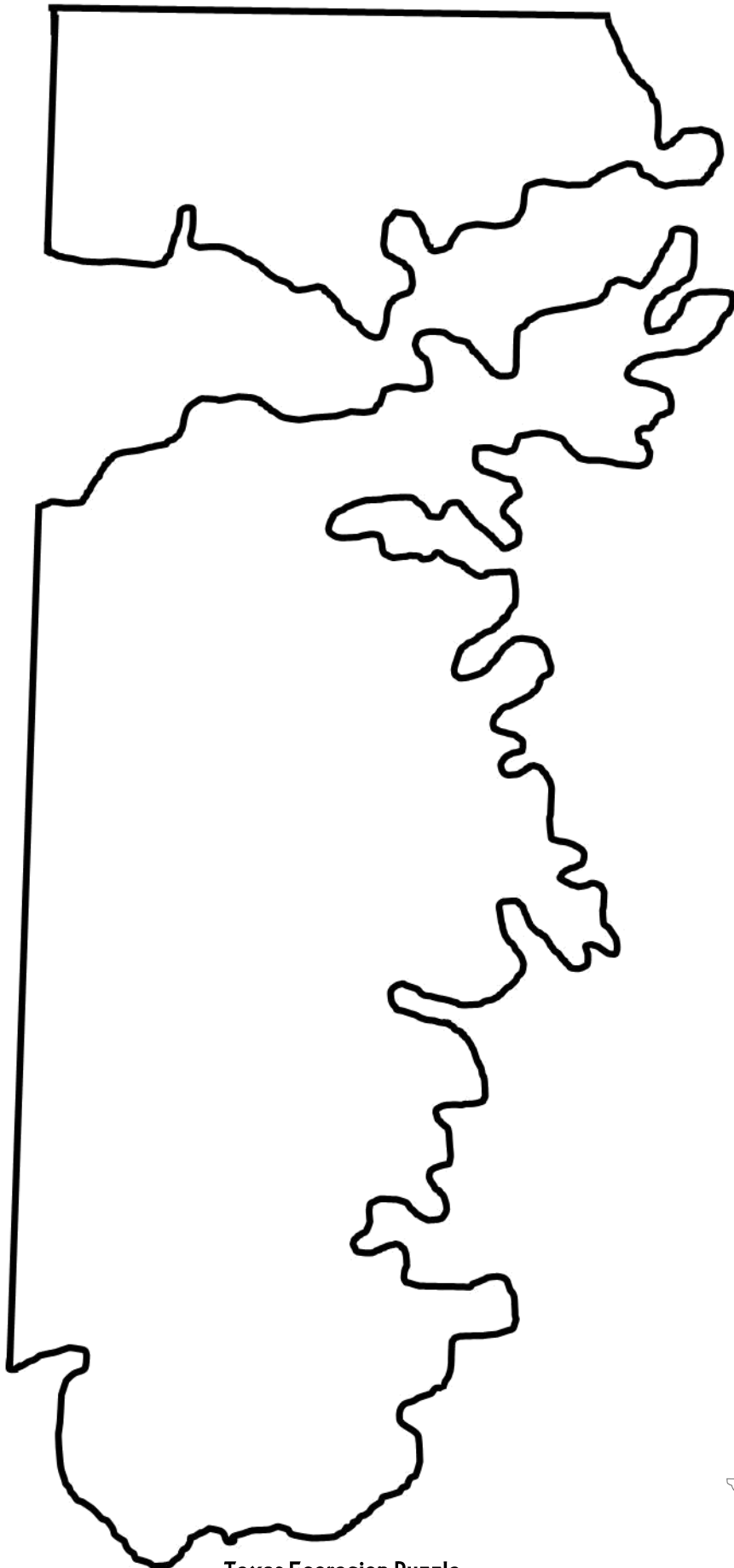
Extension:

Instruct groups that chose a native plant or animal to briefly compare theirs to an animal from another group.

Trans-Pecos Region

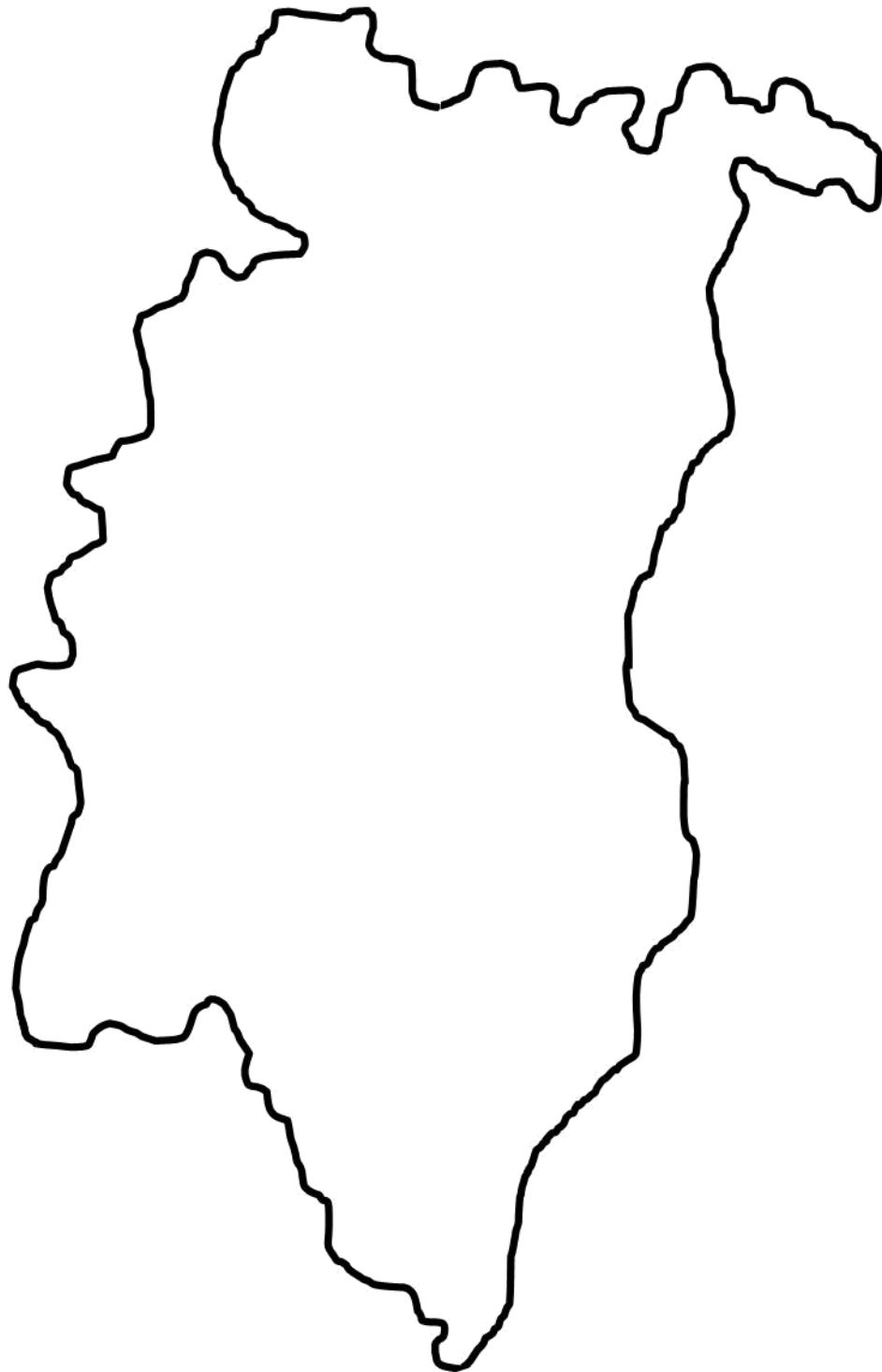


High Plains Region

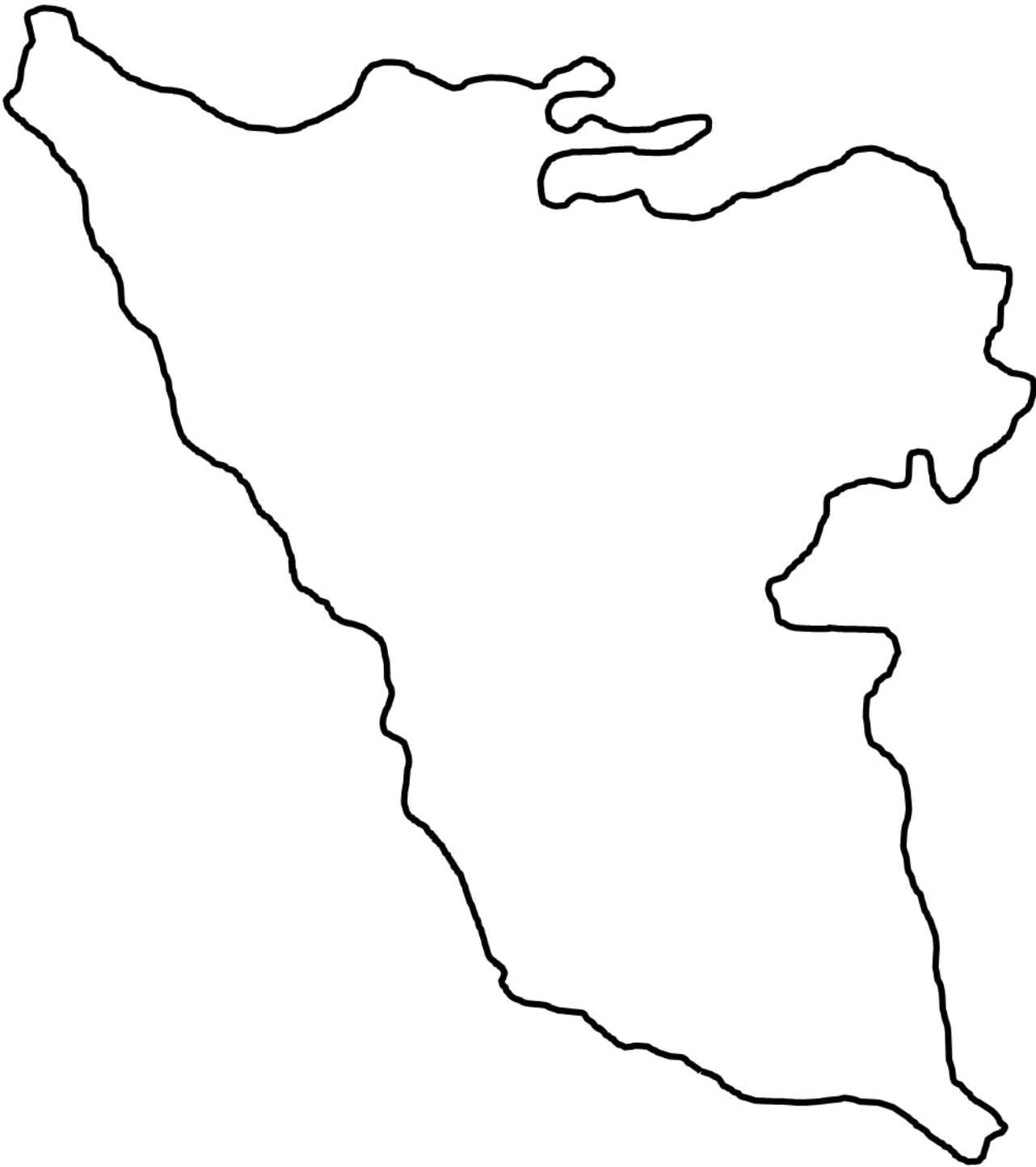


Texas Ecoregion Puzzle
Texas Wildlife Association

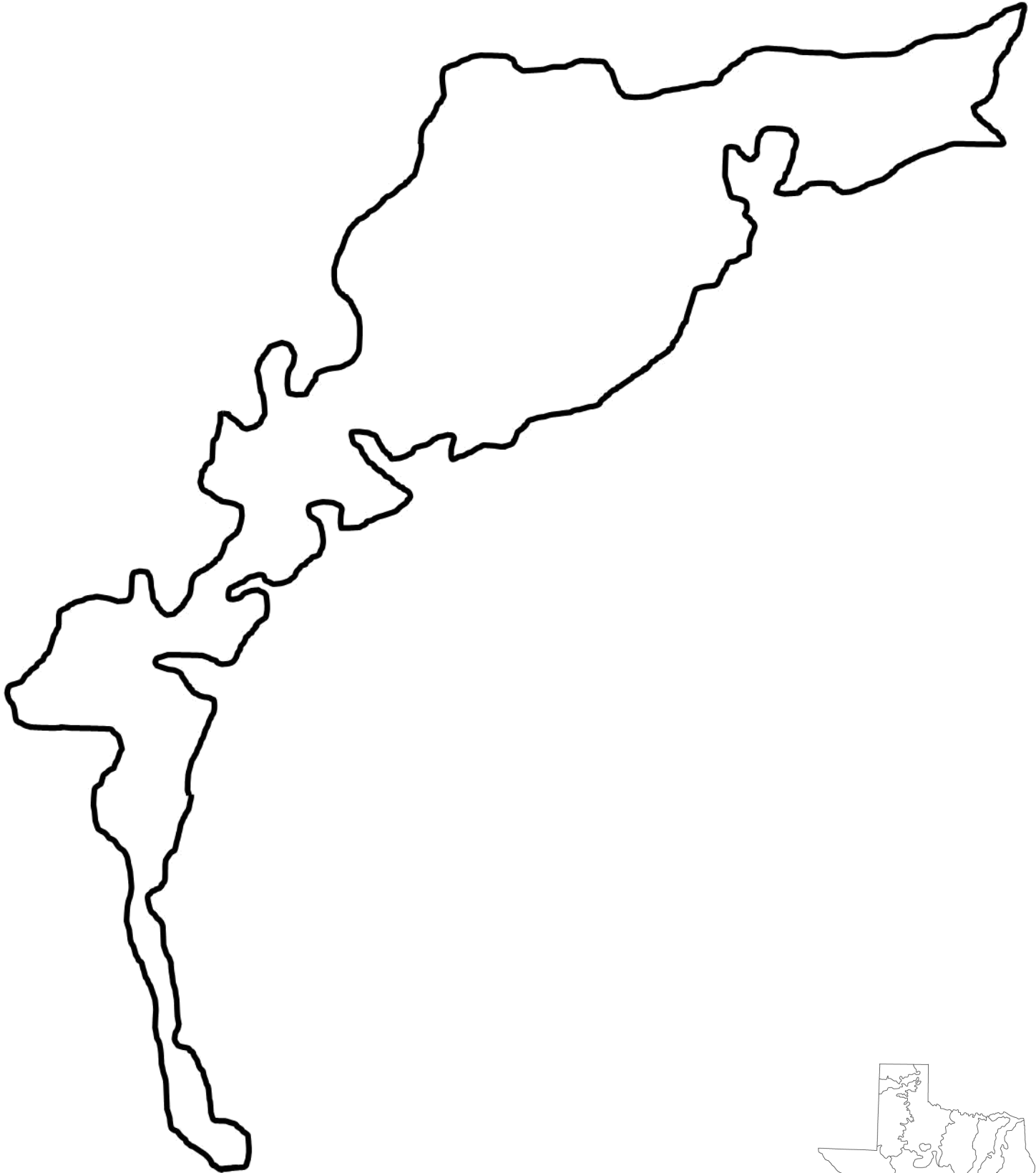
Cross Timbers Region



South Texas Plains Region

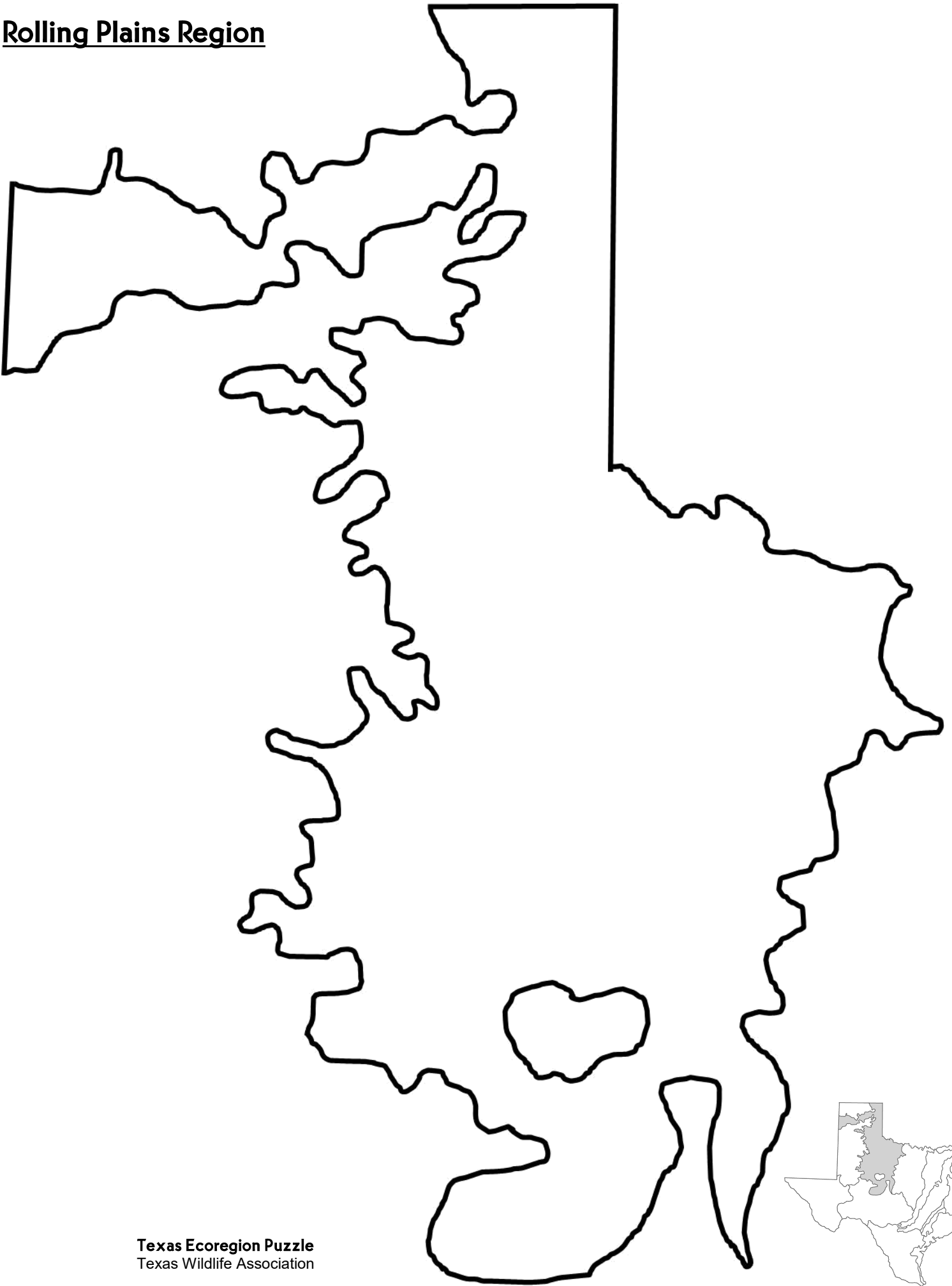


Gulf Prairies Region

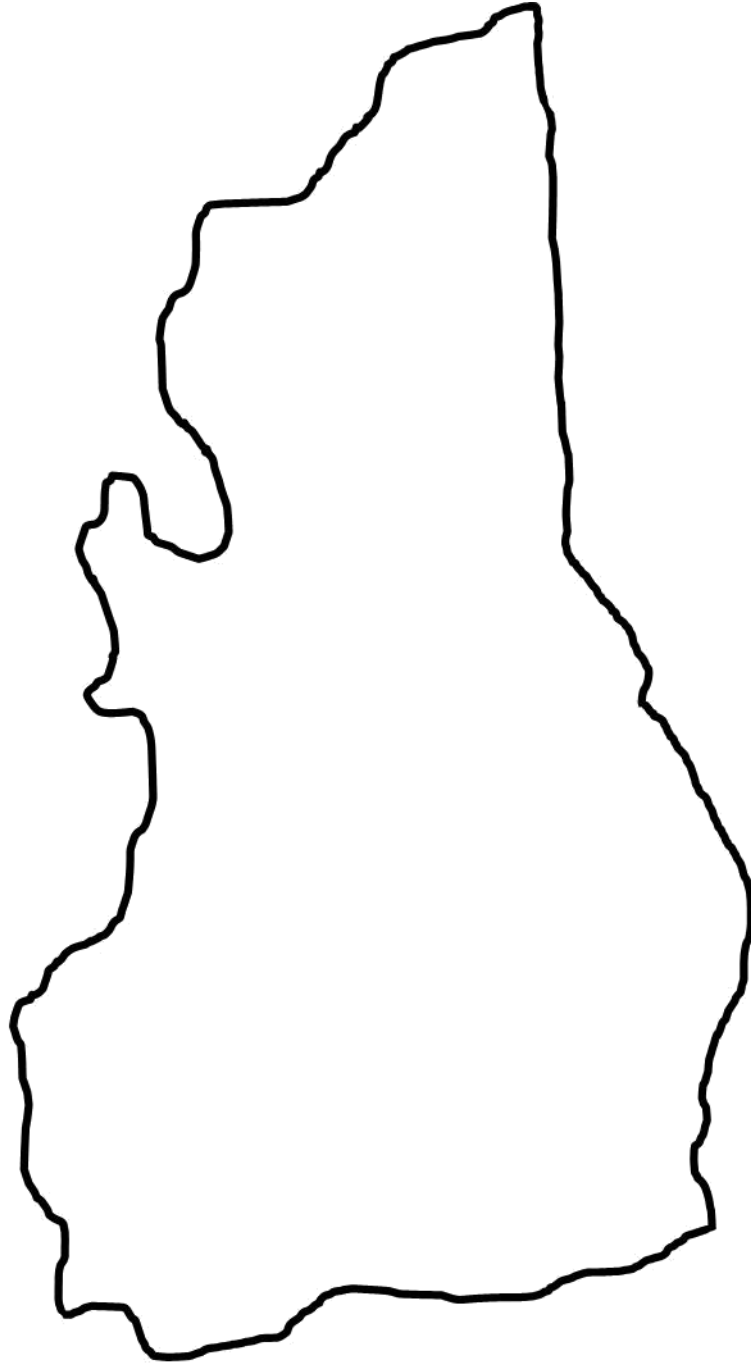


Texas Ecoregion Puzzle
Texas Wildlife Association

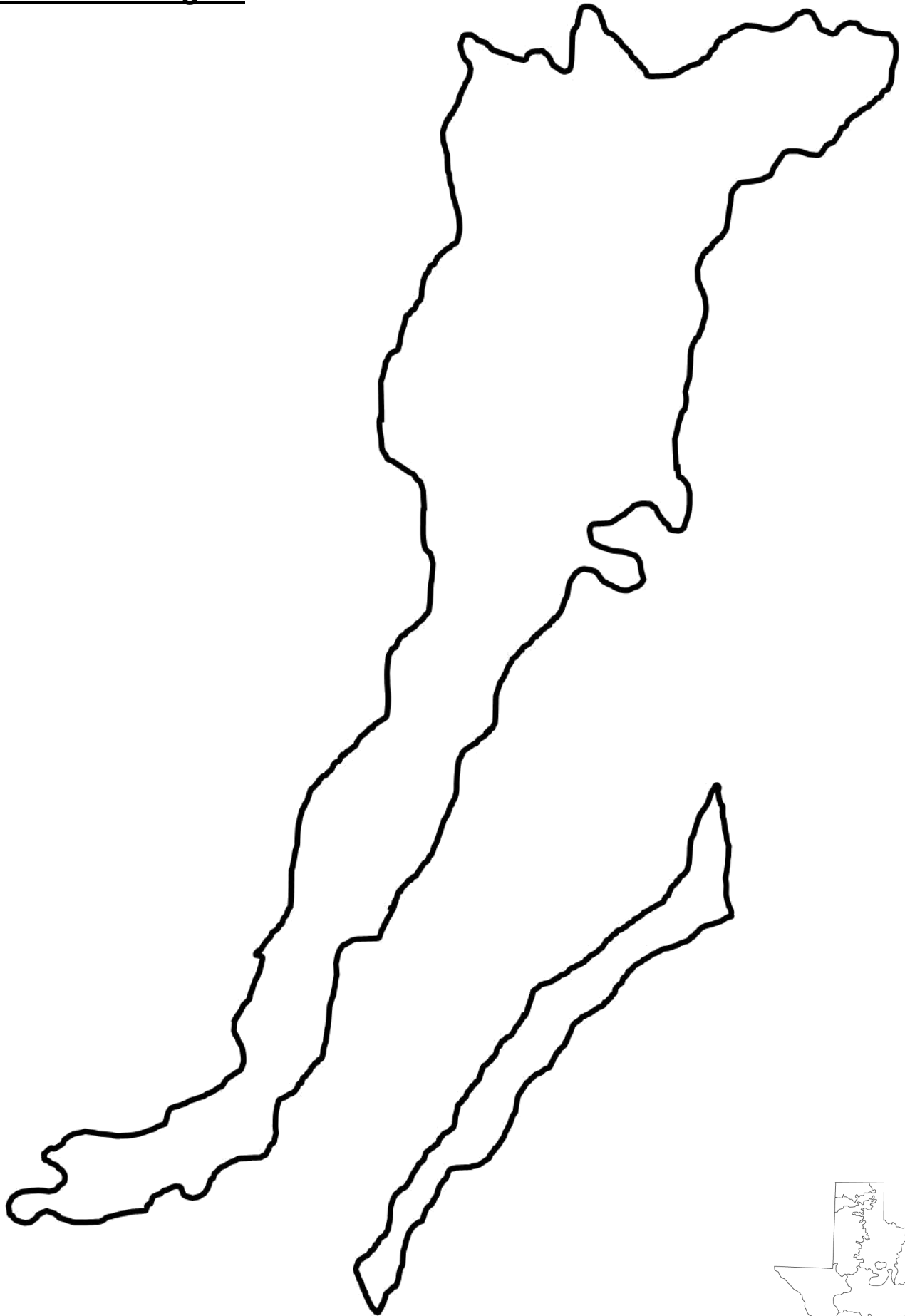
Rolling Plains Region



Pineywoods Region

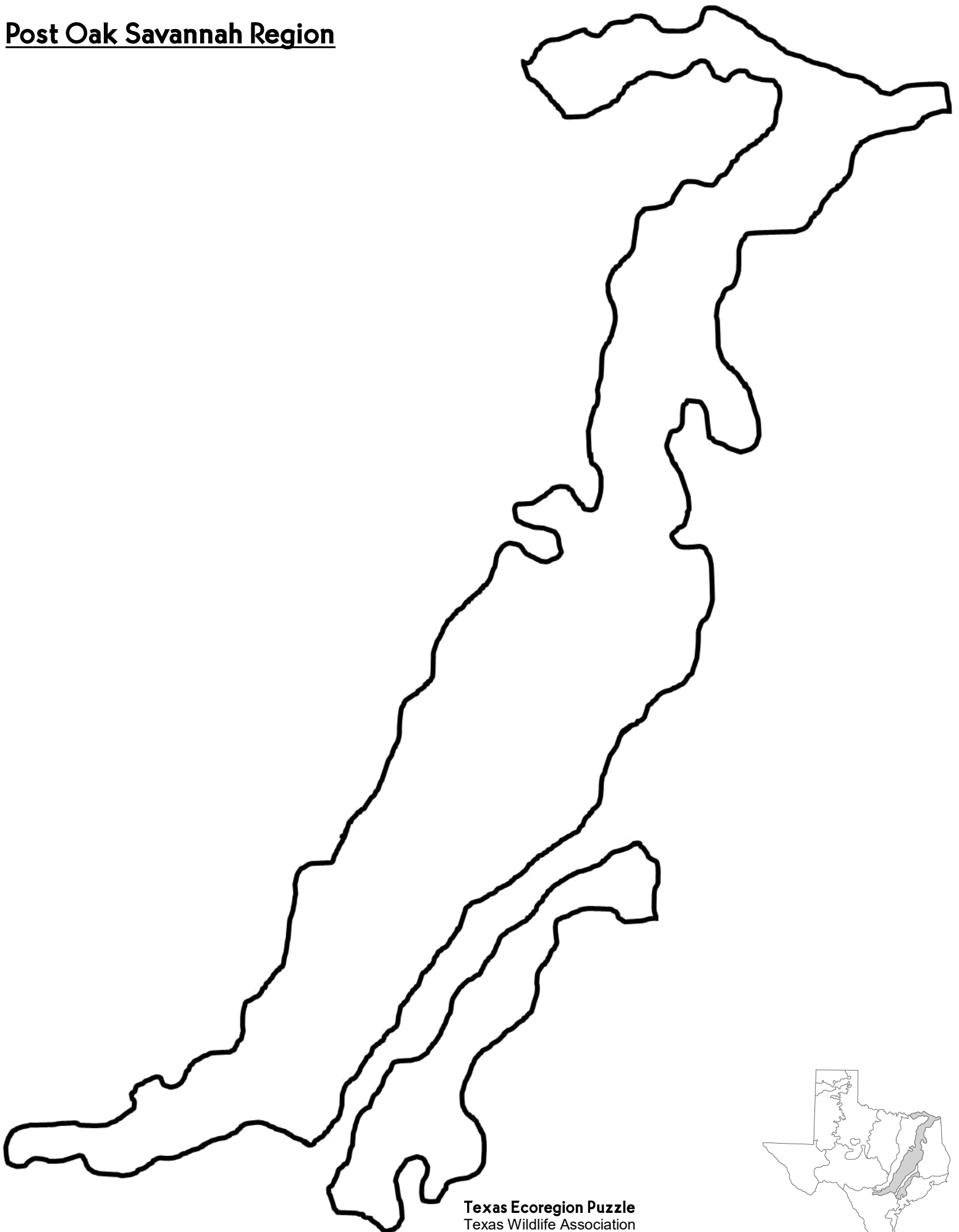


Blackland Prairie Region



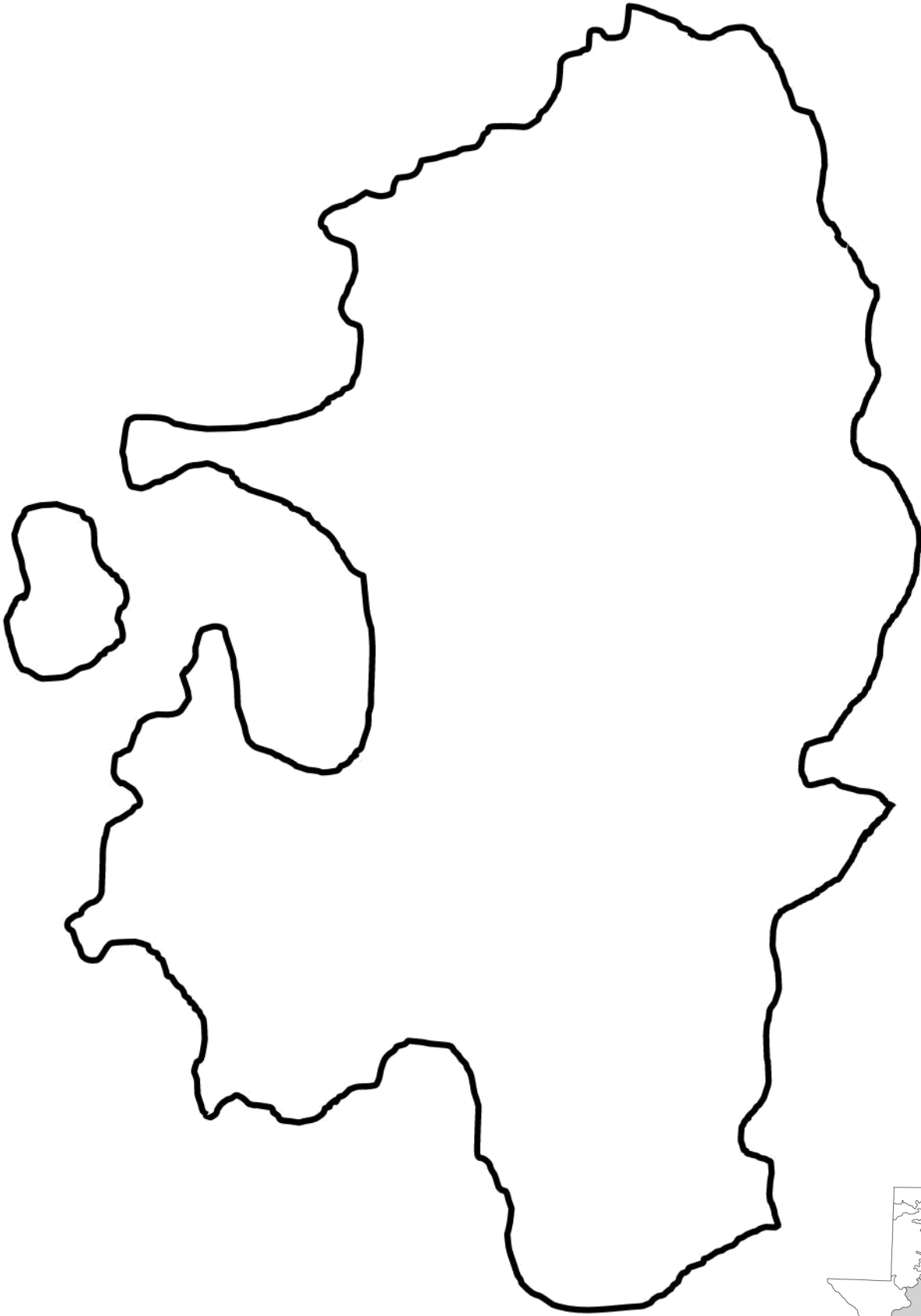
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Post Oak Savannah Region



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Edwards Plateau Region



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Blackland Prairie



Elevation

Elevation ranges from 300 feet in the southern portion to 800 feet above sea level in the north.

Precipitation

The average rainfall is approximately 35 inches in the western counties to 45 inches in the eastern counties.

Topography

Topography ranges from gently rolling hills to level land. Forested areas are typically restricted to drainages and waterways.

Soils

The region is underlain by Upper Cretaceous marine chinks, limestone, and shale which give rise to the development of the characteristic black, heavy clay soils, along major rivers, and tributaries a slightly sandier soil.

Vegetation Description

The Blackland Prairie is a true prairie grassland community that is dominated by a diverse assortment of perennial and annual grasses. The soil is considered some of the richest soil in the world. Live oaks are the trees that dominate a large part of this eco-region. The northern and central portions of this area are predominately comprised of post oak, blackjack oak, American elm, winged elm, cedar elm, sugarberry, green ash, Osage-orange, honey mesquite, and eastern redcedar. In addition to the species listed for the northern and central areas, the southern area is comprised of live oak and Ashe juniper. Pecan, black walnut, black willow, American sycamore, honey locust, and bur oak are commonly found in bottomland woodlands throughout this region.

Impacts of Fire

Prior to human settlement, fire and grazing by bison were probably the two most important factors in the overall maintenance of the Blackland area. Native Americans most likely influenced the area greatly by burning the landscape. Fires were typically very large and would burn until conditions or landforms would contain them. For the most part, fires in this eco-region no longer greatly impact vegetation. As grazing land increased over the years and with the addition of urban sprawl, fire no longer is a major factor in the maintenance of the Blackland prairies. However, the lack of wildfire has had an effect. Due to fire suppression and cattle grazing, honey mesquite, Ashe juniper, eastern red cedar, and other fire-intolerant species of woody vegetation are rapidly spreading throughout this region.



Cross Timbers



Elevation

Elevation ranges from 400 feet above sea level in the Trinity River basin to over 1,700 feet in the west.

Precipitation

Tarrant County in the east receives 32 inches of rain per year while Wichita County in the northwest averages 27 inches per year.

Topography

This eco-region is hilly, rolling, and well-drained. In the center of this region, there is more variation in topography and ranching is more common, whereas the northern and southern regions contain flatter areas and agriculture is more prevalent.



Soils

The Cross Timbers soils are neutral to acidic whereas the prairie soils are alkaline. This is why post oaks grow in the Cross Timbers and not the prairies.

Vegetation Description

The Cross Timbers eco-region is a transitional area between the once prairie, now winter wheat growing regions to the west, and the forested low mountains or hills of eastern Oklahoma and Texas. It is a mosaic of forest, woodland, savanna, and prairie. The Cross Timbers eco-region is not as suitable for growing corn and soybeans as the Central Irregular Plains to the northeast. The transitional natural vegetation of little bluestem grassland with scattered blackjack oak and post oak trees is used mostly for rangeland and pastureland. Streamside areas contain bottomland forests of such species as pecan, bur oak, American and slippery elm, ashes, cottonwood, sugarberry, and black willow. Texas ash has been found in the lower wetter areas. The more upland sites in the prairie region contain little woody vegetation unless the fire has been eliminated. Upland sites in the Cross Timbers predominantly contain post oak, blackjack oak, cedar elm, juniper, sugarberry, Texas red oak, and in the Cross Timbers escarpment, live oak. On the top of the hillside, it is common to find post oaks mixed with live oaks. On many hillsides where fire has been eliminated, there is a mix of Ashe junipers, Spanish oaks, and red oaks. Most junipers in this area are Ashe junipers, and there are occasional eastern red cedars in the eastern areas of this eco-region.



Impacts of Fire

Fire has a major impact on vegetation, especially in prairie areas. Traditionally these were fire-dominated regions and periodic burns kept much of the woody vegetation at bay, which favored the growth of grasses. As fire has been eliminated, much of this area has been invaded by woody vegetation such as juniper and mesquite and is no longer a prairie. Within the wooded areas, fire often kept the understory clear and open.



Edwards Plateau



Elevation

Elevation ranges from 600 feet above sea level in the eastern canyons to 3,000 feet above sea level in the ridges of the central and western regions.

Precipitation

Because of the elevation drop-off at the edge of the Edwards Plateau as well as its location between the dry western plains and the moist prairies and woods to the east, average rainfall varies widely from 23 inches per year to 35 inches per year.



Topography

The central and northern portions of the Edwards Plateau as well as the upland ridges of the southern and eastern portions contain round, often rolling hills.

Soils

Most of the Edwards Plateau contains mottled yellowish clay to clay loam surface soil which quickly turns into rocky clay or solid limestone rock layers beneath the surface. Erosion has left most of the region with very shallow soils of less than 10 inches.

Vegetation Description

The Edwards Plateau is characterized by a combination of tall, medium, and short grasses, often intermixed into a woodland or forest setting with hardwood trees such as escarpment live oak, Texas oak, honey mesquite, and with coniferous Ashe juniper. Protective canyons, especially on the eastern and southern portions of the plateau, provide for a great diversity of other hardwood species such as Texas madrone, escarpment black cherry, Texas mountain-laurel, Mexican plum, Carolina basswood, lacey oak, and bigtooth maple. Springs and creeks found in these canyons are typically lined with bald cypress, sycamore, and black willow.



Impacts of Fire

Prior to heavy settlement, fire played a major role in shaping the vegetation on the Edwards Plateau. The fire occurred on most of the land every 4-7 years. During this interval, Ashe juniper was kept out of most uplands by fire and dense grass competition. Other trees such as escarpment live oak and honey mesquite were kept more isolated among the grasses. In these cases, older trees or groups of trees could either withstand wildfires or inhibit their spread because they are generally more fire-resistant than grasses. Concentrated livestock grazing which reduced the fire-carrying grasses, allowed trees, especially Ashe juniper to expand into the open areas. Protected canyons and moist, north-facing slopes reduced the number of damaging fires which allowed many trees to persist prior to human settlement.



Gulf Prairies



Elevation

Elevation in the Gulf Prairies ranges from sea level or slightly below along the Gulf Coast to about 400 feet above sea level.

Precipitation

North-easternmost portions of this region receive around 56 inches of rain per year while south-western areas receive around 23 inches per year.

Topography

Topography is considered flat to less prominent as elevation increases inland. Mesquite is dominant in many sites throughout the region, regardless of other factors. Bottomland areas near creeks or rivers will often support larger hardwoods that are not found elsewhere in the region. As elevation increases and rainfall decreases away from the Gulf Coast, soil water content is often lower, supporting mainly species that are more drought tolerant.



Soils

Soils throughout this region are primarily sand-based. Mudflats near the Gulf Coast often have high salt content and only support vegetation such as salt grass. Mesquite can be found anywhere in the region, regardless of soil type or quality, whereas most large hardwoods are found primarily in the moist soils of the creek and river bottomlands.



Vegetation Description

Vegetation is somewhat varied throughout the Gulf Prairies region. Areas to the north and nearer to the Gulf Coast typically have slightly cooler summer temperatures and slightly warmer winter temperatures than do areas to the south and further inland. Live oak tends to be a major component of the region, especially north of the Nueces River and nearer the Gulf Coast. Other trees and shrubs common in the region include mesquite, huisache, Texas persimmon, blue wood, spiny hackberry, black brush, and ebony, among others. Larger hardwoods such as sugarberry, pecan, and gum bumelia are common in low-lying areas near rivers and creeks.

Impacts of Fire

Fire has had minimal impact in this area in the past, because of agricultural practices. Additionally, damage caused by fire has been minimal because prescribed fire is used as a tool for range management for cattle operations and wildlife management. Controlled fires in open areas have benefited the area by clearing up surface fuels, allowing for better horizontal space among those fuels. Tree mortality after a wildfire is minimal because fires in this region are mostly wind-driven with rapid rates of spread.

Grass/brush-type vegetation mixed with live oaks and mesquite make up the predominant carrying fuels. The biggest impact of fire on this ecoregion is not on natural resources; but, because of increased building in the Urban/Wildland Interface, fires have the capacity to have a devastating impact on residential homes and other such properties in these former predominantly rural areas. In general, though, in the past, fire has had a positive impact on this ecoregion because of normal weather conditions, agricultural practices, and range management techniques prominent in this area.



High Plains



Elevation

Elevation ranges from 600 feet above sea level in the eastern canyons to 3,000 feet above sea level in the ridges of the central and western regions.

Precipitation

Because of the elevation drop-off at the edge of the Edwards Plateau as well as its location between the dry western plains and the moist prairies and woods to the east, average rainfall varies widely from 23 inches per year to 35 inches per year.

Topography

The Texas Panhandle is the northwesternmost geographical region of Texas. New Mexico limits its western border, as does Oklahoma to the north and east. The flat north and west regions of the Panhandle are referred to as the Llano Estacado. This plain is one of the largest and most completely flat areas of its size in the world. Extending from Canyon to Silverton is the Palo Duro Canyon, America's second largest canyon. The canyon is approximately 120 miles long, 20 miles wide, and 800 feet deep. Early Spanish explorers are believed to have discovered the area and dubbed the canyon "Palo Duro" which is Spanish for "hardwood" which refers to the abundant mesquite and juniper trees.



Soils

The soil in the High Plains is primarily heavy, clay above an impervious caliche layer with some sand found in the eastern panhandle. Soils are alkaline throughout the area which limits the types of trees that can be grown successfully.



Vegetation Description

The High Plains region is primarily a short-grass prairie, also known for its shrubby mesquite, juniper, cottonwood, and agricultural crops. It is predominantly grassland; juniper, cottonwood, and mesquite are predominant tree species. The rim of the Palo Duro Canyon is considered part of the short grass prairie while the elevated moisture of the canyon floor supports a greater diversity of plants including some medium and tall grass species along with shrubs and trees. Common plant species include sideoats grama, big bluestem, Indian blanket, star thistle, fragrant sumac, mesquite, cottonwood, western soapberry, and hackberry trees.

Impacts of Fire

Early Native Americans understood the use of fire to improve the grasslands of the panhandle. Because of this periodic burning of the plains, wildlife (mainly buffalo), did not have to leave the area to search for more nutrient-rich lands. The fire ecosystem has always played a vital role in the panhandle. Fire kept invader species of trees at bay, while enriching the grasslands. Due to human population growth in the High Plains, fire is no longer allowed to burn. As a result, the panhandle has seen a dramatic increase in the number of juniper and mesquite trees. Fires that occur today are much harder to control, because of the overgrowth of grass fuel types.



Pineywoods



Elevation

Elevations range from 100 feet above sea level north of the coastal plane in Southeast Texas to more than 1,000 feet on higher ridges and peaks toward the western edge of the pine belt.

Precipitation

While rainfall can vary year to year, the Pineywoods is the wettest area of the state, with average annual rainfall ranging from 32 to 50 inches for most of the region.

Topography

Pine forest communities may usually be found on upland and mid-slope sites with gently rolling to near-flat topography throughout the region.



Soils

Most of the Pineywoods are occupied by deep, fertile, sandy loam soils which are generally slightly or moderately acidic, with a pH level of 6.5 to 4.5. Soils can be more acidic or alkaline depending on location.

Vegetation Description

The Pineywoods of East Texas is comprised of a rich variety of trees, shrubs, woody vines, and herbaceous vegetation. As the name implies, pine forest ecosystems dominate much of the landscape, although variations in soil type, drainage characteristics, as well as human disturbance, give rise to areas dominated by native hardwoods such as oaks, elms, hickories, pecan, black walnut, tupelo, sweetgum, and others. Shortleaf, longleaf, and loblolly pine are the three native species of southern yellow pine that occupy these commercially important forests. Slash pine may be observed in places as well, though it is not native to East Texas. Uplands may also be home to certain hardwoods, such as post oak and blackjack oak. Bottomlands near rivers and significant creeks are most often dominated by native bottomland hardwoods such as water oak, cherrybark oak, nutall oak, black hickory, bitternut hickory, black tupelo, and sweetgum. Dense understory growth may often be found in forest areas in the form of woody shrubs and small trees such as yaupon, waxmyrtle, American hornbeam, rusty blackhaw viburnum, and other species. In recent years, invasive species such as Chinese tallow, Japanese climbing fern, soda apple, etc., have become well established throughout the Pineywoods as well.



Impacts of Fire

Pine forests are fire climax systems, meaning that fire is necessary in order for pines to maintain dominance in the presence of hardwood competition. Historically, fire has played an important role in shaping East Texas as a pine community by controlling hardwood competition through cooler understory fires, or allowing for the re-introduction of pine seed after hot stand replacement fires. Wetter, low-lying areas with little to no fire occurrence developed into ecosystems dominated by hardwood.



Post Oak Savannah



Elevation

Elevations range from 300 feet above sea level in the southern portion to 800 feet above sea level in the north.

Precipitation

The average rainfall in the Post Oak Savannah is approximately 35 inches in the western counties to 45 inches in the eastern counties.

Topography

Forested areas in the western region of the Post Oak Savannah are generally restricted to bottomland areas associated with water, areas protected from fire, or those with specific soil types.

Soils

Bottomland soils range from clay loam to clay, while the uplands have a sandy loam or sandy soil.

Vegetation Description

The Post Oak Savannah is dominated by native bunch grasses and forbs with scattered post oaks and some plateau live oak, black hickory, and blackjack oak. In recent times this historical vegetation has been replaced by species such as yaupon holly, cedar elm, sugarberry, and eastern red cedar. Upland areas are typically where bunch grasses are concentrated.

Impacts of Fire

Recurrent fires and large herds of buffalo were major forces that molded this eco-region. Fires were typically very large and would burn until weather conditions or landforms would contain them. For the most part, fire has been completely removed from the management of this eco-region. This suppression of fire has allowed eastern red cedar, mixed hardwoods, and a thick yaupon understory to take over in most areas. Pasture grasses (bluestem, Bermuda, and bahia grass) have also been established for grazing to support the raising of cattle.

Other

Cattle ranching and hay production are the primary uses for this area along with the development of residential property. These land uses have caused a reduction in the number of acres representative of the Post Oak Savannah today. The endangered Houston toad occurs in the eastern portion of this eco-region where deep sands reside



Rolling Plains



Elevation

Elevations range from 900 feet in the northeast corner to 4,000 feet in the upper northwest arm of the Rolling Plains. The majority of the Rolling Plains is between 1,000 and 3,000 feet above sea level.

Precipitation

Rainfall amounts average 22 to 30 inches per year.

Topography

Part of the Great Plains of the central United States, the topography is characterized as being rough terrain. The bottomland areas of the east contain more riparian zones than those in the western Rolling Plains.



Soils

Most of the soils are considered neutral to alkaline. Forming under grasslands they have high fertility, making them sought after for crop production. These soils are found ranging from the lower to the upper portions of the Rolling Plains.

Vegetation Description

Native vegetation varies between the northern and southern halves of the Rolling Plains Region. The northern portion contains black willow, plains cottonwood, redberry juniper, and shin oak. On the banks of the Canadian River, salt cedars are dominantly accompanied by honey mesquite and willows. The southern portion contains pecan, persimmon, netleaf hackberry, live oak, sugarberry, Texas red oak, gum bumelia, and Ashe juniper. Both portions share honey mesquite, plains cottonwood, and western soapberry. Shrubs found in this eco-region include species of wild cherry and plum, as well as sages. The Rolling Plains contain many of the typical plains grasses: buffalo grass, hairy, blue, and sideoats grama, big bluestem, Indiangrass, Canada wildrye, and Texas bluegrass.



Impacts of Fire

Fire historically had an impact on the Rolling Plains region, by suppressing woody species and favoring open grasslands. Fire kept resprouting honey mesquite and juniper populations at low densities. Historically this area is assumed to have had a fire occurrence every 5 to 10 years. This frequency created the low populations of woody species observed by early explorers in the region. Following settlement, fires were suppressed and improper grazing occurred. Overgrazing by livestock weakened the native grasses, removed fuel needed for a burn, and set the stage for aggressive woody plant species to increase. Droughts accelerated the process. Some of the woody plants were natives which increased while others were not native to the sites. Cattle and wildlife helped to spread some of these plants as most of the seeds pass undigested in droppings. Mesquite beans, which are high in protein, are relished by cattle, especially during drought. Range managers are now faced with many areas that have crossed thresholds so that fire is no longer an effective tool. In those cases, chemical and mechanical treatments are the only options. Integrated treatments of several different brush management methods over time are recommended. Urbanization and improper grazing limits the opportunities to use fire as a management tool. However, fragmentation and urbanization in this area generally have been slow.



South Texas Plains



Elevation

Elevations range from 300 to 1,100 feet above sea level.

Precipitation

Easternmost regions receive around 23 inches per year on average while westernmost regions receive around 19 inches per year on average.

Topography

Topography is considered almost flat to gently rolling. A few major rivers run through the north and northeastern portion of this region forming bottomland ecosystems.



Soils

Soils are primarily acidic sands. Flats with poor drainage often contain huisache and some mesquite trees. Droughty flats and ridges with gravelly or rocky soils that have better drainage contain shorter mesquite, blackbrush, cenizo, etc. Larger rivers in the area are associated with deep alluvial soils, loamy to sandy in texture.



Vegetation Description

Often known as the Tamaulipan Thornscurb or “brush country”, this region of Texas is known for shorter trees and numerous shrubs, most of which contain thorns. Because of the hot dry weather, leaves are commonly small and often compound. The short height and dense, small leaves give the region an appearance of impenetrable shrubland. Honey mesquite is the primary tree in the region; however, many other trees and shrubs dominate on other sites. The flats and ridges host honey mesquite, huisache, blackbrush, guajillo, cenizo, Texas mountain laurel, and Spanish dagger. Shallow arroyos or rocky draws often host additional species such as spiny hackberry, bluewood condalia, Texas persimmon, lime prickly ash, guayacan, and kidneywood.

Impacts of Fire

Fire historically played a role in shaping the South Texas Plains. Grasses were thought to be a major component of the region prior to settlement. As grasses were grazed by livestock, the fragile soil structure eroded away leaving mostly rocky, dry soils which are now able to support mostly woody species. Now that much of the grass layer is gone, fire is not able to play much of a role except in extreme drought situations or when the land is managed for grass and fire re-establishment.



Trans-Pecos



Elevation

Elevation ranges from 1,000 feet above sea level at the low end near the meeting of the Pecos and Rio Grande Rivers to the highest point in Texas, Guadalupe Peak, reaching up to 8,749 feet. On average, elevation ranges between 3,200 and 5,200 feet above sea level.

Precipitation

On the western edge of the Trans-Pecos near El Paso, the average annual rainfall is less than 8 inches, while on the eastern edge near Fort Stockton and Sanderson, the average rainfall is around 12-15 inches per year. Summer (July – September) is considered the rainy season. Higher elevations traditionally receive greater rainfall than those at lower levels.



Topography

The Trans-Pecos region can be described as the desert portion of Texas. This region is characterized by mountains, desert valleys, sand hills, rough plateaus, and desert brushland. Variation in vegetation is closely tied to the topography in this region, mostly due to the fact that rain does not fall evenly over the area. The Sky Islands or the mountain ranges which account for a significant portion of the change in topography in the Trans-Pecos are what make this part of Texas unique.

Soils

The majority of the soils are alkaline and depending on the mountain range and source of parent material, the soils are either igneous or sedimentary. Caliche is common throughout the region because of the high content of calcium in the soil.



Vegetation Description

The vegetation in the Tran-Pecos is mostly comprised of Chihuahuan Desert species. Commonly found species include honey mesquite, red berry juniper, net-leaf hackberry, cottonwood, desert willow, western soapberry, shin oak, Texas walnut, Mexican buckeye, and Ashe juniper in the eastern part of the region. It hosts a diverse mixture of short grasses, desert cacti, and wildflowers. Some examples are creosote bush, tarbush, four-winged saltbush, Mariola, and succulents such as cacti, yuccas, agaves, ocotillo, and sotol.

Impacts of Fire

Most fires in the Trans-Pecos region are started by lightning strikes, which are common during summer storms. For the most part, it has been mostly the large areas of grassland that burn. These fires have kept juniper, pinyon, and oak at bay in the higher, wet, and cool areas and desert scrub at bay in the lower, dry and hot areas. In some areas, however, overgrazing of cattle, years of drought, and the lack of fire have allowed for the encroachment of juniper, mesquite, and other invasive vegetation, which are now replacing the once-dominant grass.



C Care for the protection of wildlife and their habitats.

A Act to become a caretaker or steward of water, land, and animals.

R Represent stewardship by being a positive role model for others.

E Educate others about stewardship and conservation.