

The Central Texas Bioregion Is Bumping With Biodiversity

Travis County in Central Texas is 30°18' north latitude and 97°45' west longitude. The Texas Northern Blackland Prairies make up the majority of my bioregion but the Edward's Plateau Woodland, Llano Uplift, Limestone Cut Plains and the Balcones Canyonlands border its edges.

Classification of agroecosystems in this bioregion includes a variety of crops, cattle, sheep, grains, poultry, greenhouses, and mixed farming systems. There are a large number of backyard gardens and community gardens. Ecological energetic processes in the agroecosystem include the use of mechanization and chemical fertilizers on the non organic farms that grow grains. Intensified agriculture in this bioregion includes semi-industrial and full industrial (Altieri 1995, 50).

The growing season is about 270 days however there are crops that can be grown year round (Smyrl 2010). The Blackland Prairie is predominantly clay and the Edward's Plateau is a mix of caliche and clay. Agricultural systems include grazing systems for cattle, while there are wildflower programs in place to incorporate native species back into the land along the highways (Altieri 1995, 40). There are gradient changes where ecoregions intersect like in Edwards Plateau and the Blackland Prairies. Cropland, pasture, urban development, industrial growth, and organic farming have altered the Texas Blackland Prairies (Glenn Griffith 2007). "Less than one percent of the original vegetation remains. Restoration activities in some of the protected prairies include prescribed burning, haying, and bison grazing (Glenn Griffith 2007)."

Some examples of the biodiversity in this bioregion include native plants, grasses, trees, succulents, flowers, herbs, and cactus. Trees include Oak, Pecan, Black Walnut, Dogwood, Mesquite, Cedar, Mexican Buckeye, and Texas Ash (Texas A & M

Agrilife Extension Service 2013). Shrubs and smaller trees that can be found here include Bottlebrush, American Beautyberry, Crepe Myrtle, and Mexican Redbud (Texas A & M Agrilife Extension Service 2013)

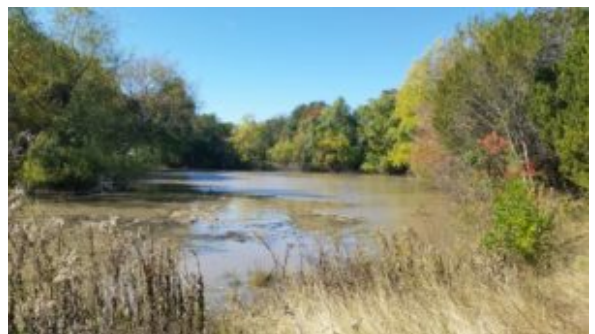
Some of the capital resources include the Ogallala Aquifer and the LCRA controls water from the Colorado River to six dams including the Highland Lakes (Lower Colorado River Authority 2014, Texas Water Development Board n.d.) An extinct volcano makes up part of the Edward's Plateau (Smyrl 2010). Soil formations are attributed to Cretaceous shale, chalk, marl and of these irregular plains, gradient streams of silt, clay, and sandy substrates are located at an elevation between 300-1050 feet above sea level (Glenn Griffith 2007). The average temperature for Travis County is 67.51°F and the average rainfall for my bioregion is 35.22 inches of rain per year (World Media Group, LLC. 2014).

Spanish settlers and the Mexican government have been a crucial part of indigenous lineage also in the Texas Blackland Prairies (Smyrl 2010). Human resources and the metapopulation include nonprofit organizations, parks, neighborhoods and east side organic farms. The ever-changing region hosts a myriad of culture, industrial development, fauna, agricultural opportunities, native and adapted flora, soil variations, geological land shifts, warm weather, light precipitation, and is a college mecca.



Just after you

cross the street to get back on the trail you are able to enjoy the beautiful maple trees turn colors in the fall. This illustrates how the landscape significantly changes within a 2 mile stretch.



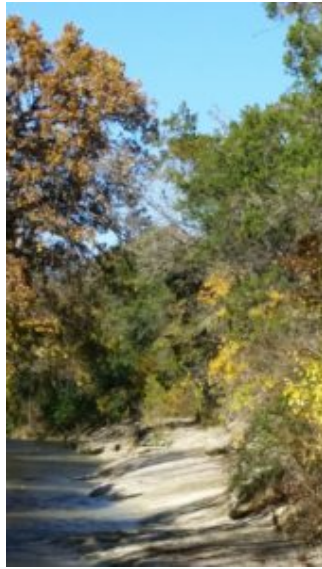
The Blackland Prairie ecoregion meets the Savannah ecoregion opening up into this beautiful wetland that is thriving as a result of habitat management.



When the river is high you can kayak alongside.



Fossilized seashells indicate oceanic activity years ago. This indicates Edward's Plateau ecoregion.



Hiking along the
bank of Walnut
Creek



Hiking with my cousin
Tabitha near the end of the
2.2 mile hike one way, at
Copperfield Greenbelt Trail
in Austin, Texas. Loop back
for a hike over 4 miles.



Balcones
Canyonland
Ecoregion near
the trailhead.

These photos were taken with my cousin Tabitha while on a hike at Copperfield Greenbelt Trail in Austin, Texas in the fall of 2015. We will cherish these memories forever as we instill her passion for adventure, nature, and life in our hearts.

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Cover Crops for Central Texas

Three cover crops that are perfect for the soil in the Blackland Prairies ecoregion in Central Texas, include buckwheat, peas, and crimson clover. The benefits of peas and clover cover crops include adding nitrogen back into the soil. Peas and clover are members of the Legume family and increase organic matter in the soil, encourage beneficial insects, which increases pollination for your growing spaces when the flowers are in bloom. Clover also provides an excellent breeding ground for ladybugs, the larvae, and pupa thrive in the microclimate that they create. Allowing some of your winter and spring crops to bolt and flower may encourage aphids to visit but that's what ladybugs and larvae love to eat so you can boost your beneficial insects in your backyard just by making a few exceptions! This year has been incredible watching the lady bug populations go wild in our largest garden. It's hard to believe that just a year and a half ago our largest bed was a small butterfly garden, but mostly clay covered by grass.

A disadvantage of using clover is that it can only survive in cooler months like spring, fall and winter, and withers in the heat of the summer. This year I planted crimson clover mid winter due

to the mild temperatures, but often it's recommended to start before winter. Since we have mild winters in Central Texas growing them after the first frost isn't a problem, they just take longer to progress. Peas get stressed from heat as well and will freeze, but there are other varieties that contend with the heat much better. Crimson clover, Buckwheat and other green manures aka cover crops aid in attracting beneficial insects like bees to pollinate (Shirey n.d.). Some legume cover crops aren't good at suppressing weeds (Grubinger n.d.).

When the heat turns up Buckwheat is a more appropriate soil builder as it also blocks other weeds from trying to break through and takes one third of the time as clover to develop. Buckwheat produces large amounts of residue that adds organic matter to the soil (Sustainable Agriculture Research & Education 2012). Buckwheat also supports pollinator populations (SARE 2012). Buckwheat is very hardy, drought tolerant to some degree and efficient at separating clay to provide a better planting medium and bring nutrients closer to the plants (Taylor 2014). Within 30 days from planting Buckwheat is blooming which makes it a great time energy source for soil building in between other plantings. Chickens love it, and it produces a great seed to make gluten free flour with, or add it or the leaves to your smoothie. **Buckwheat** can make your landscape and food plate more sustainable!

Planting in the right season is paramount to production growth and the ability to improve soil structure (Grubinger n.d.). Some downsides of cover crops and green manures are that they aren't produced for revenue but short term economic gain (Grubinger n.d.). Which is why alternating crops and planting a green manure during seasonal changes is a good time to grow these crops on your farm or in your garden because when your soil is bare, beneficial protozoa, fungi, and essential minerals are leached from the soil and it loses structure. This works against the Central Texas grower during drought season. The healthier your soil is, the more drought tolerant they are, and the healthier your plants become! Therefore diseases will potentially be decreased because of your balanced ecosystem.

It is important that cover crops are planted in succession of food crops in order to maximize biodiversity so allow enough time for the plants to enrich the soil before you plant your next food crop. Green manures can be worked into the soil at any time and harvested early if need be but in order to reach their full potential for your soil it is best to wait until they are ready to bloom. Allowing them to grow beyond blooming increases agrobiodiversity and you will find that some make an excellent living ground cover. For instance, clover is an excellent living, green mulch that surpasses weeds that try to sneak through your nifty rows. It can be an organic and

sustainable alternative to straw which is generally sprayed with chemicals if purchased in Texas, or man made ground covers that use excessive amounts of energy to produce and distribute, therefore decreasing the sustainability of your farm and your carbon footprint. Using clover as a living mulch will encourage beneficial bacteria, beneficial bugs, improves soil health, and increases biointensive growing capabilities. Plus, it looks pretty!

Cover crops maintain and improve soil fertility, prevent wind erosion and encourage biomass (SARE 2012). In order for cover crops to be the most beneficial they also need to be trimmed or turned into the soil which can take time. Leaving soil bare prevents bacteria, earthworms, and fungi from encouraging micronutrient production (Relf 2009). Cover crops and green manures should be planted in succession of other crops.

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The Dust Bowl Demanded Sustainable Agriculture

Our first records of weather tracking from the U.S. Weather Bureau were from 1898 for relative humidity, winds and temp. It wasn't until radiosonde initiatives were launched in 1938 that we were able to test temperature, humidity, pressure, and transmit information during inclement weather (Service 2007). But by then it was too late to see what New York City already had (A&E Television Networks, LLC 2015). The **Dust Bowl** was an ecological disaster that hit over 150 million acres and drove "exodusters" to urban life east or as far west as California (Eric Foner and John A. Garraty 1991). In 1931 the drought that swept the plains was the onset of the Dust Bowl (Hurt 2002). The Dust Bowl was a direct result of what happens when you mess with science and nature over a degradingly long period of time.

Several generations of farmers monocropped the grasslands of the Great Plains and planted seed into fertile topsoil which became the means to earn a meager

wage. They didn't understand sustainable agriculture, biointensive growing, companion planting, or cultivating drought tolerant seeds. Cattle ranching and wheat farming contributed to the ecological imbalance of earth and sky because they stripped the grasslands dry and left them structureless too. Topsoil stripped of beneficial nutrients and moisture prompted soil erosion. Drought and wind erosion set in parching the dirt even more. After a period of time with no rain, the wind hit the prairies, statically lifting up dust up to 10,000 feet, traveling 65 miles an hour, and causing enough electricity to power NYC (A&E Television Networks, LLC 2015).

By 1934, 300 million tons of top soil had been removed by the Great Plains which touched Kansas, Northeast New Mexico, Southeast Colorado, Oklahoma Panhandles, and parts of Texas (Hurt 2002). Roosevelt enacted "practical measures" to remediate drought, dust, and depression beginning with the Great Plains Drought Area Committee (Hurt 2002). Several organizations were formed to assist with the Dust Bowl and Great Depression including land and social services relief. Most of the Great Plains farmers were in some form of federal agricultural relief program. The AAA, RA, CCC, and FSA couldn't help enough and someone had to pay for it (Hurt 2002).

The goals for New Deal Agricultural Conservation included removing excess and marginal acreage from crop production, preventing soil erosion with improved agronomic practices, rural zoning, grassroots involvement, eliminating farm poverty, and practicing ecological resource management (Worster 1979). Conservation efforts that were enacted on behalf of the government to plant 220 million trees through the

Shelterbelt Program of the Forest Service or let land grow fallow through the Taylor Grazing Act, were just a few attempts to help the Great Plains flourish again (Danbom 1995).

Rexford Tugwell, Lewis Gray and Henry Wallace were detrimental towards sustainable improvements during the 1930s (Worster 1979). Although there were a lot of initiatives in place to alleviate the pressures at the time there wasn't a consistent foothold in all acts because different people were in control of governmental legislation. The Soil Conservation Service (SCS) was initiated to teach about soil conservation but one had to sign a five year contract in order to reap rewards. Sustainable education on behalf of agriculture and the environment should have been included in all relief efforts and initiatives. That would have helped prevent future reliance on government assistance and fueled a more sustainable economy. Perhaps they would have been more prepared for a "fundamental environmental reform," if they were educated along the way (Worster 1979). If our government continued to integrate conservation with sustainable agriculture as part of the New Agricultural reform then and implemented it into sustainable mandated policies to this day, our country would be a lot better off. We've come a long way since the Dust Bowl, but our sustainable challenges in agriculture in the twenty first century are far more difficult.

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