

Ecological site R083AY022TX Loamy Sand

Last updated: 9/19/2023
Accessed: 05/01/2024

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

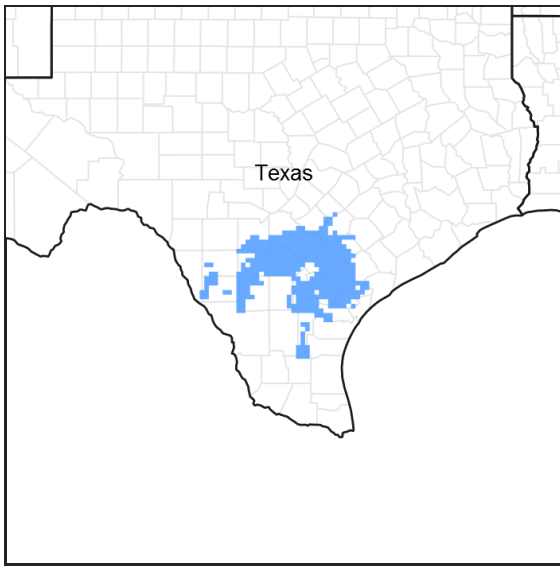


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 083A–Northern Rio Grande Plain

This area is entirely in Texas and south of San Antonio. It makes up about 11,115 square miles (28,805 square kilometers). The towns of Uvalde, Cotulla, and Hondo are in the western part of the area, and Beeville, Goliad, and Kenedy are in the eastern part. The town of Alice is just outside the southern edge of the area. Interstate Highways 35 and 37 cross this area. This area is comprised of inland, dissected coastal plains.

Classification relationships

USDA-Natural Resources Conservation Service, 2006.
-Major Land Resource Area (MLRA) 83A

Ecological site concept

The Loamy Sand site has a sandy surface over a loamy or clayey subsoil. These sites are located on uplands or stream terraces.

Associated sites

| | |
|-------------|---------------------------|
| R083AY020TX | Sand Hills |
| R083AY021TX | Sandy |
| R083AY024TX | Tight Sandy Loam |
| R083AY004TX | Shallow Sandy Loam |
| R083AY010TX | Vega |
| R083AY011TX | Claypan Prairie |
| R083AY012TX | Loamy Draw |

Similar sites

| | |
|-------------|-------------------|
| R083CY022TX | Loamy Sand |
| R083EY022TX | Loamy Sand |

Table 1. Dominant plant species

| | |
|------------|--|
| Tree | Not specified |
| Shrub | (1) <i>Quercus virginiana</i> (2) <i>Lantana</i> |
| Herbaceous | (1) <i>Schizachyrium littorale</i> (2) <i>Bothriochloa laguroides</i> ssp. <i>torreyana</i> |

Physiographic features

The soils for this site formed from fluviomarine deposits and/or loamy residuum weathered from sandstone. The site can be found on interfluves of the Coastal Plains and stream terraces of river valleys. The slopes are nearly level to gently sloping. Slope gradients range from 0 to 8 percent with the majority of the slopes less than 4 percent. Elevation ranges from 200 to 1,000 feet. This area is comprised of inland, dissected coastal plains.

Table 2. Representative physiographic features

| | |
|--------------------|--|
| Landforms | (1) Coastal plain > Interfluve (2) Coastal plain > Stream terrace |
| Runoff class | Negligible to high |
| Flooding frequency | None |
| Ponding frequency | None |
| Elevation | 61–305 m |
| Slope | 0–8% |
| Aspect | Aspect is not a significant factor |

Climatic features

MLRA 83A is subtropical, subhumid on the western boundary and subtropical humid on the eastern boundary. Winters are dry and mild and the summers are hot and humid. Tropical maritime air masses predominate throughout spring, summer, and fall. Modified polar air masses exert considerable influence during winter, creating a continental climate characterized by large variations in temperature. Average precipitation for MLRA 83A is 20 inches on the western boundary and 35 inches on the eastern boundary. Peak rainfall, because of rain showers, occurs late in spring and a secondary peak occurs early in fall. Heavy thunderstorm activities increase in April, May, and June. July is hot and dry with little weather variations. Rainfall increases again in late August and September as tropical disturbances increase and become more frequent. Tropical air masses from the Gulf of Mexico dominate during the spring, summer, and fall. Prevailing winds are southerly to southeasterly throughout the year except in December when winds are predominately northerly.

Table 3. Representative climatic features

| | |
|--|--------------|
| Frost-free period (characteristic range) | 223-251 days |
| Freeze-free period (characteristic range) | 263-365 days |
| Precipitation total (characteristic range) | 635-813 mm |
| Frost-free period (actual range) | 208-263 days |
| Freeze-free period (actual range) | 254-365 days |
| Precipitation total (actual range) | 610-940 mm |
| Frost-free period (average) | 235 days |
| Freeze-free period (average) | 314 days |
| Precipitation total (average) | 737 mm |

Climate stations used

- (1) BEEVILLE 5 NE [USC00410639], Beeville, TX
- (2) CROSS [USC00412125], Tilden, TX
- (3) DILLEY [USC00412458], Dilley, TX
- (4) FLORESVILLE [USC00413201], Floresville, TX
- (5) GOLIAD [USC00413618], Goliad, TX
- (6) LYTLE 3W [USC00415454], Natalia, TX
- (7) HONDO MUNI AP [USW00012962], Hondo, TX
- (8) CHEAPSIDE [USC00411671], Gonzales, TX
- (9) CUERO [USC00412173], Cuero, TX
- (10) HONDO [USC00414254], Hondo, TX
- (11) NIXON [USC00416368], Stockdale, TX
- (12) CARRIZO SPRINGS 3W [USC00411486], Carrizo Springs, TX
- (13) KARNES CITY 2N [USC00414696], Karnes City, TX
- (14) MATHIS 4 SSW [USC00415661], Mathis, TX
- (15) PLEASANTON [USC00417111], Pleasanton, TX
- (16) TILDEN 4 SSE [USC00419031], Tilden, TX
- (17) UVALDE 3 SW [USC00419268], Uvalde, TX
- (18) CHARLOTTE 5 NNW [USC00411663], Charlotte, TX
- (19) FOWLERTON [USC00413299], Fowlerton, TX
- (20) PEARSALL [USC00416879], Pearsall, TX
- (21) POTEET [USC00417215], Poteet, TX
- (22) CALLIHAM [USC00411337], Calliham, TX

Influencing water features

Runoff is low to negligible due to the sandy surface texture.

Wetland description

N/A

Soil features

This site consists of deep to very deep, moderately well and well drained soils 50 to 80 inches over eolian sediments, alluvial sediments, and sandstone. Sandy surface thickness ranges from 10 inches to 40 inches before an increase in clay content is noticed, also called the argillic horizon. Secondary calcium carbonate is at depths deeper than 35 inches. Runoff is negligible to low. Soil series correlated to this site include: Alum, Comitas, Duval, Leming, Poth and Wilco.

Table 4. Representative soil features

| | |
|--|---|
| Parent material | (1) Alluvium–sedimentary rock (2) Residuum–sedimentary rock (3) Eolian sands–sedimentary rock |
| Surface texture | (1) Loamy fine sand (2) Loamy sand |
| Family particle size | (1) Loamy |
| Drainage class | Moderately well drained to well drained |
| Permeability class | Slow to moderate |
| Soil depth | 127–203 cm |
| Surface fragment cover <=3" | 0% |
| Surface fragment cover >3" | 0% |
| Available water capacity (0-101.6cm) | 7.62–15.24 cm |
| Calcium carbonate equivalent (0-101.6cm) | 0–10% |
| Electrical conductivity (0-101.6cm) | 0–2 mmhos/cm |
| Sodium adsorption ratio (0-101.6cm) | 0–2 |
| Soil reaction (1:1 water) (0-101.6cm) | 5.6–7.3 |
| Subsurface fragment volume <=3" (Depth not specified) | 0–7% |
| Subsurface fragment volume >3" (Depth not specified) | 0–5% |

Ecological dynamics

The plant communities of this site are dynamic and community composition varies with topographic position, soil moisture, grazing, and fire. The site is subject to extreme variation in rainfall. During the years 1900 to 1983, 36 percent were drought years and 34 percent were wet years. During dry periods the amount of bare ground increases. Bare ground may predominate during droughts. Shortgrasses such as fringed signalgrass (*Urochloa ciliatissima*), red lovegrass (*Eragrostis secundiflora*), and hooded windmillgrass (*Chloris cucullata*), in addition to forbs, increase in abundance at the expense of the dominant midgrasses during drought.

The reference plant community was a grassland with scattered woody plants. Seacoast bluestem (*Schizachyrium scoparium* var. *littorale*), brownseed paspalum (*Paspalum plicatulum*), and Pan American balsamscale (*Elyonurus tripsacoides*) dominated moister sites. Drier sites were dominated by seacoast bluestem, brownseed paspalum, tanglehead (*Heteropogon contortus*), and arrow feather threeawn (*Aristida purpurascens*). Swales at the bottom of slopes with high soil moisture levels supported a woody community dominated by mesquite, wolfberry (*Lycium* spp.), and granjeno (*Celtis pallida*).

Historically fire maintained this site as grassland with scattered mesquite (*Prosopis glandulosa*) and associated woody plants. White-tailed deer (*Odocoileus virginianus*) and pronghorns (*Antilocapra americana*) were the major large herbivores on this site before colonization by Europeans. Bison (*Bos bison*) were infrequent visitors to the site. Continued overuse by livestock results in a decline of seacoast bluestem and an increase in Pan American balsamscale, arrow feather threeawn, hooded windmillgrass, thin paspalum (*Paspalum setaceum*), and forbs. Mesquite seedlings become established with lack of fire and heavy grazing. Pan-American balsamscale, arrow feather three-awn, hooded windmillgrass, and thin paspalum decline on severely grazed rangeland. Seacoast bluestem is virtually eliminated by severe grazing and is replaced by fringed signalgrass, red lovegrass, grassbur (*Cenchrus* spp.), and forbs. Mesquite increases in abundance with continued overuse. Once the mesquites reach sufficient size, understory shrubs including granjeno, wolfberry, and lime prickly-ash (*Zanthoxylum fagara*) establish

beneath them forming brush mottes.

State and transition model

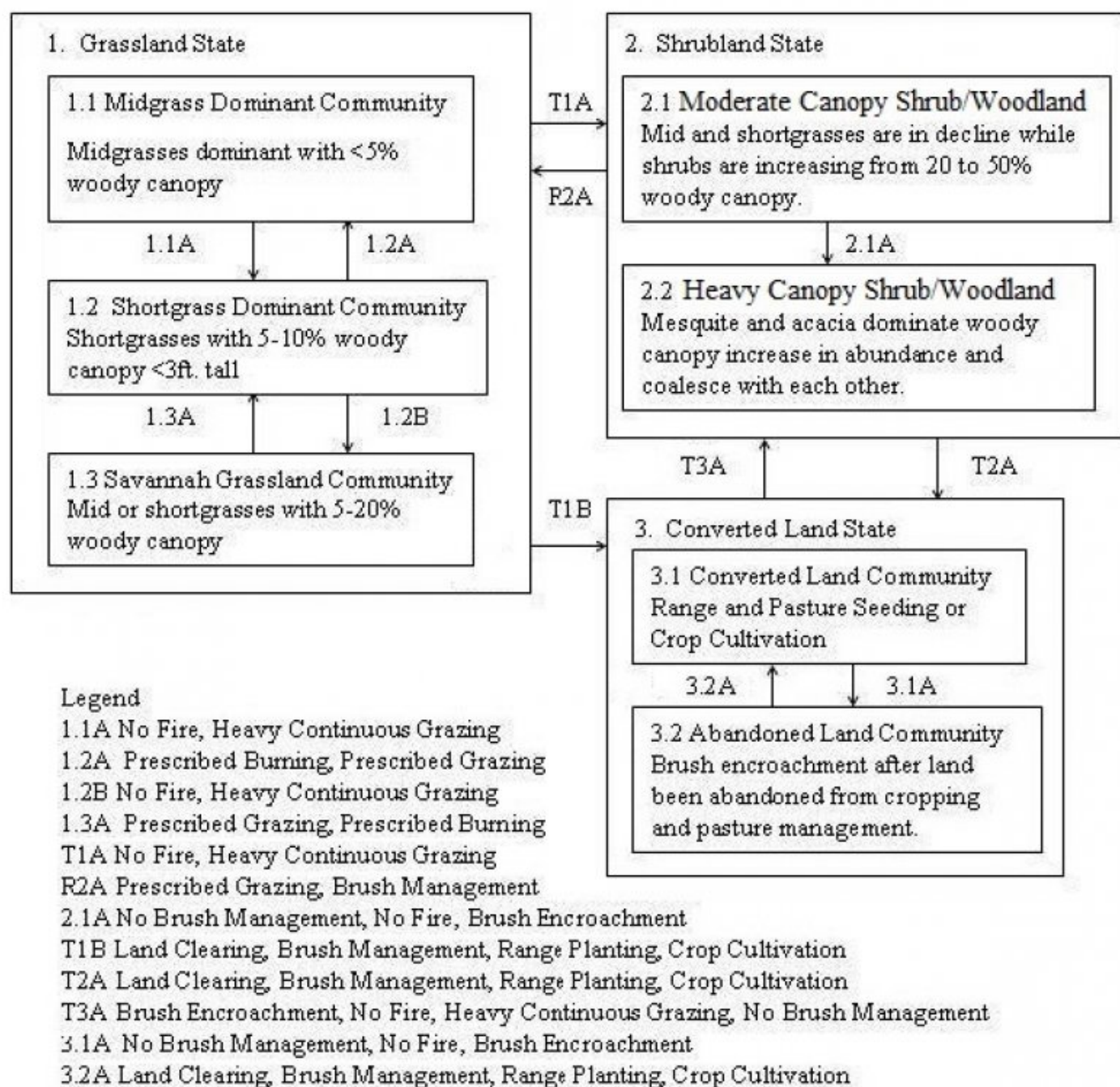


Figure 8. STM

State 1 Grassland

Dominant plant species

- shore little bluestem (*Schizachyrium littorale*), grass
- brownseed paspalum (*Paspalum plicatulum*), grass

Community 1.1 Midgrass Dominant



Figure 9. 1.1 Midgrass Dominant Community

The reference community is dominated by midgrasses. The grassland state is composed of midgrasses with scattered mesquites and associated subordinate shrubs. Mesquite-dominated mottes compose about five percent of the vegetation canopy cover. Heavy grazing or absence of fire shifts community composition to either a short grass community, or to a community dominated by larger mesquites and associated woody plants composing 5 to 20 percent of the canopy cover. Prescribed grazing and prescribed fire at periodic intervals are required to maintain the original midgrass dominated community.

Table 5. Annual production by plant type

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|-----------------|---------------------|--------------------------------------|----------------------|
| Grass/Grasslike | 2018 | 3531 | 5044 |
| Shrub/Vine | 112 | 196 | 280 |
| Forb | 112 | 196 | 280 |
| Tree | – | – | – |
| Total | 2242 | 3923 | 5604 |

Figure 11. Plant community growth curve (percent production by month). TX4537, Mid/Tallgrass Community. Mid and tallgrasses dominant with less than 5% woody canopy species..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 0 | 5 | 10 | 20 | 15 | 5 | 10 | 15 | 10 | 5 | 5 |

Community 1.2 Shortgrass Dominant

Heavy grazing or absence of fire results in establishment of woody plant seedlings and a shift from dominance by midgrasses to a community dominated by shortgrasses, including arrow feather threeawn, fringed signalgrass, red lovegrass, and hooded windmillgrass. The overstory consists of 5 to 10 percent canopy cover of mesquites and associated woody plants under three feet tall. Drought will hasten the process. At this point, the restoration of prescribed fire and grazing management can restore this plant community back to one similar to the Midgrass Dominant Community (1.1). There are usually enough residual herbaceous plants to recolonize the site. Once the woody plants have established, grazing management alone will not completely restore the plant community. However, fire can maintain this plant community which does have beneficial uses, especially for wildlife.

Table 6. Annual production by plant type

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|-----------------|---------------------|--------------------------------------|----------------------|
| Grass/Grasslike | 953 | 1905 | 2690 |
| Shrub/Vine | 168 | 196 | 364 |
| Forb | 112 | 140 | 308 |
| Tree | – | – | – |
| Total | 1233 | 2241 | 3362 |

Figure 13. Plant community growth curve (percent production by month). TX4547, Shortgrass Dominant Grassland Community 5-10% woody canopy. Shortgrass dominant with some midgrass remnants and increasing forbs and shrubs approaching 10% canopy..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 0 | 5 | 10 | 20 | 15 | 5 | 10 | 15 | 10 | 5 | 5 |

Community 1.3 Savannah Grassland



Figure 14. 1.3 Savannah Grassland

A continued abusive grazing or absence of fire results in a shift from dominance by midgrasses or shortgrasses to a community with 5 to 20 percent canopy cover of mesquite and associated woody plants. Prescribed fire at periodic intervals and proper grazing management can maintain a savannah-like structure to the community. A very aggressive prescribed burn program, coupled with some individual plant treatment (IPT), can transition this plant community back to the Shortgrass Dominated Community (1.2), and eventually the Midgrass Dominant Community (1.1). With mesquite and most of the mixed brush on this site being resprouters following top removal, suppression of the woody species will provide an openness to the site. Once recurring fire is removed, then the canopy will quickly thicken and increase in structure. As the canopy approaches 20 percent a threshold to the Shrubland State (2) is being approached.

Table 7. Annual production by plant type

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|-----------------|---------------------|--------------------------------------|----------------------|
| Grass/Grasslike | 897 | 1793 | 2578 |
| Shrub/Vine | 224 | 308 | 476 |
| Forb | 112 | 140 | 308 |
| Tree | – | – | – |
| Total | 1233 | 2241 | 3362 |

Figure 16. Plant community growth curve (percent production by month).

TX4548, Savannah Grassland Community. Mid and shortgrass community with 5-20 percent canopy cover of mesquite and associated woody plants. .

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 0 | 5 | 10 | 20 | 15 | 5 | 10 | 15 | 10 | 5 | 5 |

Pathway 1.1A Community 1.1 to 1.2

The reference community (1.1) will transition to the Shortgrass Dominant Community (1.2) with lack of fire, continued overgrazing, insufficient rest cycles, and/or natural disturbances, like prolonged drought.

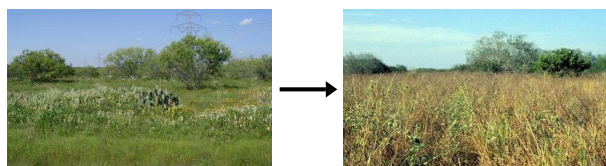
Pathway 1.2A Community 1.2 to 1.1

This phase can be managed back to the Midgrass Dominant Community (1.1) but will take the reintroduction of fire to the ecosystem or some method of brush management that allows selective removal of the plants. A prescribed grazing plan will be essential to reverse the trend and returning the midgrasses back to the plant community over an extended period time.

Pathway 1.2B Community 1.2 to 1.3

If heavy continuous grazing continues with the exclusion of fire, the phase will transition to the Savannah Grassland Community (1.3).

Pathway 1.3A Community 1.3 to 1.1



Savannah Grassland

Midgrass Dominant

This phase can be managed back to the Community 1.2, and eventually 1.1 but will take the reintroduction of fire to the ecosystem or some method of brush management that allows selective removal of the plants. A prescribed grazing plan will be essential to reverse the trend and restoring the plant community over an extended period time.

State 2 Shrubland

Dominant plant species

- mesquite (*Prosopis*), shrub
- acacia (*Acacia*), shrub

Community 2.1 Moderate Canopy Shrub/Woodland

Elimination of fire on this site results in crossing a threshold from the grassland state to a shrubland complex with 20 to 50 percent woody cover. At this point, prescribed grazing will not reduce the brush. Once canopy exceeds 30 percent, then the shade is a major factor preventing herbaceous recovery. Brush management and implementation of proper grazing management are required to cause a transition back to the grassland state once the shrubland complex has developed. Fire can be used to maintain it once it has transitioned. The shrubland complex that develops is a mix of mesquite, acacia, wolfberry, granjeno, and hogplum (*Colubrina texensis*).

Table 8. Annual production by plant type

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|-----------------|---------------------|--------------------------------------|----------------------|
| Grass/Grasslike | 673 | 1569 | 2354 |
| Shrub/Vine | 448 | 532 | 701 |
| Forb | 112 | 140 | 308 |
| Tree | – | – | – |
| Total | 1233 | 2241 | 3363 |

Figure 18. Plant community growth curve (percent production by month). TX4528, Shrub/Woodland Community, 20-50% canopy. Shrub/Woodland Community with 20-50% woody canopy..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2 | 2 | 5 | 10 | 18 | 15 | 5 | 9 | 15 | 9 | 5 | 5 |

Community 2.2 Heavy Canopy Shrub/Woodland



Figure 19. 2.2 Heavy Canopy Shrub/Woodland

Continued absence of fire or brush management results in a shift from a community with 20 to 50 percent woody cover to a community with greater than 50 percent woody cover. The shrubland complex is mixed with mesquite, acacia, wolfberry, granjeno, and hogplum. These woody communities will persist indefinitely in the absence of fire or brush management. Aggressive brush management along with proper grazing management are required to invoke a transition back to the grassland state once the shrubland complex has developed. The heavy canopy cover of brush reduces herbaceous production, and prescribed fire is usually not possible in this community without an initial mechanical or chemical treatment because there is too little fine fuel. Prescribed fire is the recommended maintenance treatment following mechanical or chemical brush management on this site. Prescribed grazing then becomes important to maintain fuel for burning.

Table 9. Annual production by plant type

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|-----------------|---------------------|--------------------------------------|----------------------|
| Shrub/Vine | 841 | 1373 | 1933 |
| Grass/Grasslike | 336 | 785 | 1177 |
| Forb | 56 | 84 | 252 |
| Tree | – | – | – |
| Total | 1233 | 2242 | 3362 |

Figure 21. Plant community growth curve (percent production by month). TX4529, Shrub Woodland Community with >50% Woodies. Shrub Woodland

Community with >50% Woodyies.

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2 | 2 | 5 | 10 | 18 | 15 | 5 | 9 | 15 | 9 | 5 | 5 |

Pathway 2.1A
Community 2.1 to 2.2

Continued heavy grazing coupled with lack of fire will cause this community to transition to the Heavy Canopy Shrub/Woodland Community (2.2). Brush density and height will continue to increase and shade the ground.

State 3
Converted Land

Dominant plant species

- Bermudagrass (*Cynodon dactylon*), grass
- kleingrass (*Panicum coloratum*), grass

Community 3.1
Converted Land

Any of the prior plant communities can be converted to alternative plants through brush management and seeding. The site can be planted to either native mixtures or to introduced plants depending upon management objectives. Introduced grasses commonly seeded on the site include bermudagrass (*Cynodon dactylon*) and Kleingrass (*Panicum coloratum*). The introduced species will require a concerted management effort to keep the stands pure because of the seedbank of woody species. Native plantings will require some form of brush removal such as individual plant treatment, prescribed fire, broadcast treatments, or mechanical treatments to maintain a grassland.

Table 10. Annual production by plant type

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|-----------------|------------------|-----------------------------------|-------------------|
| Shrub/Vine | 841 | 1373 | 1933 |
| Grass/Grasslike | 336 | 785 | 1177 |
| Forb | 56 | 84 | 252 |
| Tree | – | – | – |
| Total | 1233 | 2242 | 3362 |

Figure 23. Plant community growth curve (percent production by month). TX4530, Converted Land Community. Community converted into warm-season grass seed mixtures..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2 | 2 | 5 | 10 | 18 | 15 | 5 | 9 | 15 | 9 | 5 | 5 |

Figure 24. Plant community growth curve (percent production by month). TX4531, Converted Land - Introduced Grass Seeding. Seeding Converted Land into Introduced grass species..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 0 | 5 | 10 | 20 | 15 | 5 | 10 | 15 | 10 | 5 | 5 |

Community 3.2
Abandoned Land

This site is sometimes cultivated and used for production of watermelons and other crops. Abandoned fields on this site are usually impoverished in nutrients. Willow baccharis (*Baccharis salicina*) is commonly one of the initial

woody plant species to establish once cultivation ceases. Later in succession, huisache (*Acacia smallii*) and mesquite establish and become the dominant woody plants on the site. With no form of brush management, the Abandoned Land Community will become solid brush in 10 to 15 years, resulting in a transition to the Shrubland State (2). In most cases, cultivation has destroyed all the residual herbaceous native plants and has deteriorated the soil structure. To restore this plant community back to a grassland will require significant intervention with heavy equipment to remove the brush and replant. An on-going therapy of brush management, fire, and prescribed grazing will be needed to hold off the brush and maintain the grassland.

Table 11. Annual production by plant type

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|-----------------|---------------------|--------------------------------------|----------------------|
| Grass/Grasslike | 2074 | 3587 | 5100 |
| Forb | 112 | 196 | 280 |
| Shrub/Vine | 56 | 140 | 224 |
| Tree | – | – | – |
| Total | 2242 | 3923 | 5604 |

Figure 26. Plant community growth curve (percent production by month). TX4534, Converted Land - Woody Seedlings Encroachment. Woody seedling encroachment on converted lands such as abandoned cropland, native seeded land, and introduced seeding lands..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2 | 2 | 5 | 10 | 18 | 15 | 5 | 9 | 15 | 9 | 5 | 5 |

Pathway 3.1A Community 3.1 to 3.2

The transition from can occur when crop fields are left to fallow without management. Generally, pastureland will transition to the Shrubland State (2) and not to the Abandoned Land Community (3.2).

Pathway 3.2A Community 3.2 to 3.1

Many land managers may want to utilize this site as cropland or pastureland. To achieve this transition land clearing practices such as land clearing, dozing and raking will be necessary. After the land has been cleared and an appropriate seedbed prepared, the crop or pasture can be planted.

Transition T1A State 1 to 2

Once the woody canopy exceeds approximately 20 percent and is taller than three feet, a threshold will have been passed to the Shrubland State (2). In this case, energy in the form of heavy equipment and/or herbicides will be required along with prescribed grazing to shift the plant community back to the Grassland State (1).

Transition T1B State 1 to 3

The Grassland State (1) can be converted to the Converted Land State (3) by controlling the brush and seeding to native or introduced grasses. It may also be plowed and converted to cropland.

Restoration pathway R2A State 2 to 1

Brush management is the key driver in restoring Shrubland State (2) back to the Grassland State (1). Reduction in woody canopy below 20 percent will take large energy inputs depending on the canopy cover. A prescribed grazing

plan and prescribed burning plan will keep the state functioning.

Transition T2A State 2 to 3

The Shrubland State (2) can be converted to the Converted Land State (3) by controlling the brush and seeding to native or introduced grasses. It may also be plowed and converted to cropland.

Transition T3A State 3 to 2

If the Abandoned Land Community (3.2) is left alone, eventually the woody plants will create a moderate to heavy canopy. At this point, the desired understory grasses, forbs, and/or crops will be shaded out and the site will transition into a Shrubland State (2).

Additional community tables

Table 12. Community 1.1 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production (Kg/Hectare) | Foliar Cover (%) |
|------------------------|-----------------------|--------|--|--------------------------------|------------------|
| Grass/Grasslike | | | | | |
| 1 | Tallgrasses | | | 897–2354 | |
| | shore little bluestem | SCLI11 | <i>Schizachyrium littorale</i> | 560–1681 | – |
| | little bluestem | SCSCS | <i>Schizachyrium scoparium</i> var. <i>scoparium</i> | 560–1681 | – |
| | switchgrass | PAVI2 | <i>Panicum virgatum</i> | 280–841 | – |
| 2 | Midgrasses | | | 224–560 | |
| | tanglehead | HECO10 | <i>Heteropogon contortus</i> | 168–336 | – |
| | brownseed paspalum | PAPL3 | <i>Paspalum plicatulum</i> | 168–336 | – |
| | crinkleawn grass | TRACH2 | <i>Trachypogon</i> | 168–336 | – |
| 3 | Midgrasses | | | 560–1569 | |
| | silver beardgrass | BOLAT | <i>Bothriochloa laguroides</i> ssp. <i>torreyana</i> | 336–560 | – |
| | hooded windmill grass | CHCU2 | <i>Chloris cucullata</i> | 336–560 | – |
| | Arizona cottontop | DICA8 | <i>Digitaria californica</i> | 336–560 | – |
| | Texas cottontop | DIPA6 | <i>Digitaria patens</i> | 336–560 | – |
| | pink pappusgrass | PABI2 | <i>Pappophorum bicolor</i> | 336–560 | – |
| | plains bristlegrass | SEVU2 | <i>Setaria vulpiseta</i> | 336–560 | – |
| 4 | Shortgrasses | | | 224–560 | |
| | threeawn | ARIST | <i>Aristida</i> | 112–224 | – |
| | slender grama | BORE2 | <i>Bouteloua repens</i> | 112–224 | – |
| | fall witchgrass | DICO6 | <i>Digitaria cognata</i> | 112–224 | – |
| | balsamscale grass | ELION | <i>Elionurus</i> | 112–224 | – |
| | knotgrass | PADI6 | <i>Paspalum distichum</i> | 112–224 | – |
| | thin paspalum | PASE5 | <i>Paspalum setaceum</i> | 112–224 | – |
| | fringed signalgrass | URCI | <i>Urochloa ciliatissima</i> | 112–224 | – |
| Forb | | | | | |
| 5 | Forbs | | | 67–168 | |
| | doyleflower | COMME | <i>Commelina</i> | 22–56 | |

| | | | | | |
|-------------------|------------------------|--------|-----------------------------------|---------|---|
| | dayflower | COGIVL | <i>Cornifraga</i> | 22-56 | - |
| | prairie clover | DALEA | <i>Dalea</i> | 22-56 | - |
| | coastal indigo | INMI | <i>Indigofera miniata</i> | 22-56 | - |
| | dotted blazing star | LIPU | <i>Liatris punctata</i> | 22-56 | - |
| | sensitive plant | MIMOS | <i>Mimosa</i> | 22-56 | - |
| | snoutbean | RHYNC2 | <i>Rhynchosia</i> | 22-56 | - |
| | awnless bushsunflower | SICA7 | <i>Simsia calva</i> | 22-56 | - |
| | vervain | VERBE | <i>Verbena</i> | 22-56 | - |
| 6 | Forbs | | | 45-112 | |
| | Forb, annual | 2FA | <i>Forb, annual</i> | 0-56 | - |
| | Indian mallow | ABUTI | <i>Abutilon</i> | 22-56 | - |
| | ragweed | AMBRO | <i>Ambrosia</i> | 22-56 | - |
| | croton | CROTO | <i>Croton</i> | 22-56 | - |
| Shrub/Vine | | | | | |
| 7 | Shrubs/Vines | | | 112-280 | |
| | live oak | QUVI | <i>Quercus virginiana</i> | 112-280 | - |
| | pricklypear | OPUNT | <i>Opuntia</i> | 56-112 | - |
| | mesquite | PROSO | <i>Prosopis</i> | 0-112 | - |
| | hackberry | CELT1 | <i>Celtis</i> | 0-112 | - |
| | snakewood | CONDA | <i>Condalia</i> | 0-56 | - |
| | Texan hogplum | COTE6 | <i>Colubrina texensis</i> | 0-56 | - |
| | Christmas cactus | CYLE8 | <i>Cylindropuntia leptocaulis</i> | 22-56 | - |
| | lantana | LANTA | <i>Lantana</i> | 11-56 | - |
| | Berlandier's wolfberry | LYBE | <i>Lycium berlandieri</i> | 0-56 | - |
| | spiny hackberry | CEEH | <i>Celtis ehrenbergiana</i> | 0-56 | - |

Animal community

As a historic tall/midgrass prairie, this site was occupied by bison, antelope, deer, quail, turkey, and dove. This site was also used by many species of grassland songbirds, migratory waterfowl, and coyotes. This site now provides forage for livestock and is still used by quail, dove, migratory waterfowl, grassland birds, coyotes, and deer.

Feral hogs (*Sus scrofa*) can be found on most ecological sites in Texas. Damage caused by feral hogs each year includes, crop damage by rutting up crops, destroyed fences, livestock watering areas, and predation on native wildlife, and ground-nesting birds. Feral hogs have few natural predators, thus allowing their population to grow to high numbers.

Wildlife habitat is a complex of many different plant communities and ecological sites across the landscape. Most animals use the landscape differently to find food, shelter, protection, and mates. Working on a conservation plan for the whole property, with a local professional, will help managers make the decisions that allow them to realize their goals for wildlife and livestock.

Grassland State (1): This state provides the maximum amount of forage for livestock such as cattle. It is also utilized by deer, quail and other birds as a source of food. When a site is in the reference plant community phase (1.1) it will also be used by some birds for nesting, if other habitat requirements like thermal and escape cover are near.

Shrubland State (2): This state can be maintained to meet the habitat requirements of cattle and wildlife. Land managers can find a balance that meets their goals and allows them flexibility to manage for livestock and wildlife.

Forbs for deer and birds like quail will be more plentiful in this state. There will also be more trees and shrubs to provide thermal and escape cover for birds as well as cover for deer.

Converted Land State (3): The quality of wildlife habitat this site will produce is extremely variable and is influenced greatly by the timing of rain events. This state is often manipulated to meet landowner goals. If livestock production is the main goal, it can be converted to pastureland. It can also be planted to a mix of grasses and forbs that will benefit both livestock and wildlife. A mix of forbs in the pasture could attract pollinators, birds and other types of wildlife. Food plots can also be planted to provide extra nutrition for deer.

This rating system provides general guidance as to animal preference for plant species. It also indicates possible competition between kinds of herbivores for various plants. Grazing preference changes from time to time, especially between seasons, and between animal kinds and classes. Grazing preference does not necessarily reflect the ecological status of the plant within the plant community. For wildlife, plant preferences for food and plant suitability for cover are rated. Refer to habitat guides for a more complete description of a species habitat needs.

Hydrological functions

Water infiltration is rapid in the site. Therefore, runoff and soil erosion from water is seldom a problem except on cultivated and overgrazed areas.

Recreational uses

Hunting, recreation, and bird watching are common activities.

Inventory data references

Information presented was derived from the revised Range Site, literature, limited NRCS clipping data (417s), field observations, and personal contacts with range-trained personnel.

Other references

AgriLife. 2009. Managing Feral Hogs Not a One-shot Endeavor. AgNews, April 23, 2009.
<http://agnews.tamu.edu/showstory.php?id=903>.

Archer, S. 1995. Herbivore mediation of grass-woody plant interactions. *Tropical Grasslands*, 29:218-235.

Archer, S. 1995. Tree-grass dynamics in a *Prosopis*-thornscrub savanna parkland: reconstructing the past and predicting the future. *Ecoscience*, 2:83-99.

Archer, S. 1994. Woody plant encroachment into southwestern grasslands and savannas: rates, patterns and proximate causes. *Ecological implications of livestock herbivory in the West*, 13-68.

Archer, S. and F. E. Smeins. 1991. Ecosystem-level Processes. In *Grazing Management: An Ecological Perspective*. Edited by R.K. Heischmidt and J.W. Stuth. Timber Press, Portland, OR.

Baen, J. S. 1997. The growing importance and value implications of recreational hunting leases to agricultural land investors. *Journal of Real Estate Research*, 14:399-414.

Bailey, V. 1905. North American Fauna No. 25: Biological Survey of Texas. United States Department of Agriculture Biological Survey. Government Printing Office, Washington D. C.

Bestelmeyer, B. T., J.R. Brown, K. M. Havstad, R. Alexander, G. Chavez, and J. E. Herrick. 2003. Development and use of state-and-transition models for rangelands. *Journal of Range Management*, 56(2):114-126.

Box, T. W. 1960. Herbage production on four range plant communities in South Texas. *Journal of Range Management*, 13:72-76.

Briske, B B, B. T. Bestelmeyer, T. K. Stringham, and P. L. Shaver. 2008. Recommendations for development of

resilience-based State-and-Transition Models. *Rangeland Ecology and Management*, 61:359-367.

Brown, J. R. and S. Archer. 1999. Shrub invasion of grassland: recruitment is continuous and not regulated by herbaceous biomass or density. *Ecology*, 80(7):2385-2396.

Diamond, D. D. and T. E. Fulbright. 1990. Contemporary plant communities of upland grasslands of the Coastal Sand Plain, Texas. *Southwestern Naturalist*, 35:385-392.

Dillehay T. 1974. Late quaternary bison population changes on the Southern Plains. *Plains Anthropologist*, 19:180-96.

Edward, D. B. 1836. *The history of Texas; or, the immigrants, farmers, and politicians guide to the character, climate, soil and production of that country. Geographically arranged from personal observation and experience.* J. A. James and Co., Cincinnati, OH.

Everitt, J. H., D. L. Drawe, and R. I. Leonard. 2002. *Trees, Shrubs, and Cacti of South Texas.* Texas Tech University Press, Lubbock, TX.

Everitt, J. H., D. L. Drawe, and R. I. Lonard. 1999. *Field Guide to the Broad-Leaved Herbaceous Plants of South Texas.* Texas Tech University Press. Lubbock, TX.

Foster, J. H. 1917. Pre-settlement fire frequency regions of the United States: a first approximation. *Tall Timbers Fire Ecology Conference Proceedings No. 20.*

Foster, W. C., ed. 1998. *The La Salle Expedition to Texas: The Journal of Henry Joutel, 1684-1687.* Texas State Historical Association, Austin, TX.

Frost, C. C. 1995. Presettlement fire regimes in southeastern marshes, peatlands, and swamps. In: *Proceedings, 19th Tall Timbers fire ecology conference*, 39-60. Tall Timbers Research Station, Tallahassee, FL.

Fulbright, T. E. and S. L. Beasom. 1987. Long-term effects of mechanical treatment on white-tailed deer browse. *Wildlife Society Bulletin*, 15:560-564.

Fulbright, T. E., J. A. Ortega-Santos, A. Lozano-Cavazos, and L. E. Ramirez-Yanez. 2006. Establishing vegetation on migrating inland sand dunes in Texas. *Rangeland Ecology and Management*, 59:549-556.

Fulbright, T. E., D. D. Diamond, J. Rappole, and J. Norwine. *The Coastal Sand Plain of Southern Texas.* *Rangelands*, 12:337-340.

Gould, F. W. 1975. *The Grasses of Texas.* Texas A&M University Press, College Station, TX.

Grace, J. B., L. K. Allain, H. Q. Baldwin, A. G. Billock, W. R. Eddleman, A. M. Given, C. W. Jeske, and R. Moss. 2005. Effects of prescribed fire in the coastal prairies of Texas. *USGS Open File Report 2005-1287.*

Hamilton, W. and D. Ueckert. 2005. Rangeland Woody Plant Control: Past, Present, and Future. In: *Brush Management: Past, Present, and Future*, 3-16. Texas A&M University Press. College Station, TX.

Hansmire, J. A., D. L. Drawe, B. B. Wester and C.M. Britton. 1988. Effect of winter burns on forbs and grasses of the Texas Coastal Prairie. *The Southwestern Naturalist*, 33(3):333-338.

Heitschmidt R. K., Stuth J. W., eds. 1991. *Grazing management: an ecological perspective.* Timberline Press, Portland, OR.

Inglis, J. M. 1964. *A history of vegetation of the Rio Grande Plains.* Texas Parks and Wildlife Department Bulletin No. 45, Austin, TX.

Kneuper, C. L., C. B. Scott, and W. E. Pinchak. 2003. Consumption and dispersion of mesquite seeds by ruminants. *Journal of Range Management*, 56:255-259.

- Kramp, B., R. Ansley, and D. Jones. 1998. Effect of prescribed fire on mesquite seedlings. Texas Tech University Research Highlights - Range, Wildlife and Fisheries Management, 29:13.
- Le Houerou, H. N. and J. Norwine. 1988. The ecoclimatology of South Texas. In *Arid lands: today and tomorrow*. Edited by E. E. Whitehead, C. F. Hutchinson, B. N. Timmesman, and R. G. Varady, 417-444. Westview Press, Boulder, CO.
- Lehman, V. W. 1965. Fire in the range of Attwater's prairie chicken. Tall Timbers Fire Ecology Conference, 4:127-143.
- Lehman, V. W. 1969. *Forgotten Legions: Sheep in the Rio Grande Plain of Texas*. Texas Western Press, El Paso, TX.
- Mann, C. 2004. 1491. *New Revelations of the Americas before Columbus*. Vintage Books, New York City, NY.
- Mapston, M. E. 2009. Feral Hogs in Texas. Rep. Texas Cooperative Extension. 23 Apr. 2009
<http://icwdm.org/Publications/pdf/Feral%20Pig/Txferalhogs.pdf>
- McClendon, T. 1991. Preliminary description of the vegetation of South Texas exclusive of the Coastal Saline Zones. *Texas Journal of Science*, 43:13-32.
- McGinty A., D. N. Ueckert. 2001. The Brush Busters success story. *Rangelands*, 23:3-8.
- McLendon, T. 1991. Preliminary description of the vegetation of south Texas exclusive of coastal saline zones. *Texas Journal of Science*, 43:13-32.
- Norwine, J. 1978. Twentieth-century semiarid climates and climatic fluctuations in Texas and northeastern Mexico. *Journal of Arid Environments*, 1:313-325.
- Norwine, J. and R. Bingham. 1986. Frequency and severity of droughts in South Texas: 1900-1983, 1-17. In *Livestock and wildlife management during drought*. Edited by R. D. Brown. Caesar Kleberg Wildlife Research Institute, Kingsville, TX.
- Olmsted, F. L. 1857. *A journey through Texas, or a saddle trip on the Southwest frontier: with a statistical appendix*. Dix, Edwards, and co., New York, London.
- Prichard, D. 1998. *A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lentic Areas*. Bureau of Land Management. National Applied Resource Sciences Center, CO.
- Rappole, J. H. and G. W. Blacklock. 1994. *A field guide: Birds of Texas*. Texas A&M University Press, College Station, TX.
- Rhyne, M. Z. 1998. Optimization of wildlife and recreation earnings for private landowners. M. S. Thesis, Texas A&M University-Kingsville, Kingsville, TX.
- Schindler, J. R. and T. E. Fulbright. 2003. Roller chopping effects on Tamaulipan scrub community composition. *Journal of Range Management*, 56:585-590.
- Schmidley, D. J. 1983. *Texas mammals east of the Balcones Fault zone*. Texas A&M University Press, College Station, TX.
- Scifres C. J., W. T. Hamilton, J. R. Conner, J. M. Inglis, and G. A. Rasmussen. 1985. *Integrated Brush Management Systems for South Texas: Development and Implementation*. Texas Agricultural Experiment Station, College Station, TX.
- Scifres, C. J. and W. T. Hamilton. 1993. *Prescribed burning for brushland management: the South Texas example*. Texas A&M Press, College Station, TX.

- Scifres, C. J. 1975. Systems for improving McCartney rose infested coastal prairie rangeland. Texas Agricultural Experiment Station Bulletin MP 1225.
- Smeins, F. E., S. Fuhlendorf, and C. Taylor, Jr. 1997. Environmental and Land Use Changes: A Long Term Perspective. In Juniper Symposium, 1-21. Texas Agricultural Experiment Station.
- Smeins, F. E., D. D. Diamond, and W. Hanselka. 1991. Coastal prairie, 269-290. In Ecosystems of the World: Natural Grasslands. Edited by R. T. Coupland. Elsevier Press, Amsterdam, Netherlands.
- Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database.
- Snyder, R. A. and C. L. Boss. 2002. Recovery and stability in barrier island plant communities. *Journal of Coastal Research*, 18:530-536.
- Stiles, H. R., ed. 1906. Joutel's journal of La Salle's last voyage, 1686-1687. Joseph McDonough, Albany, NY.
- Stringham, T. K., W. C. Krueger, and P. L. Shaver. 2001. State and transition modeling: and ecological process approach. *Journal of Range Management*, 56(2):106-113.
- Texas A&M Research and Extension Center. 2000. Native Plants of South Texas <http://uvalde.tamu.edu/herbarium/index.html>.
- Texas Agriculture Experiment Station. 2007. Benny Simpson's Texas Native Trees <http://aggie-horticulture.tamu.edu/ornamentals/natives/>.
- Texas Parks and Wildlife Department. 2007. List of White-tailed Deer Browse and Ratings. District 8.
- Tharp, B. C. 1926. Structure of Texas Vegetation east of the 98th meridian. Bulletin 2606. University of Texas, Austin. TX.
- Thurow, T. L. 1991. Hydrology and Erosion. In: *Grazing Management: An Ecological Perspective*. Edited by R.K. Heitschmidt and J.W. Stuth. Timber Press, Portland, OR.
- Urbatsch, L. 2000. Chinese tallow tree (*Triadica sebifera* (L.) Small). USDA-NRCS Plant Guide.
- USDA-NRCS Plant Database. 2018. <https://plants.usda.gov/>.
- Van't Hul, J. T., R. S. Lutz and N. E. Mathews. 1997. Impact of prescribed burning on vegetation and bird abundance on Matagorda Island, Texas. *Journal of Range Management*, 50:346-360.
- Vines, R. A. 1984. *Trees of Central Texas*. University of Texas Press, Austin, TX.
- Wade, D. D., B. L. Brock, P. H. Brose, J. B. Grace, G. A. Hoch, and W. A. Patterson III. 2000. Fire in Eastern ecosystems. In *Wildland fire in ecosystems: effects of fire on flora*. Edited by J. K. Brown and J. Kaplers. United States Forest Service, Rocky Mountain Research Station, Ogden, UT.
- Weltz, M. A. and W. H. Blackburn. 1995. Water budget for south Texas rangelands. *Journal of Range Management*, 48:45-52.
- Whittaker, R. H., L. E. Gilbert, and J. H. Connell. 1979. Analysis of a two-phase pattern in a mesquite grassland, Texas. *Journal of Ecology*, 67:935-52.
- Wright, B. D., R. K. Lyons, J. C. Cathey, and S. Cooper. 2002. White-tailed deer browse preferences for South Texas and the Edwards Plateau. Texas Cooperative Extension Bulletin B-6130.
- Wright, H.A. and A.W. Bailey. 1982. *Fire Ecology: United States and Southern Canada*. John Wiley & Sons, Inc.,

Hoboken, NJ.

Approval

Bryan Christensen, 9/19/2023

Acknowledgments

Reviewers and Technical Contributors:

Shanna Dunn, RSS, NRCS, Corpus Christi, Texas

Jason Hohlt, RMS, NRCS, Kingsville, Texas

Justin Clary, RMS, NRCS, Temple, Texas

Mark Moseley, RMS, NRCS, Boerne, Texas

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

| | |
|---|-------------------|
| Author(s)/participant(s) | |
| Contact for lead author | |
| Date | 05/01/2024 |
| Approved by | Bryan Christensen |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

Dominant:

Sub-dominant:

Other:

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

17. **Perennial plant reproductive capability:**
