USDA Natural Resources Conservation Service

Ecological site R080BY154TX
Low Stony Hill 26-33" PZ

Last updated: 9/19/2023
Accessed: 05/12/2025

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.

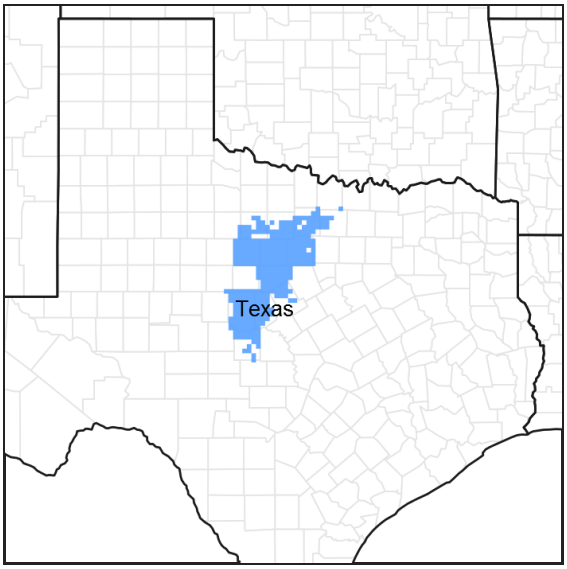


Figure 1. Mapped extent

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): 080B–Texas North-Central Prairies

MLRA 80B consists of gently rolling, dissected plains with very steep hillsides and sideslopes and narrow flood plains associated with small streams. Loamy and clayey soils range from very shallow to deep and developed in sandstones, shales, and limestones of Pennsylvanian age.

Classification relationships

This ecological site is correlated to soil components at the Major Land Resource Area (MLRA) level which is further described in USDA Ag Handbook 296.

Ecological site concept

These sites occur over shallow stony clay loam soils on uplands. Reference vegetation includes native perennial tall and midgrasses with numerous forbs and scattered oaks. While the soils are shallow, plant roots can often penetrate cracks in the limestone rock. Without periodic fire or brush management, woody species may increase and dominate the site.

Associated sites

R080BY146TX	**Clay Loam 26-33" PZ** Clay Loam site frequently occurs adjacent to the Low stony Hills site in a lower position on the landscape and receive run-on water.
R080BY163TX	**Steep Rocky 26-33" PZ** The Steep Rocky site is immediately adjacent and upslope of the Low Stony Hill site with steeper, rocky soils.

Similar sites

R080BY163TX	**Steep Rocky 26-33" PZ** This site is immediately adjacent and upslope of the Low Stony Hill site. It has somewhat lower production because of shallower soils and steeper slopes.

Table 1. Dominant plant species

Tree	(1) *Quercus fusiformis* (2) *Quercus buckleyi*
Shrub	Not specified
Herbaceous	(1) *Schizachyrium scoparium* (2) *Andropogon gerardii*

Physiographic features

This site occurs on linear to convex interfluves and crests of dip slopes and ridges in the Texas North-Central Prairies. This site is characteristically a water distributing site. Slopes are typically less than 8 percent.

Table 2. Representative physiographic features

Landforms	(1) Hills > Ridge (2) Hills > Dip slope
Runoff class	Medium to high
Elevation	750–2,400 ft
Slope	1–8%
Aspect	Aspect is not a significant factor

Climatic features

The climate is subtropical subhumid and is characterized by hot humid summers and relatively mild winters. Tropical maritime air controls the climate during spring, summer and fall. In winter and early spring, frequent surges of polar Canadian air cause sudden drops in temperatures and add considerable variety to the daily weather. The average first frost generally occurs about November 5 and the last freeze of the season usually occurs about March 19. The average frost free period ranges from 215 days in the northern counties, to 240 days in the south.

The average relative humidity in mid-afternoon is about 60 percent in the summer months. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 75 percent of the time possible during the summer and 50 percent in winter. The prevailing wind direction is from the southwest and highest windspeeds occur during the spring months.

Approximately 75% of annual rainfall occurs between April 1 and October 31. Rainfall during the months of April through September typically occurs during thunderstorms which tend to be intense and brief, resulting in large amounts of rain in a short time. The wettest months of the year are May, June, September, and October. The driest months during the growing season are July and August. The winter months of November, December, January, and February are the driest months overall.

Average annual precipitation for the entire MLRA is approximately 28 inches. There is a noticeable difference in the average annual precipitation in the northern counties in comparison to the southern and western counties of this Major Land Resource Area. Jack, Clay, Young, and Palo Pinto Counties all have an average annual precipitation of more than 31 inches. Stephens, Eastland, McCulloch, and San Saba Counties all have an average annual precipitation of less than 28 inches.

Winters tend to be mild, with occasional periods of very cold temperatures which can be accompanied by strong northerly winds and freezing precipitation. Snow is infrequent and significant accumulations are rare. These periods of very cold weather are generally short-lived. Summers tend to be hot and dry. Drought conditions are common during most summers. Air temperatures of more than 95oF are common from mid-June through September. In the northern counties nearest to the Red River, temperatures are generally slightly cooler during winter months and slightly warmer during summer months than in the other counties in the North Central Prairie.

Table 3. Representative climatic features

Frost-free period (characteristic range)	184-200 days
Freeze-free period (characteristic range)	211-225 days
Precipitation total (characteristic range)	30-32 in
Frost-free period (actual range)	183-204 days
Freeze-free period (actual range)	210-226 days
Precipitation total (actual range)	29-33 in
Frost-free period (average)	193 days
Freeze-free period (average)	217 days
Precipitation total (average)	31 in

Climate stations used

- (1) SAN SABA 7NW [USC00417994], Richland Springs, TX
- (2) BROWNWOOD 2ENE [USC00411138], Early, TX
- (3) EASTLAND [USC00412715], Eastland, TX
- (4) MINERAL WELLS AP [USW00093985], Millsap, TX
- (5) BRECKENRIDGE [USC00411042], Breckenridge, TX
- (6) GRAHAM [USC00413668], Graham, TX
- (7) JACKSBORO [USC00414517], Jacksboro, TX

Influencing water features

These sites often shed water to adjacent areas downslope via runoff. However, the presence of good ground cover and deep rooted plants can help facilitate rainwater infiltration into the soil profile. The sites are not associated with wetlands.

Wetland description

NA

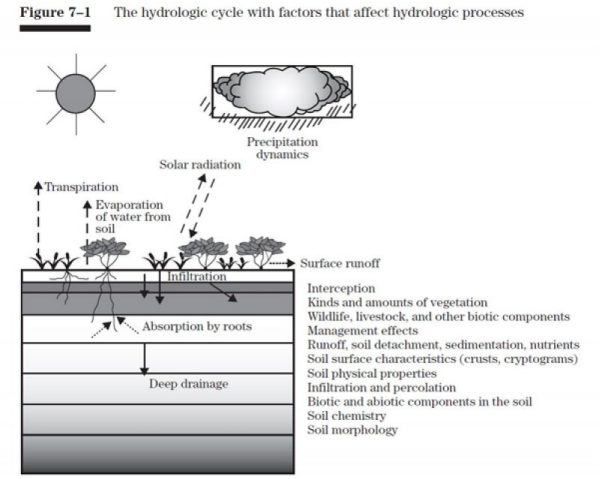


Figure 8.

Soil features

Representative soil components for this ecological site include: Palopinto

The site is characterized by shallow, rubbly, well drained soils.

Table 4. Representative soil features

Parent material	(1) Residuum–limestone
Surface texture	(1) Very stony loam (2) Very stony clay loam
Drainage class	Well drained
Permeability class	Moderately slow
Soil depth	6–20 in
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	15–50%
Available water capacity (0-40in)	1–2 in
Calcium carbonate equivalent (0-40in)	0–5%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0–80%

Ecological dynamics

The reference plant community for the Low Stony Hill ecological site is a live oak savanna with large areas of open grassland dominated by tallgrasses with an abundant variety of forbs as well as a significant presence of trees and shrubs. Numerous mottes of oaks, elms, and hackberry, as well as several other species of trees and shrubs are distributed throughout the site to create a diverse mosaic of grasses, forbs, shrubs, and trees. Evidence of the

historic vegetation can be found in the journals and records of explorers, military expeditions, and boundary survey teams.

Climate is a major factor influencing vegetation on the site. Long-term droughts lasting multiple years or growing seasons are infrequent, but when they do occur, they can have a negative impact on the vegetation. Because of the relatively shallow and stony characteristics of the soil, this site often shows signs of drought earlier than adjacent sites with deeper soils. Those same characteristics enable this site to respond quickly when rainfall does occur. The effects of erratic seasonal moisture and short-term dry spells lasting a few months are not as severe as those caused by long-term droughts. However, the lower the ecological status of the site, the greater the negative impact will be during drought periods regardless of duration.Abusive grazing during or immediately following the drought period can have disastrous consequences. The extended drought of the 1950's was especially devastating on the Low Stony Hill site. Grass production on this and other sites was significantly reduced for five to seven consecutive years, but livestock numbers were not adjusted accordingly. The result was severe overgrazing that caused long-term, and often permanent, adverse changes to the plant community on this site. Many of these areas have not recovered, and may never recover, from the impacts of that drought.

Fire was an important part of the ecosystem. Most ecosystems in the North Central Prairie developed in a 4 to 6 year regime of recurring fires. Many of these fires resulted from lightning strikes during thunderstorms. Native Americans frequently set fires to manipulate the movement of bison and other animals as well as using fire as a defensive or offensive technique when dealing with their enemies. These historic fires were usually severe because of the amount and volatility of fuel available to carry the fire. The intensity of fires kept shrubs and sapling trees suppressed and allowed grasses and forbs to flourish along with the established trees and naturally occurring dense mottes of shrubs. Tallgrass species are fire tolerant and are enhanced by periodic burning. Forbs usually increase for a year or two following these fires before the grasses become dominant again. These periodic fires perpetuated the diverse mosaic pattern of vegetation on the site.

Lack of fire allows herbaceous vegetation to become senescent and may eventually lead to the loss of the most desirable species. Seedlings of non-native brush species and invasive weeds may encroach on the site from adjacent sites, as well as allowing native shrubs and trees to increase in density and canopy cover.

Prior to settlement, this site was subject to periodic grazing and browsing by vast herds of bison, wild cattle, wild horses, and deer. At times the site was grazed heavily along with adjacent sites. These grazing and browsing episodes were intense and severe, but periods of heavy use were followed by long periods of non-use as the herds migrated to fresh grazing areas before returning to previously grazed areas. The grazed areas had an opportunity to rest, regrow, regain vigor, and reproduce prior to the next grazing event. Intervals between grazing periods were frequently influenced by the amount of time that had elapsed since the last fire on the area.

As the region was settled, fire was reduced or eliminated and grasslands were fenced off to control movement and facilitate grazing by domestic livestock. As a result of abusive grazing or lack of grazing and/or the elimination of fire, in association with extreme climatic events, the tallgrass plant community has been eliminated or severely altered on most Low Stony Hill sites.

Further deterioration leads to the loss of the perennial warm-season midgrass and forb plant community and an increase in short grasses, annuals, and bare ground. This provides the opportunity for aggressive woody species such as juniper to increase in density and canopy, and encroach from adjacent sites.

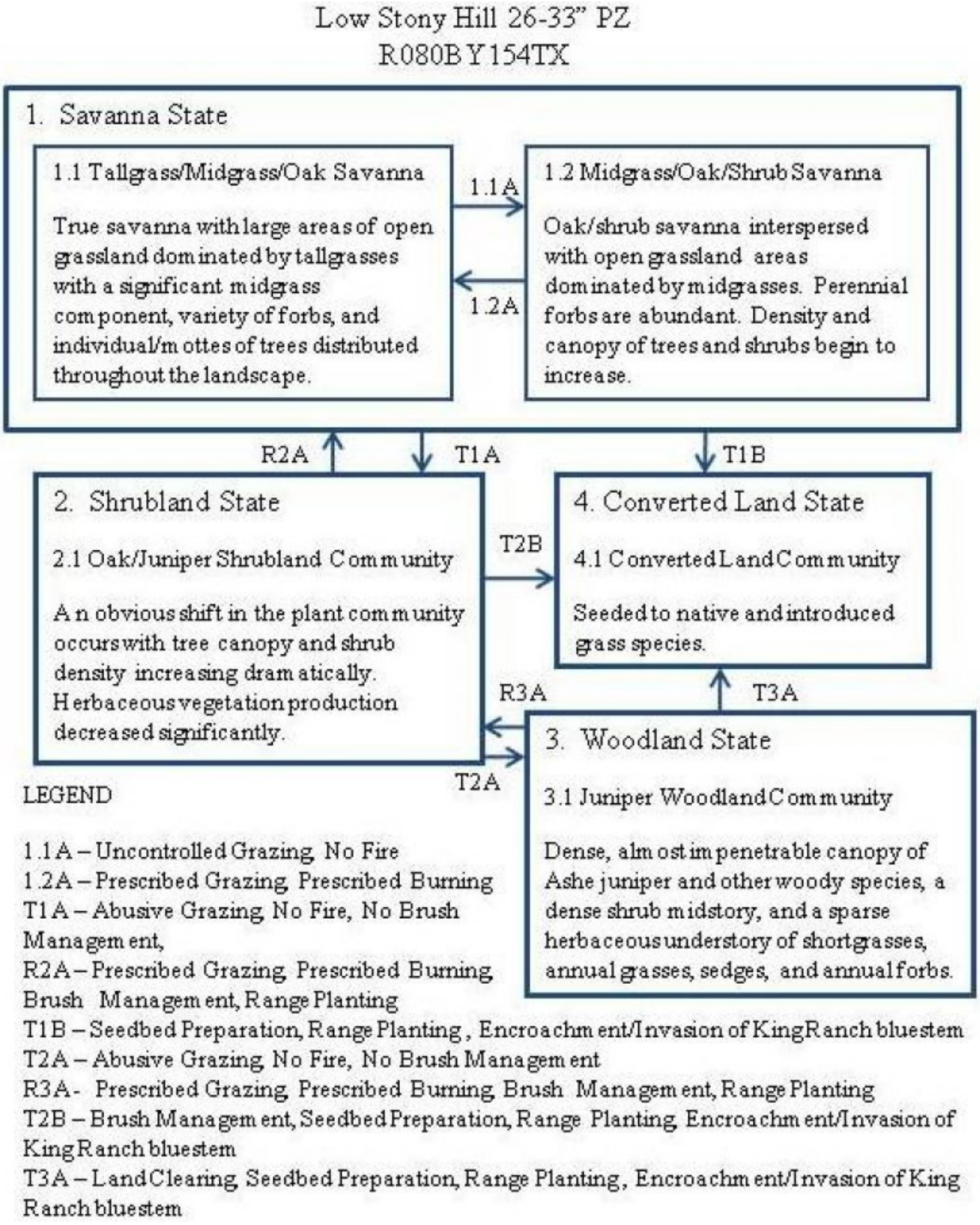
Selective individual removal of unwanted trees and shrubs is relatively easy and more practical when brush plants initially appear on the site. The increase of brush can be fairly rapid and the plants per acre will soon become too numerous for individual control to be feasible. Once woody plants become mature or develop into dense stands, control is expensive, uneconomical, impractical, and difficult to achieve. Brush management is most successful using a systems approach. Initial treatment by mechanical methods can be followed by using approved herbicides, and using prescribed fire as a maintenance technique. Prescribed grazing with a reasonable stocking rate can sustain the grass species composition and production at a near reference community level.

Changes in plant communities and vegetation states on the Low Stony Hill site are the result of the combined influences of natural events (rainfall, temperature, droughts, etc.) and the accompanying management systems implemented on the area (prescribed fire, grazing management, and brush management).

Rangeland Health Reference Worksheets have been posted for this site on the Texas NRCS website (www.tx.nrcs.usda.gov) in Section II of the eFOTG under (F) Ecological Site Descriptions.

State and Transitional Pathways:
The State and Transition Diagram which follows provides information on some of the most typical pathways that the vegetation on this site can follow as the result of natural events, management inputs, and application of conservation treatments. There may be other plant communities that can exist on this site under certain conditions. Consultation with local experts and professionals is recommended prior to application of practices or management strategies in order to ensure that specific objectives will be met.

State and transition model



State 1
Savanna State - Reference

The reference plant community for the Low Stony Hill ecological site is Tallgrass/Midgrass/Oak Savanna Community. In reference conditions, the site is dominated by little bluestem, big bluestem, and Indiangrass with minor amounts of switchgrass, and a significant community of warm-season midgrasses. An abundant variety of forbs occurs on this site. Trees and shrubs are a very important component of the historic plant community. Annual

production ranges from 2000 to 4000 pounds per acre. In the Midgrass/Oak/Shrub Savanna Community, the plant community changed from a tallgrass dominant to a midgrass dominant. Little bluestem and other tallgrasses are still present on the site, but sideoats grama, dropseeds, hairy grama, tridens, cane and silver bluestem, and Texas wintergrass become the dominant grasses. The density and canopy of trees and shrubs begin to increase as shrubs begin to encroach from adjacent areas. There is still a sufficient population of little bluestem and tallgrasses remaining to enable this site to recover to near its historic potential through proper grazing management and prescribed burning. Annual production ranges from 1600 to 3200 pounds per acre.

Dominant plant species

- Texas live oak (*Quercus fusiformis*), tree
- little bluestem (*Schizachyrium scoparium*), grass

Community 1.1
Tallgrass/Midgrass/Oak Savanna Community

Figure 9. 1.1 Tallgrass/Midgrass/Oak Savanna Community

The reference plant community for the Low Stony Hill ecological site is Tallgrass/Midgrass/Oak Savanna Community. In reference conditions, the site is dominated by little bluestem, big bluestem, and Indiangrass with minor amounts of switchgrass, and a significant community of warm-season midgrasses including sideoats grama, green sprangletop, Texas cupgrass, vine mesquite, silver and cane bluestem, and dropseeds. There is also a small, but important, cool-season grass component of Texas wintergrass, Canada and Virginia wildrye, sedges, and Scribner's rosettegrass. An abundant variety of forbs occurs on this site. Some of the most common or significant forbs are bundleflower, bushsunflower, gayfeather, Engelmann daisy, sagewort, prairie clover sensitivebriar, orange zexmenia, and several native legumes including milkpea, scurfpea, least snoutbean, and trailing wildbean. Trees and shrubs are a very important component of this plant community. Live oak, hackberry, several species of elms, as well as other oaks are the dominant tree species. A small amount of Ashe juniper has always been a part of the historic vegetation on this site. The most common shrubs are bumelia, sumacs, catclaw acacia, elbowbush, kidneywood, agarito, and shinoak. Yucca, pricklypear, and greenbriar are present in small amounts. Annual production ranges from 2000 to 4000 pounds per acre.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1600	2400	3200
Forb	200	300	400
Shrub/Vine	100	150	200
Tree	100	150	200
Total	**2000**	**3000**	**4000**

Figure 11. Plant community growth curve (percent production by month). TX3014, Tall and mid-grass Savannah, 10 % canopy. Tall and mid grass savannah with some forbs and woody species..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	2	2	10	20	24	10	5	10	10	3	2

Community 1.2
Midgrass/Oak/Shrub Savanna Community

Figure 12. 1.2 Midgrass/Oak/Shrub Savanna Community

Uncontrolled grazing, lack of fire, and/or extended unfavorable climatic conditions eventually cause the plant community to change from a tallgrass dominant to a midgrass dominant. Little bluestem and other tallgrasses are still present on the site, but sideoats grama, dropseeds, hairy grama, tridens, cane and silver bluestem, and Texas wintergrass become the dominant grasses. The density and canopy of trees and shrubs begin to increase as shrubs begin to encroach from adjacent areas. There is still a sufficient population of little bluestem and tallgrasses remaining to enable this site to recover to near its historic potential through proper grazing management and prescribed burning. Annual production ranges from 1600 to 3200 pounds per acre.

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1250	1900	2600
Forb	150	250	300
Shrub/Vine	100	125	150
Tree	100	125	150
Total	**1600**	**2400**	**3200**

Figure 14. Plant community growth curve (percent production by month). TX3045, Midgrass/Tallgrass-Oak Savanna, <20% canopy. Open grassland with abundant forbs, numerous individual trees and mottes of trees and shrubs distributed throughout the site..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	2	4	14	24	20	5	5	10	8	4	2

Pathway 1.1A
Community 1.1 to 1.2

Tallgrass/Midgrass/Oak Savanna Community

Midgrass/Oak/Shrub Savanna Community

With uncontrolled and heavy continuous grazing and no fires, the Tallgrass/Midgrass/Oak Savanna Community will shift to the Midgrass/Oak/Shrub Savanna Community.

Pathway 1.2A
Community 1.2 to 1.1

Midgrass/Oak/Shrub Savanna Community

Tallgrass/Midgrass/Oak Savanna Community

With the implementation of Prescribed Grazing and Prescribed Burning conservation practices, the Midgrass/Oak/Shrub Savanna Community can be restored back to the Tallgrass/Midgrass/Oak Savanna Community.

Conservation practices

Prescribed Burning
Prescribed Grazing

State 2
Shrubland State

In the Oak/Juniper Shrubland Community, tree canopy and shrub density increase dramatically. There is an increase in woody species such as oaks, elms, hackberry, shrubs, and juniper. There is still a fairly good grass and forb community, but herbaceous vegetation production decreases significantly as it is displaced by shrubs. Annual production ranges from 1400 to 2400 pounds per acre.

Dominant plant species

- Texas live oak (*Quercus fusiformis*), tree
- Ashe's juniper (*Juniperus ashei*), tree
- sideoats grama (*Bouteloua curtipendula*), grass

Community 2.1
Oak/Juniper Shrubland Community

Figure 15. 2.1 Oak/Juniper Shrubland Community

An obvious shift in the plant community occurs as a result of heavy grazing, lack of fire, no brush management, and/or extended droughts. Tree canopy and shrub density increase dramatically. There is an increase in woody species such as oaks, elms, hackberry, shrubs, and juniper. There is still a fairly good grass and forb community,

but herbaceous vegetation production decreases significantly as it is displaced by shrubs. Annual production ranges from 1400 to 2400 pounds per acre.

Table 7. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	700	900	1100
Shrub/Vine	300	400	500
Tree	200	300	400
Forb	200	300	400
Total	**1400**	**1900**	**2400**

Figure 17. Plant community growth curve (percent production by month). TX3042, Midgrasses/Shrubs/Juniper, 30% Canopy. Midgrass community with significant increase in overstory and midstory canopy, predominantly oak and juniper species..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	2	5	15	20	20	5	5	14	7	3	2

State 3
Woodland State

The Juniper Woodland Community is noted for the development of a dense, almost impenetrable canopy of Ashe juniper and other woody species, a dense shrub midstory, and a sparse herbaceous understory of shortgrasses, annual grasses, sedges, and annual forbs. Annual production ranges from 700 to 1200 pounds per acre.

Dominant plant species

- Texas live oak (*Quercus fusiformis*), tree
- Ashe's juniper (*Juniperus ashei*), tree
- brome (*Bromus*), grass
- sedge (*Carex*), grass

Community 3.1
Juniper Woodland Community

Figure 18. 3.1 Juniper Woodland Community

Elimination of fire, lack of brush management, and abusive grazing eventually result in the development of a dense, almost impenetrable canopy of Ashe juniper and other woody species, a dense shrub midstory, and a sparse herbaceous understory of shortgrasses, annual grasses, sedges, and annual forbs. Annual production ranges from 700 to 1200 pounds per acre.

Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	200	300	400
Tree	300	350	400
Forb	100	150	200
Grass/Grasslike	100	150	200
Total	**700**	**950**	**1200**

Figure 20. Plant community growth curve (percent production by month). TX3046, Juniper Woodland, Closed Canopy. Juniper woodland with more than 50% canopy, significantly reduced herbaceous understory vegetation..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5	5	10	15	20	5	3	2	10	10	10	5

State 4
Converted Land State

The Converted Land Community has been cultivated for cropland or pastureland purposes. Small grain or forage sorghum may be cropped. Permanent native and introduce pasture may also be planted. Sometimes the community may be abandoned and let “go back” to native species encroached by woody species.

Dominant plant species

- Bermudagrass (*Cynodon dactylon*), grass

Community 4.1
Converted Land Community

Figure 21. 4.1 Converted Land Community

Low Stony Hill sites are sometimes seeded to adapted grasses following brush management or other disturbances of the soil surface. They may be seeded to a mixture of native grasses such as sideoats grama, green sprangletop, and Indiangrass. Thousands of acres have been seeded to King Ranch bluestem, an aggressive introduced species that is well adapted to shallow, rocky, soils and harsh conditions. The seeding usually follows brush management practices. King Ranch bluestem has also invaded thousands of acres of this site from adjacent areas. Annual production ranges from 1200 to 2800 pounds per acre.

Table 9. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1000	1700	2350
Forb	100	150	200
Shrub/Vine	50	100	150
Tree	50	50	100
Total	**1200**	**2000**	**2800**

Figure 23. Plant community growth curve (percent production by month). TX3047, Reseeded Grassland Community. Reseeded grassland with limited forbs, scattered trees and shrubs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	2	4	14	24	20	5	5	10	8	4	2

Transition T1A
State 1 to 2

With abusive grazing, no fires, and no brush management, the Savanna State will transition into the Shrubland State.

Transition T1B
State 1 to 4

With Seedbed Preparation, Range Planting, Pasture Planting, and Encroachment/Invasion of King Ranch bluestem, the Savanna State will transition into the Converted Land State.

Restoration pathway R2A
State 2 to 1

The restoration occurs from the Shrubland State to the Savanna State by the use of various conservation practices including Prescribed Grazing, Prescribed Burning, Brush Management, and Range Planting.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing
Range Planting

Transition T2A
State 2 to 3

The transition from the Shrubland State to the Woodland State occurs due to continuation of abusive grazing pressure, no fires, and no brush management practices.

Transition T2B
State 2 to 4

The transition from the Shrubland State to the Converted Land State occurs due to the application of Brush Management, Seedbed preparation, Range Planting, and Encroachment/Invasion of King Ranch bluestem.

Restoration pathway R3A
State 3 to 2

To restore from the Woodland State to the Shrubland State, the following conservation practices are required: Prescribed Grazing, Prescribed Burning, Brush Management, and Range Planting.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing
Range Planting

Transition T3A
State 3 to 4

The transition from the Woodland State to the Converted Land State requires the use of land clearing, seedbed preparation, range planting, and encroachment/invasion of King Ranch bluestem.

Additional community tables

Table 10. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Tallgrass**			600–900	
	little bluestem	SCSC	*Schizachyrium scoparium*	600–900	–
2	**Tallgrasses**			600–1000	
	big bluestem	ANGE	*Andropogon gerardii*	200–1000	–
	switchgrass	PAVI2	*Panicum virgatum*	100–1000	–
	Indiangrass	SONU2	*Sorghastrum nutans*	200–1000	–
3	**Midgrasses**			600–800	
	sideoats grama	BOCU	*Bouteloua curtipendula*	150–600	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	50–200	–
	tall grama	BOHIP	*Bouteloua hirsuta var. pectinata*	0–200	–
	silver beardgrass	BOLAT	*Bothriochloa laguroides ssp. torreyana*	50–200	–
	tumble windmill grass	CHVE2	*Chloris verticillata*	0–200	–
	plains lovegrass	ERIN	*Eragrostis intermedia*	0–200	–
	Texas cupgrass	ERSE5	*Eriochloa sericea*	50–200	–
	sand lovegrass	ERTR3	*Eragrostis trichodes*	0–200	–
	green sprangletop	LEDU	*Leptochloa dubia*	50–200	–
	seep muhly	MURE2	*Muhlenbergia reverchonii*	50–200	–
	vine mesquite	PAOB	*Panicum obtusum*	0–200	–
	bristlegrass	SETAR	*Setaria*	0–200	–
	composite dropseed	SPCOC2	*Sporobolus compositus var. compositus*	0–200	–
	Drummond's dropseed	SPCOD3	*Sporobolus compositus var. drummondii*	50–200	–
	white tridens	TRAL2	*Tridens albescens*	0–200	–
	slim tridens	TRMUE	*Tridens muticus var. elongatus*	0–200	–
	slim tridens	TRMUM	*Tridens muticus var. muticus*	0–200	–

	purple threeawn	ARPU9	*Aristida purpurea*	0–200	–
	Wright's threeawn	ARPUW	*Aristida purpurea var. wrightii*	0–200	–
	cane bluestem	BOBA3	*Bothriochloa barbinodis*	0–200	–
4	**Cool-season grasses**			100–250	
	Texas wintergrass	NALE3	*Nassella leucotricha*	100–500	–
	cedar sedge	CAPL3	*Carex planostachys*	50–200	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	0–200	–
	Canada wildrye	ELCA4	*Elymus canadensis*	0–200	–
	Virginia wildrye	ELVI3	*Elymus virginicus*	0–200	–
5	**Shortgrasses**			100–250	
	fall witchgrass	DICO6	*Digitaria cognata*	0–200	–
	hairy woollygrass	ERPI5	*Erioneuron pilosum*	0–200	–
	curly-mesquite	HIBE	*Hilaria belangeri*	0–200	–
	Hall's panicgrass	PAHAH	*Panicum hallii var. hallii*	0–200	–
	buffalograss	BODA2	*Bouteloua dactyloides*	50–200	–
	Texas grama	BORI	*Bouteloua rigidiseta*	0–100	–
	red grama	BOTR2	*Bouteloua trifida*	0–100	–
Forb					
6	**Forbs**			200–400	
	Texas Indian mallow	ABFR3	*Abutilon fruticosum*	0–200	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	0–200	–
	white sagebrush	ARLUM2	*Artemisia ludoviciana ssp. mexicana*	0–200	–
	Berlandier's sundrops	CABE6	*Calylophus berlandieri*	0–200	–
	American star-thistle	CEAM2	*Centaurea americana*	0–200	–
	purple prairie clover	DAPU5	*Dalea purpurea*	0–200	–
	bundleflower	DESMA	*Desmanthus*	0–200	–
	ticktrefoil	DESMO	*Desmodium*	0–200	–
	Engelmann's daisy	ENPE4	*Engelmannia peristenia*	0–200	–
	buckwheat	ERIOG	*Eriogonum*	0–200	–
	Leavenworth's eryngo	ERLE11	*Eryngium leavenworthii*	0–200	–
	Texas stork's bill	ERTE13	*Erodium texanum*	0–200	–
	milkpea	GALAC	*Galactia*	0–200	–
	Indian blanket	GAPU	*Gaillardia pulchella*	0–200	–
	beeblossom	GAURA	*Gaura*	0–200	–
	curlycup gumweed	GRSQ	*Grindelia squarrosa*	0–200	–
	hoary false goldenaster	HECA8	*Heterotheca canescens*	0–200	–
	trailing krameria	KRLA	*Krameria lanceolata*	0–200	–
	Nuttall's sensitive-briar	MINU6	*Mimosa nuttallii*	0–200	–
	yellow puff	NELU2	*Neptunia lutea*	0–200	–
	beardtongue	PENST	*Penstemon*	0–200	–
	scurfpea	PSORA2	*Psoralidium*	0–200	–

	snoutbean	RHYNC2	*Rhynchosia*	0–200	–
	pitcher sage	SAAZG	*Salvia azurea var. grandiflora*	0–200	–
	mealycup sage	SAFA2	*Salvia farinacea*	0–200	–
	awnless bushsunflower	SICA7	*Simsia calva*	0–200	–
	amberique-bean	STHE9	*Strophostyles helvola*	0–200	–
	white heath aster	SYERE	*Symphyotrichum ericoides var. ericoides*	0–200	–
	Texas vervain	VEHA	*Verbena halei*	0–200	–
Shrub/Vine					
7	**Shrubs/Vines**			100–200	
	catclaw acacia	ACGRG3	*Acacia greggii var. greggii*	0–200	–
	snakewood	CONDA	*Condalia*	0–200	–
	Christmas cactus	CYLE8	*Cylindropuntia leptocaulis*	0–200	–
	clapweed	EPAN	*Ephedra antisyphilitica*	0–200	–
	Texas kidneywood	EYTE	*Eysenhardtia texana*	0–200	–
	stretchberry	FOPU2	*Forestiera pubescens*	0–200	–
	algerita	MATR3	*Mahonia trifoliolata*	0–200	–
	pricklypear	OPUNT	*Opuntia*	0–200	–
	plum	PRUNU	*Prunus*	0–200	–
	pungent oak	QUPU	*Quercus pungens*	0–200	–
	bastard oak	QUSIB	*Quercus sinuata var. breviloba*	0–200	–
	prairie sumac	RHLA3	*Rhus lanceolata*	0–200	–
	littleleaf sumac	RHMI3	*Rhus microphylla*	0–200	–
	skunkbush sumac	RHTR	*Rhus trilobata*	0–200	–
	gum bully	SILA20	*Sideroxylon lanuginosum*	0–200	–
	greenbrier	SMILA2	*Smilax*	0–200	–
	yucca	YUCCA	*Yucca*	0–200	–
	Texas Hercules' club	ZAHI2	*Zanthoxylum hirsutum*	0–200	–
	lotebush	ZIOB	*Ziziphus obtusifolia*	0–200	–
Tree					
8	**Trees**			100–200	
	eastern redbud	CECA4	*Cercis canadensis*	0–200	–
	sugarberry	CELAL	*Celtis laevigata var. laevigata*	0–200	–
	netleaf hackberry	CELAR	*Celtis laevigata var. reticulata*	0–200	–
	ash	FRAXI	*Fraxinus*	0–200	–
	Ashe's juniper	JUAS	*Juniperus ashei*	0–200	–
	black walnut	JUNI	*Juglans nigra*	0–200	–
	Texas red oak	QUBU2	*Quercus buckleyi*	0–200	–
	Texas live oak	QUFU	*Quercus fusiformis*	100–200	–
	Lacey oak	QULA	*Quercus laceyi*	0–200	–
	winged elm	ULAL	*Ulmus alata*	0–200	–
	American elm	ULAM	*Ulmus americana*	0–200	–
	slippery elm	ULRU	*Ulmus rubra*	0–200	–

Animal community

Historically, the Low Stony Hill site was inhabited permanently and intermittently by a wide variety of mammals, reptiles, and birds. Several historical references and journals written in the 18th and 19th century by explorers, survey parties, and military expeditions refer to herds of bison, wild cattle, wild horses, deer, and other animals roaming freely across the North Central Prairie and adjacent regions.

The Low Stony Hill site provides excellent habitat for many species of wildlife due to the diversity of plant species, growth forms, distribution, and structure of the vegetation that occur. The site provides shelter, escape cover, and nesting habitat, as well as a variety of browse, mast, seeds, and fruit that are important to the diets of various wildlife species. Currently, the site is utilized by deer, wild turkey, quail, numerous species of birds, and a variety of small fur-bearing mammals. Animal species and populations fluctuate as the vegetation cycles through temporary phases and different ecological stages.

Livestock grazing should be controlled by implementing grazing management systems that incorporate frequent and timely deferment periods to prevent abusive grazing. Because of the tree and shrub component and the topography, the Low Stony Hill site is well suited for grazing and browsing by goats.

Hydrological functions

The Low Stony Hill site has a very good soil-water-air-plant relationship because of the amount of rock on the soil surface and in the upper portions of the soil profile. Surface rocks retain moisture and release it slowly to the soil and vegetation following showers and light rainfall. Rocks and fragments in the soil provide pockets for oxygen, moisture, and plant roots. When herbaceous vegetation and ground cover are maintained in a healthy and vigorous status, water infiltration into the soil profile is increased significantly, resulting in less runoff. A thick, healthy grass cover also results in improved water quality because it serves as a filter or trap to reduce sediments and pollutants before the water flows offsite. In many areas where this site occurs, the presence of honeycomb limestone or fractured limestone allows water to penetrate deeper into the soil profile than on some of the associated sites with deeper soils and less rock. Natural springs can occasionally be found on this site where the pastures have been well managed.

As the canopy of juniper increases, more rainfall is intercepted before it can reach the soil surface or herbaceous vegetation below. Where dense canopies of junipers and other trees and shrubs occur on this site, the benefits of light and moderate rainfall are effectively eliminated because the moisture never reaches the understory vegetation.

Surface runoff is rapid during heavy rainfall events due to the rough, steep topography, slowly permeable soils, and numerous limestone outcrops.

Recreational uses

These scenic areas offer outdoor activities including photography, shaded picnic areas, bird watching, hiking, camping, horseback riding, and off-road vehicle use. The Low Stony Hill site is a prime site for wildlife habitat. Where it is managed properly, it provides outstanding opportunities for hunting deer and turkey.

Wood products

Ashe juniper is often used for fence posts. Oaks and some of the other hardwood trees can be used for firewood. Some of the woody species may be used for specialty products and crafts.

Other products

Plums, agarito berries and pricklypear tunas can be eaten or used to make jelly.

Other information

None.

Inventory data references

Vegetation data for this site was obtained from existing Range Site Descriptions, SCS-RANGE -417 Production and Composition Records for Native Grazing Lands, and on-site inventories by the author and local experts including ranchers, natural resource specialists from federal and state agencies, and personnel from cooperating agencies and organizations. A total of 18 SCS-RANGE-417's containing data collected from 4 counties during the period 12/30/1981 to 12/12/1986 were reviewed for this site.

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Acknowledgments

Site Development and Testing Plan:

Future work, as described in a Project Plan, to validate the information in this Provisional Ecological Site Description is needed. This will include field activities to collect low, medium and high intensity sampling, soil correlations, and analysis of that data. Annual field reviews should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final document. Annual reviews of the Project Plan are to be conducted by the Ecological Site Technical Team.

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)	Lem Creswell, Zone RMS, NRCS, Weatherford, Texas
Contact for lead author	817-596-2865
Date	10/22/2007
Approved by	Bryan Christensen
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None.

2. **Presence of water flow patterns:** Deposition or erosion is uncommon during normal rainfall events, but may occur in limited areas during intense rainfall events.

3. **Number and height of erosional pedestals or terracettes:** None.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Expect no more than 20% bare ground scattered randomly throughout the site.

5. **Number of gullies and erosion associated with gullies:** Few rills and no gullies should occur.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None.

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7. **Amount of litter movement (describe size and distance expected to travel):** Little or no litter movement or deposition during normal rainfall events.

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil surface in HCPC is resistant to erosion. Stability range is expected to be 5-6.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** 0-6 inches of Dark brown flaggy silty clay loam with subrounded to angular pebbles, cobbles, and stones. Has a strong fine granular structure. SOM is 1-4%. See soil survey for more information.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** The tallgrass/midgrass savanna with abundant forbs, adequate litter, and little bare ground provides for maximum infiltration and negligible runoff.

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

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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: Warm-season tallgrasses >

    Sub-dominant: Warm-season midgrasses > Perennial forbs > Trees > Shrubs/Vines >

    Other: Cool-season grasses > Warm-season shortgrasses

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Perennial grasses will naturally exhibit a minor amount (less than 5%) of senescence and some mortality every year.

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14. **Average percent litter cover (%) and depth (in):** Litter is dominantly herbaceous.

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

production): 2000 to 4000 pounds per acre.

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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:** Ashe juniper, redberry juniper, pricklypear, yucca, tasajillo, pricklyash, lotebush, mesquite, King Ranch bluestem, annual broomweed

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17. **Perennial plant reproductive capability:** All perennial species should be capable of reproducing every year unless disrupted by extended drought, overgrazing, wildfire, insect damage, or other events occuring immediately prior to, or during the reproductive phase.
