Ecological site R150AY012LA
Loamy Terrace Prairie

Last updated: 9/22/2023
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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.

MLRA notes

Major Land Resource Area (MLRA): 150A–Gulf Coast Prairies

MLRA 150A is in the West Gulf Coastal Plain Section of the Coastal Plain Province of the Atlantic Plain in Texas (83 percent) and Louisiana (17 percent). It makes up about 16,365 square miles (42,410 square kilometers). It is characterized by nearly level plains that have low local relief and are dissected by rivers and streams that flow toward the Gulf of Mexico. Elevation ranges from sea level to about 165 feet (0 to 50 meters) along the interior margin. It includes the towns of Crowley, Eunice, and Lake Charles, Louisiana, and Beaumont, Houston, Bay City, Victoria, Corpus Christi, Robstown, and Kingsville, Texas. Interstates 10 and 45 are in the northeastern part of the area, and Interstate 37 is in the southwestern part. U.S. Highways 90 and 190 are in the eastern part, in Louisiana. U.S. Highway 77 passes through Kingsville, Texas. The Attwater Prairie Chicken National Wildlife Refuge and the Fannin Battleground State Historic Site are in the part of the area in Texas.

Classification relationships

USDA-Natural Resources Conservation Service, 2006.
-Major Land Resource Area (MLRA) 150A

Ecological site concept

The site consists of very deep, moderately well drained to poorly drained, moderately to slowly permeable soils with loamy surfaces that formed in alluvium of the Pleistocene age. These areas were part of the tall grass prairie.

Associated sites

R150AY013LA	**Clayey Terrace Prairie** This site is on low broad flats having clayey-textured soils.
R150AY014LA	**Loamy Terrace Ridge** This site is comprised of silt loam soils on slopes of 0 to 3 percent.

Similar sites

R150AY741TX	**Northern Loamy Prairie** This site is characterized by very deep loamy soils occurring on uplands. They are vegetatively productive and provide good grazing for livestock.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified

Herbaceous	(1) *Schizachyrium scoparium* (2) *Chasmanthium laxum*

Physiographic features

This area is in the West Gulf Coastal Plain Section of the Coastal Plain Province of the Atlantic Plain. It is characterized by nearly level plains that have low local relief and are dissected by rivers and streams that flow toward the Gulf of Mexico, consisting of Pleistocene age deposits of deltaic and lagoonal clays and loams. At the eastern edge, a cap of mixed loess and alluvium occurs on most soils. The loess was derived from the flood plain along the Mississippi River. Areas of this site may contain remnant mima, or pimple mounds, which are characterized by low circular or oval domes composed of coarser-textured material. The basal diameter varies from 10 to more than 100 feet and the height from 1 to about 6 feet. Most of these mounds have been leveled to improve production efficiencies however, there are areas where they still exist.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Stream terrace (2) Coastal plain > Flat
Runoff class	Low to very high
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	Rare to frequent
Elevation	0–80 ft
Slope	0–3%
Water table depth	0–24 in
Aspect	Aspect is not a significant factor

Climatic features

The climate of MLRA 150A is humid subtropical with mild winters. The average annual precipitation in the northern two-thirds of this area is 45 to 63 inches. It is 28 inches at the extreme southern tip of the area and 30 to 45 inches in the southwestern third of the area. The precipitation is fairly evenly distributed, but it is slightly higher in late summer and midsummer in the western part of the area and slightly higher in winter in the eastern part. Rainfall typically occurs as moderate intensity, tropical storms that produce large amounts of rain during the winter. The average annual temperature is 66 to 72 degrees F. The freeze-free period averages 325 days and ranges from 290 to 365 days, increasing in length to the southwest.

Table 3. Representative climatic features

Frost-free period (characteristic range)	235-239 days
Freeze-free period (characteristic range)	273-310 days
Precipitation total (characteristic range)	59-61 in
Frost-free period (actual range)	234-243 days
Freeze-free period (actual range)	271-351 days
Precipitation total (actual range)	58-61 in
Frost-free period (average)	238 days
Freeze-free period (average)	296 days
Precipitation total (average)	60 in

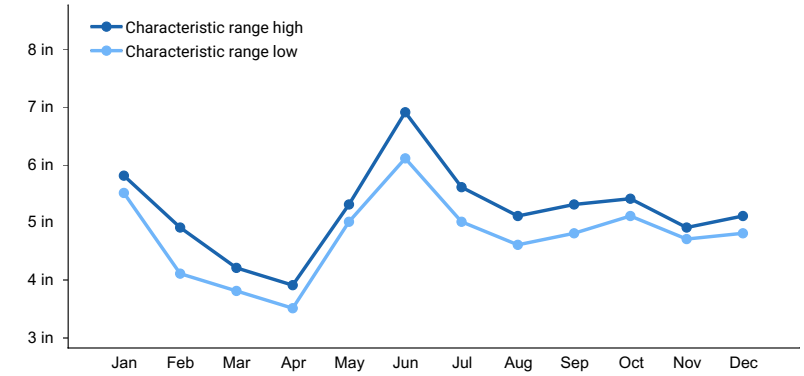


Figure 1. Monthly precipitation range

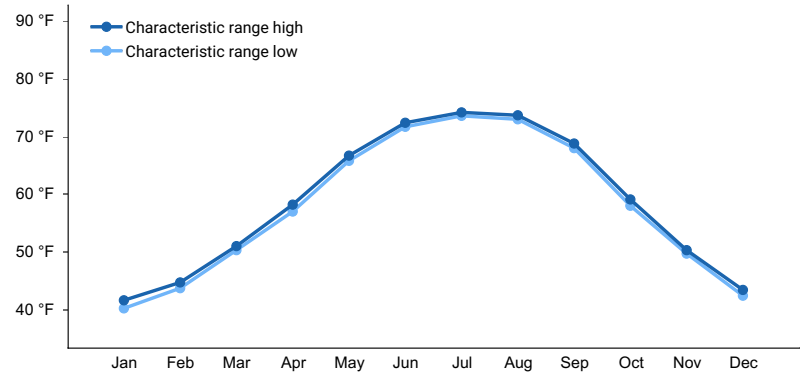


Figure 2. Monthly minimum temperature range

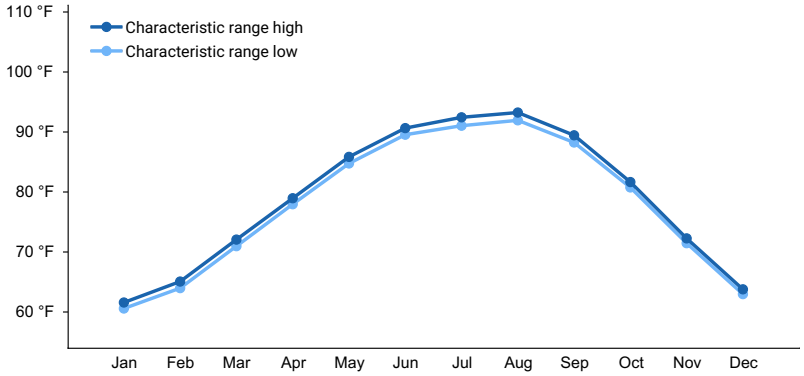


Figure 3. Monthly maximum temperature range

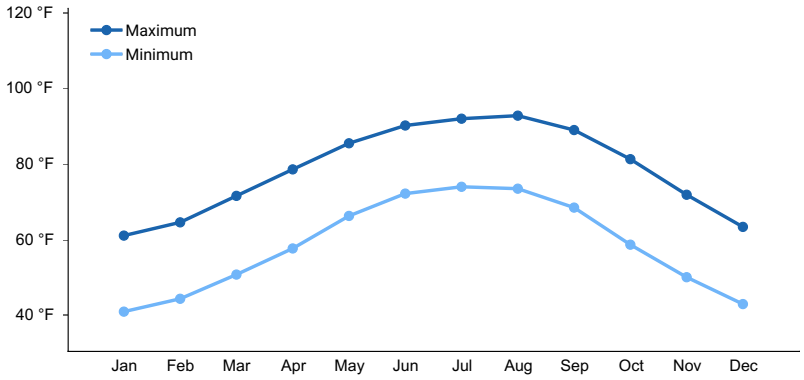


Figure 4. Monthly average minimum and maximum temperature

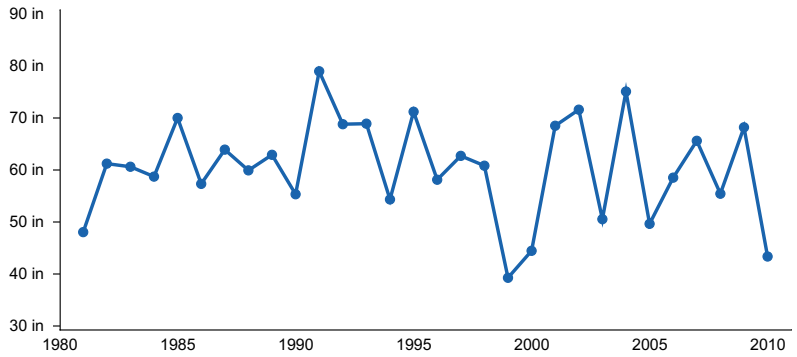


Figure 5. Annual precipitation pattern

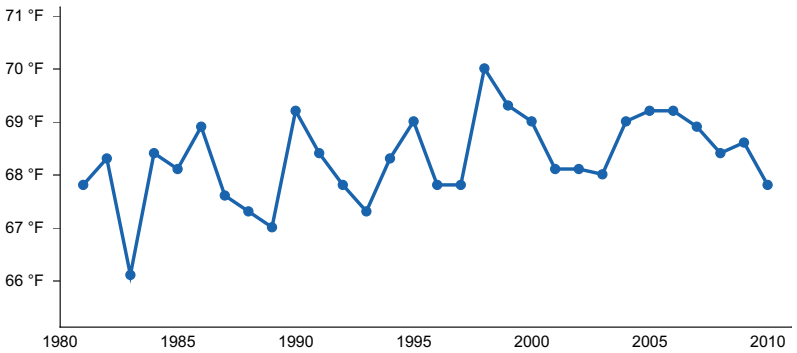


Figure 6. Annual average temperature pattern

Climate stations used

- (1) EUNICE [USC00162981], Eunice, LA
- (2) CROWLEY 2 NE [USC00162212], Crowley, LA
- (3) JENNINGS [USC00164700], Jennings, LA
- (4) LAKE CHARLES [USW00003937], Lake Charles, LA

Influencing water features

Water table depths will fluctuate according to the season of the year. Typically the water table will be highest during the winter and early spring when warm season vegetation is not drawing moisture from the soil. Although ponding is not shown as a characteristic for the soils of this site, ponding may occur for brief to long periods during the growing season on micro-lows and influence the plant community. Some soils associated with this site are hydric or have hydric inclusions and may be wetlands.

Wetland description

This site has hydric and non-hydric soils. Those areas with non-hydric soils have minor components of hydric soils. Hydric areas are mostly due to frequent flooding for long periods. Onsite investigation is necessary to determine exact local conditions.

Soil features

The site consists of very deep, moderately well drained to poorly drained, moderately to slowly permeable soils that formed in alluvium of the Pleistocene age. Soils correlated to this site include: Acadiana, Basile, Brule, Pineisland, and Vidrine series.

Table 4. Representative soil features

Parent material	(1) Alluvium–igneous, metamorphic and sedimentary rock (2) Eolian deposits–igneous, metamorphic and sedimentary rock

Surface texture	(1) Loam (2) Silty clay loam (3) Silt loam
Family particle size	(1) Fine-silty (2) Fine
Drainage class	Moderately well drained to poorly drained
Permeability class	Slow to moderate
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-60in)	10–12 in
Electrical conductivity (0-60in)	0–2 mmhos/cm
Sodium adsorption ratio (0-60in)	0–8
Soil reaction (1:1 water) (0-24in)	4.5–6
Subsurface fragment volume <=3" (0-60in)	0%
Subsurface fragment volume >3" (0-60in)	0%

Ecological dynamics

The pre-settlement plant community of the Loamy Terrace Prairie was a tallgrass prairie. Soils, climate, fire, and grazing by native wild herbivores were the major influences on the plant community. Historically, bison were the primary large ungulates that grazed the site. There are historical records that fires commonly occurred, but none that definitively describe the frequency, timing, or intensity of fires. It has been postulated fires occurred as frequently as every 2 to 5 years.

Under the influences mentioned above, this prairie was dominated by tallgrasses. Major tallgrass species include little bluestem (*Schizachyrium scoparium*), yellow Indiangrass (*Sorghastrum nutans*), big bluestem (*Andropogon gerardii*), switchgrass (*Panicum virgatum*), and eastern gamagrass (*Tripsacum dactyloides*). Perennial forbs are an important part of the composition and include ashy sunflower (*Helianthus mollis*), button snake root (*Eryngium yuccifolium*), gayfeather (Liatris spp.), and goldenrod (Solidago spp.). The species composition varies to include species from several families and will vary along the moisture gradient. The micro-highs and lows contribute to the diverse plant community; the micro-highs are slightly drier and the micro-lows slightly wetter. Elevation differences between highs and lows range from 6 to 15 inches. Vegetation tolerant of moist soil grows on the lower elevations of the while less water-tolerant vegetation grows on the higher elevations.

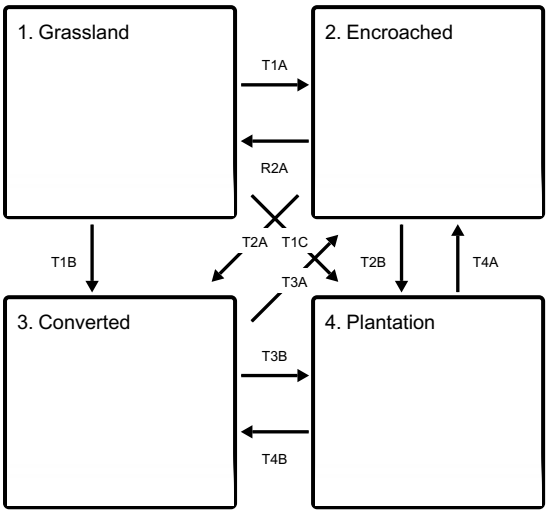
Excessive grazing by domestic livestock contributes to the reduction or elimination of eastern gamagrass, big bluestem, yellow Indiangrass, switchgrass, and little bluestem. As the site transitions, species such as brownseed paspalum (*Paspalum plicatulum*), bushy bluestem (*Andropogon glomeratus*), knotroot bristlegrass (*Setaria parviflora*), smutgrass (*Sporobolus indicus*), and shorter-stature species increase. In addition to site transistion due to excessive grazing, farming has had a significant influence. Not only has the site changed through the loss of native plant communities from cultivation, but also through the change in soils, hydrology, and topography by land leveling, ditching, and leveeing. Continued overuse by livestock, lack of fire, or abandonment of cropping allows woody plants to invade. These woody pioneers include eastern baccharis (Baccharis halamifolia), hackberry (Celtis sp.), ash (Fraxinus sp.), and Chinese tallow (*Triadica sebifera*).

As the plant community transitions from the Tallgrass Prairie Community (1.1) to the other states, changes occur in plant composition, biomass production, litter accumulation, and water infiltration and storage. These changes influence most treatment alternatives including the ability to use fire as a management tool. The resulting increase

in woody plant density signifies that a threshold has been crossed. Once this threshold is crossed, restoration back towards the reference plant community becomes much more difficult and expensive. Even though a plant community similar can establish, the reference community may never be fully restored. Although a combination of practices such as brush management, re-seeding, prescribed grazing, and fire are required for restoration. Also, the expansive soil disturbance associated with a transition to a converted state removes soil microenvironmental factors that can prevent total restoration.

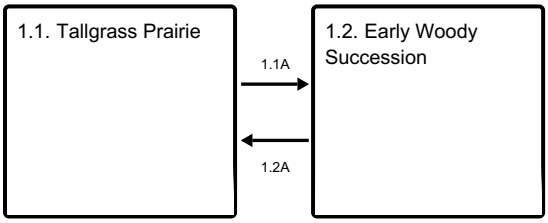
State and transition model

Ecosystem states

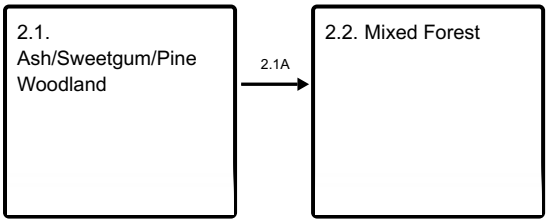


T1A - Absence of disturbance and natural regeneration over time
T1B - Clearing of native vegetation, followed by planting of improved forage species or annual crops
T1C - Timber is harvested by clearcut, followed by planting to a monoculture of pine
R2A - Reintroduction of fire and regular disturbance return intervals
T2A - Clearing of vegetation, followed by planting improved forage species or annual crops
T2B - Vegetation is cleared, followed by planting a monoculture of pine trees
T3A - Absence of disturbance and natural regeneration over time
T3B - Planted to a monoculture of pine trees
T4A - Absence of disturbance and natural regeneration over time
T4B - Timber is harvested, followed by planting improved forage species or annuals crops

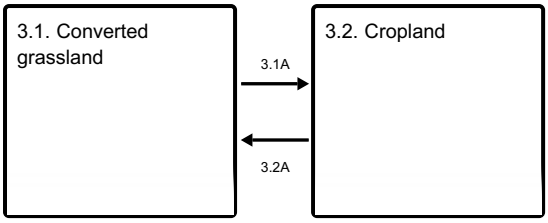
State 1 submodel, plant communities



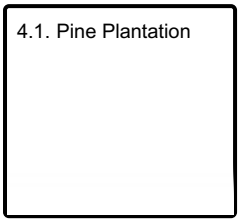
State 2 submodel, plant communities



State 3 submodel, plant communities



State 4 submodel, plant communities



State 1
Grassland

The Reference state is representative of the pre-Euro settlement conditions. Climate, fire, and grazing by native wild herbivores were the major ecological drivers. There are historical records that fires commonly occurred, but none that definitively describe the frequency, timing, or intensity of fires. It has been postulated fires occurred as frequently as every 2 to 5 years. Historically, bison were the primary large ungulates that grazed the site.

Dominant plant species

- little bluestem (*Schizachyrium scoparium*), grass
- big bluestem (*Andropogon gerardii*), grass

Community 1.1
Tallgrass Prairie

Figure 7. 1.1 Tallgrass Prairie

This community historically covered 2.5 million acres that once dominated southwest Louisiana and is the reference plant community. Currently, less than 100 acres remain, making it one of the most endangered ecosystems. Most of the few remaining remnants of prairie in Louisiana are found on narrow strips of land along railroad tracks, small areas outside the reach of tillage, within grazing systems, and wildlife refuges. Despite the small size of these remnants, most contain a high diversity of native tallgrass prairie flora. Nearly 1,000 plant species have been identified in the Coastal Prairie and almost all are perennials. Conversion of these sites occurred over most of the region by plowing and planting crop species or repeated and severe overgrazing, a practice which favors nonnative, sod-forming plants. Restoration is difficult as soil microbial communities are largely not well understood and seed sources for the quantities of species are difficult to locate. Historic disturbances included fire and grazing by bison. Their grazing was intense but were followed by long periods of recovery. The bison grazing accelerated nutrients cycling, removed any decadent plants, and promoted species diversity. Fire set by storms or Native Americans

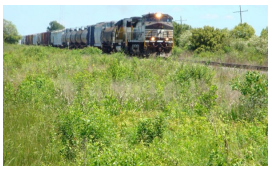
recycled minerals and nutrients, retarded the invasion of woody species, and increased the quality of the plants. Bison would have been attracted to these burned areas. The combined effect of fire and grazing over long periods kept the prairie functioning. This disturbance-driven community was always evolving with shifts in species composition by time of year, climatic variability, and disturbance.

Community 1.2
Early Woody Succession

Figure 8. 1.2 Early Woody Succession

This community is characterized by a diverse species composition of grasses and forbs with an increasing composition of woody species, especially ash, sweetgum, and pines. If disturbance of the vegetative community is not regularly implemented this community will transition to the Woodland State. If this is not desired, it will require input of extensive resources to return to a grassland. Vegetative disturbance can be achieved by prescribed burning, mowing, disking, or herbicide treatment. Disking or mowing may not be applicable if the woody species are too large. If a woodland is the desired community, proper management is required. Some Invasive woody species, such as tallow trees, will invade quickly and in as few as 3 years produce viable seeds. The community is critical if the desired outcome is a grassland because further establishment of woody species will be more costly.

Pathway 1.1A
Community 1.1 to 1.2



Tallgrass Prairie

Early Woody Succession

Lack of brush management and fire will transition the reference community to the Early Woody Succession Community (1.2).

Pathway 1.2A
Community 1.2 to 1.1

Early Woody Succession

Tallgrass Prairie

Brush management and return of regular fire will remove the woody species and restore the tallgrass prairie.

State 2

Encroached

The Encroached state is characterized by an increase in long-lived woody plants. Changes in disturbance frequency has allowed woody plants do dominate ecological processes, such as rates of runoff and infiltration, shading, litter accumulation, nutrient cycling and biomass production.

Dominant plant species

- eastern baccharis (*Baccharis halimifolia*), tree
- hackberry (*Celtis*), tree
- ash (*Fraxinus*), tree

Community 2.1
Ash/Sweetgum/Pine Woodland

This community has crossed a threshold from the Grassland State (1) to the Woodland State (2). Typically, the overstory will contain ash, sweetgum, and pines, but some Invasive woody species, such as Chinese tallow, can invade and create a closed woody canopy. This phase can provide beneficial habitat for some wildlife species. If a woodland phase is the desired community, proper management is required. This community has a critical time frame for control of undesirable species. Due to rainfall, soil fertility, and temperature, woody species will continue to grow.

Community 2.2
Mixed Forest

This community is a result of continued growth by the previous woodland community (2.1). At this phase, some species have reached maturity and are being replaced by other woody species. This may be desired for areas that are planted to woodland species. This phase can provide beneficial habitat for some wildlife species. If timber production is the desired community, proper management is required. Control of undesirable species should be part of the harvest strategy and due to rainfall, drainage and soil properties, harvest limitations exist and will require attention.

Pathway 2.1A
Community 2.1 to 2.2

Continued, unabated growth by woody species will transition the woodland into a forest.

State 3
Converted

The Converted State is characterized by the removal of native vegetation and natural disturbance return intervals. Major ecological drivers in this state include the presence of long-lived, persistent, non-natives and intensive annual soil disturbance.

Community 3.1
Converted grassland

Figure 9. 3.1 Converted grassland

Figure 10. 3.1 Converted grassland with native tallgrass prairie species and managment

This community is characterized by a typical hay production field. The species composition generally consists of a single grass species that is managed for forage production. These communities are typically harvested for stored forage although grazing may occur. These sites are productive for forage and can provide ecological benefits such as control of soil erosion. Allowing for adequate rest and regrowth of desired species is required to maintain productivity. Maintenance of monoculture stands also requires control of unwanted species which will require pest management and nutrient management to maintain the needed fertility. Some attempts are made to restore the native reference plant community. Due to the large numbers of plant species, and the variability within communities, the exact mixture and number of species will vary greatly. Many of the reference species seeds are not available for purchase. Therefore, full restoration to the reference community may not be fully possible, but a similar community with the same disturbance regime can be replicated. This community is disturbance dependent; primarily fire. Other methods for maintenance include prescribed grazing and brush management. There is an equilibrium that must be reached between maintaining species composition and disturbance. If a site is destructively grazed, trafficked in saturated soil conditions, utilized as a feeding area, mechanically disturbed, and plant crowns and/or roots are destroyed, the transition process to a Woodland State (2) will occur.

Community 3.2
Cropland

This community is characterized by a crop production field. Annual plantings for forage production would also be included in this phase, which may include cool-season annual grasses, legumes, and warm-season forage species. Vegetable crops are generally grown on a small scale. On fields with an adequate water source capable of being utilized for rice production, crawfish may be included in the rotation or as a standalone crop. Often two or more crops will be grown in a multiyear rotation, this breaks pest cycles and some crops produce higher amounts of residue, which is left on the soil to improve soil quality. Maintenance of monoculture crop stands also requires control of unwanted species, which will require pest management and nutrient management to maintain the needed fertility.

Pathway 3.1A
Community 3.1 to 3.2

The land manager's decision to farm is the driver for transition to the Cropland Community (3.2).

Pathway 3.2A
Community 3.2 to 3.1

The land manager's decision to plant grass for grazing, hay, or restoration is the driver for transition to the Converted Grassland Community (3.1).

State 4
Plantation

Community 4.1
Pine Plantation

Figure 11. 4.1 Pine Plantation

Pine plantations are the result of land managers trying to maximize silviculture potential. This may be achieved by planting pine species at the desired densities. Proper management is required to achieve the desired production. Harvest of marketable timber will occur in this phase. Control of undesirable species should be part of the harvest strategy and due to environmental conditions, rainfall, drainage, and soil properties.

Transition T1A
State 1 to 2

Lack of prescribed grazing, fire, and brush management

Transition T1B
State 1 to 3

Planting introduced forages in the form of crops or grasses will transition the site to the Converted State (3).

Transition T1C
State 1 to 4

Maximizing silviculture potential by planting a monoculture of pine species transitions this community.

Restoration pathway R2A
State 2 to 1

Restoration back to reference conditions requires brush management to remove the overstory canopy followed by

prescribed grazing and return of regular fire intervals.

Transition T2A
State 2 to 3

Planting introduced forages in the form of crops or grasses will transition the site to the Converted State (3).

Transition T2B
State 2 to 4

Maximizing silviculture potential by planting a monoculture of pine species transitions this community.

Transition T3A
State 3 to 2

Without pest management and brush management to remove woody species, the Converted Grassland (3.1) or Cropland (3.2) can transition into a Woodland State (2).

Transition T3B
State 3 to 4

Maximizing silviculture potential by planting a monoculture of pine species transitions this community.

Transition T4A
State 4 to 2

Without management of unwanted species, the plantation site can be overrun and transition to the Woodland State (2).

Transition T4B
State 4 to 3

Planting introduced forages in the form of crops or grasses will transition the site to the Converted State (3).

Additional community tables

Animal community

The Coastal Prairie communities support a wide array of animals. Cattle and many species of wildlife make extensive use of the site. White-tailed deer may be found scattered across the prairie and are found in heavier concentrations where woody cover exists. Feral hogs are present and at times abundant. Coyotes are abundant and fill the mammalian predator niche. Rodent populations rise during drier periods and fall during periods of inundation. Attwater's pocket gophers are abundant and have an important impact on the ecology of the site. The badger is present but not abundant in locations at the southern extent of the site. Locally unique species alligators and bullfrogs.

The region is a major flyway for waterfowl and migrating birds. Hundreds of thousands of ducks, geese, and sandhill cranes abound during winter. Two important endangered species occur in the area, the whooping crane and Attwater's prairie chicken. Many other species of avian predators including northern harriers, ferruginous hawks, red-tailed hawks, white-tailed kites, kestrels, and, occasionally, swallow-tailed kites utilize the vast grasslands. Many species of grassland birds use the site, including blue grosbeaks, dickcissels, eastern meadowlarks, several sparrows, including, vesper sparrow, lark sparrow, savannah sparrow, grasshopper sparrow, and Le Conte's sparrow.

Inventory data references

This site description was developed as part of the provisional ecological site initiative using historic soil survey

manuscripts, available range site descriptions, and low intensity field sampling

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Approval

Bryan Christensen, 9/22/2023

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	04/20/2024
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):

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

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

---

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:**

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17. **Perennial plant reproductive capability:**
