Ecological site R083AY013TX
Loamy Bottomland

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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): 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

Loamy Bottomlands occupy the lowest setting on the landscape. They are comprised of flood plains formed from loamy alluvium. Flooding can occur on these sites.

Associated sites

R083AY002TX	Shallow Ridge
R083AY009TX	Clayey Bottomland
R083AY019TX	Gray Sandy Loam
R083AY026TX	Eastern Clay Loam
R083AY027TX	Western Clay Loam

Similar sites

R083CY013TX	Loamy Bottomland
R083DY013TX	Loamy Bottomland
R083BY013TX	Loamy Bottomland

Table 1. Dominant plant species

Tree	(1) *Ulmus* (2) *Carya illinoinensis*
Shrub	(1) *Vitis* (2) *Smilax bona-nox*
Herbaceous	(1) *Schizachyrium scoparium var. scoparium* (2) *Panicum anceps*

Physiographic features

The sites are in flood plains of streams and rivers of the Coastal Plains. They carry sediments from Cretaceous limestone, shales, and calcareous sandstone. Flooding occurs frequently to occasionally for brief durations. Slope gradients are mainly less than one percent but range up to three percent in undulating areas. 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 > Flood plain (2) River valley > Flood plain
Runoff class	Negligible to medium
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	None to frequent
Elevation	60 – 310 m
Slope	0 %
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)	220-250 days
Freeze-free period (characteristic range)	260-370 days
Precipitation total (characteristic range)	640-810 mm
Frost-free period (actual range)	210-260 days
Freeze-free period (actual range)	250-370 days
Precipitation total (actual range)	610-940 mm
Frost-free period (average)	240 days
Freeze-free period (average)	310 days
Precipitation total (average)	740 mm

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

- (22) CALLIHAM [USC00411337], Calliham, TX

Influencing water features

Flooding intervals vary in occurrence, primarily from May through September during the growing season.

Wetland description

This site may contain some small areas of hydric soils or wetlands, but an onsite investigation is needed to confirm when thought to exist.

Soil features

The soils in this site are deep to very deep, somewhat poorly drained to well drained, and have moderately rapid to slow permeability. They formed in loamy alluvium. Diagnostic horizons and horizons include ochric and mollic epipedons, and cambic and calcic horizons. Soil series correlated to this site include: Christine, Conalb, Divot, Meguin, Poteet, Winterhaven, Zavala, and Zunker.

Table 4. Representative soil features

Parent material	(1) Alluvium – sedimentary rock
Surface texture	(1) Loam (2) Clay loam (3) Silty clay loam (4) Fine sandy loam
Drainage class	Moderately well drained to well drained
Permeability class	Very slow to moderate
Soil depth	200 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	7.62 – 17.78 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 30 %
Electrical conductivity (0-101.6cm)	Not specified

Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	6.1 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	0 – 10 %
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

The Loamy Bottomland is a fire-influenced Mixed Savannah Community interspersed with occasional perennial forbs. Reference sites show that an intact grass community without fire are rapidly invaded by woody species. Improper grazing management will result in a reduction of tallgrass dominance and an increase in composition of midgrasses, unpalatable forbs, and invaders. In the absence of fire, the site is occupied by dense stands of hardwoods, including pecan (Carya spp.) and oak (Quercus spp.). The two communities in the Savannah State shifted between one another depending on the frequency and intensity of fire, grazing, drought, and flooding events.

Precipitation patterns are highly variable. Long-term droughts, occurring three to four times per century, cause shifts in species composition by causing die-off of seedlings, less drought-tolerant species, and some woody species. Droughts also reduce biomass production and create open space, which is colonized by opportunistic species when precipitation increases. Wet periods allow tallgrasses and hardwoods to increase in dominance.

Natural vegetation is predominantly tall, cool-season grasses, warm-season perennial bunchgrasses, and sedges (Carex spp.). Virginia wildrye (Elymus virginicus), eastern gamagrass (Tripsacum dactyloides), switchcane (Arundinaria gigantea), switchgrass (Panicum virgatum), little bluestem (Schizachyrium scoparium), and sedges decrease in abundance and are replaced by dallisgrass (Paspalum dilatatum), common bermudagrass (Cynodon dactylon), and carpetgrass (Axonopus fissifolius) if improper grazing continues. Shrubs and hardwood saplings invade the site in the absence of brush management. Prolonged lack of brush management or abandonment allows the site to become a hardwood forest dominated by water oak (Quercus nigra), willow oak (Quercus phellos), overcup oak (Quercus lyrata), and cedar elm (Ulmus crassifolia) on non-calcareous sites. Green ash (Fraxinus pennsylvanica), cottonwood (Populus spp.), and pecan (Carya illinoinensis) occur on sites that are more acidic.

Much of this site was converted to cropland in the late 1800’s to early 1900’s, primarily to grow cotton. Much of the converted farmland has been planted to tame pastures once it was no longer farmed. Most areas where open native grassland remains have histories of long-term management as native hay pastures with brush control. Loamy Bottomland sites produce palatable and nutritious forage, have large shade trees, and are close to water. When not flooded, cattle prefer this site for grazing and loafing. Consequently, the site is frequently overgrazed.

Prior to European settlement (pre-1825), fire and grazing were the two primary forms of disturbance. Grazing by large herbivores included antelope, deer, and small herds of bison. The infrequent but intense, short-duration grazing by these species suppressed woody species and invigorated herbaceous species (Eidson and Smeins 1999). The herbaceous savannah species adapted to fire and grazing disturbances by maintaining belowground perennating tissues. A natural fire frequency of three to seven years seems reasonable for this site, as fires would need to be frequent enough that trees did not grow above a height were they are susceptible to fire kill. Fire frequency on the savannah sites was likely to have been highly variable. Indigenous humans likely set frequent fires to maintain open grasslands. Once the tree canopy was closed, fires would have been infrequent and the result of carryover from the adjoining sites with enough heat to create crown fires.

These sites have also been influenced by the construction of dams upstream, ranging from small ponds to large flood control projects designed to reduce flooding and downstream damages. Collectively, they have had the impact of altering the natural flushing of the channels and the natural deposition of sediments depending upon the distance from a dam and other watershed characteristics. This may contribute to more rapid establishment of woody vegetation due to the reduction in natural scouring.

Introduced pasture has been established on many acres of old cropland and in areas with deeper soils. Typical introduced species planted for tame pastures and haylands the most common are buffelgrass, bermudagrass varieties (Cynodon spp.), bahiagrass (Paspalum notatum), annual ryegrass (Lolium perenne), and white clover (Trifolium repens). Some former cropland has been seeded to native species, including switchgrass, dallisgrass, and eastern gamagrass. Hay has also been harvested from prairie remnants, where long-term mowing at the same time of year has possibly changed the ecological relationships of the native species. Cropland is found in the valleys, bottomlands, and deeper upland soils. Wheat (Triticum spp.), oats (Avena spp.), forage and grain sorghum (Sorghum spp.), cotton (Gossypium spp.), and corn (Zea mays) are the major crops in the region.

State and transition model

Figure 7. STM

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	**Tallgrasses**			981-2018	
	little bluestem	SCSCS	*Schizachyrium scoparium var. scoparium*	981-1793	–
	eastern gamagrass	TRDA3	*Tripsacum dactyloides*	448-1681	–
	switchgrass	PAVI2	*Panicum virgatum*	448-1681	–
2	**Midgrasses**			981-2018	
	beaked panicgrass	PAAN	*Panicum anceps*	560-1345	–
	rustyseed paspalum	PALA11	*Paspalum langei*	560-1345	–
	panicgrass	PANIC	*Panicum*	560-1345	–
	vine mesquite	PAOB	*Panicum obtusum*	560-1345	–
	gaping grass	STHI3	*Steinchisma hians*	560-1345	–
	white tridens	TRAL2	*Tridens albescens*	560-1345	–
	purpletop tridens	TRFL2	*Tridens flavus*	560-1345	–
	longspike tridens	TRST2	*Tridens strictus*	560-1345	–
	nimblewill	MUSC	*Muhlenbergia schreberi*	336-757	–
	cylinder jointtail grass	COCY	*Coelorachis cylindrica*	112-420	–
3	**Cool-season grasses**			392-897	
	Canada wildrye	ELCA4	*Elymus canadensis*	392-729	–
	Virginia wildrye	ELVI3	*Elymus virginicus*	392-729	–
	Texas wintergrass	NALE3	*Nassella leucotricha*	392-729	–
	Indian woodoats	CHLA5	*Chasmanthium latifolium*	224-476	–
	longleaf woodoats	CHSE2	*Chasmanthium sessiliflorum*	224-476	–
4	**Grasslikes**			196-448	
	sedge	CAREX	*Carex*	196-364	–
	flatsedge	CYPER	*Cyperus*	196-364	–
Forb					
5	**Forbs**			196-364	
	Texan great ragweed	AMTRT	*Ambrosia trifida var. texana*	168-308	–
	partridge pea	CHFA2	*Chamaecrista fasciculata*	168-308	–
	ticktrefoil	DESMO	*Desmodium*	168-308	–
	lespedeza	LESPE	*Lespedeza*	168-308	–
	dotted blazing star	LIPU	*Liatris punctata*	168-308	–
	snoutbean	RHYNC2	*Rhynchosia*	168-308	–

	fuzzybean	STROP	*Strophostyles*	168-308	–
	ironweed	VERNO	*Vernonia*	168-308	–
	white crownbeard	VEVI3	*Verbesina virginica*	168-308	–
Shrub/Vine					
6	**Shrubs, Vines and Trees**			785-1457	
	elm	ULMUS	*Ulmus*	560-1261	–
	pecan	CAIL2	*Carya illinoinensis*	560-1261	–
	hackberry	CELTI	*Celtis*	560-1261	–
	ash	FRAXI	*Fraxinus*	560-1261	–
	American sycamore	PLOC	*Platanus occidentalis*	560-1261	–
	eastern cottonwood	PODE3	*Populus deltoides*	560-1261	–
	oak	QUERC	*Quercus*	560-1261	–
	black willow	SANI	*Salix nigra*	560-1261	–
	hawthorn	CRATA	*Crataegus*	224-420	–
	grape	VITIS	*Vitis*	224-420	–
	saw greenbrier	SMBO2	*Smilax bona-nox*	224-420	–
	peppervine	AMPEL3	*Ampelopsis*	224-420	–

Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 7. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 8. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 9. Community 3.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

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. Savannah 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. Woodland 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

Under the Mixed Grass Savannah Community (1.1), site infiltration is rapid, soil organic matter is high, soil structure is good, sediments are trapped, and porosity is high. The site will have high quality surface runoff with low erosion and sedimentation rates. During periods of heavy rainfall, the high infiltration rates will allow water to fill the soil profile. Larger trees will dissipate flood energy and the root masses will bind the soil. The Mixed Grass Savannah Community should be absent of rills and gullies. Drainageways should be vegetated and stable. This site is often in a flood plain with occasional out-of-bank flow. Under the Woodland Community (2.1) leaf litter can build up to the point that herbaceous vegetation can be suppressed. Shading also suppresses warm-season grasses. The large wood can dissipate flood energy, trap sediments, and the root masses bind the soil. This is a stable community with no rills or gullies. Improper grazing management reduces composition of bunchgrasses and reduces ground cover (resulting in a transition to the Midgrass Savannah Plant Community, 1.2). This decreases the function of the water cycle: infiltration declines and runoff increases due to poor ground cover, rainfall splash, soil capping, low organic matter and poor structure. Combining sparse ground cover with intensive rainfall creates conditions that increase the frequency and severity of flooding. The decline in the quality of the understory component and the increase in shrub canopy cover cause soil erosion to accelerate, surface runoff quality to decline, and sedimentation to increase. Streambank stability will decline and erosion of waterways will increase. Under domination by woody species, especially oaks and pecan, interception of rainfall by tree canopies increases. This reduces the amount of rainfall reaching the soil surface. The funneling effect of the canopy increases stemflow and soil moisture at tree bases. Trees have increased transpiration compared to grasses, especially evergreen species such as live oak. The increased transpiration reduces the amount of water available for other plants to use. An increase in woody canopy creates a decline in grass cover, which has similar impacts as those described for improper grazing above.

Recreational uses

Recreational uses include recreational hunting, hiking, camping, equestrian, and bird watching.

Wood products

Hardwoods are used for posts, firewood, charcoal, and other specialty wood products.

Other products

Jams and jellies are made from many fruit bearing species, such as wild grape. Many grasses and forbs are harvested by the dried-plant industry for sale in dried flower arrangements. Honeybees are utilized to harvest honey from many flowering plants. This is a very good site for pecan production.

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.

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Approval

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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.

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Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

2. **Presence of water flow patterns:** Large water flow patterns are expected as this is a bottomland site. Large volume of water can occur during high 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):** 0 to 5 percent bare ground. Small and non-connected areas due to highly productive site.

5. **Number of gullies and erosion associated with gullies:** Gullies can occur in areas along stream banks where poor vegetative cover occurs.

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

7. **Amount of litter movement (describe size and distance expected to travel):** Minimal and long under normal rainfall intensity.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil surface is resistant to erosion. Stability class anticipated to be 5 to 6 at the surface. These values need to be verified.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Dark grayish brown clay loam; moderate, fine, subangular blocky/medium granular structure; hard/slightly firm; common fine roots; few fine calcium carbonate concretions; few snail shells; calcareous; moderately alkaline; Soil organic matter is three to five percent.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** High canopy, basal cover and density with small interspaces should make rainfall impact negligible. This site has well drained soils, deep with 0 to 1 percent slopes should not have detrimental runoff and erosion.

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

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 midgrasses >

    Sub-dominant: Cool-season midgrasses > Warm-season tallgrasses > Trees >

    Other: Forbs

    Additional: Forbs make up 5 percent of species composition, shrubs and trees compose up to 15 percent species composition.

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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 primarily herbaceous.**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** **3,500 to 6,500 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:** **Huisache, buffelgrass, King Ranch bluestem, bermudagrass, and Old World bluestems.**

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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, insect damage, or other events occuring immediately prior to, or during the reproductive phase.**
