USDA Natural Resources Conservation Service

Ecological site R078CY102TX
Lakebed 23-30" PZ

Last updated: 9/15/2023
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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.

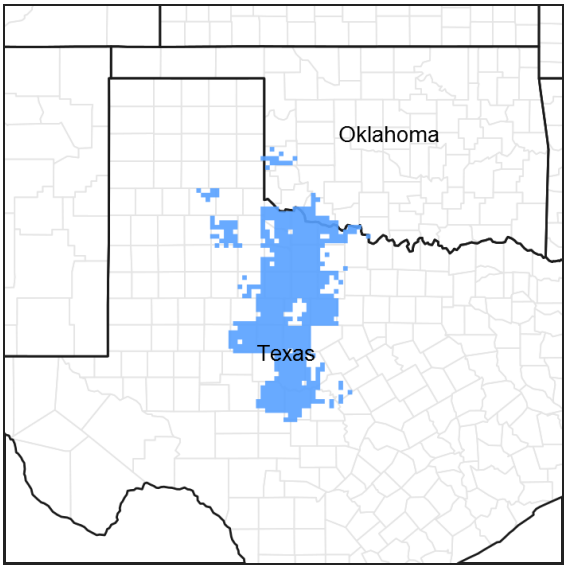


Figure 1. Mapped extent

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): 078C–Central Rolling Red Plains, Eastern Part

MLRA 78C is characterized by moderately dissected, rolling plains with prominent ridges and valleys and numerous terraces adjacent to dissecting streams. Loamy and clayey soils are generally deep, well drained, and developed in calcareous and gypsiferous sediments of Permian age.

LRU notes

NA

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 on closed depressional areas. Water is often ponded on these areas, supporting hydrophitic vegetation. The plant community may be quite variable across this site depending on the amount of water and

length of ponding.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Panicum obtusum* (2) *Phyla*

Physiographic features

These soils are on nearly level alluvial plains and slightly depressed playas and waterways. These nearly level soils are on the floor of playa basins 3 to 15 meters (10 to 50 feet) below the surrounding plain and range in size from 10 to more than 150 acres. Slopes range from 0 to 1 percent. Elevation is 1,200 to 4,100 feet.

Table 2. Representative physiographic features

Landforms	(1) Plains > Depression (2) Plains > Playa
Runoff class	Negligible
Flooding frequency	None
Ponding duration	Long (7 to 30 days) to very long (more than 30 days)
Ponding frequency	Occasional to frequent
Elevation	1,200–4,100 ft
Slope	0–1%
Water table depth	72 in
Aspect	Aspect is not a significant factor

Climatic features

MLRA 78C lies within the subtropical sub-humid climate regime, which typically has dry winters with hot and not as humid summers. This regime is characterized by rapid changes in temperature; marked extremes, both daily and annual; and rather erratic rainfall.

This region lies in the path of polar air masses that move down from the north during the winter. With the passage of cold fronts during the fall and winter, abrupt temperature drops sometimes occur. While the area is subject to a wide range of temperature, winters are generally mild. Low humidity and good wind movements characterize the summers.

Wind speeds average more than eleven miles an hour with prevailing southern winds. Rather strong winds can occur in all months of the year. While strong gusty winds occur, severe dust storms are rare.

Normal rainfall averages 23 to 30 inches a year but distribution of rainfall patterns are so erratic short dry periods are common. The majority of the rainfall occurs as showers, rather than general rain events between March and November. Dry periods of three to four weeks can be expected during this time as well. Even if these dry conditions occur, complete crop failures seldom results.

May is the wettest month and December is the driest. Effective precipitation is low due to high temperatures, amounts received and intensity.

Table 3. Representative climatic features

Frost-free period (characteristic range)	196-202 days
Freeze-free period (characteristic range)	215-216 days

Precipitation total (characteristic range)	26-28 in
Frost-free period (actual range)	195-204 days
Freeze-free period (actual range)	215-216 days
Precipitation total (actual range)	25-28 in
Frost-free period (average)	199 days
Freeze-free period (average)	216 days
Precipitation total (average)	27 in

Climate stations used

- (1) ROTAN [USC00417782], Rotan, TX
- (2) MERKEL 12 SW [USC00415852], Merkel, TX
- (3) VERNON [USC00419346], Vernon, TX

Influencing water features

Despite the fact that Lakebed ecological sites are of limited extent in any landscape, their relative productivity belies the acreage they occupy. Their position within a landscape plus the inherent productivity of the underlying soils makes them, from a vegetative perspective, very productive when compared to surrounding sites. Lakebed sites are considered ecologically sensitive. This productivity/sensitivity is directly related to the volume of water making its way to the site and remaining there for extended periods.

Lakebed sites are found in lower landscape positions. Usually, they are found on the floors or bottoms of playa basins or depressional areas that are from a few inches to five feet lower than surrounding areas. They are also found in smooth, slightly depressional areas on uplands or in intermittent shallow lakes. Since they occupy a lower landscape position, run-off water from surrounding uplands collects on these sites and keeps them moist for longer periods than the upland areas.

The soils found on a Lakebed site are very deep to deep heavy clays with very slow permeability. They have a high potential for shrinking and swelling. Due to the heavy clay content, water moves very slowly through these soils. Although they are deep soils with a deep root zone, roots have a difficult time penetrating the soil due to its high clay content.

The shrink-swell potential of Lakebed site soils manifests itself in two features characteristic of these heavy clay soils. During dry periods, large cracks form that can reach 20 inches or more into the soil and stretch as much as three inches across. Rainfall or run-off water reaching these cracks flows into them, allowing very rapid and deep water movement into the soil. However, the water causes the surrounding soil to quickly expand which closes the cracks and effectively seals the surface. Thereafter, infiltration or water movement into the soil is very slow. Until it evaporates, the remaining water stands or ponds on the surface. Shrink-swell capacity also results in the formation of gilgai micro-relief which consists of knolls 5 to 8 feet in diameter that are 3-8 inches higher than the surrounding depressions. The presence of gilgai indicates a lack of soil disturbance.

Particularly following heavy rains, water stands or ponds on the surface of these sites for extended periods. In places, this or ponding can last for several weeks to months one or more times during a year. Many of these areas are inundated for at least a few days to weeks each year.

Soils found in Lakebed sites have a high available water capacity. This means they have a high capacity to hold water available for use by most plants. Vegetation found in Lakebed sites is productive over a long period due to this high available water capacity. Lakebed sites are preferred feeding sites for a variety of animals and, often, are heavily impacted by their activities.

Wetland description

Wetlands are determined by the confirmation of the three wetland criteria. In order for an area to be considered a

wetland, hydric soils, wetland hydrology, and hydro-phytic vegetation must be documented on a site. Hydric soils are, during the growing season, wet long enough to develop conditions that support hydro-phytic vegetation. Hydro-phytic vegetation grows in water, or in soil that lacks oxygen due to water. Wetland hydrology is enough of a presence of water to support a dominant hydro-phytic vegetation cover.

Lakebed ecological sites cannot be classified generally as wetlands or in other words, they cannot be given a blanket wetland label. Many Lakebed sites are wetlands and have been determined as such. Others contain wetlands and non-wetlands intermingled to such a degree and scale that separating them is difficult. Still others are non-wetlands that exhibit either only partial wetland criteria or none at all.

Lakebed sites with a history of repeated soil saturation or inundation readily exhibit wetland criteria. Soil colors are very dark gray or black indicating the accumulation of organic matter due to reducing conditions. These dark colors persist as one moves deeper into the soil profile. Hydro-phytic or water-loving vegetation dominates the site. Water's presence is easily documented. These sites are not farmable in most years. Clearly, such sites are wetlands.

On drier sites, wetland criteria are either partially exhibited or not at all. Although soil colors are gray, they are lighter or brighter grays. Some may even exhibit grayish brown colors. Moving deeper into the soil profile, the grayish tinge disappears and brown colors dominant the soil matrix. Although the vegetative cover may contain water-loving species, they do not dominate the cover. In instances, vegetation may be completely non-hydrophytic. Wetland hydrology is either difficult to document or non-existent. Calling or labeling these areas as wetlands is questionable.

Soil features

Soils are mapped for each county within the MLRA. Mapunits are representations of the major soil series component(s) and named accordingly. Each Mapunit is spatially represented on a digital soils map as polygons of different shapes and sizes. Within these Mapunits, there are often minor soil series components included. These minor components are soils that occur within a Mapunit polygon but are of small extent (15% or less of the Mapunit area). However, it is difficult to separate these minor soils spatially due to the scale of soil mapping.

Ecological sites are correlated at the component level of the soil survey. Therefore, a single Mapunit may contain multiple Ecological Sites just as it may contain multiple soil components. This is important to understand when investigating soils and Ecological Sites. A soil survey Mapunit may be correlated to a single Ecological Site based on the major component; however, there may be inclusional areas of additional Ecological Sites which are correlated to the minor components of that particular soil Mapunit.

Representative soil components for this site include:
Lipan and Randall

The series for the Lakebed ecological site consists of deep to very deep, moderately well or poorly drained, very slowly permeable soils that formed in clayey alluvial and lacustrine sediments. The soils formed in calcareous clays. Water enters the soil rapidly when the soil is cracked; but after the cracks are closed water movement into the soil is very slow. In wet years water stands on the surface until it evaporates in the spring or fall.

Table 4. Representative soil features

Parent material	(1) Alluvium–claystone
Surface texture	(1) Clay
Family particle size	(1) Clayey
Drainage class	Poorly drained to somewhat poorly drained
Permeability class	Very slow
Soil depth	60–80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%

Available water capacity (0-40in)	4.5–7.9 in
Calcium carbonate equivalent (0-40in)	0–20%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–3
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–1%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

The information contained in the State and Transition Diagram (STD) and the Ecological Site Description was developed using archeological and historical data, professional experience, and scientific studies. The information presented is representative of a very complex set of plant communities. Not all scenarios or plants are included. Key indicator plants, animals and ecological processes are described to inform land management decisions.

The Lakebed ecological site occurs on bottoms of enclosed depressions with nearly level to concave surfaces. The soils of this site are often ponded. The drainage to storage ratio influences ponding occurrence and amount. A large lake with a small drainage area may never pond water or support obligate hydrophytes. In contrast, a small lake with a large drainage area may be inundated much of the time except during long droughts. Ponding varies from very brief to very long and has considerable impact on the existing plant community. Extended wet or dry periods can significantly change the Lakebed environment.

The plant community found on the site by early settlers was highly variable. This variability was influenced more by size of the site, inundation period, and moisture regime than by the overall climate, herbivory, or fire. The historic plant community (reference) is believed to have been alternately dominated by shortgrasses and hydrophytes such as sedges, flatsedges, rushes and spike rushes. Their presence, or absence, depended on wet and dry cycles and extended droughts. This situation is true today, even after years of livestock grazing and other impacts. Dramatic fluctuations in amounts of vegetation occur.

The plant community on the Lakebed Ecological Site is under continual change from grass to forbs and back to grass. This change is created more by variation in water availability than by grazing pressure. Smaller lakes, or those infrequently inundated, generally support a Mixed-grass Community (1.1) with few hygrophilous species except during extended wet periods. In climax this community was typically dominated by vine-mesquite and buffalograss, with lesser amounts of sedges, white tridens and a few facultative hydrophilic species. The grasses decline during extended wet periods, being replaced by sedges, rushes and other hydrophytes. Shortgrasses became dominant again during subsequent normal or dry cycles.

Those sites with more frequent or longer periods of inundation supported a Mixed-hydrophyte Community (2.1), generally devoid of non-hygrophytes except around edges of the ponded area. Grass-like species such as sedges, spike rushes and rushes were most common. Some facultative hydrophilic grasses, such as vine-mesquite and barnyardgrass, occurred on higher terrain on the outer edges of the lakebed.

Abusive grazing, along with extended dry periods, will eventually cause the decline of the more palatable grasses, grass-likes and forbs. When this happens, the site quality deteriorates; plant vigor and productivity is reduced and the more desirable species give way to shortgrasses and weedy annuals. An accompanying reduction in plant basal area, root biomass, mulch levels, and leaf area of the dominants creates openings for invading or subdominant plants. On the drier lakebeds supporting the Mixed-grass Community (1.1), buffalograss will increase initially along with the less palatable forbs and grass-like species. Continued overgrazing by livestock will cause deterioration of the buffalograss sod and the invasion of annuals such as little barley, barnyardgrass, six-weeks fescue and weeds.

With less vegetation production, bare ground increases and soil organic matter decreases. When annuals dominate the total annual production, the plant community becomes the Degraded Shortgrass/Annuals Community (1.2). Subsequent inundation and drying will cause more bare ground and more dominance by annuals when moisture is available seasonally.

On the wetter lakebeds, long-term continuous overgrazing causes the Mixed-hydrophyte Community (2.1) to regress to less palatable hydrophytes, mostly flatsedges, rushes and annuals. Further degradation, caused by overgrazing or prolonged drought followed by a long period of inundation, will result in a Degraded Hydrophytes/Annuals Community (2.2). This plant community is composed primarily of annual and perennial forbs such as kochia, frog-fruit, and bursage, along with large patches of bare ground during droughts.

The Lakebed site, being small in area compared to surrounding sites and often receiving extra water, was likely a concentration area for herbivores and other wildlife before European settlement. This is the general situation today and the site is generally in a deteriorated condition unless good grazing management is practiced. It small size compared to adjacent rangeland can be problematic from a grazing management standpoint. Because of its productivity and moisture regime, it can add diversity to rangeland as habitat for endemic wildlife as well as for migratory animals and waterfowl. Therefore, more intensive management is warranted.

State and Transition Diagram:
A State and Transition Diagram for the Lakebed (R078CY102TX) site is depicted below. Thorough descriptions of each state, transition, and pathway follow the model. Experts base this model on available experimental research, field observations, professional consensus, and interpretations. It is likely to change as knowledge increases. Plant communities will differ across the MLRA because of the natural variability in weather, soils, and aspect. The Reference Plant Community is not necessarily the management goal; other vegetative states may be desired plant communities as long as the Range Health assessments are in the moderate and above category.

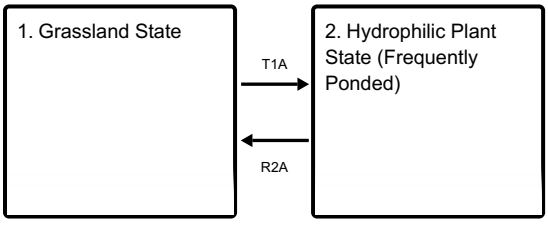
The biological processes on this site are complex. Therefore, representative values are presented in a land management context. The species lists are representative and are not botanical descriptions of all species occurring, or potentially occurring, on this site. They are not intended to cover every situation or the full range of conditions, species, and responses for the site.

Composition by dry weight and percent canopy cover are provided to describing the functional groups. Most observers find it easier to visualize or estimate percent canopy for woody species (trees and shrubs).

The following diagram suggests some pathways that the vegetation on this site might take. There may be other states not shown on the diagram. This information is intended to show what might happen in a given set of circumstances. It does not mean that this would happen the same way in every instance. Local professional guidance should always be sought before pursuing a treatment scenario.

State and transition model

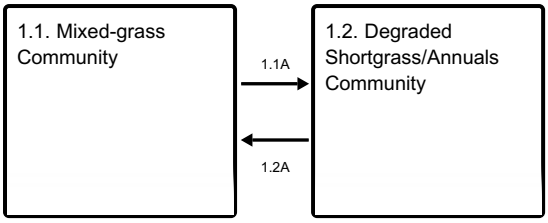
Ecosystem states



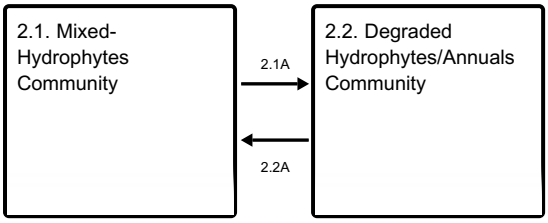
T1A - Long duration ponding/above average precipitation

R2A - Absence of ponding/prolonged drought conditions

State 1 submodel, plant communities



State 2 submodel, plant communities



State 1
Grassland State

The interpretive plant community for the Lakebed occurs when the moisture regime of the Lakebed Site is relatively dry because inundation is infrequent or occasional; the reference plant communtiy is a Mixed-grass Community (1.1). This situation normally occurs in the smaller lakebeds and in larger, deeper lakes during extended dry cycles. Vine-mesquite, buffalograss, western wheatgrass, knotgrass, blue grama and white tridens are the primary grasses in most of the grass-dominated lakebeds. Sedges and spike rushes are generally present in small amounts. Common forbs are frogfruit, arrowhead, evening primrose, knotweed and plains coreopsis, especially during wet cycles. Total annual yields ranged from 1000 pounds in dry years to as much as 4,000 pounds in wetter years. The Degraded Shortgrass/ Annuals Community is composed of less palatable, or less grazing resistant, shortgrasses, grass-likes and forbs. Sedges, rushes and buffalograss increase in composition along with annuals such as little barley, barnyard grass, and six-weeks fescue. Invading forbs include knotweed, kochia, primrose, silverleaf nightshade and blueweed sunflower.

Community 1.1
Mixed-grass Community

When the moisture regime of the Lakebed Site is relatively dry because inundation is infrequent or occasional, the reference plant community is a Mixed-grass Community (1.1). This situation normally occurs in the smaller lakebeds and in larger, deeper lakes during extended dry cycles. Vine-mesquite, buffalograss, western wheatgrass, knotgrass, blue grama and white tridens are the primary grasses in most of the grass-dominated lakebeds. Sedges and spike rushes are generally present in small amounts. Common forbs are frogfruit, arrowhead, evening primrose, knotweed and plains coreopsis, especially during wet cycles. Herbage production is primarily by the grasses, however. Total annual yields ranged from 1,000 pounds in dry years to as much as 4,000 pounds when moisture conditions for plant growth were ideal. The amount of standing water, length of time of inundation and lengths and severity of dry periods dictated the plant succession stage at any given time. If long periods of inundation occur, the grasses are replaced by hydrophilic plants such as sedge, spikerush, frogfruit and knotweed. Historically herbivory had less impact on this communities' composition than the moisture regime. Prescribed grazing, which controls the frequency and intensity of grazing, is required to maintain this plant community. Continued overgrazing by livestock can cause this plant community to regress to a Degraded Shortgrass/Annuals community (1.2). The transition is complete when 75 percent or more of the annual herbage production is by annuals, and bare ground is common.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	850	2125	3400
Forb	150	375	600
Tree	0	0	1
Shrub/Vine	0	0	1
Microbiotic Crusts	0	0	0
Total	**1000**	**2500**	**4002**

Figure 9. Plant community growth curve (percent production by month). TX2284, Mixedgrass Prairie with Forbs . Warm-season rangeland with some cool-season species along with some shrubs and trees component..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2	5	15	25	20	4	5	15	5	2	1

Community 1.2
Degraded Shortgrass/Annuals Community

The Degraded Shortgrass/Annuals Community is the result of long-term overgrazing by livestock. Selective grazing reduces the more palatable, or less grazing resistant, shortgrasses, grass-likes and forbs. Sedges, rushes and buffalograss increase in composition along with annuals such as little barley, barnyard grass, and six-weeks fescue. Invading forbs include knotweed, kochia, primrose, silverleaf nightshade and blueweed sunflower. The site becomes more susceptible to drought. Since herbage production is primarily dependent upon annuals, it varies greatly depending on rainfall. Grasses and grass-likes remain the dominant vegetation type. Pricklypear, and other shrubs from adjacent sites, may invade during dry cycles. Considerable effort and expense is required to return the Degraded Shortgrass/Annuals Community (1.2) back to a Mixed-grass Community (1.1). Prescribed grazing, including deferment, and range planting is required to return this community to the reference condition and maintain its potential.

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	480	990	1500
Forb	320	660	1000
Microbiotic Crusts	0	0	0
Tree	0	0	0
Shrub/Vine	0	0	0
Total	**800**	**1650**	**2500**

Figure 11. Plant community growth curve (percent production by month). TX2296, Degraded Shortgrass/Annuals Community. Low vigor warm-season shortgrasses, hydrophilic plants with increasing amounts of cool-season annuals. .

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	6	20	28	20	5	3	8	5	3	1

Pathway 1.1A
Community 1.1 to 1.2

With heavy continuous grazing, no pest management, no brush management, and drought conditions, the Mixed-grass Community can be shifted to the Degraded Shortgrass/Annuals Community.

Pathway 1.2A
Community 1.2 to 1.1

Considerable effort and expense is required to return the Degraded Shortgrass/Annuals Community (1.2) back to a Mixed-grass Community (1.1). Prescribed grazing, including deferment, Brush Management, and Pest Management are required to return this community to the reference condition and maintain its potential.

Conservation practices

Brush Management
Integrated Pest Management (IPM)
Prescribed Grazing

State 2
Hydrophilic Plant State (Frequently Ponded)

The Mixed-Hydrophytes Community are frequently ponded or inundated for long periods of time. It can occur as the result of an extended wet cycle. Plants such as arrowhead, rushes, spike rushes, flatsedges, knotweed, smartweed and annuals dominate the composition and production. Vine-mesquite and buffalograss are often present around the edges of the ponded areas, but absent where water stands for long periods. Larger lakebeds support the greatest diversity of vegetation. Several mesic forbs such as sawtooth frogfruit, kochia, bur ragweed, slimleaf goosefoot and spiny aster can be expected. Total annual herbage production ranges from 1,500 pounds in dry years to over 4,500 pounds under good moisture conditions. Most of the production is by hydrophytes, many of them grass-like species. The Degraded Hydrophytes/Annuals Community (2.2) is the result of long-term overgrazing of the Mixed-Hydrophytes Community (2.1) by livestock. Selective grazing reduces the more palatable, or less grazing resistant shortgrasses, grass-likes and forbs. Flatsedges, spikerushes and rushes increase in composition along with sawtooth frogfruit, smartweed, knotweed, kochia, primrose, silverleaf nightshade and arrowhead. Annuals grasses such as little barley, barnyard grass, and six-weeks fescue may occur seasonally along the outer edges. Considerable bare ground occurs in denuded areas and along the edges of the ponded areas. Drought conditions shrink the ponded area negatively affecting the hygrophilous species allowing egress of annual grasses and forbs.

Community 2.1
Mixed-Hydrophytes Community

The Mixed-Hydrophytes Community is found on Lakebed Ecological sites that are frequently ponded or inundated for long periods of time. It can occur as the result of an extended wet cycle. Plants such as arrowhead, rushes, spike rushes, flatsedges, knotweed, smartweed and annuals dominate the composition and production. Vine-mesquite and buffalograss are often present around the edges of the ponded areas, but absent where water stands for long periods. Larger lakebeds support the greatest diversity of vegetation. Several mesic forbs such as sawtooth frogfruit, kochia, bur ragweed, slimleaf goosefoot and spiny aster can be expected. Annual yields vary widely from year to year. Total annual herbage production ranges from 1,500 pounds in dry years to over 4,500 pounds under good moisture conditions. Most of the production is by hydrophytes, many of them grass-like species. Long dry cycles can bring on an increase of grasses and other non-hydrophytes. Changes in vegetation are created more by variation in water availability and ponding duration than by grazing pressure. Selective grazing by livestock does, however, impact the community over time. With continued overgrazing, the more palatable grass-likes, grasses and forbs decline, being replaced by less palatable grass-likes, buffalograss and annuals. This is a structural change in the vegetation. As a result, the Mixed-Hydrophytes Community (2.1) transitions into the Degraded Hydrophytes/Annuals Community (2.2). Prescribed grazing is required to prevent this transition.

Table 7. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1200	2400	3600
Forb	300	600	900
Tree	0	0	0
Shrub/Vine	0	0	0
Total	**1500**	**3000**	**4500**

Figure 13. Plant community growth curve (percent production by month). TX2297, Perennial hydrophytic grasslikes and forbs. Perennial hydrophytic grasslikes and forbs with spring and summer growth..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	3	10	20	22	13	8	4	8	6	6	0

Community 2.2
Degraded Hydrophytes/Annuals Community

The Degraded Hydrophytes/Annuals Community (2.2) is the result of long-term overgrazing of the Mixed-Hydrophytes Community (2.1) by livestock. Selective grazing reduces the more palatable, or less grazing resistant shortgrasses, grass-likes and forbs. Flatsedges, spikerushes and rushes increase in composition along with sawtooth frogfruit, smartweed, knotweed, kochia, primrose, silverleaf nightshade and arrowhead. Annuals grasses such as little barley, barnyard grass, and six-weeks fescue may occur seasonally along the outer edges. Considerable bare ground occurs in denuded areas and along the edges of the ponded areas. Drought conditions shrink the ponded area negatively affecting the hygrophilous species allowing egress of annual grasses and forbs. Herbage production is primarily by annuals and varies with season and on rainfall. Grass-likes remain the dominant vegetation type. Considerable effort and expense is required to return the Degraded Hydrophytes/Annuals Community (2.2) back to a Mixed-hydrophytes Plant Community (2.1). Prescribed grazing, including deferment, is required to return this community to the HCPC condition.

Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	600	1800	2400
Forb	400	1200	1600
Tree	0	0	0
Shrub/Vine	0	0	0
Total	**1000**	**3000**	**4000**

Figure 15. Plant community growth curve (percent production by month). TX2298, Degraded Hydrophytes/Annuals Community. Degraded hydrophytes and annuals with spring and summer growth..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	3	10	20	22	13	8	4	8	6	6	0

Pathway 2.1A
Community 2.1 to 2.2

With heavy continuous grazing, no pest management, and no brush management, the Mixed-Hydrophytes Community will shift to the Degraded Hydrophytes/Annuals Community.

Pathway 2.2A
Community 2.2 to 2.1

Considerable effort and expense is required to return the Degraded Hydrophytes/Annuals Community (2.2) back to a Mixed-Hydrophytes Community (2.1). Prescribed grazing, including deferment, Pest Management, Brush Management, and Range Planting is required to return this community back.

Conservation practices

Brush Management
Prescribed Grazing
Range Planting
Integrated Pest Management (IPM)

Transition T1A
State 1 to 2

The transition from the Grassland State (infrequently ponded) to the Hydrophilic Plant State (frequently ponded) occurs when there is an increased frequency and/or duration of the ponding cycle (wet cycle).

Restoration pathway R2A
State 2 to 1

Decreased frequency and/or duration of ponding (dry cycle) is required to return the Frequently Ponded State to the Infrequently Ponded State.

Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Midgrasses**			350–1400	
	sideoats grama	BOCU	*Bouteloua curtipendula*	250–1000	–
	white tridens	TRAL2	*Tridens albescens*	100–400	–
2	**Shortgrasses**			350–1400	
	buffalograss	BODA2	*Bouteloua dactyloides*	325–1300	–
	knotgrass	PADI6	*Paspalum distichum*	25–100	–
3	**Cool-season grass**			8–40	
	western wheatgrass	PASM	*Pascopyrum smithii*	8–40	–
4	**Grass-likes**			150–575	
	sedge	CAREX	*Carex*	30–100	–
	spikerush	ELEOC	*Eleocharis*	30–100	–
	rush	JUNCU	*Juncus*	30–100	–
	arrowhead	SAGIT	*Sagittaria*	30–100	–
	cattail	TYPHA	*Typha*	10–80	–
Forb					
5	**Forbs**			150–600	
	Forb, annual	2FA	*Forb, annual*	20–90	–
	ragweed	AMBRO	*Ambrosia*	15–60	–
	Texas blueweed	HECI	*Helianthus ciliaris*	15–60	–
	cutleaf evening primrose	OELA	*Oenothera laciniata*	15–60	–
	evening primrose	OENOT	*Oenothera*	15–60	–
	turkey tangle fogfruit	PHNO2	*Phyla nodiflora*	15–60	–
	fogfruit	PHYLA	*Phyla*	15–60	–
	knotweed	POLYG4	*Polygonum*	15–60	–
	Pennsylvania smartweed	POPE2	*Polygonum pensylvanicum*	15–60	–
	silverleaf nightshade	SOEL	*Solanum elaeagnifolium*	15–60	–
Shrub/Vine					
6	**Shrub**			0–1	
	common buttonbush	CEOC2	*Cephalanthus occidentalis*	0–1	–
Tree					
7	**Tree**			0–1	
	willow	SALIX	*Salix*	0–1	–

Animal community

Many types of insects, reptiles, birds and mammals use the Lakebed Ecological Site, either as their base habitat or from the adjacent sites. Frogs and salamanders are found in abundance in wet seasons. Small mammals include many kinds of rodents, jackrabbit and skunk. Predators include coyote, bobcats and snakes. Prairie dogs may inhabit this site in the dryer phase. Game birds, songbirds, and birds of prey were indigenous or frequent users. Most are still plentiful. White-tailed and mule deer use the Lakebed site in its various states. Deer, turkey, quail, pheasant, and dove hunting are an important sport, or commercial enterprise, providing considerable income to land owners.

The site is very suited to grass eaters such as cattle. Livestock should be stocked in proportion to the available

forage, keeping deer competition for forbs in mind. If the animal numbers are not kept in balance with herbage through grazing management and wildlife population management, the Degraded Shortgrass/Annuals (1.2) or the Degraded Hydrophytes/Annuals (2.2) will have little to offer livestock and wildlife except annual vegetation on a seasonal basis.

Hydrological functions

Since the Lakebed Site occurs in depressions they are not subject to water erosion. Runoff from adjacent sites ponds on the Lakebed site. After rains, the runoff from surrounding soils accumulates on the site to a depth of a few inches to several feet and remains for a few days or several months. When the soil dries, wide deep cracks form at the surface. The cracks take in water readily, but close when wet. Permeability is slow and water availability is high. Water erosion hazard is slight, but soil-blowing hazard is moderate for denuded soil. Perennial vegetation is hard to maintain due to long periods of inundation by water. Current and previous ponding has a major impact on vegetation composition and production.

Hydrology manipulations (pits, ditches and berms) plus silt loads can have a significant influence on the plant community. The use of these practices is not as common in rangeland depressions but deserves consideration.

Recreational uses

Bird watching, photography and horseback riding in conjunction with adjacent sites are feasible.

Wood products

None.

Other products

None.

Other information

None.

Inventory data references

Information presented here has been derived from the Lakebed Range Site (RR, PE 30-40), literature, limited NRCS clipping data (417s), field observations and personal contacts with range-trained personnel.

Special thanks to NRCS personnel for assistance and guidance with development of this ESD: Justin Clary, NRCS Temple, Texas and Mark Moseley, NRCS San Antonio, TX.

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Approval

Bryan Christensen, 9/15/2023

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	02/09/2009
Approved by	Bryan Christensen
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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2. **Presence of water flow patterns:** Deposition ffrom erosion is uncommon but may occur during intense rainfall events.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals or terracettes would have been uncommon for this site.

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 randomly distributed throughout.

5. **Number of gullies and erosion associated with gullies:** None.

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

7. **Amount of litter movement (describe size and distance expected to travel):** This is a depressional area that can be ponded with water. Under normal rainfall, litter movement should be expected; however, litter of all sizes may accumulate in the depressional areas.

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.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** 0-26 inches thick with dark gray clay colors having moderate, medium course blocky structure. SOM is approximately 1-6%. See soil survey for more information.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Lakebed having mid and shortgrasses with adequate litter and little bare ground provides for maximum infiltration and little runoff under normal rainfall events.

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 > Warm-season shortgrasses >

    Sub-dominant: Grass-likes >

    Other: Cool-season grasses > Forbs > Trees > Shrubs/Vines

    Additional:

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.

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

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1000-4000 pounds per acre.

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:** Honey mesquite, pricklypear, bermudagrass, johnsongrass, and King Ranch bluestem.

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.