USDA Natural Resources Conservation Service

Ecological site R077AY005TX
Playa 16-22" PZ

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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): 077A–Southern High Plains, Northern Part

MLRA 77A is characterized by nearly level plains with playa depressions and sloping breaks along rivers and creeks. Soils are generally deep, fine-textured, and occur in a mesic soil temperature regime.

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 depressions over fine-textured soils with high shrink-swell properties formed in lacustrine deposits. Water is ponded for various lengths of time. Vegetation may fluctuate as a result of the duration and depth of ponding. Hydrophytic vegetation is present.

Associated sites

R077AY001TX	**Deep Hardland 16-22" PZ** Nearly level to gently sloping fine-textured soils on higher positions that formed in calcareous loess. Dominated by short and mid-grass species with few woody species.
R077AY002TX	**Draw 16-22" PZ** Gently sloping loamy soils on positions that receive and channel water from higher adjacent sites to the playa site. Tall and mid grasses with high production potential.
R077AY004OK	**Parna Dune 16-22" PZ** Gently to moderately sloping silty and loamy soils formed in calcareous parna on higher adjacent dune positions and sideslopes. Dominated by mid- and shortgrass species with very few woody species.
R077AY006TX	**Limy Upland 16-22" PZ** Gently sloping to moderately sloping loamy soils with highly calcareous subsoils on higher shoulder and side slope positions. Short and mid-grass dominate and with few tall grasses, perennial and annual forbs, and few woody species present.
R077AY015KS	**Loamy Upland 16-22" PZ** Nearly level to gently sloping soils on higher positions formed in mixed loamy and silty eolian deposits with subsoils of fine-loamy or fine-silty argillic horizons. Mixture of tall and mid grass species dominate with a few woody species present.

Similar sites

R077EY098OK	**Depression 16-24" PZ** A similar site in MLRA 77E with soils formed in a slightly warmer thermic soil temperature regime.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Bouteloua dactyloides* (2) *Phyla nodiflora*

Physiographic features

This site occurs as playa lake basins with soils formed from lacustrine deposits. These depressions occur in a scattered pattern over the southern high plains MLRA. There are some 25,000 of these playas in the southern great plains and they vary in size from one acre to several hundred acres. On the average there is a playa per every square mile. Most geologists are of the opinion that subsidence in the underlying strata caused these depressions to form during the Pleistocene period. The playas range from very shallow to moderately deep. They hold water in the more rainy seasons and most of them will go dry in dryer seasons of the year. In the event of drought, playas may be dry for several years. The frequency and duration of inundation is highly variable from playa to playa. Drainage areas are highly variable in size and in character. Storage to drainage ratios vary. The areas surrounding the playas are generally nearly level plains with a gently sloping transitional area immediately upslope from the playa basins.

Table 2. Representative physiographic features

Geomorphic position, flats	(1) Dip
Landforms	(1) Plains > Playa (2) Plains > Playa lake
Runoff class	Negligible
Flooding frequency	None
Ponding duration	Brief (2 to 7 days) to very long (more than 30 days)
Ponding frequency	Occasional to frequent
Elevation	762–1,372 m

Slope	0–2%
Ponding depth	30–91 cm
Water table depth	203 cm
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Runoff class	Negligible
Flooding frequency	None
Ponding duration	Brief (2 to 7 days) to very long (more than 30 days)
Ponding frequency	Occasional to frequent
Elevation	701–1,521 m
Slope	0–2%
Ponding depth	10–152 cm
Water table depth	203 cm

Climatic features

Climate is a cold semi-arid steppe (Koppen-Geiger classification BSk). Summers are hot and winters are cold. Temperature extremes are common. Humidity is generally low, and short-term droughts are common. Humidity is generally low and evaporation high. Average annual wind speed is 12 mph with highest winds in early spring. The prevailing wind direction is south. Summertime brings strong high pressure systems that build into heat domes with highs in the upper 90 to mid-100 degree F range. Evaporation in summer is high and open pan evaporation exceeds 6 feet per year. Early autumn temperatures are mild, with Canadian and Pacific cold fronts bringing cold air in mid-autumn throughout winter. Arctic air can settle in and dominate for several weeks during winter with very cold air in place for 2 to 3 weeks at a time.

Most of the precipitation comes in the form of rain from May through September. Rainfall events often occur as intense showers of relatively short duration. Snowfall average is about 15 inches but is also variable from 8 to 36 inches annually. Long term droughts are likely to occur every 15 to 20 years and may last 4 to 5 years. Mean precipitation is around 19 inches but varies significantly from year to year. Rainfall amounts over the last 100 years have varied from as little as 9 inches to as much as 37 inches. The probability is about 70% that precipitation will fall between 14 inches and 23 inches. Growing season averages 180 days. Average first frost is around October 17, and the last freeze of the season occurs around April 21.

Table 4. Representative climatic features

Frost-free period (characteristic range)	143-156 days
Freeze-free period (characteristic range)	175-190 days
Precipitation total (characteristic range)	457-533 mm
Frost-free period (actual range)	138-163 days
Freeze-free period (actual range)	169-194 days
Precipitation total (actual range)	457-559 mm
Frost-free period (average)	150 days
Freeze-free period (average)	182 days
Precipitation total (average)	483 mm

Climate stations used

- (1) ELKHART [USC00142432], Elkhart, KS

- (2) HUGOTON [USC00143855], Hugoton, KS
- (3) LIBERAL [USC00144695], Liberal, KS
- (4) PERRYTON [USC00416950], Perryton, TX
- (5) SPEARMAN [USC00418523], Spearman, TX
- (6) BOISE CITY 2 E [USC00340908], Boise City, OK
- (7) DUMAS [USC00412617], Dumas, TX
- (8) STRATFORD [USC00418692], Stratford, TX
- (9) GOODWELL 2 E [USW00003055], Goodwell, OK

Influencing water features

This site receives runoff from surrounding areas. The playa sites are closed basins with no outlet, therefore runoff collects and ponds for several days to several months. Evaporation is high and infiltration very slow due to the heavy clay soils.

Wetland description

There is high degree of variability to the water status in individual playas. Some playas exhibit wetland hydrology, have hydric soils, and have predominantly hydrophytic vegetation. The dryer, grass dominated playas often do not exhibit all three of these characteristics.

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 inclusions of areas of additional Ecological Sites which are correlated to the minor components of that particular soil Mapunit.

The soils of this site are deep, poorly drained to moderately well drained soils high in silicate clays. Clay content is from 45 to 60 percent. They have high shrink–swell capacities. They are slightly acidic to moderately alkaline in nature. These soils have either aquic and udic soil moisture regimes. Those with aquic soil moisture regimes are are classified as hydric soils. They exhibit gilgai microrelief and will have redoximorphic features in the profile. When dry, these soils crack to a depth of as much as 40 inches.

Taxonomic classification: Fine, smectitic, superactive, mesic Ustic Epiaquerts (this classification applies to playas with wetter moisture regimes). The drier playa soils are classified as Calcic Haplusterts or Udic Haplusterts.

Representative soil components for this site include: Hansford, Knoblaw, and Lautz. Some older soil surveys may include the Ness series.

Table 5. Representative soil features

Parent material	(1) Lacustrine deposits
Surface texture	(1) Clay (2) Silty clay
Family particle size	(1) Fine
Drainage class	Poorly drained to somewhat poorly drained
Permeability class	Very slow
Soil depth	203 cm

Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	11.43–21.59 cm
Calcium carbonate equivalent (0-101.6cm)	2–3%
Soil reaction (1:1 water) (0-101.6cm)	6.1–7.8
Subsurface fragment volume <=3" (0-101.6cm)	0%
Subsurface fragment volume >3" (0-101.6cm)	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.

Two water associated characteristics affect vegetative composition in playas: frequency and duration of inundation. In addition to these factors, the nature of the drainage area is also very important. If the drainage is from rangeland, then there are minimal influences from things such as fertilizers and pesticides that are associated with production agriculture. For many of the playas, even some of those in native vegetation, much of the runoff are from cropland drainage areas. This can affect the nature of the vegetation to some degree. Siltation is increased if the drainage area is from cropland and incidence of contaminants is higher.

The drainage to storage ratio of playas has much to do with whether they pond little water or a lot of water. A very large playa with a small drainage area may never pond much water and will probably not support a predominance of hydrophytic vegetation. By the same token, a small playa with a large drainage area may support hydrophytic vegetation much of the time.

To discuss the nature of playa vegetation, it is necessary to recognize that the water regime varies greatly among the many playas in the region. As previously stated, the drainage to storage ratio governs the amount of runoff. With longer periods of inundation, grass species tend to disappear because they cannot stand being covered by water for very long. Most of the grass dominated playas are largely western wheatgrass with some small amounts of buffalograss (*Bouteloua dactyloides*) and vine mesquite (*Panicum obtusum*) present. There will be some forbs present such as frogfruit (*Phyla nodiflora*) and coreopsis (*Coreopsis tinctoria*) especially in the wetter spots. As the period of inundation increases, western wheatgrass (Pascoyrum smithii) and other grass species will disappear and species such as spike rushes (Eleocharis spp.) and smartweed (Polygonum spp.) will become dominant. In even wetter environments, species such as arrowhead (Sagittaria spp.) and rushes (Juncus spp.) prevail. Species composition is also affected by the timing of the moisture. As a person observes playa after playa on a given day, it becomes obvious that they are all a bit different and it is also difficult to explain the variations. Since rainfall patterns vary so much from year to year and also within the particular growing season, playa vegetation will also vary from year to year and within a given year. It should be noted that over the long haul (> 50 years), playas will probably be dry more than wet. However, in the period when they are wet, they contribute significantly to the biodiversity of the southern Great Plains.

It should be noted that probably 80 percent of the playas on the high plains have been affected by cultivation on their drainage area and by such structures as roads, culverts, terraces and modifications such as pits or ponds constructed in the playa basin itself. Because of these effects, it is hard to picture what the playas looked like in pristine times.

As to the part played by grazing on the overall ecology of playas, grazing plays a lesser role than does water regime. The grazing potential of playas is seasonal and cattle prefer to graze the lakes in summer when the forage is lush and green. The productive capacity of many playas is quite high and they can provide a good deal of grazing. It is certainly possible to graze so heavily as to adversely affect vegetation, especially grass vegetation. The general effect of abusive grazing over several years seems to be to decrease the number of perennials and increase the number of annual species. Along with this comes a decrease in overall plant diversity. Most of the hydrophytic perennials exhibit a surprising ability for their root stocks to go into dormancy when the playas become dry. These roots can live for many months and even years of dry conditions and when wet conditions again prevail, the plants quickly sprout and grow rapidly. It is very difficult to state a particular transitional pathway for playa vegetation based on grazing management. The best general statement would be that perennial grasses and forbs are the most susceptible plants to abusive grazing practices, and that strong perennial grasslikes are resistant to grazing damage. Overgrazing of playas is very detrimental to the host of wildlife that relies on the playas for habitat. One of the biggest detriments is the reduction of valuable wildlife cover. It is probable that the value for native wildlife exceeds the value for grazing. Dozens of species depend on playa vegetation for a home and for a food supply. In pre-settlement times, the buffalo most likely depended on water in the playas in order to graze out on the Llano Estacado. In dryer years with no standing water, the grazing was limited to areas along the major streams. At this point it is worth mentioning that production agriculture which includes the occasional tilling of the playas tends to promote more annual forb growth and contributes to the spread of noxious species such as wooly leaf bursage (bur ragweed).

Playas are very important in their affect on overall hydrological conditions. They receive runoff and in that runoff comes certain natural contaminants that are processed and recycled in the playas. Infiltration through the heavy clay soils is very slow but does occur. There is definitely some recharge to the underground aquifer through the playa system. It is difficult to speculate what effect hundreds of playas full or water during the summer months might have on rainfall locally. The evaporation is high and water going into the atmosphere may have some effect on rainfall. Playas act as natural filters and improve the quality of ground water. Because of their scattered presence over the high plains, they play an important part in trapping excess runoff from heavy rainfall events, thus limiting the distance runoff water travels down slope, thereby helping to control erosion.

Natural fire played a part in the ecology of this site as with all plains sites. The main effect of fire on the playa site was to stimulate growth and reduce old decadent plant cover from previous years. Most hydrophytic perennial species respond well to fire. In the playas, the root systems of these plants are protected by either wet soil or by being in dormancy. Fire helps in the reduction of old growth and stimulates new shoots and helps in breaking down accumulated plant material, thus aiding the nutrient cycle. Fire may have also helped in favoring the perennials over the annual species.

All species of plains wildlife benefit from the playa system. From the predators to small mammals to grassland birds to waterfowl, the playa lakes provide a diversity of habitat that the shortgrass plains upland sites cannot. They are an extremely important part of the shortgrass plains ecosystem.

State and Transitional Pathways Narrative:
As a site changes in the structure and makeup of the plant community, the changes may be due to management or due to natural occurrences or both. Changes may occur slowly or fairly rapidly, depending on the type of events that effect change. At some point in time thresholds are crossed, which means that once changes in vegetative makeup have progressed to a certain point, the balance of the community has been altered. When this point is reached, a return to the former community state is generally not possible – unless some significant energy inputs are provided to induce a response in that direction. These changes in plant communities occur on all ecological sites with some being more resistant to changes than other sites. Some sites seem to be more resilient and are more easily restored to former vegetative states than are other sites. Usually, changes in grazing management alone, such as improvement in grazing techniques, will not be sufficient to induce the desired change in plant communities. An example of energy input that might be needed to induce change might be the implementation of chemical brush management and complete growing season rest in order to reduce the domination of woody shrubs and promote the dominance of perennial grasses and forbs. This action might have to be done more than once and might take some time. Such a vegetative shift would not be possible with grazing management alone. The amount of energy input needed to effect change depends on present vegetation and the desired effect.

As previously stated, it is difficult to put forth a predictable state and transitional pathway that applies to playa lakes. Water regime is the biggest influencing factor. Grazing abuse can also affect playa communities but the predictability of that effect is somewhat questionable. Modification of playas by changes in drainage patterns, and structural modifications are the main man induced effects, and are more drastic as to the impact on vegetation than grazing by livestock.

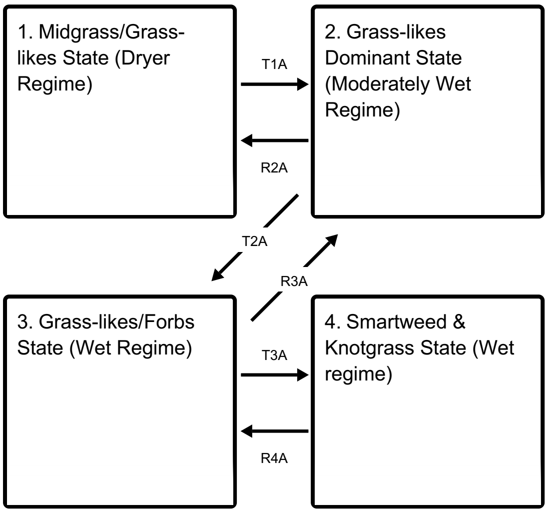
Plant Communities based on frequency and duration of inundation:

In general, the more shallow the playa and the less frequently inundated, the more likely grasses such as western wheatgrass will dominate. The greater the depth and the more frequent the inundation, the more likely hydrophytic forbs and grasslikes will dominate. Many of the species now present in many playas that are associated with tillage and / or altered hydrology were probably not present in the natural grassland state of the high plains. In observing playas located within large areas of native rangeland, it was noted that well over half of these playas had a dominance of eleocharis macrostachya (creeping spikerush). The dryer moisture regimes had a predominance of western wheatgrass. A much fewer number had a predominance of smartweed and other hydrophytic forbs.

In cropland areas, the situation tends to show more annual forbs and pronounced increase in wooly leaf bursage. The playas on the south plains (from approximately Lubbock County south) are somewhat different in their ecology due to surrounding soils being sandy and, in some cases, increased salinity.

State and transition model

Ecosystem states



T1A - Frequent, prolonged inundation

R2A - Reduced inundation or drought conditions

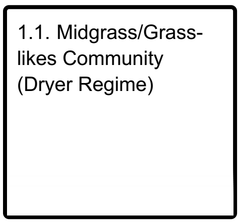
T2A - Increased frequency and duration of inundation

R3A - Reduced frequency and duration of inundation

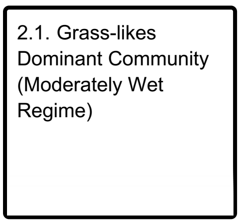
T3A - Increased frequency and duration of inundation

R4A - Prolonged frequent and long duration inundation

State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities

3.1. Grasslike & Forbs Community (wet regime)

State 4 submodel, plant communities

4.1. Smartweed & Knotgrass Community (Wet regime)

State 1
Midgrass/Grass-likes State (Dryer Regime)

Plants found in this community include midgrasses and forbs with few grasslikes. Midgrasses include western wheatgrass, buffalograss and vine mesquite. There may also be small areas of creeping spikerush present in the micro lows. Infrequent to occasional inundation.

Dominant plant species

- buffalograss (*Bouteloua dactyloides*), grass
- turkey tangle fogfruit (*Phyla nodiflora*), grass

Community 1.1
Midgrass/Grass-likes Community (Dryer Regime)

Figure 8. 1. Historic Climax Plant Community (Dryer Regime)

Plants found in this community include midgrasses and forbs with few grasslikes. Midgrasses include western wheatgrass, buffalograss and vine mesquite. There may also be small areas of creeping spikerush present in the micro lows. Predominant forbs include smallhead sneezeweed and woolly leaf bursage. There are hydrophytic plants present but they are not generally more than 25 to 35 percent of the total vegetation. This community is indicative of shallow ponding and fairly short inundation periods. Some playas may contain 80 percent grass species, mainly western wheatgrass.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1009	1681	2242
Forb	560	785	1121
Tree	–	–	1
Shrub/Vine	–	–	1
Microbiotic Crusts	–	–	–
Total	**1569**	**2466**	**3365**

Figure 10. Plant community growth curve (percent production by month). TX0506, Perennial hydrophytic grasslikes and forbs. Perennial hydrophytic grasslikes and forbs..

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

State 2
Grass-likes Dominant State (Moderately Wet Regime)

Plants found in this community include creeping spikerush, saltmarsh elder, and rumex. Smaller amounds of facilitating and upland species. Moderate frequency of inundation.

Dominant plant species

- bulrush (*Scirpus*), other herbaceous
- dock (*Rumex*), other herbaceous

Community 2.1
Grass-likes Dominant Community (Moderately Wet Regime)

Figure 11. 2. Historic Climax Plant Community (Moderately We

Grass-likes such as creeping spikerush, wooly leaf bursage, California loosestrife, and Pennsylvania smartweed dominates the site. This community is dominated by creeping spikerush, with a smaller amount of bursage. Hydrophytic species dominate. Some forbs also exist. This playa is inundated fairly frequently but not to a depth of > 1 ft.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1457	1905	2466
Forb	224	336	448
Tree	–	56	56
Total	**1681**	**2297**	**2970**

Figure 13. Plant community growth curve (percent production by month). TX0507, Grasslikes - creeping spikerush dominate. Emergent hydrophytic - Grasslike OBL.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	2	8	12	26	30	5	12	3	2	0

State 3
Grass-likes/Forbs State (Wet Regime)

Grass-likes and FACW forbs such as spikerush, smartweed, rumex, loosestrife, and other hydrophytic plants dominate the plant community. Frequent inundation.

Dominant plant species

- bulrush (*Scirpus*), other herbaceous
- bushy knotweed (*Polygonum ramosissimum*), other herbaceous
- loosestrife (*Lythrum*), other herbaceous

Community 3.1
Grasslike & Forbs Community (wet regime)

Figure 14. 3. Grasslike & Forbs Community (wet regime)

Grass-likes/Forb Community consists of creeping spikerush, smartweed, California loosestrife, dock and other hydrophytic plants. Water held in playa for long periods. Amount of smartweed exists in community is dependent on the season of inundation.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Forb	1009	1345	1793
Grass/Grasslike	785	1177	1345
Total	**1794**	**2522**	**3138**

Figure 16. Plant community growth curve (percent production by month). TX0508, Grasslike-Forb Community . Grasslike-Forb Community with hydrophytic plants..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	3	8	12	24	28	8	10	4	2	0

State 4
Smartweed & Knotgrass State (Wet regime)

Pennsylvania smartweed is the dominant species with knotgrass growing in shallow water areas. Other species present in smaller amounts are saltmarsh aster, cattail, arrowhead, and curly dock. Shrubs such as willow can be common around the periphery of the basin near the high water mark. Frequent inundation.

Dominant plant species

- bushy knotweed (*Polygonum ramosissimum*), other herbaceous
- Pennsylvania smartweed (*Polygonum pensylvanicum*), other herbaceous

Community 4.1
Smartweed & Knotgrass Community (Wet regime)

Figure 17. 4. Smartweed & Knotgrass Community (wet regime)

This community is inundated frequently and for longer time periods. Pennsylvania smartweed is the dominant species with knotgrass growing in shallow water areas. In order for Pennsylvania smartweed to germinate and thrive, early growing season rains (late spring especially during the month of May) are especially beneficial. Other species present in smaller amounts are saltmarsh aster, cattail, arrowhead, and curly dock. Shrubs such as willow can be common around the periphery of the basin near the high water mark.

Table 9. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1233	1569	2018
Forb	336	673	1009
Total	**1569**	**2242**	**3027**

Figure 19. Plant community growth curve (percent production by month). TX0509, Smartweed & Knotgrass dominate - Playas. Wet regime consisting of smartweed and knotgrass dominance..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	2	8	16	24	26	8	10	4	1	0

Transition T1A
State 1 to 2

Frequency and duration of inundation increases from Infrequent/Occasional to Moderately Frequent. Plants shift from grass dominant to grass-likes dominant.

Restoration pathway R2A
State 2 to 1

Frequency and duration of innudation decreases from Moderately frequent to Infrequent/Occasional. Plants shift from grass-likes dominant to midgrass/grass-likes dominant.

Transition T2A
State 2 to 3

Frequency and duration of innudation increases from moderately frequent to frequent. Plants shift from grass-likes dominant to grass-likes/forb dominant.

Restoration pathway R3A
State 3 to 2

Frequency and duration of innudation decreases from frequent to moderately frequent. Plants shift from grass-likes/forbs dominant to grass-likes dominant.

Transition T3A
State 3 to 4

Frequency and duration of innudation increases from frequent to frequent. Plants shift from grass-likes/forb dominant to smartweed/knotgrass dominant community.

Restoration pathway R4A
State 4 to 3

Frequency and duration of inundation remains frequent. Plants shift from smartweed/knotgrass dominant to grass-likes/forbs dominant community.

Additional community tables

Table 10. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Grasses**			841–1861	
	buffalograss	BODA2	*Bouteloua dactyloides*	0–465	–
	barnyardgrass	ECCR	*Echinochloa crus-galli*	0–465	–
	vine mesquite	PAOB	*Panicum obtusum*	0–465	–
	western wheatgrass	PASM	*Pascopyrum smithii*	0–465	–
	white tridens	TRAL2	*Tridens albescens*	0–465	–
2	**Grass**			168–297	
	creeping spikerush	ELFA	*Eleocharis fallax*	168–297	–
Forb					
3	**Forbs**			560–1121	
	lambsquarters	CHAL7	*Chenopodium album*	0–280	–
	golden tickseed	COTI3	*Coreopsis tinctoria*	0–280	–
	snow on the mountain	EUMA8	*Euphorbia marginata*	0–280	–
	curlycup gumweed	GRSQ	*Grindelia squarrosa*	0–280	–
	common sunflower	HEAN3	*Helianthus annuus*	0–280	–
	Texas blueweed	HECI	*Helianthus ciliaris*	0–280	–
	spotted evening primrose	OECA3	*Oenothera canescens*	0–280	–
	turkey tangle fogfruit	PHNO2	*Phyla nodiflora*	0–280	–
	silverleaf nightshade	SOEL	*Solanum elaeagnifolium*	0–280	–
	plains ironweed	VEMA2	*Vernonia marginata*	0–280	–

Table 11. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Grass-likes**			897–1121	
	pale spikerush	ELMA5	*Eleocharis macrostachya*	897–1121	–
2	**Midgrasses**			280–785	
	knotgrass	PADI6	*Paspalum distichum*	224–448	–
	Carolina foxtail	ALCA4	*Alopecurus carolinianus*	112–224	–
	barnyardgrass	ECCR	*Echinochloa crus-galli*	112–224	–
	white tridens	TRAL2	*Tridens albescens*	56–112	–
3	**Midgrass**			56–112	
	cattail	TYPHA	*Typha*	56–112	–
Forb					
4	**Forbs**			168–616	
	woollyleaf bur ragweed	AMGR5	*Ambrosia grayi*	0–56	–
	golden tickseed	COTI3	*Coreopsis tinctoria*	0–56	–
	smallhead sneezeweed	HEMI	*Helenium microcephalum*	0–56	–
	California loosestrife	LYCA4	*Lythrum californicum*	0–56	–
	spotted evening primrose	OECA3	*Oenothera canescens*	0–56	–
	turkey tangle fogfruit	PHNO2	*Phyla nodiflora*	0–56	–
	Pennsylvania smartweed	POPE2	*Polygonum pensylvanicum*	0–56	–
	bushy knotweed	PORA3	*Polygonum ramosissimum*	0–56	–
	curly dock	RUCR	*Rumex crispus*	0–56	–
	longbarb arrowhead	SALO2	*Sagittaria longiloba*	0–56	–
	eastern annual saltmarsh aster	SYSU5	*Symphyotrichum subulatum*	0–56	–
5	**Forbs**			168–392	
	Forb, annual	2FA	*Forb, annual*	0–224	–
	redroot amaranth	AMRE	*Amaranthus retroflexus*	0–224	–
	lambsquarters	CHAL7	*Chenopodium album*	0–224	–
Tree					
6	**Trees**			0–56	
	black willow	SANI	*Salix nigra*	0–56	–

Animal community

A variety of animals utilize the site. Small mammals use the site for food and cover. Frogs and salamanders are found in abundance in wet seasons. Predators such as skunks, coyotes and snakes find food and cover there. Pronghorn will sometime graze around the perimeter of playas. Raptors such as hawks (especially harriers) favor the site as hunting areas. Many species of shorebirds and waterfowl utilize the lakes in wetter seasons. Herons and egrets utilize the wetter playas.

Vegetative cover provided by playas is valuable for species such as waterfowl and a variety of upland birds during the nesting season. Also in the fall and winter the playas provide thermal cover and escape cover.

Hydrological functions

The site captures runoff water from surrounding sites. Playas are recharge sites for the Ogallala aquifer.

Recreational uses

Hunting, birdwatching, and nature study areas.

Wood products

None

Other products

None

Other information

None

Inventory data references

The information in this document is based on long term observations of well managed ranges, and numerous vegetative transects made over several years for the purpose of documenting wetland vegetation.

Other references

USDA, Soil Survey Reports, Soil Series Narratives, USDA-NRCS
Hatch, Gandhi and Brown, Checklist of the Vascular Plants of Texas (Texas A&M, 1990)
Haukos and Smith, Common Flora of the Playa Lakes, Texas Tech University Press, 1997
Correll and Correll, Aquatic and Wetland Plants of the Southwestern United States, 1975

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Approval

Bryan Christensen, 9/11/2023

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)	Stan Bradbury, Zone RMS, NRCS, Lubbock, Texas
Contact for lead author	806-791-0581
Date	05/13/2005
Approved by	Bryan Christensen
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

2. **Presence of water flow patterns:** None to slight.

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

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 20%

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

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

7. **Amount of litter movement (describe size and distance expected to travel):** None to slight.

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

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Moderate medium subangular blocky structure with moderate to high SOM.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Basal cover and density with small interspaces should make rainfall impact minimal. This site is poorly drained, permeability is very slow to moderately slow, and available water holding capacity is high to moderately high.

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

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

    Dominant: Cool-season grasses > Warm-season midgrasses >

    Sub-dominant: Sedges, Rushes, Knotgrass > Warm-season shortgrasses > Forbs >

    Other: Shrubs

    Additional:

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

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

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1,500 to 1,800 pounds annual production

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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:** Willows.

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17. **Perennial plant reproductive capability:** All plant species should be capable of reproduction except during periods of prolonged drought conditions, heavy natural herbivory or intense wildfires.
