USDA Natural Resources Conservation Service

Ecological site R150BY651TX
Salt Flat

Last updated: 9/22/2023
Accessed: 04/23/2025

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

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

MLRA 150B is in the West Gulf Coastal Plain Section of the Coastal Plain Province of the Atlantic Plain and entirely in Texas. It makes up about 3,420 square miles. It is characterized by nearly level to gently sloping coastal lowland plains dissected by rivers and streams that flow toward the Gulf of Mexico. Barrier islands and coastal beaches are included. The lowest parts of the area are covered by high tides, and the rest are periodically covered by storm tides. Parts of the area have been worked by wind, and the sandy areas have gently undulating to irregular topography because of low mounds or dunes. Broad, shallow flood plains are along streams flowing into the bays. Elevation generally ranges from sea level to about 10 feet, but it is as much as 25 feet on some of the dunes. Local relief is mainly less than 3 feet. The towns of Groves, Texas City, Galveston, Lake Jackson, and Freeport are in the northern half of this area. The towns of South Padre Island, Loyola Beach, Corpus Christi, and Port Lavaca are in the southern half. Interstate 37 terminates in Corpus Christi, and Interstate 45 terminates in Galveston.

Classification relationships

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

Ecological site concept

Salt Flats are on nearly level areas of the Coastal Plain with high salinity and high electrical conductivity.

Associated sites

R150BY716TX	**Wind Tidal Flat** This site is lower on the landscape than Salt Flat.
R150BY650TX	**Low Coastal Sand** This site is found on the barrier flat and is slightly above the landscape.
R150BY652TX	**Southern Salt Marsh** This site is located on a slightly lower landform and is wetter.
R150BY552TX	**Tidal Flat** This site is on a landform closer to the bay and is wetter due to tidal enfluence.

Similar sites

R150BY552TX	**Tidal Flat** These areas are on a similar to lower landform and are subject to tidal flooding.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Borrichia frutescens*
Herbaceous	(1) *Distichlis spicata* (2) *Spartina spartinae*

Physiographic features

The Site consists of very deep soils that were formed in sandy eolian and storm washover sediments, marine sediments, loamy eolian deposits, and dredge. These nearly level soils are on planar to concave landforms. The soils are subject to occasional flooding by high storm surge from strong tropical storms and are ponded after periods of heavy rainfall. Slope ranges from 0 to 1 percent.

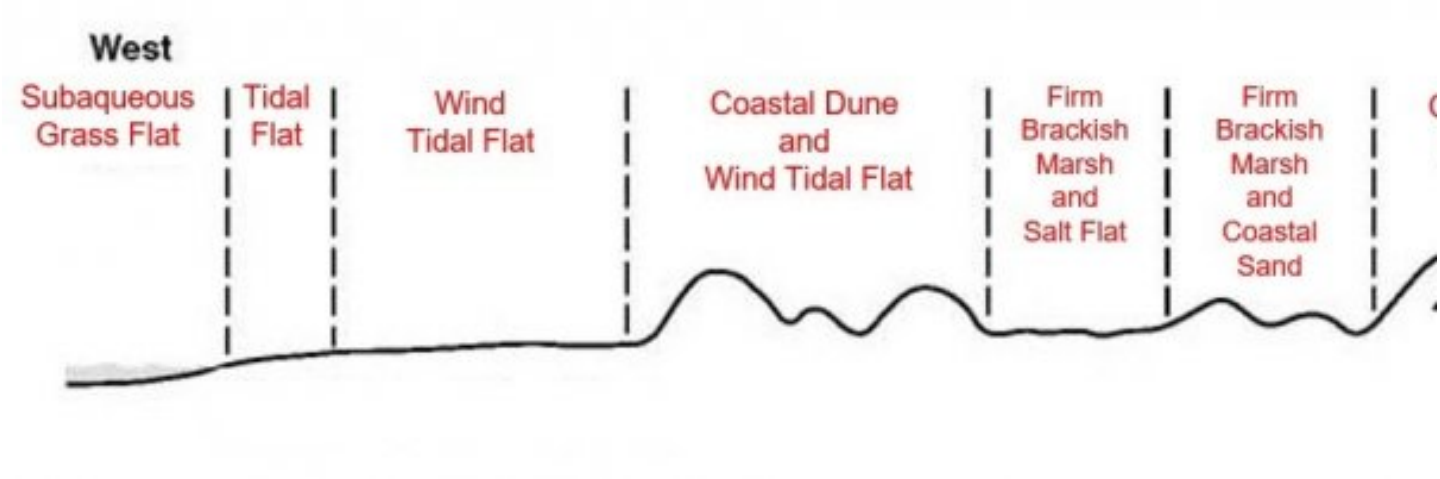


Figure 2.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Depression (2) Barrier island > Barrier flat (3) Coastal plain > Sand sheet (4) Barrier island > Tidal flat

Runoff class	Negligible to medium
Flooding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Flooding frequency	None to frequent
Ponding duration	Long (7 to 30 days)
Ponding frequency	None to occasional
Elevation	0–20 ft
Slope	0–1%
Ponding depth	0–12 in
Water table depth	0–40 in
Aspect	Aspect is not a significant factor

Climatic features

The climate is predominately maritime, controlled by the warm and very moist air masses from the Gulf of Mexico. The climate along the upper coast of the barrier islands is subtropical subhumid and the climate on the lower coast of Padre Island is subtropical semiarid (due to high evaporation rates that exceed precipitation). Almost constant sea breezes moderate the summer heat along the coast. Winters are generally warm and are occasionally interrupted by incursions of cool air from the north. Spring is mild and damaging wind and rain may occur during spring and summer months. Tropical cyclones or hurricanes can occur with wind speeds of greater than 74 mph and have the potential to cause flooding from torrential rainstorms. Despite the threat of tropical storms, the storms are rare. Throughout the year, the prevailing winds are from the southeast to south-southeast.

The average annual precipitation is 45 to 57 inches in the northeastern half of this area, 26 inches at the extreme southern tip of the area, and 30 to 45 inches in the rest of the area. Precipitation is abundant in spring and fall in the southwestern part of the area and is evenly distributed throughout the year in the northeastern part. Rainfall typically occurs as moderate-intensity, tropical storms that produce large amounts of rain during the winter. The average annual temperature is 68 to 74 degrees F. The freeze-free period averages 340 days and ranges from 315 to 365 days.

Table 3. Representative climatic features

Frost-free period (characteristic range)	309-365 days
Freeze-free period (characteristic range)	365 days
Precipitation total (characteristic range)	28-35 in
Frost-free period (actual range)	266-365 days
Freeze-free period (actual range)	365 days
Precipitation total (actual range)	26-39 in
Frost-free period (average)	341 days
Freeze-free period (average)	365 days
Precipitation total (average)	33 in

Climate stations used

- (1) ROCKPORT [USC00417704], Rockport, TX
- (2) PORT O'CONNOR [USC00417186], Port O Connor, TX
- (3) PADRE IS NS [USC00416739], Padre Island Ntl Seashor, TX
- (4) CORPUS CHRISTI NAS [USW00012926], Corpus Christi, TX
- (5) ROCKPORT ARANSAS CO AP [USW00012972], Rockport, TX
- (6) ARANSAS WR [USC00410305], Tivoli, TX
- (7) PORT ISABEL [USC00417179], Port Isabel, TX

- (8) PORT ISABEL CAMERON AP [USW00012957], Los Fresnos, TX
- (9) PORT MANSFIELD [USC00417184], Port Mansfield, TX

Influencing water features

This is a wet, saline, and sodic site receiving water from runoff and seepage from adjacent sites. It has a permanent water table at a depth of 0 to 40 inches throughout most years. Some areas are ponded for extended periods of time or are flooded due to tidal surge from strong seasonal tropical storms.

Wetland description

This site has hydric soils. Onsite investigation needed to determine local conditions.

Soil features

These are very deep, poorly and somewhat poorly drained, moderate to very slowly permeable saline and sodic soils. The high salinity reduces the amount of water available to plants, and is a greater influence on the range site than texture or permeability. Surface runoff is low to negligible. Because of seepage from adjoining sites and the relative landscape position, water is at or near the surface for some time following rains. A permanent water table can be found at a depth of 0 to 40 inches throughout the year in most years. Soils of this site include the Dianola, Latina, Malaquite, Saucel, and Sejita series.

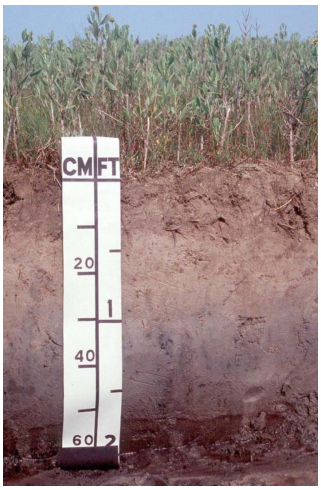


Figure 9. 1.1 Malaquite Profile

Table 4. Representative soil features

Parent material	(1) Eolian deposits–igneous, metamorphic and sedimentary rock
Surface texture	(1) Fine sandy loam (2) Fine sand (3) Loamy sand
Family particle size	(1) Fine-loamy (2) Coarse-loamy
Drainage class	Somewhat poorly drained to poorly drained
Permeability class	Moderate to very slow
Soil depth	80 in
Surface fragment cover <=3"	0–8%
Surface fragment cover >3"	0%
Available water capacity (0-60in)	1 in
Calcium carbonate equivalent (0-60in)	0–15%

Electrical conductivity (0-60in)	8–70 mmhos/cm
Sodium adsorption ratio (0-60in)	13–60
Soil reaction (1:1 water) (0-60in)	7.4–9
Subsurface fragment volume <=3" (20-60in)	0–11%
Subsurface fragment volume >3" (20-60in)	0–2%

Ecological dynamics

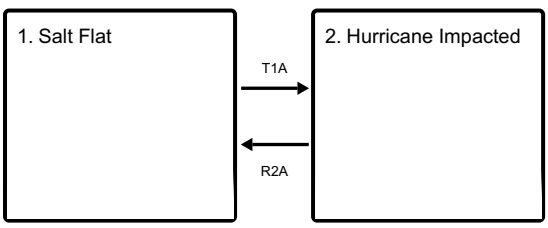
The Texas coastline is composed of barrier islands, peninsulas, bays, estuaries, and man-made passes. These mobile environments are constantly reshaped by the process of erosion and accretion. Hurricane activity can significantly change the island environment. The barrier islands are subdivided into habitats based on landform, elevation, and vegetation. The Salt Flat lies on the bay side of the foredunes in the barrier flat landscape. The plant communities vary because of grazing and hydrology. This site is very saline and has a variable high-water table which limits variety and amount of plant growth. The reference plant community, because of its proximity to the Gulf of Mexico with associated tropical storms and hurricanes, is periodically inundated by freshwater from heavy rains and by saline storm surges associated with hurricanes. Periodic inundation from storm surges and high tides maintain the salinity and water table.

The reference community consists of two distinctly different plant communities caused by elevation, hydrology, and salinity differences. One plant community is in the lower, wetter areas. Due to its landscape position and frequent inundation by salt water from high tides, this area is more saline. This community consists of annual glasswort (*Salicornia bigelovii*) and saltwort (*Batis maritima*). The second plant community is slightly higher and less saline. It is dominated by shoregrass (*Monanthochloe littoralis*) and seashore saltgrass (*Distichlis spicata*) with small amounts of sea lavender (*Limonium carolinianum*), bushy sea-ox-eye (*Borrichia frutescens*), and creeping glasswort (Salicornia virginica). Salinity and periodic inundation keep out most woody invaders. Because of the low vegetative productivity, mulch cover, and soil organic matter are relatively low. Under heavy continuous livestock grazing, the plant community rapidly deteriorates to weedy forbs, bushy sea-ox-eye, and woody glassworts. Continued grazing pressure results in bare ground which can be difficult to restore to a because of high salinity and periodic inundation.

Disturbances cause transitions to other communities include mismanaged grazing and natural disturbances like drought and hurricanes. When the site is grazed by domestic livestock, cattle will concentrate on the slightly higher shoregrass community. Under heavy, continuous livestock grazing, the community rapidly. Species found in this community include bushy sea-ox-eye, creeping glasswort, annual glasswort and small amounts of other annual grasses and forbs with increasing bare ground. Storm surges, high winds, and deposition can also transition the reference community. Restoration from any of these transitions depends on the severity and scale of disturbance. If nearby vegetative communities are still functioning, then natural propagation will occur quicker. Seed sources for restoring many of these communities are difficult to find or expensive.

State and transition model

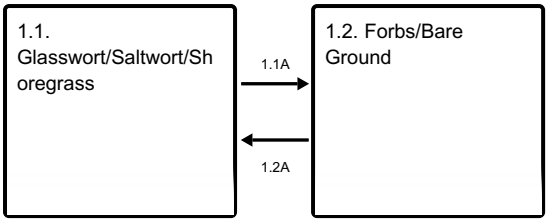
Ecosystem states



T1A - Loss of vegetative cover

R2A - Natural regeneration over time

State 1 submodel, plant communities



State 1
Salt Flat

Dominant plant species

- dwarf saltwort (*Salicornia bigelovii*), grass
- turtleweed (*Batis maritima*), grass

Community 1.1
Glasswort/Saltwort/Shoregrass

Figure 10. 1.1 Glasswort/Saltwort/Shoregrass Community

Two intermingling communities exist in the reference plant community. They differ by slight changes in micro-elevation. The lower community is dominated by annual glasswort (*Salicornia bigelovii*) and saltwort (*Batis maritima*) as the areas are wetter and more saline. On slightly higher elevation, the plant community becomes much more diverse. This area is less saline, receives freshwater seepage, and is not as subject to extreme high tides. This plant community is dominated by shoregrass (*Monanthochloe littoralis*) with varying amounts of seashore saltgrass (*Distichlis spicata*), glassworts, saltworts, bushy sea-ox-eye (*Borrichia frutescens*), sea purslane (*Sesuvium maritimum*), and sea lavender. Natural factors maintaining this plant community include high salinity, poor drainage, and inundation during storm periods. Under continuous, heavy livestock grazing, the shortgrasses and sparse forbs die out leaving bare areas, which increase in salinity in the surface therefore retarding new plant growth.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	490	700	1050
Forb	210	300	450
Total	**700**	**1000**	**1500**

Figure 12. Plant community growth curve (percent production by month). TX7755, Open Warm-Season Grassland. Shortgrass community with forbs.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	10	20	15	5	10	15	10	5	5

Community 1.2
Forbs/Bare Ground

This community is comprised mostly of forbs, a sparse cover of warm-season perennial grasses with an increased amount of bare ground. The changes result from overgrazing. Forbs include annual glasswort, saltwort, and bushy sea-ox-eye with scattered amounts of sea purslane and sea lavender. Grasses are scarce with occasional shoregrass, seashore saltgrass, and other various warm-season perennials. If enough overuse occurs sea-ox-eye and bare ground will be all that is evident. Once in this condition, the community can be restored through prescribed grazing over an extended time, although high soil salinity and periodic inundation make this difficult.

Pathway 1.1A
Community 1.1 to 1.2

Overgrazing by livestock will transition the site to Community 1.2.

Pathway 1.2A
Community 1.2 to 1.1

The site can be reverted back to Community 1.1 by grazing management. Specifically, using deferment periods will allow reference plants to recover.

State 2
Hurricane Impacted

Vegetation is severely reduced or absent

Transition T1A
State 1 to 2

Transition to State 2 is caused by the associated effects of Hurricanes. This includes storm surges, wind scouring of plants, and burial of vegetation by sediment deposition.

Restoration pathway R2A
State 2 to 1

Restoration back to State 1 typically requires time and deferment of grazing. Time for recovery depends on the severity of the hurricane.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Grasses**			450–1000	
	saltgrass	DISP	*Distichlis spicata*	450–1000	–
	shoregrass	MOLI	*Monanthochloe littoralis*	450–1000	–
2	**Grasses**			25–50	
	Grass, perennial	2GP	*Grass, perennial*	25–50	–
Forb					
3	**Forbs**			125–270	
	turtleweed	BAMA5	*Batis maritima*	125–270	–
	dwarf saltwort	SABI	*Salicornia bigelovii*	125–270	–
	annual rabbitsfoot grass	POMO5	*Polypogon monspeliensis*	1–2	–
4	**Forbs**			85–180	
	Forb, perennial	2FP	*Forb, perennial*	85–180	–
	bushy seaside tansy	BOFR	*Borrichia frutescens*	85–180	–
	lavender thrift	LICA17	*Limonium carolinianum*	85–180	–
	slender seapurslane	SEMA3	*Sesuvium maritimum*	85–180	–
	saltgrass	DISP	*Distichlis spicata*	1	–
	Canada spikesedge	ELGE	*Eleocharis geniculata*	1	–
	sand spikerush	ELMO2	*Eleocharis montevidensis*	1	–
	seashore dropseed	SPVI3	*Sporobolus virginicus*	1	–

Animal community

The animal communities of the Coastal Prairie communities are influenced by fresh and salt water inundations. Cattle and many species of wildlife make extensive use of the site. White-tailed deer may be found scattered across the prairie and are found in heavier concentrations where woody cover exists. Feral hogs are present and at times become abundant. Coyotes are abundant and fill the mammalian predator niche. Rodent populations rise during drier periods and fall during periods of inundation. Alligators are locally abundant and make frequent use of the marshes depending on salt concentrations in the marshes.

The region is a major flyway for waterfowl and migrating birds. Hundreds of thousands of ducks, geese, and sandhill cranes abound during winter. Whooping cranes are an important endangered species that occur in the area, especially near Aransas National Wildlife Refuge. Northern harriers are common predatory birds seen patrolling marshes. Curlews, plovers, sandpipers, and willets are shorebirds that make use of the tidal areas. Seagulls and terns are plentiful throughout the year trolling the shores as well. Further inland, rails, gallinules, and moorhens make use of the brackish marshes.

Hydrological functions

Infiltration into the sandy soils of this site is rapid. However, because of proximity to marshes and streams and the level terrain, this site is periodically inundated for short periods.

Recreational uses

The Padre Island National Seashore is a popular tourist designation throughout the year. Because the National Seashore endeavors to preserve Padre Island in its natural state, visiting the island is very much like stepping back into the past. Bird watching and saltwater fishing are other recreational uses.

Inventory data references

Information presented was derived from the Range Site Description, NRCS clipping data, literature, field observations, and personal contacts with range-trained personnel.

Other references

Archer, S. 1994. Woody plant encroachment into southwestern grasslands and savannas: rates, patterns and proximate causes. Ecological implications of livestock herbivory in the West, 13-68.

Archer, S. and F. E. Smeins. 1991. Ecosystem-level processes. Grazing Management: An Ecological Perspective. Edited by R.K. Heischmidt and J.W. Stuth. Timber Press, Portland, OR.

Bailey, V. 1905. North American Fauna No. 25: Biological Survey of Texas. United States Department of Agriculture Biological Survey. Government Printing Office, Washington D. C.

Beasom, S. L, G. Proudfoot, and J. Mays. 1994. Characteristics of a live oak-dominated area on the eastern South Texas Sand Plain. In the Caesar Kleberg Wildlife Research Institute Annual Report, 1-2.

Bestelmeyer, B. T., J. R. Brown, K. M. Havstad, R. Alexander, G. Chavez, and J. E. Herrick. 2003. Development and use of state-and-transition models for rangelands. Journal of Range Management, 56(2):114-126.

Briske, B. B, B. T. Bestelmeyer, T. K. Stringham, and P. L. Shaver. 2008. Recommendations for development of resilience-based State-and-Transition Models. Rangeland Ecology and Management, 61:359-367.

Brown, J. R. and S. Archer. 1999. Shrub invasion of grassland: recruitment is continuous and not regulated by herbaceous biomass or density. Ecology, 80(7):2385-2396.

Butzler, R. E. 2006. The Spatial and Temporal Patterns of Lycium carolinianum Walt. M. S. Thesis. Texas A&M, College Station, TX.

Chabreck, R. H. 1972. Vegetation, water and soil characteristics of the Louisiana coastal region. Louisiana State University Agriculture Experiment Station Bulletin, 664.

Davis, W. B. 1974. The Mammals of Texas. Texas Parks and Wildlife Department Bulletin, 41.

Drawe, D. L., A. D. Chamrad, and T. W. Box. 1978. Plant communities of the Welder Wildlife Refuge. The Welder Wildlife Refuge, Sinton, TX.

Drawe, D. L., K. R. Kattner, W. H. McFarland, and D. D. Neher. 1981. Vegetation and soil properties of five habitat types on north Padre Island. Texas Journal of Science, 33:145-157.

Everitt, J. H., D. L. Drawe, and R. I. Leonard. 2002. Trees, Shrubs, and Cacti of South Texas. Texas Tech University Press, Lubbock, TX.

Foster, J. H. 1917. Pre-settlement fire frequency regions of the United States: A first approximation. Tall Timbers Fire Ecology Conference Proceedings, 20.

Frost, C. C. 1995. Presettlement fire regimes in southeastern marshes, peatlands, and swamps. Tall Timbers Fire Ecology Conference Proceedings, 19:39-60.

Fulbright, T. E., D. D. Diamond, J. Rappole, and J. Norwine. 1990. The Coastal Sand Plain of Southern Texas. Rangelands, 12:337-340.

Fulbright, T. E., J. A. Ortega-Santos, A. Lozano-Cavazos, and L. E. Ramirez-Yanez. 2006. Establishing vegetation on migrating inland sand dunes in Texas. Rangeland Ecology and Management, 59:549-556.

Gosselink, J.D., C.L. Cordes, and J.W. Parsons. 1979. An. Ecological characterization study of the Chenier Plain Coastal Ecosystem of Louisiana and Texas. U.S. Fish and Wildlife Service, Office of Biological Services, Washington, D.C.

Gould, F. W. 1975. The Grasses of Texas. Texas A&M University Press, College Station, TX.

Gould, F. W. and T. W. Box. 1965. Grasses of the Texas Coastal Bend. Texas A&M University Press, College Station, TX.

Grace, J. B., L. K. Allain, H. Q. Baldwin, A. G. Billock, W. R. Eddleman, A. M. Given, C. W. Jeske, and R. Moss. 2005. Effects of prescribed fire in the coastal prairies of Texas. USGS Open File Report, 2005-1287.

Hamilton, W. and D. Ueckert. 2005. Rangeland woody plant control: Past, present, and future. Brush management: Past, present, and future, 3-16.

Harcombe, P. A. and J. E. Neaville. 1997. Vegetation types of Chambers County, Texas. The Texas Journal of Science, 29:209-234.

Hatch, S. L., J. L. Schuster, and D. L. Drawe. 1999. Grasses of the Texas Gulf Prairies and Marshes. Texas A&M University Press, College Station, TX.

Johnson, M. C. 1963. Past and present grasslands of southern Texas and northeastern Mexico. Ecology 44(3):456-466.

Lehman, V. W. 1965. Fire in the range of Attwater's prairie chicken. Tall Timbers Fire Ecology Conference Proceedings, 4:127-143.

Mann, C. 2004. 1491: New Revelations of the Americas before Columbus. Vintage Books, New York City, NY.

Mapston, M. E. 2007. Feral Hogs in Texas. Texas Agrilife Extension Bulletin, B-6149

McAtee, J. W., C. J. Scifres, D. L. and Drawe. 1979. Digestible energy and protein content of gulf cordgrass following burning or shredding. Journal of Range Management, 376-378.

McGowen, J. H., L. F. Brown, T. J. Evans, W. L. Fisher, and C. G. Groat. 1976. Environmental geologic atlas of the Texas Coastal Zone-Bay City-Freeport area. The University of Texas at Austin, Bureau of Economic Geology, Austin, TX.

Miller, D. L., F. E Smeins, and J. W. Webb. 1998. Response of a Texas *Distichlis spicata* coastal marsh following Lesser Snow Goose herbivory. Aquatic Botany, 61:301-307.

Miller, D. L., F. E. Smeins, and J. W. Webb. 1996. Mid-Texas coastal marsh change (1939-1991) as influenced by Lesser Snow Goose herbivory. Journal of Coastal Research, 12:462-476.

Miller, D. L., F. E. Smeins, J. W. Webb, and M. T. Longnecker. 1997. Regeneration of Scirpus americanus in a Texas coastal marsh following Lesser Snow Goose herbivory. Wetlands, 17:31-42.

Oefinger, R. D. and C. J. Scifres. 1977. Gulf cordgrass production, utilization, and nutritional value following burning. Texas Agricultural Experiment Station Bulletin, B-1176.

Palmer, G. R., T. E. Fulbright, and G. McBryde. 1995. Inland sand dune reclamation on the Coastal Sand Plain of Southern Texas. Caesar Kleberg Wildlife Research Institute Annual Report, 1994-1995.

Prichard, D. 1998. Riparian area management: A user guide to assessing proper functioning condition and the supporting science for lotic areas. Bureau of Land Management, Denver, CO.

Rappole, J. H. and G. W. Blacklock. 1985. Birds of the Texas Coastal Bend: Abundance and distribution. Texas A&M University Press, College Station, TX.

Scifres, C. J. and W. T. Hamilton. 1993. Prescribed burning for brushland management: The South Texas example. Texas A&M Press, College Station, TX.

Scifres, C. J., J. W. McAtee, and D. L. Drawe 1980. Botanical, edaphic, and water relationships of gulf cordgrass (Spartina spartinae [Trin.] Hitchc.) and associated communities. The Southwestern Naturalist, 25(3):397-409.

Shiflet, T. N. 1963. Major ecological factors controlling plant communities in Louisiana marshes. Journal of Range Management, 16:231-235.

Singleton, J. R. 1951. Production and utilization of waterfowl food plants on the east Texas gulf coast. Journal of Wildlife Management, 15:46-56.

Smeins, F. E., D. D. Diamond, and W. Hanselka. 1991. Coastal prairie, 269-290. Ecosystems of the World: Natural Grasslands. Edited by R. T. Coupland. Elsevier Press, Amsterdam, Netherlands.

Smeins, F. E., S. Fuhlendorf, and C. Taylor, Jr. 1997. Environmental and land use changes: A long term perspective. Juniper Symposium, 1-21.

Snyder, R. A. and C. L. Boss. 2002. Recovery and stability in barrier island plant communities. Journal of Coastal Research, 18:530-536.

Stoddart, L. A., A. D. Smith, and T. W. Box. 1975. Range management. McGraw-Hill Book Co., New York, NY.

Stringham, T. K., W. C. Krueger, and P. L. Shaver. 2001. State and transition modeling: An ecological process approach. Journal of Range Management, 56(2):106-113.

Thornthwaite, C. W. 1948. An approach towards a rational classification of climate. Geographical Review, 38: 55-94.

Thurow, T. L. 1991. Hydrology and erosion. Grazing Management: An Ecological Perspective. Edited by R.K. Heitschmidt and J.W. Stuth. Timber Press, Portland, OR.

Urbatsch, L. 2000. Chinese tallow tree Triadica sebifera (L.) Small. USDA-NRCS, National Plant Center, Baton Rouge, LA.

Van't Hul, J. T., R. S. Lutz, and N. E. Mathews. 1997. Impact of prescribed burning on vegetation and bird abundance on Matagorda Island, Texas. Journal of Range Management, 50:346-360.

Vines, R. A. 1977. Trees of Eastern Texas. University of Texas Press, Austin, TX.

Vines, R. A. 1984. Trees of Central Texas. University of Texas Press, Austin, TX.

Wade, D. D., B. L. Brock, P. H. Brose, J. B. Grace, G. A. Hoch, and W. A. Patterson III. 2000. Fire in Eastern ecosystems. Wildland fire in ecosystems: effects of fire on flora. Edited by. J. K. Brown and J. Kaplers. United States Forest Service, Rocky Mountain Research Station, Ogden, UT.

Warren, W. S. 1998. The La Salle Expedition to Texas: The journal of Henry Joutel, 1684-1687. Edited by W. C. Foster. Texas State Historical Association, Austin, TX.

Weaver, J. E. and F. E. Clements. 1938. Plant ecology. McGraw-Hill, New York, NY.

Williams, A. M., R. A. Feagin, W.K. Smith, and N. L. Jackson. 2009. Ecosystem impacts of Hurricane Ike on Galveston Island and Bolivar Peninsula: Perspectives of the coastal barrier island network (CBIN). Shore and Beach, 7(2):1-5.

Williams, L. R. and G. N Cameron. 1985. Effects of removal of pocket gophers on a Texas coastal prairie. The American Midland Naturalist Journal, 115:216-224.

Wright, H.A. and A.W. Bailey. 1982. Fire Ecology: United States and Southern Canada. John Wiley & Sons, Inc., Hoboken, NJ.

Contributors

Tim Reinke, RMS, NRCS, Victoria, TX

Approval

Bryan Christensen, 9/22/2023

Acknowledgments

Contributing Authors:
Justin Clary, RMS, NRCS, Temple, TX
Shanna Dunn, SS, NRCS, Corpus Christi, TX
Vivian Garcia, RMS, NRCS, Corpus Christi, TX
Jason Hohlt, RMS, NRCS, Kingsville, TX
Stan Reinke, RMS, NRCS, Corpus Christi, TX
Homer Sanchez, RMS, NRCS, Temple, TX

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)	
Contact for lead author	
Date	04/23/2025
Approved by	Bryan Christensen
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

---

2. **Presence of water flow patterns:**

---

3. **Number and height of erosional pedestals or terracettes:**

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

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

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

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

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

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

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

    Dominant:

    Sub-dominant:

    Other:

    Additional:

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

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

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

---

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

---

17. **Perennial plant reproductive capability:**
