Ecological site R150BY647TX
Coastal Ridge

Last updated: 9/22/2023
Accessed: 05/11/2025

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

Coastal Ridges are found inland, west of the barrier islands. They are comprised of sandy clay loams and clay loams instead of pure sands. They are often referred to as clay dunes.

Associated sites

R150BY551TX	**Salty Prairie** These areas are on a higher landform.
R150BY708TX	**Sandy Flat** These areas are on a similar to slightly lower landform and have more sand throughout.

Similar sites

R150BY714TX	**Coastal Dune** These areas have more sand throughout.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Sporobolus wrightii* (2) *Trichloris crinita*

Physiographic features

These nearly level to sloping soils are on convex sloping coastal ridges. Slope ranges from 1 to 8 percent.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Dune
Runoff class	Medium to very high
Flooding frequency	None to rare
Ponding frequency	None
Elevation	3–49 ft
Slope	1–8%
Water table depth	72 in

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)	365 days
Freeze-free period (characteristic range)	365 days
Precipitation total (characteristic range)	28-33 in
Frost-free period (actual range)	365 days
Freeze-free period (actual range)	365 days
Precipitation total (actual range)	26-34 in
Frost-free period (average)	365 days
Freeze-free period (average)	365 days
Precipitation total (average)	30 in

Climate stations used

- (1) CORPUS CHRISTI NAS [USW00012926], Corpus Christi, TX
- (2) PADRE IS NS [USC00416739], Padre Island Ntl Seashor, TX
- (3) PORT MANSFIELD [USC00417184], Port Mansfield, TX
- (4) PORT ISABEL [USC00417179], Port Isabel, TX

Influencing water features

Areas closest to the coastline may be flooded by seawater from high tides or tropical storms for brief periods.

Wetland description

These areas are not hydric but some small areas may exist that are hydric. Onsite investigation needed to determine local conditions.

Soil features

The series consists of very deep, well drained, moderately slowly to slowly permeable soils that formed in loamy and calcareous loamy, eolian deposits. The soils correlated to this site include: Lalinda and Point Isabel.

Table 4. Representative soil features

Parent material	(1) Eolian deposits–igneous, metamorphic and sedimentary rock
Surface texture	(1) Sandy clay loam (2) Clay loam
Family particle size	(1) Fine (2) Fine-loamy
Drainage class	Well drained
Permeability class	Moderately slow to slow
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-60in)	4–6 in
Calcium carbonate equivalent (0-60in)	8–18%

Electrical conductivity (0-12in)	2–8 mmhos/cm
Sodium adsorption ratio (0-12in)	3–13
Soil reaction (1:1 water) (0-60in)	7.4–9

Ecological dynamics

The Texas coastline is composed of barrier islands, peninsulas, bays, estuaries, and natural or man-made passes. These mobile environments are constantly reshaped by the process of erosion and accretion. Hurricane activity can significantly change the environment drastically. The Padre Island region is subdivided into habitats based on landform and vegetation. The Coastal Ridge ecological site lies inland of the bay. The landforms vary from in size and are also known as clay dunes.

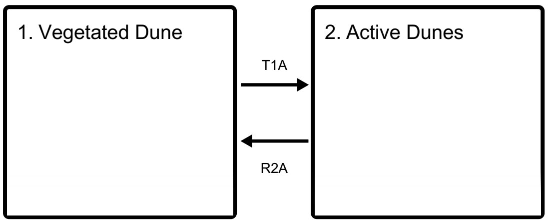
The plant communities are dynamic, and composition may vary dramatically with variations in annual rainfall, grazing, and fire. This landscape is typically a vegetated barrier flat unless impacted by recent hurricane activity. Because of southern proximity and nearness to the Gulf of Mexico, extreme climatic variations ranging from extended drought to hurricanes are possible. Bare ground may predominate during droughts or following hurricanes while a midgrass prairie may predominate under proper management and non-droughty periods.

The intensity of a hurricane plays a large role in the plant community. Due to the extensive creeping rhizomes and ability to tolerate high salinity levels, gulfdune paspalum can survive a moderately-intensive hurricane while other species cannot. Following a hurricane, the plant community will consist of gulfdune paspalum and various annual pioneer plants. Following a severe hurricane, vegetation will be virtually devoid. Length of recovery to reference conditions will depend severity and the ability to defer from grazing or other major natural disturbance.

Active sand dunes occur on this site. Overuse by livestock exacerbates dune formation. Continuous dunes sometimes cover several square miles. The dunes add to landscape diversity but can pose management problems because they migrate across the landscape and may cover fences, roads, equipment, and buildings. Cutting native hay near a sand dune and mulching the dune with the hay while lightly incorporating the hay into the soil is an effective method of stabilizing dunes.

State and transition model

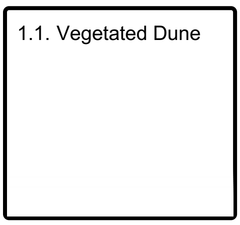
Ecosystem states



T1A - Loss of vegetative cover

R2A - Natural regeneration over time

State 1 submodel, plant communities



State 2 submodel, plant communities

2.1. Hurricane Impacted and Blowouts

State 1
Vegetated Dune

Dominant plant species

- big sacaton (*Sporobolus wrightii*), grass
- false Rhodes grass (*Trichloris crinita*), grass

Community 1.1
Vegetated Dune

The reference vegetation of this ecological site occurs as a grassland with scattered brush and pricklypear. The composition by weight is about 85 percent grasses, 5 percent forbs, and 10 percent woody plants. Approximate total annual yield ranges from 1,000 pounds per acre of air-dry vegetation in low production years to 5,000 pounds per acre of air-dry vegetation in above average production years. Approximately 65 percent of the vegetation is made up of a combination of tall and midgrasses such as giant sacaton, false Rhodesgrass, Arizona cottontop, and plains bristlegrass and the remaining 20 percent are short grass species such as buffalograss, fall witchgrass, hooded windmillgrass, pink pappusgrass, and lovegrass tridens. Approximately 10 percent of species composition is composed of shrubs and cacti such as desert yaupon, spiny hackberry, condalia, twisted acacia, and pricklypear. The remaining 5 percent species composition is composed of forbs which include sensitive briar, dalea, orange zexmenia, and bush sunflower. As retrogression occurs, grasses that dominate the site give way to condalia, spiny hackberry, cenizo, coyotillo, leatherstem, and pricklypear forming a dense chaparral type landscape. Some common invaders on this site include red grama, whorled dropseed, gummy lovegrass, and acacia species. If further overgrazing or hurricanes occur, the site will transition to State 2.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	850	2550	4250
Shrub/Vine	100	300	500
Forb	50	150	250
Total	**1000**	**3000**	**5000**

State 2
Active Dunes

Community 2.1
Hurricane Impacted and Blowouts

This plant community forms because of continued overgrazing or a hurricane. Overgrazing removes all vegetation and allows the dune to become unstable. Hurricanes cause the vegetation to be burned by high salinity content carried by high winds laden with coastal water. Vegetation can also be buried under thick sediment deposits of sand. Some areas are scoured and devoid of vegetation and may temporarily suffer complete vegetative loss. This community can recover to reference conditions given enough time. Deferment is the main management practice for recovery. Vegetation typically reestablishes through propagules sent by remaining plants, therefore recovery will be dependent on remnant population densities.

Transition T1A
State 1 to 2

Severe overgrazing or hurricane will cause State 1 to transition to State 2.

Restoration pathway R2A
State 2 to 1

Time and prescribed grazing (deferment) are required to restore the community to reference conditions.

Additional community tables

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.

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.

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Approval

Bryan Christensen, 9/22/2023

Acknowledgments

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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	05/11/2025
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):

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

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

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

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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:

    Sub-dominant:

    Other:

    Additional:

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

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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:**

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17. **Perennial plant reproductive capability:**
