USDA Natural Resources Conservation Service

# Ecological site R150BY708TX
# Sandy Flat

Last updated: 9/22/2023
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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.

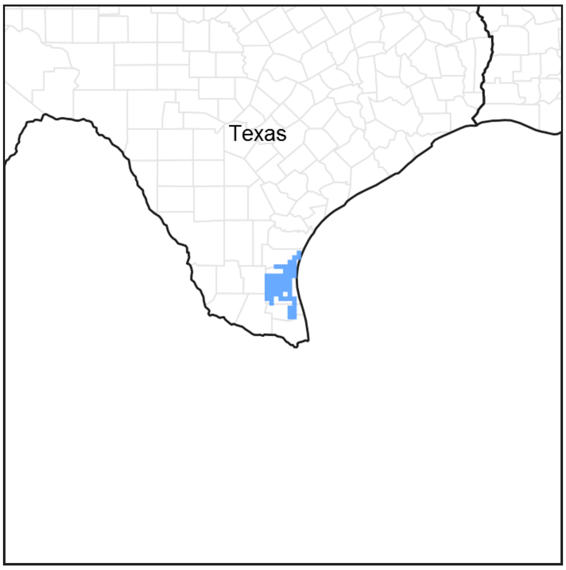



**Figure 1. Mapped extent**

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): 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

Sandy Flats have sandy surface soils and a seasonal high water table 6 to 18 inches below the surface. They are affected by inundation and an ever-changing plant community.

## Associated sites

| | |
|---|---|
| R150BY650TX | **Low Coastal Sand**<br>These areas are higher in the landscape and generally have lower electrical conductivity values. |
| R150BY647TX | **Coastal Ridge**<br>These sites are higher in the landscape and are loamy. |

## Similar sites

| | |
|---|---|
| R150BY650TX | **Low Coastal Sand**<br>These areas are higher in the landscape and have more diverse and abundant vegetation. |

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | Not specified |
| Shrub | (1) *Shrub, deciduous* |
| Herbaceous | (1) *Spartina spartinae*<br>(2) *Panicum virgatum* |

## Physiographic features

The site is found on nearly level to gently sloping soils on coastal plains. Slope ranges from 0 to 1 percent. A seasonal water table occurs at depths of 6 to 18 inches below the surface and perched water tables can occur after heavy rains. Strong tropical storms can also cause rare flooding.

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Coastal plain > Sand sheet |
| Runoff class | High |
| Flooding duration | Brief (2 to 7 days) |
| Flooding frequency | None to rare |
| Ponding frequency | None |
| Elevation | 0–30 m |
| Slope | 0–1% |
| Water table depth | 15–46 cm |

## 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) | 340-365 days |
| Freeze-free period (characteristic range) | 365 days |
| Precipitation total (characteristic range) | 660-787 mm |
| Frost-free period (actual range) | 264-365 days |
| Freeze-free period (actual range) | 365 days |
| Precipitation total (actual range) | 660-838 mm |
| Frost-free period (average) | 340 days |
| Freeze-free period (average) | 365 days |
| Precipitation total (average) | 737 mm |

## Climate stations used

- (1) PADRE IS NS [USC00416739], Padre Island Ntl Seashor, TX
- (2) CORPUS CHRISTI NAS [USW00012926], Corpus Christi, TX
- (3) PORT MANSFIELD [USC00417184], Port Mansfield, TX
- (4) PORT ISABEL CAMERON AP [USW00012957], Los Fresnos, TX
- (5) PORT ISABEL [USC00417179], Port Isabel, TX
- (6) ARMSTRONG 4SE [USC00410345], Armstrong, TX
- (7) SARITA 7 E [USC00418081], Sarita, TX
- (8) FALFURRIAS [USC00413063], Encino, TX

## Influencing water features

This ecological site is not influenced by water from a wetland or stream but may experience periodic water inundation caused by storm surges from the Gulf of Mexico. Ponding occurs rarely and a seasonal water table exists at 6 to 18 inches below the surface.

## Wetland description

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

## Soil features

The soils are very deep, poorly drained, moderately slowly permeable formed in loamy eolian deposits derived from Holocene-age sediments. Sauz is the only series correlated to this site and is classified as a coarse-loamy, mixed, active, hyperthermic Typic Natraqualf. They have a fine sand or loamy fine sand surface texture and dark grayish brown to gray colors. These soils are moderately and strongly saline, slightly to strongly alkaline and will be effervescent within the top 40 inches. A natric horizon can be found between 7 to 14 inches below the soil surface.

**Table 4. Representative soil features**

| | |
|---|---|
| Parent material | (1) Eolian sands–igneous, metamorphic and sedimentary rock |
| Surface texture | (1) Fine sand<br>(2) Loamy fine sand |
| Family particle size | (1) Coarse-loamy |
| Drainage class | Poorly drained |

| | |
|---|---|
| Permeability class | Moderately slow |
| Soil depth | 203 cm |
| Surface fragment cover <=3" | 0% |
| Surface fragment cover >3" | 0% |
| Available water capacity (0-152.4cm) | 10.16–17.78 cm |
| Electrical conductivity (0-83.8cm) | 2–16 mmhos/cm |
| Sodium adsorption ratio (0-152.4cm) | 15–30 |
| Soil reaction (1:1 water) (0-45.7cm) | 6.6–7.8 |
| Subsurface fragment volume <=3" (0-152.4cm) | 0% |
| Subsurface fragment volume >3" (0-152.4cm) | 0% |

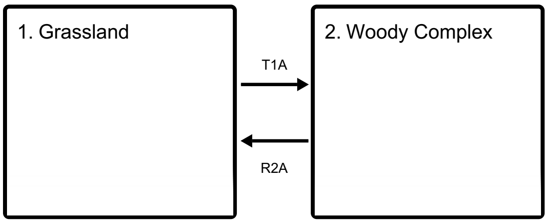
## Ecological dynamics

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 plant communities are dynamic and community composition may vary dramatically with annual rainfall, grazing, and fire. This site is heavily influenced by droughts.

Hurricanes occur, and the intensity plays a large role in the prevailing dominant plant community. It will either be covered with salt water, or washover will deposit silt and sand. Following this occurrence, vegetation will be virtually absent. 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

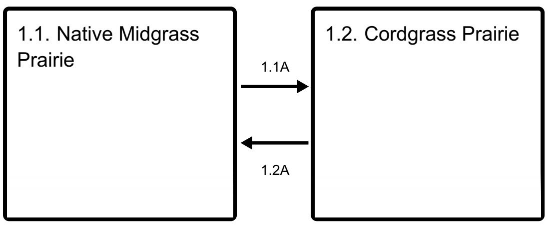
**Ecosystem states**




**T1A** - Absence of disturbance and natural regeneration over time

**R2A** - Removal of woody species and reintroduction of historic disturbance return intervals

**State 1 submodel, plant communities**



**State 2 submodel, plant communities**

2.1. Woody Encroachment

## State 1
## Grassland

### Dominant plant species

- gulf cordgrass (*Spartina spartinae*), grass

## Community 1.1
## Native Midgrass Prairie

Because of a lack of reference communities, the interpretive information for this plant community is derived from previously developed range site descriptions and professional consensus of range-trained field staff. This plant community is a productive, open grassland with a relatively low abundance of forb species. The plant structure is driven by periodic water inundation and a seasonal water table, but is also maintained by a grazing and fire regime which allows upland grasses to compete with gulf cordgrass for resources. During periods of infrequent water inundation, upland grass species will increase and remain a large component of the plant community. The Grassland State (1) is resistant to change but the Reference Plant Community (1.1) is not very resilient and is highly affected by unsustainable grazing pressure and frequent periods of water inundation.

**Table 5. Annual production by plant type**

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|---|---:|---:|---:|
| Grass/Grasslike | 2130 | 3727 | 5324 |
| Forb | 112 | 168 | 224 |
| Shrub/Vine | – | 28 | 56 |
| **Total** | **2242** | **3923** | **5604** |

**Table 6. Soil surface cover**

| | |
|---|---|
| Tree basal cover | 0% |
| Shrub/vine/liana basal cover | 0-5% |
| Grass/grasslike basal cover | 85-95% |
| Forb basal cover | 5-10% |
| Non-vascular plants | 0% |
| Biological crusts | 0% |
| Litter | 5-10% |
| Surface fragments >0.25" and <=3" | 0-2% |
| Surface fragments >3" | 0% |
| Bedrock | 0% |
| Water | 0% |
| Bare ground | 0-5% |

**Table 7. Canopy structure (% cover)**

| Height Above Ground (M) | Tree | Shrub/Vine | Grass/ Grasslike | Forb |
|---|---|---|---|---|
| <0.15 | – | 0-5% | 85-95% | 0-5% |
| >0.15 <= 0.3 | – | 0-5% | 85-95% | 0-5% |
| >0.3 <= 0.6 | – | 0-5% | 85-95% | 0-5% |
| >0.6 <= 1.4 | – | 0-5% | 85-95% | 0-5% |
| >1.4 <= 4 | – | – | – | – |
| >4 <= 12 | – | – | – | – |
| >12 <= 24 | – | – | – | – |
| >24 <= 37 | – | – | – | – |
| >37 | – | – | – | – |

## Community 1.2
## Cordgrass Prairie

**Figure 9. 1.2 Cordgrass Prairie Community**

Gulf cordgrass dominates this plant community and will make up a significant portion of the total annual production. Grasses like purple dropseed (*Sporobolus purpurascens*), brownseed paspalum (Paspalum plicatum), Hartweg's paspalum (*Paspalum hartwegianum*), fringed signalgrass ( *Urochloa ciliatissima*), and red lovegrass (*Eragrostis secundiflora*) will make up a portion of the plant composition. Gulf cordgrass can be an excellent emergency forage for cattle if managed through prescribed fire and prescribed grazing. Overall, bare ground and litter cover will remain relatively constant from the Reference Plant Community (1.1) to the Cordgrass Prairie Community (1.2) because of the high herbaceous production of gulf cordgrass.

**Table 8. Annual production by plant type**

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|---|---|---|---|
| Grass/Grasslike | 2186 | 3755 | 5324 |
| Forb | 56 | 140 | 224 |
| Shrub/Vine | – | 28 | 56 |
| **Total** | **2242** | **3923** | **5604** |

## Pathway 1.1A
## Community 1.1 to 1.2

This pathway represents a dramatic reduction in species diversity. Upland grasses begin to disappear and gulf cordgrass will account for the majority of the plant composition. Unsustainable grazing pressure and periods of long-term water inundation are the main drivers for this transition.

## Pathway 1.2A
## Community 1.2 to 1.1

Grazing management is key to restoring the Midgrass Prairie Community (1.1). Sustainable grazing keeps pressure off target grass species and allows enough fine fuel to build up and support prescribed burns. Uncontrollable factors, like periodic water inundation, will have a large impact on the successional direction of this plant community. The transition back to the Reference Plant Community (1.1) can take a very long time if seed sources for desirable grass species have been depleted.

## State 2
## Woody Complex

### Dominant plant species

- honey mesquite (*Prosopis glandulosa*), shrub

## Community 2.1
## Woody Encroachment

**Figure 11. 2.1 Woody Encroachment Community**

The woody plant species of this area are not well adapted to the edaphic conditions of this ecological site. Periodic water inundation and a seasonal water table create barriers to seedling germination and affect the longevity of plants that do establish. Under the right circumstances, woody plants including mesquite and huisache (*Acacia farnesiana*) will grow on this ecological site, but their growth is stunted and plant mortality is high. A significant woody canopy cover is not typical for this ecological site. In rare circumstances, areas may not experience periodic water inundation or may no longer have a seasonal water table. Woody species will be more common and longer lived in these situations.

**Table 9. Annual production by plant type**

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|---|---:|---:|---:|
| Grass/Grasslike | 2130 | 3643 | 5156 |
| Shrub/Vine | 56 | 140 | 224 |
| Forb | 56 | 140 | 224 |
| **Total** | **2242** | **3923** | **5604** |

## Transition T1A
## State 1 to 2

Woody plants will occasionally establish on this ecological site, but will not create a canopy cover over 20 percent. Woody plants will germinate in between periods of water inundation, but are not typically a persistent part of the plant community.

## Restoration pathway R2A
## State 2 to 1

Land managers may want to restore this ecological site to the Native Grassland State (1). Once in the Woody Complex (2), mechanical or chemical brush control can be used to remove unwanted woody plants, but often the herbaceous component is the main focus. Prescribed burning will have a positive impact on recruitment of desirable grass species. The restoration process is heavily dependent on favorable weather and patience. Land managers can plant native seed to speed up restoration efforts or can rely on seed that is already in the soil. Extensive soil disturbance is not recommended because of the salty nature of the subsoil. Grazing pressure on restoration sites should be deferred for a minimum of one growing season, but it is often necessary to defer livestock grazing completely or carefully graze for years before the desired plant community can develop.

## 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 | **Midgrasses** | | | 673–1681 | |
| | gulf cordgrass | SPSP | *Spartina spartinae* | 673–1681 | – |
| 2 | **Mid/Tallgrasses** | | | 785–1961 | |
| | shore little bluestem | SCLI11 | *Schizachyrium littorale* | 336–953 | – |
| | bushy bluestem | ANGL2 | *Andropogon glomeratus* | 224–560 | – |
| | switchgrass | PAVI2 | *Panicum virgatum* | 224–560 | – |
| 3 | **Mid/Shortgrasses** | | | 673–1681 | |
| | tumble lovegrass | ERSE2 | *Eragrostis sessilispica* | 84–252 | – |
| | Mexican sprangletop | LEFUU | *Leptochloa fusca ssp. uninervia* | 84–252 | – |
| | Nealley's sprangletop | LENE2 | *Leptochloa nealleyi* | 84–252 | – |
| | Judd's grass | LEVI4 | *Leptochloa virgata* | 84–252 | – |
| | Hartweg's paspalum | PAHA3 | *Paspalum hartwegianum* | 84–252 | – |
| | brownseed paspalum | PAPL3 | *Paspalum plicatulum* | 84–252 | – |
| | alkali sacaton | SPAI | *Sporobolus airoides* | 84–252 | – |
| | purple dropseed | SPPU3 | *Sporobolus purpurascens* | 84–252 | – |
| | fringed signalgrass | URCI | *Urochloa ciliatissima* | 84–252 | – |
| **Forb** | | | | | |
| 4 | **Forbs** | | | 112–224 | |
| | partridge pea | CHFA2 | *Chamaecrista fasciculata* | 11–56 | – |
| | gulf croton | CRPU6 | *Croton punctatus* | 11–56 | – |
| | blanketflower | GAILL | *Gaillardia* | 11–56 | – |
| | littleleaf sensitive-briar | MIMI22 | *Mimosa microphylla* | 11–56 | – |
| | snoutbean | RHYNC2 | *Rhynchosia* | 11–56 | – |
| **Shrub/Vine** | | | | | |
| 5 | **Shrubs** | | | 0–56 | |
| | honey mesquite | PRGLG | *Prosopis glandulosa var. glandulosa* | 0–56 | – |

## 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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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 | 05/19/2024 |
| 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:

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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:**

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