Ecological site R150BY713TX
Coastal Swale

Last updated: 9/22/2023
Accessed: 05/10/2025

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.

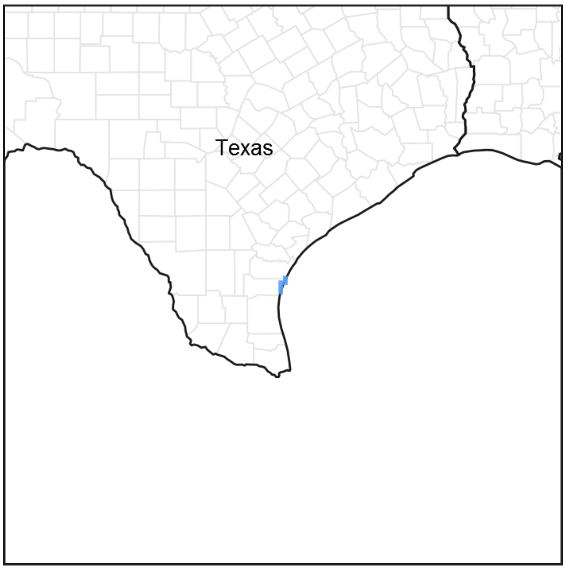


Figure 1. Mapped extent

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 Swales are sandy-textured depressions found on the interior of the barrier islands. Ponded water is brackish to fresh.

Associated sites

R150BY650TX	**Low Coastal Sand** These sites are higher on flats that do not pond water for long periods.
R150BY530TX	**Northern Coastal Sand** These sites are in areas with more than 41 inches of mean annual precipitation, on higher sandier landforms and do not pond water.
R150BY648TX	**Southern Coastal Sand** These sites are in areas with less than 41 inches of mean annual precipitation, on higher sandier landforms and do not pond water.

Similar sites

R150BY550TX	**Northern Salt Marsh** These areas occur in areas of mean annual precipitation greater than 41 inches and are on low flats closer to the bay with more salt tolerant vegetation.
R150BY652TX	**Southern Salt Marsh** These areas occur in areas of mean annual precipitation less than 41 inches and are on low flats closer to the bay with more salt tolerant vegetation.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Typha* (2) *Spartina patens*

Physiographic features

These nearly level soils are on concave positions in fresh-water swales on barrier flats. These soils are ponded for very long periods in normal years and are subject to occasional flooding by high storm surge from strong tropical storms. Slope ranges from 0 to 1 percent.

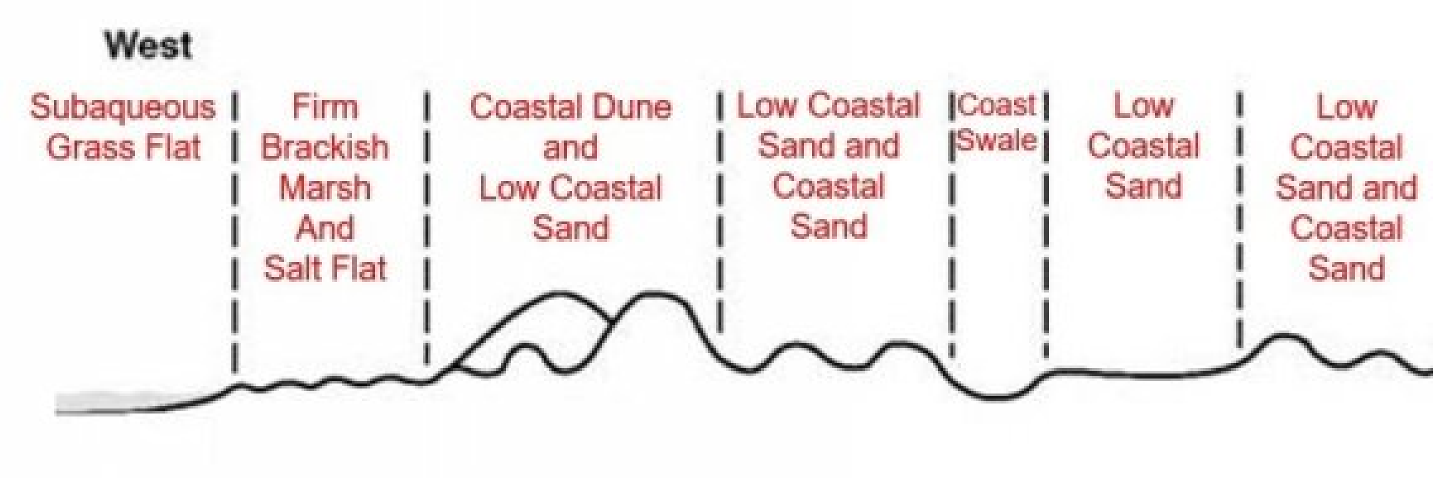


Figure 2.

Table 2. Representative physiographic features

Landforms	(1) Barrier island > Depression
Runoff class	Negligible
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Rare to occasional
Ponding duration	Long (7 to 30 days) to very long (more than 30 days)
Ponding frequency	Occasional to frequent
Elevation	0–5 ft
Slope	0–1%
Ponding depth	0–30 in
Water table depth	0–10 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)	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)	27-34 in
Frost-free period (average)	365 days
Freeze-free period (average)	365 days
Precipitation total (average)	31 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

Influencing water features

This is a wet site receiving water from runoff and seepage from adjacent sites. It has a permanent water table at a depth of 0 to 6 inches throughout the year in most years. Areas, on average, are ponded to a depth of 30 inches for extended periods of time and less than 20 acres in size. However, rarely, some areas have been found to be larger than 20 acres and deeper than 6 feet.

Wetland description

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

Soil features

The site consists of very deep, very poorly drained soils that formed in sandy eolian sediments on barrier islands. These soils are also subject to occasional flooding for brief periods by high storm surge during strong tropical storms. Soils correlated to this site include: Nass and Novillo.

Table 4. Representative soil features

Parent material	(1) Eolian sands–igneous, metamorphic and sedimentary rock
Surface texture	(1) Fine sand (2) Sand
Family particle size	(1) Sandy
Drainage class	Very poorly drained
Permeability class	Very slow
Soil depth	80 in
Available water capacity (0-60in)	2 in
Calcium carbonate equivalent (0-60in)	0%
Electrical conductivity (0-60in)	0–2 mmhos/cm
Sodium adsorption ratio (0-60in)	0–8
Soil reaction (1:1 water) (0-60in)	5.6–7.8
Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

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's environment. The barrier islands are subdivided into habitats based on landform, elevation, and vegetation. The Coastal Swale ecological site lies on the bay side of the foredunes in the barrier flat landscape. This nearly level site is in a concave position in the landscape and occurs as a fresh-water swale. The soils of this site are ponded with fresh water for very long periods of time. The plant communities are dynamic and community composition may vary dramatically with annual rainfall, grazing, and fire. This site is heavily influenced by droughts. Although normally inundated in the lower portions of the site with fresh to slightly brackish water, it may be devoid of standing water during extended dry periods.

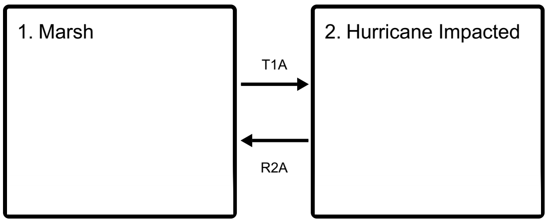
The reference community is unique in that the species may differ slightly depending on the microelevation. The slightly wetter plant community is in the lower reaches and generally has up to 30 inches of water present. This community consists of cattail (Typha spp.) and Olney bulrush (Scirpus olneyi). The slightly drier plant community is higher and composed of bulrush, marshhay cordgrass (*Spartina patens*), gulfdune paspalum (*Paspalum monostachyum*), bushy bluestem (*Andropogon glomeratus*), spikerush (Eleocrus spp.), frog-fruit (*Phyla lanceolata*), and coastal water hyssop (*Bacopa monnieri*).

If the site is grazed by domestic livestock, the slightly higher portions will receive the most pressure. Eventually, it will cause the loss of marshhay cordgrass and gulfdune paspalum. These species will be replaced by increased amounts of spikerush, frog-fruit, coastal saltgrass (*Distichlis spicata*), slimleaf rosette grass (*Dichanthelium linearifolium*), and coastal water hyssop; narrow-leaf iva (*Iva angustifolia*) may also increase significantly. Further heavy grazing will allow annual and perennial forbs such as water hyssop, frog-fruit, and narrow-leaf iva to dominate and cause large patches of bare ground.

The intensity of a hurricane 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

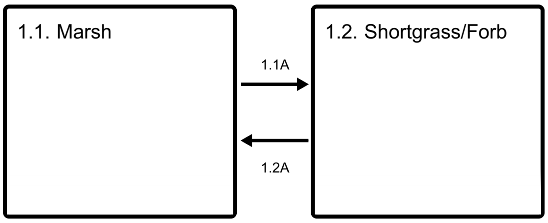
Ecosystem states



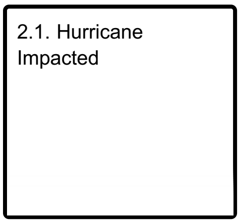
T1A - Loss of vegetative cover

R2A - Natural regeneration over time

State 1 submodel, plant communities



State 2 submodel, plant communities



State 1
Marsh

Dominant plant species

- saltmeadow cordgrass (*Spartina patens*), grass
- cattail (*Typha*), other herbaceous

Community 1.1
Marsh

Figure 9. Community 1.1

The reference plant community dominated by cattail and bulrush in the lowest reaches of the site. On slightly higher microelevations, cattail and bulrush diminish while other perennial, warm-season plants including marshhay cordgrass (*Spartina patens*), gulfdune paspalum (*Paspalum monostachyum*), bushy bluestem (*Andropogon glomeratus*), saltmarsh bulrush (Scirpus robustus), seashore saltgrass (*Distichlis spicata*), Virginia dropseed (*Sporobolus virginicus*), knotroot bristlegrass (*Setaria parviflora*), frogfruit (*Phyla lanceolata*), and coastal water hyssop (*Bacopa monnieri*) are apparent. In the most permanent water sites, two woody species, black willow (*Salix nigra*) and marsh elder (*Iva frutescens*) may occur but the presence of these plants is rare.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1750	2600	3400
Forb	150	250	350
Shrub/Vine	50	75	125
Tree	50	75	125
Total	**2000**	**3000**	**4000**

Figure 11. 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
Shortgrass/Forb

This community occurs on the periphery and is grazing induced. Gulfdune paspalum, marshhay cordgrass, and other midgrasses are replaced by seashore saltgrass, Virginia dropseed, slimleaf rosette grass, and forbs like frogfruit, water hyssop, and narrow-leaf iva. The wetter areas are little affected by grazing because of the unpalatability of cattail and bulrush. Prescribed grazing will restore the reference community. But if further overgrazed, the shortgrasses will disappear and only frogfruit, water hyssop, and other forbs will remain. Bare ground is more evident in this community.

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 severely reduced or absent.

Community 2.1
Hurricane Impacted

The Hurricane Impacted Community will typically be devoid of vegetation following the storm surge. After the surge recedes back into the Gulf of Mexico the most salt-tolerant plants, and those that are rhizomatous, will begin to repopulate. Species such as gulfdune paspalum, seashore saltgrass, and bushy sea-ox-eye will be the pioneer plants that appear first. Following the hurricane event, primary pathways of succession through any one of the plant communities in the reference state will start to take place as recovery begins.

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	**Wetland Plants**			1000–2600	
	chairmaker's bulrush	SCAM6	*Schoenoplectus americanus*	1000–2600	–
	cattail	TYPHA	*Typha*	1000–2600	–
2	**Tall/Midgrasses**			400–600	
	bushy bluestem	ANGL2	*Andropogon glomeratus*	400–600	–
	gulfdune paspalum	PAMO4	*Paspalum monostachyum*	400–600	–
	saltmeadow cordgrass	SPPA	*Spartina patens*	400–600	–
3	**Mid/Shortgrasses**			150–300	
	slimleaf panicgrass	DILI2	*Dichanthelium linearifolium*	150–300	–
	saltgrass	DISP	*Distichlis spicata*	150–300	–
	marsh bristlegrass	SEPA10	*Setaria parviflora*	150–300	–
	seashore dropseed	SPVI3	*Sporobolus virginicus*	150–300	–
4	**Grasslike Plants**			50–100	
	sedge	CAREX	*Carex*	50–100	–
	spikerush	ELEOC	*Eleocharis*	50–100	–
	starrush whitetop	RHCO7	*Rhynchospora colorata*	50–100	–
Forb					
5	**Forbs**			100–200	
	herb of grace	BAMO	*Bacopa monnieri*	100–200	–
	floating marshpennywort	HYRA	*Hydrocotyle ranunculoides*	100–200	–
	narrowleaf marsh elder	IVAN	*Iva angustifolia*	100–200	–
	fogfruit	PHYLA	*Phyla*	100–200	–
	perennial saltmarsh aster	SYTE6	*Symphyotrichum tenuifolium*	100–200	–
Shrub/Vine					
6	**Vine**			25–75	
	Jesuit's bark	IVFR	*Iva frutescens*	25–75	–
Tree					
7	**Tree**			25–75	
	black willow	SANI	*Salix nigra*	25–75	–

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

Because of the concave nature of this site in the landscape, it will receive seepage from surrounding sites such as the Coastal Sand, Low Coastal Sand, and Firm Brackish Marsh. This site is a Palustrine, emergent wetland and in its deepest states is a Lacustrine wetland. As such, it acts as the wetland filter for the barrier island landscape. During wet periods this site is ponded with fresh to slightly brackish water at depths ranging from 2 to 30 inches and in its deepest reaches will have permanent open water.

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. Birdwatching and salt water 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.

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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	05/10/2025
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:

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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:**
