Ecological site R150BY550TX
Northern Salt Marsh

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.

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 Marshes are closed depressions of the inland Coastal Plains exhibiting salt-tolerant vegetation.

Associated sites

R150BY551TX	**Salty Prairie** This site is on a higher landform and not as wet.
R150BY552TX	**Tidal Flat** This site is on a lower landform and is subject to daily tides.
R150BY530TX	**Northern Coastal Sand** This site is in a higher site and are sandy throughout.

Similar sites

R150BY652TX	**Southern Salt Marsh** This site is in a drier precipitation regime.

Table 1. Dominant plant species

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

Physiographic features

The Salt Marsh formed in flood plains and flats on the barrier islands and coastal plains adjacent to the Gulf of Mexico. They are on broad tidal areas in coastal marshes. The landscape is typically very flat and interspersed with small drainages, small depressional areas, and variable sized open water bays. Streams or rivers that flow may cross towards the ocean. The marshlands may extend a few hundred yards or up to several miles from the coast depending on the slope gradient. Due to their location between the ocean and inland, the marshes are influenced by tides, saline substrates, and freshwater inflows. This site was formed in saline clayey coastal sediments. The slope is nearly level with elevation ranging from 0 to 10 feet.

Table 2. Representative physiographic features

Landforms	(1) Delta plain > Flood plain (2) Coastal plain > Marsh
Runoff class	Negligible to high
Flooding duration	Long (7 to 30 days)
Flooding frequency	Occasional to frequent
Ponding duration	Very brief (4 to 48 hours) to very long (more than 30 days)
Ponding frequency	None to occasional
Elevation	0 m
Slope	0 %
Water table depth	0 – 80 cm
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)	260-370 days
Freeze-free period (characteristic range)	370 days
Precipitation total (characteristic range)	1,040-1,250 mm
Frost-free period (actual range)	250-370 days
Freeze-free period (actual range)	370 days
Precipitation total (actual range)	940-1,270 mm
Frost-free period (average)	320 days
Freeze-free period (average)	370 days
Precipitation total (average)	1,120 mm

- (1) ARANSAS WR [USC00410305], Tivoli, TX
- (2) PORT O'CONNOR [USC00417186], Port O Connor, TX
- (3) PALACIOS MUNI AP [USW00012935], Palacios, TX
- (4) MATAGORDA NO 2 [USC00415659], Matagorda, TX
- (5) FREEPORT 2 NW [USC00413340], Freeport, TX
- (6) GALVESTON SCHOLES FLD [USW00012923], Galveston, TX
- (7) GALVESTON [USW00012944], Galveston, TX

Influencing water features

This site has an Aquic soil moisture regime. Gulf storms and high tides flood most areas occasionally or frequently for long periods. Ponding occurs on some areas for very long periods. A permanent water table can be found within 30 inches of the surface during most of the year. Runoff is negligible on depressed sites and high on others due to the high water table. These are hydric soils.

Wetland description

These areas have hydric soils. Onsite investigation needed to determine local conditions.

Soil features

The site consists of very deep, saline, very poorly drained, very slowly permeable soils. Tidal influence and salty substrates produce saline to brackish conditions. However, at any given location, the degree of salinity is a result of the local interaction of tidal influence, freshwater inflows, and substrate salt content. This site has an Aquic soil moisture regime with gleyed colors throughout the profile. Other features include moderate to strong sodicity and neutral to strong alkalinity. Soil correlated to this site include: Placedo, Swan, Velasco, and Veston.

Table 4. Representative soil features

Parent material	(1) Alluvium – igneous, metamorphic and sedimentary rock
Surface texture	(1) Clay (2) Silty clay
Family particle size	(1) Clayey (2) Fine-silty
Drainage class	Poorly drained to very poorly drained
Permeability class	Very slow
Soil depth	200 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-152.4cm)	7.62 – 17.78 cm
Calcium carbonate equivalent (0-152.4cm)	0 – 10 %
Electrical conductivity (0-152.4cm)	10 – 20 mmhos/cm

Sodium adsorption ratio (0-152.4cm)	10 – 70
Soil reaction (1:1 water) (0-152.4cm)	7.9 – 10
Subsurface fragment volume <=3" (63.5-152.4cm)	Not specified

Ecological dynamics

The environment is largely controlled by the Salt Marshes position between the ocean and inland upland sites. The generally flat, featureless plain is influenced by flooding of ocean tides, which vary seasonally and from year-to-year in their extent, duration, depth, and degree of salinity. In opposition to these ocean influences are freshwater inflows which move into the marsh as sheet flow from adjacent areas following precipitation events or result from flood overflow of streams that cross through the marsh from inland areas. Throughout the marsh, slight variations of a few inches in relief can produce noticeable changes in the plant community since minor variations in elevation can locally alter the salinity and water regime.

Within the marsh, many features add heterogeneity to the landscape and increase vegetation variability. Included are many small streams to large rivers that cross the marsh with their associated levees, oxbows, tidal guts, or drains that carry tidal waters inland. Depressional wetlands and small-to-large ridges that resulted from historic differential deposition and erosion within this geomorphologically recent and active surface are present. Interspersed within the vegetated marsh may be open water bays and mudflats that vary in size, depth, and duration of standing water. The interaction of the tidal influence and the freshwater inflows are temporally and spatially variable which contribute to vegetative variation. This results from the local internal variation in elevation, as well as the rise in elevation from the coast inland, which may be subtle and gradual over long distances or can be abrupt and rapid over short distances.

All the variables contribute influences on the degree and rate of change of water and salinity regime moving inland. This correspondingly controls change in plant composition, which may be gradual and continuous when there is a minor elevation gradient or more zonal where it is more abrupt. The variation in salinity fluctuates as the site is further away from the ocean. Typically, saline water (greater than 10 parts per thousand of salt) is found closest to the ocean. Located further inland, they become brackish (3.5 to 10 parts per thousand), then intermediate (0.5 to 3.5 parts per thousand). Eventually, they arrive on the inland border as fresh marsh with less than 0.5 parts per thousand of salt.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	**Tall/midgrasses**			6277-11657	
	common reed	PHAU7	*Phragmites australis*	6277-11208	–
	saltmeadow cordgrass	SPPA	*Spartina patens*	6277-11208	–
	seashore dropseed	SPVI3	*Sporobolus virginicus*	6277-11208	–
2	**Tall/midgrasses**			392-729	
	smooth cordgrass	SPAL	*Spartina alterniflora*	392-673	–
	saltgrass	DISP	*Distichlis spicata*	224-448	–
	longtom	PADE24	*Paspalum denticulatum*	224-448	–
	seashore paspalum	PAVA	*Paspalum vaginatum*	224-448	–
	switchgrass	PAVI2	*Panicum virgatum*	224-448	–

	marsh bristlegrass	SEPA10	*Setaria parviflora*	224-448	–
	gulf cordgrass	SPSP	*Spartina spartinae*	0-224	–
3	**Rushes**			392-729	
	chairmaker's bulrush	SCAM6	*Schoenoplectus americanus*	392-729	–
Forb					
4	**Forbs**			392-729	
	annual marsh elder	IVAN2	*Iva annua*	336-673	–
	bushy seaside tansy	BOFR	*Borrichia frutescens*	336-673	–
	eastern annual saltmarsh aster	SYSU5	*Symphyotrichum subulatum*	336-673	–
	hairypod cowpea	VILU3	*Vigna luteola*	336-673	–
	salt heliotrope	HECU3	*Heliotropium curassavicum*	112-336	–
	sea lavender	LIMON	*Limonium*	112-336	–
	dwarf saltwort	SABI	*Salicornia bigelovii*	112-336	–
	Virginia glasswort	SADE10	*Salicornia depressa*	112-336	–
	turtleweed	BATIS	*Batis*	112-336	–
Shrub/Vine					
5	**Shrubs/Vines**			392-729	
	eastern baccharis	BAHA	*Baccharis halimifolia*	112-673	–
	Carolina desert-thorn	LYCA2	*Lycium carolinianum*	112-673	–
	bigpod sesbania	SEHE8	*Sesbania herbacea*	112-673	–

Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 7. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 8. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

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

In the Salt Marsh Prairie State (1) infiltration into marshy sandy soils is low because the water table is high. This site is a wetland and as such serves as a part of the wetland filtering system that is essential to the Gulf Coast. Because of landscape position, this site receives seepage water from adjacent sites and may be inundated following extensive rains from rainfall and seepage. Runoff and erosion from water are seldom a problem in the Cordgrass Plant State except for ship wake. The hydrology of the Mudflat State (2) functions differently depending on the soil deposited following a hurricane. If it was a sandy textured soil infiltration will be high, however, if the soil had a clay type texture it is expected to have slower infiltration. As vegetation increases, infiltration will increase. The more slope on the site the high the runoff will be and the higher chance of erosion that is likely to occur because of the sand found in the soil.

Recreational uses

The beach area is a popular tourist designation throughout the year. Bird watching and saltwater fishing are other recreational uses.

Inventory data references

Information presented was derived from the Salty Marsh 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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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)	Mike Stellbauer, Zone RMS, NRCS, Bryan, TX
Contact for lead author	
Date	06/08/2004
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

2. **Presence of water flow patterns:** **At large scales, some drainage do occur.**

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

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** **Less than 5 percent bare ground randomly distributed throughout.**

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

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

7. **Amount of litter movement (describe size and distance expected to travel):** **Small to medium-sized litter can be expected to move short to long distances depending on the degree and extent of flooding.**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** **Soil surface is resistant to erosion. Stability class ranges from 4 to 5 on the surface.**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface structure is 60 inches thick of dark gray to very dark gray clay or silty clay of moderate fine subangular blocky structure. SOM is 1 to 2 percent.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** This tallgrass marsh site along with adequate litter and little bare ground provides for maximum infiltration and little runoff under normal rainfall events.

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

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

    Dominant: Warm-season tallgrasses/grass-likes

    Sub-dominant: Forbs

    Other: Warm-season midgrasses Shrubs Warm-season annual grasses Warm-season annual forbs

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Grasses due to their growth habit will exhibit some mortality and decadence, though very slight.

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14. **Average percent litter cover (%) and depth (in):** Litter is primarily herbaceous.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 7,000 pounds per acre for below average moisture years to 13,000 pounds per acre for above average moisture years.

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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:** Chinese tallow and salt cedar.

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17. **Perennial plant reproductive capability:** Perennial plants should be capable of reproduction, except for periods of prolonged drought conditions, heavy natural herbivory, hurricanes, and intense wildfires.
