USDA Natural Resources Conservation Service

# Ecological site R151XY012LA
# Saline Firm Marsh 55-64

Last updated: 8/24/2021
Accessed: 05/12/2025

## 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.

## MLRA notes

Major Land Resource Area (MLRA): 151X–Gulf Coast Marsh

Major land resource area (MLRA)151, Gulf Coast Marsh, is in Louisiana (95 percent), Texas (4 percent), and Mississippi (1 percent). It makes up about 8,495 square miles (22,015 square kilometers). The towns of Gretna, Chalmette, and Marrero, Louisiana, and the city of New Orleans, Louisiana, are in the eastern part of this MLRA. The town of Port Arthur, Texas, is in the western part. Interstate 10 and U.S. Highway 90 cross the area. The New Orleans Naval Air Station is in this MLRA. Fort Jackson, overlooking the mouth of the Mississippi River, and the Jean Lafitte National Historic Park and Preserve are in the MLRA. A number of national wildlife refuges and State parks occur throughout this area. MLRA 151 is a very complex ecosystem with active deltaic development and subsidence with extreme anthropogenic impact by man with construction of flood protection levees and channelization occurring on the eastern portion of the MLRA. The Western portion of the MLRA is more stable in that portions of the landscape is protected naturally by the Chenier's, although there is Anthropogenic affects of the interior due to channelization for navigation.

## Classification relationships

Major Land Resource Area (MLRA) and Land Resource Unit (LRU) (USDA-Natural Resources Conservation Service, 2006)
The Natural Communities of Louisiana - (Louisiana Natural Heritage Program - Louisiana Department of Wildlife and Fisheries)

## Ecological site concept

These areas are on low Gulf coastal saline marshes at elevations of 1 foot or less. Slopes range from 0 to 0.2 percent. The soils formed in clayey alluvium at or near sea level and are firm enough to support grazing by large herbivours. These areas flood very frequently and frequently with salt water during high tides. This plant community is dominated by marshhay cordgrass, smooth cordgrass, gulf cordgrass, bushy sea-oxeye, seashore saltgrass, spiny aster, shoregrass, sedges, and rushes. Average depth of water at high tide ranges from 2 to 12 inches and water salinity varies from 12 to 50 ppt, but may become fresher during periods of high rainfall.

## Associated sites

| | |
|---|---|
| R151XY002LA | **Saline Marsh 55-64 PZ**<br>Saline Marsh is more Fluid than the Saline Firm Marsh Site, similar plant communities. |
| R151XY010LA | **Sandy Chenier 55-64 PZ**<br>The Sandy Chenier Site is generally the next step above the Saline Firm Marsh Site. |
| R151XY011LA | **Saline Sandy Ridge 55-64 PZ**<br>The Saline Sandy Ridge Site is generally the next step above the Saline Firm Marsh Site. |

| | |
|---|---|
| R151XY677TX | **Saline Fluid Marsh 42+ PZ**<br>Saline Fluid Marsh is more Fluid than the Saline Firm Marsh Site, similar plant communities. |

## Similar sites

| | |
|---|---|
| R151XY006LA | **Clayey Chenier Brackish Marsh 55-64 PZ**<br>The Clayey Chenier Brackish Marsh Site is similar in landscape position but the salinity range of the Saline Firm Site is higher, therefore the species composition and production will be less. |
| R151XY005LA | **Brackish Firm Mineral Marsh 55-64 PZ**<br>The Brackish Firm Marsh Site is similar in landscape position but the salinity range of the Saline Firm Site is higher, therefore the species composition and production will be less. |

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | Not specified |
| Shrub | Not specified |
| Herbaceous | Not specified |

## Physiographic features

These areas are on low Gulf coastal saline marshes at elevations of 1 foot or less. Slopes range from 0 to 0.2 percent. The soils formed in clayey alluvium. Theses are trafficable by large herbivores. These areas flood very frequently and frequently with salt water during high tides.

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Marsh<br>(2) Delta plain<br>(3) Salt marsh |
| Flooding duration | Very long (more than 30 days) |
| Flooding frequency | Frequent to very frequent |
| Ponding duration | Very long (more than 30 days) |
| Ponding frequency | Frequent |
| Elevation | 0–2 ft |
| Slope | 0% |
| Ponding depth | 0–6 in |
| Water table depth | 0–6 in |
| Aspect | Aspect is not a significant factor |

## Climatic features

The average annual precipitation is 60 to 65 inches. About 70 percent of the precipitation occurs during the growing season. Rainfall typically occurs as post-frontal precipitation in the winter and heat-convection showers and thunderstorms in the spring and summer. In addition, tropical storms can bring large amounts of rainfall. The freeze-free period averages 325 days and ranges from 290 to 365 days, increasing in length from north to south.

**Table 3. Representative climatic features**

| | |
|---|---|
| Frost-free period (average) | 278 days |
| Freeze-free period (average) | 318 days |
| Precipitation total (average) | 65 in |

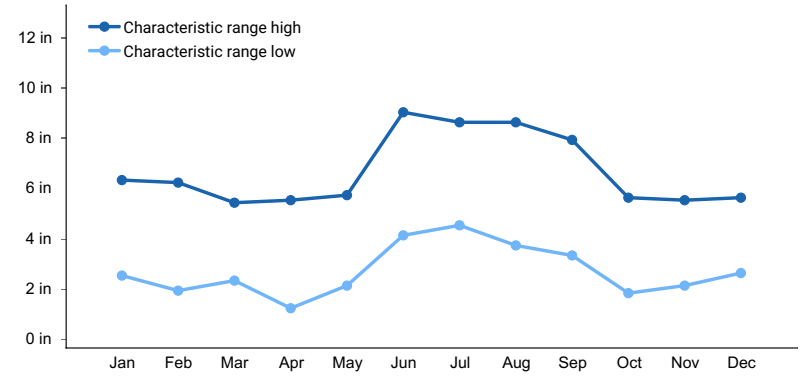



**Figure 1. Monthly precipitation range**

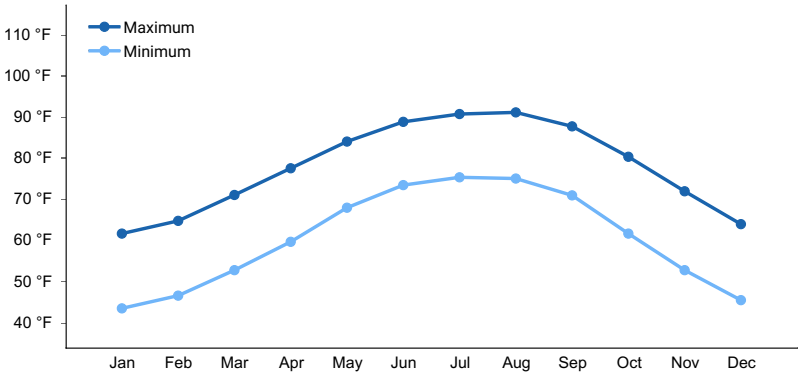



**Figure 2. Monthly average minimum and maximum temperature**

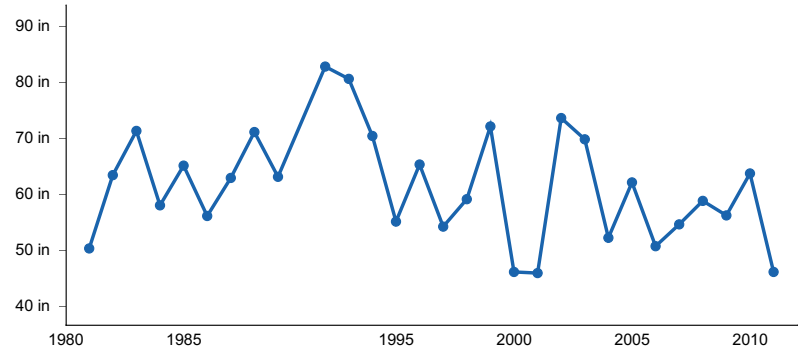



**Figure 3. Annual precipitation pattern**

## Climate stations used

- (1) TERRYTOWN 3S [USC00168941], New Orleans, LA
- (2) HACKBERRY 8 SSW [USC00163979], Cameron, LA
- (3) MORGAN CITY [USC00166394], Berwick, LA
- (4) NEW IBERIA ACADIANA AP [USC00166657], New Iberia, LA
- (5) ROCKEFELLER WL REFUGE [USC00167932], Grand Chenier, LA

## Influencing water features

Marsh ecosystems are characterized by unique vegetative and hydrologic factors. Salinity, depth of water, and duration of inundation determine the kinds of plants that can persist in marsh ecosystems. Several factors may affect salinity and/or water depth as well as duration of inundation:

Natural Factors:
•Upstream Hydrology – the duration of flooding is influenced by the volume of water discharged upstream (runoff) in the hydrologic unit. This may be a permanent or transient feature of the water regime.

•Tidal Exchange – all marsh ecosystems are affected to some degree by tidal exchange. It is most evident in saline marshes because the presence or absence of water is obvious. At low tide, salts tend to crystallize on the soil surface where tidal flux is not ponded.

•Salinity – the amount of salt per unit volume of water is a limiting factor in determining which plants that can persist in a marsh ecosystem. Relatively few plants can tolerate prolonged exposure or inundation to waters with high salt concentrations.

Human Induced Factors
•Navigation Enhancement – canals and realignment of natural water courses may have catastrophic effects on marsh ecosystems. These features can inject salt water into areas that previously had lower levels of salinity, and/or they may prolong salt water inundation. Navigation features are frequently deeper than previous natural hydrologic conduits. Salt water is heavier than fresh water and creates a salt water wedge below the fresher surface water in a canal or other navigation feature. In marshes near the Gulf of Mexico or adjacent natural water bodies, navigation features can alter the duration and salinity of tidal flux.

•Salt Water Sills or Barriers – these structural measures limit tidal flow. They are usually in a navigable stream or canal and are designed to limit the amount and/or duration of saline inundation.

•Water Control Structures – these structures are designed to maintain optimum water depth in a hydrologic or management unit. They may be used to manipulate water depth for wildlife, moderate salinity levels, and enhance vegetation management.

## Soil features

Soils on this site include the Placedo series. The Placedo series consists of very deep, very poorly drained, very slowly permeable, ponded soils that have formed in saline, alkaline, clayey alluvium near sea level. These nearly level flood plain soils have slopes of 0 to 1 percent.

## Ecological dynamics

The Saline Firm Marsh ecological site is a broad, nearly level coastal flat that are subject to tidal activity. This is a dynamic ecosystem which changes constantly and sometimes rapidly as a result of natural environmental conditions and climatic events. An overriding site requirement is accessibility of tidal exchange by salt water. Characteristically, saline marshes occur at or near sea level, usually between mean high tide and low tide.

The Saline Firm Marsh ecological site is typically a wet grassland inhabited by salt-tolerant species. The vegetation consists almost entirely of grasses and grass-like plants. Portions of the site may have dense vegetation, but there are frequently areas where plant density is sparse. The micro-relief on saline sites may restrict plant density. Areas which have a shallow depth of water at high tide frequently have a crust of salt crystals at low tide. This concentration of salt restricts the number of species that can persist on this site (e.g. saltworts and glassworts). Likewise, areas which remain wet at low tide frequently have more dense stands of vegetation adapted to higher moisture regimes (e.g. seashore saltgrass). Smooth cordgrass and black needlerush are the dominant plants on the site. Both species need alternating water regimes (i.e. tidal activity) for optimum production and stand persistence. This site has the least plant species diversity of all the marsh sites due to the high concentrations of salt. Site transitions to other vegetative communities can occur with prolonged fresher influences and adequate seed source.

The marsh serves as a natural filtration system for the adjacent coastal waters. It captures sediments, waste, pollutants, and nutrients deposited from agricultural, urban, and industrial areas above the marsh. As upstream waters move through the marsh ecosystem, the continuous filtering action releases cleaner water into the Gulf of Mexico. Marsh sites function as nitrogen and phosphorous sinks, resulting in the improvement in the quality of water that passes through the site. It can serve as a buffer to modify the effects of storms. Marsh vegetation also stabilizes the shoreline and reduces erosion caused by tides, wave action, storms, and flooding.

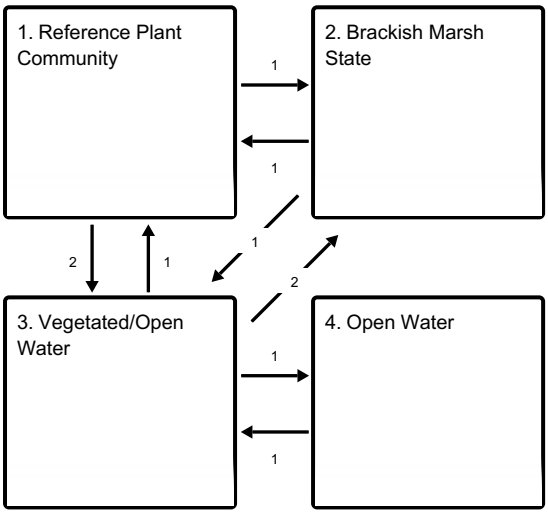
The proximity to the Gulf of Mexico makes this site susceptible to degradation by several natural and human induced actions. Hurricanes and tropical storms can cause entire plant communities to be destroyed in a very short period of time. Constant wind action and low topographic relief make shoreline erosion a constant threat. Those areas with a long fetch of open water are especially vulnerable to wave action.

Subsidence is the process of the soil surface sinking to a lower level. It may occur naturally or be influenced by human activities such as pumping water from wells or creation of navigation channels. As subsidence progresses, vegetation is submerged and may eventually weaken and die. Deepening of existing water bodies and/or dredging new access to canals can cause changes in water depth and increase salinity levels, which may affect marsh vegetation. The loss of anchoring vegetation and the subsequent subaqueous erosion of surface sediment and organic detritus as the result of current or wave action, may lead to permanent loss of vegetation and eventually result in regression to an open water state.
Grazing by cattle, furbearers, and geese can adversely affect vegetation on this site if not properly managed. Cattle grazing can be managed with proper stocking rates and manipulation of the time, frequency, intensity, and duration of grazing. Wildlife grazing pressure presents a management challenge because it is not possible to consistently control the numbers and movements of most wildlife species.

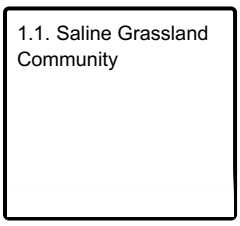
Fire is primary tool for management of saline marsh ecosystems. In order for fire to play a beneficial role in marsh management, burning must be done in a prescribed manner. Burning should be done when there is at least six (6) inches of water covering the marsh. This cushion of water protects the vegetative reproduction tissues of marsh plants. Fire is an excellent tool for removal of old growth to encourage vigorous high quality growth. Fire is effectively used to enhance wildlife habitat and aid in cattle management. A fresh burn will attract cattle, deer, furbearers, and geese to the lush new growth. Burns should be sufficient in size to prevent destructive grazing (eatouts) by furbearers and geese. Timing of Prescribed fire to reduce impacts by tropical storms or Hurricanes must be part of the planning process, untimely burns and subsequent tidal or storm action can degrade the site.

## State and transition model

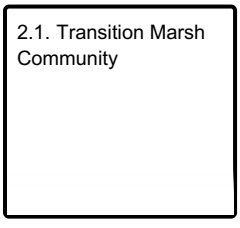
**Ecosystem states**



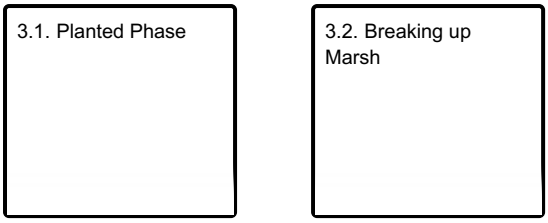

**State 1 submodel, plant communities**



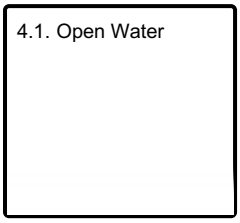

**State 2 submodel, plant communities**



**State 3 submodel, plant communities**




**State 4 submodel, plant communities**




## State 1
## Reference Plant Community

The plant community, which consists primarily of seashore saltgrass along with glassworts and saltworts, seashore dropseed, seashore paspalum, and bushy sea-oxeye is found in the upper reaches of the Saline Mineral Marsh. At MHT it is in the intertidal zone. This plant community has a relatively short period of inundation as it experiences the briefest period of tidal exchange. Micro-relief and depth of water are the determining factors in where these species occur. Seashore saltgrass is usually dominant in areas with lower relief and along the trailing edges of tidal flow. Seashore saltgrass can withstand salinities of 13 ppt with spikes up to 20 ppt. Glassworts and saltworts are found on areas of higher micro-relief. These areas are the first to be free of water as the tides recede. As the site begins to dry, salts are wicked to the soil surface. Saltworts can withstand salinities of 15 ppt with spikes up to 30 ppt. Glassworts can withstand salinities of 24 ppt with spikes up to 34 ppt. A number of forbs may occur on the edge of the MHT zone in this plant community. Bushy sea-oxeye, which is the dominant forb, can withstand salinities of 12 ppt with spikes up to 20 ppt. Seashore paspalum also is present along the trailing edge of tidal exchange.

### Community 1.1
### Saline Grassland Community

## State 2
## Brackish Marsh State

Marsh plants exist in a delicate balance with water depth and salinity levels. When this balance is altered, the plant community adapts to the new regime. The mixed grass plant community is dominated by Species best suited to Brackish conditions.

### Community 2.1
### Transition Marsh Community

Brackish Species Composition

## State 3
## Vegetated/Open Water

Marsh plants exist in a delicate balance with water depth and salinity levels. When this balance is altered, the plant community adapts to the new regime. The Vegetated/Open Water community is dominated by Species best suited to conditions where the system is breaking up or where open areas have been planted as part of a restoration effort. This phase requires knowledge of the landscape to determine whether it has been planted or is breaking up.

### Community 3.1
### Planted Phase

Smooth Cordgrass plantings can be an effective way to capture available nutrients in the system and re-establish emergent marsh. Plantings can be linear or random depending on the water depth and configuration of the area and the desired community composition that is wanted.

### Community 3.2
### Breaking up Marsh

When salinity levels or water depths increase beyond the tolerances of the vegetative species they reduce in number and open water appears.

### State 4
### Open Water

Marsh plants exist in a delicate balance with water depth and salinity levels. When this balance is altered, the plant community adapts to the new regime. The Open Water community is where the system is breaking up or where open water ponds exist within the landscape. This phase requires knowledge of the landscape to determine whether it is breaking up. The open water areas within a planning unit are beneficial for wildlife, but require monitoring to insure that they are not enlarging due to erosion of the shorelines which can be a symptom of a marsh unit that it deteriorating.

### Community 4.1
### Open Water

There may be few individual plants occurring in the shallowest water areas.

### Transition 1
### State 1 to 2

Salinity levels decrease, species numbers increase (more diversity), Brackish Species increase.

### Transition 2
### State 1 to 3

Increased water Depth or Salinity, reduces number of plants in an area. Open water area increases.

### Restoration pathway 1
### State 2 to 1

Salinity Levels Increase, Fewer species, and More saline specific species.

### Transition 1
### State 2 to 3

Increased water Depth or Salinity, reduces number of plants in an area. Open water area increases.

### Restoration pathway 1
### State 3 to 1

Reduced water Depth or Salinity, plants increase or planted and colonizing site. Open water area decrease.

### Restoration pathway 2
### State 3 to 2

Reduced water Depth or Salinity, plants increase or planted and colonizing site. Open water area decrease.

### Transition 1

### State 3 to 4

Increased water Depth or Salinity, reduces number of plants in an area. Open water area increases.

### Restoration pathway 1
### State 4 to 3

Reduced water Depth or Salinity, plants increase or planted and colonizing site. Open water area decrease

### Additional community tables

### Type locality

| Location 1: Iberia County, LA | |
|---|---|
| General legal description | Marsh Island Wildlife Refuge, interior of Island adjacent to Beach along Gulf of Mexico. |

### Other references

NRCS Soil Survey for Iberia Parish LA.
NRCS NASIS soils database.
Fluid Saline Marsh 42+" PZ ESD (TX).
Saline Marsh Ecological Site Description (LA).
Brackish Firm Ecological Site Description (LA).

### Contributors

D. Charles Stemmans II

### Approval

Curtis Talbot, 8/24/2021

### 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 | 05/12/2025 |
| Approved by | Curtis Talbot |
| 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):**

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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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