

MARSH HAMMOCK

Concept: Marsh Hammocks are small evergreen forest or woodland patches that occur in a matrix of salt or brackish marshes, on either the sound side of barrier islands or on the mainland. They resemble depauperate Maritime Evergreen Forests but usually contain some marsh species, are more subject to edge effects and storm water intrusion and are less influenced by salt spray. They may occur farther inland than the other maritime communities, though they also overlap their ranges. They may range in structure from forests to woodlands or savannas.

Distinguishing Features: Marsh Hammocks are most easily distinguished from Maritime Evergreen Forest and Coastal Fringe Evergreen Forest by occurring in small patches adjacent to marshes. The vegetational distinction of these communities can be subtle. Marsh Hammocks may be dominated by any of the same tree species, though *Quercus virginiana*, *Pinus taeda*, or *Juniperus silicicola* are much more likely than *Quercus hemispherica*. The understory and shrub layers of Marsh Hammocks generally have fewer species. Most of the species of the maritime forests may be present, but *Quercus hemisphaerica*, *Cornus florida*, *Carpinus caroliniana*, and *Prunus caroliniana* are unlikely. Also present are some marsh edge species such as *Baccharis halimifolia* and *Borrchia frutescens*, as well as *Morella cerifera*. Herbs may be sparse but usually include some species shared with the adjacent marsh or marsh edge, such as *Juncus roemerianus*, *Cladium jamaicense*, *Panicum virgatum*, or *Sporobolus pumilus* (*Spartina patens*),

Synonyms: Maritime Evergreen Forest. *Juniperus virginiana* var. *silicicola* - (*Quercus virginiana*, *Sabal palmetto*) Forest (CEGL007813).

Ecological Systems: Atlantic Coastal Plain Embayed Region Tidal Salt and Brackish Marsh (CES203.260). Southern Atlantic Coastal Plain Salt and Brackish Tidal Marsh (CES203.270).

Sites: Marsh Hammocks occur on small elevated areas within or on the edges of tidal marshes. Most examples are associated with mainland marshes, but a few are recognized on barrier islands. Elevations are generally only a few feet above the marsh.

Soils: Soils often are sandy Entisols, but there is little consistency in how the soils in Marsh Hammocks are treated in soil mapping, when patches are large enough to be distinguished at all. Examples on barrier islands may be mapped as Duckston, Newhand, or Fripp (Typic Quartzipsamments), or Corolla (Aquic Quartzipsamment). Mainland examples are mapped a wide variety of soils, including Humaquepts and even Ultisols.

Hydrology: Sites appear to range from well drained to marginally wet. The small mounds and ridges on which these communities usually occur produce strong gradients in wetness from the edges to the center. The water table is seldom far below the surface, but the water may be brackish; the patches probably are too small to form a lens of fresh groundwater. Mass effects and clonal spread allow marsh plants to occur even in drier portions, making it difficult to tell how wet or salty an area is, though the presence of less salt-tolerant plants makes it clear that the environment is different from that of the adjacent marsh. Marsh Hammocks are subject to brief flooding by salt or brackish water during major storms but are not flooded or saturated by normal tides.

Vegetation: Marsh Hammocks can range in structure from closed forest canopy to open woodland or even savanna. The canopy may be tall but usually is short. As in all woody maritime communities, the structure may depend on recent history of natural disturbances. Both the limited CVS plot data and qualitative descriptions indicate substantial variation in vegetation. *Quercus virginiana* is constant, usually dominating or codominating the canopy, though occasionally occurring as an understory beneath *Pinus taeda*. *Juniperus silicicola* codominates some examples. *Quercus hemispherica* is only rarely present. CVS plot data included no other understory or canopy species, but other observations have noted a few more inland species, such as *Quercus nigra*, *Carya glabra*, or *Liquidambar styraciflua*, and understory species such as *Persea palustris*, *Ilex opaca*, *Diospyros virginiana*, *Magnolia virginiana*, and some unexpected species such as *Quercus margarettae* and *Quercus geminata*. All have low constancy. The shrub layer may be sparse or dense throughout, or may be dense only near the edges. *Ilex vomitoria*, *Morella cerifera*, *Baccharis halimifolia*, *Iva frutescens*, and *Borrchia frutescens* all have high constancy. Vines may be sparse or dense, though species vary. *Toxicodendron radicans* and several species of *Smilax* are most constant, but a wide variety of species occur with low frequency. The herb layer may be dense or sparse. Species typical of marshes or marsh edges are almost always present in significant amounts. *Sporobolus pumilus* is most constant and sometimes dense. *Distichlis spicata*, *Juncus roemerianus*, and *Fimbristylis Castanea* are in at least 50% of both plots and other occurrences. Less frequent species include *Panicum virgatum*, *Ipomoea sagittata*, *Solidago sempervirens*, *Elymus glabriflorus*, and *Limonium carolinianum*.

Range and Abundance: Ranked G3? Marsh Hammocks range along the entire coast of North Carolina, but recorded examples are few and very widely scattered. A few examples are miles inland along the sounds, but most are within a few miles of the mainland coast. Examples often were not reported in earlier site surveys, and it is likely that this community is more abundant than recorded examples suggest. The equivalent association ranges southward to Georgia.

Associations and Patterns: Marsh Hammocks occur as small patches, from a few acres to less than one acre. Most are completely or largely surrounded by Salt Marsh or Brackish Marsh communities, though they may border open water. They may potentially border upland communities on one side.

Variation: Examples are extremely variable, but patterns are not well enough known to recognize variants. A potential distinction between northern and southern examples, or between more inland and more coastal examples, needs investigation.

Dynamics: Like other maritime communities, Marsh Hammocks are exposed to natural disturbances more than inland communities. The importance of the same evergreen salt-tolerant tree and shrub species suggests a similar environment of moderate climate but exposure to stresses related to salt. Compared to the similar Maritime Evergreen Forest, they are farther from the beach and from chronic salt spray but are subject to storm winds and potentially exposed to salt spray during storms. They also are susceptible to flooding by brackish or salt water during storm surges.

The potential role of fire in Marsh Hammocks is unknown. Marsh vegetation can carry fire, and many examples occur in marshes connected to the mainland, where fires might spread from

ignitions anywhere in a large area. However, vegetation includes few species known to be tolerant of fire, suggesting that the community is not shaped by it.

Cleary, et al. (1979) described the origin of marsh island landforms in southeastern North Carolina as being connected to inlets in the barrier islands, with storm waves pushing sand from flood tidal deltas over marshes to produce higher land. They suggested that ongoing deposition is needed to maintain the island, and that islands will sink and disappear into the marsh if the inlet migrates away. Different dynamics may prevail in other parts of the coast, however. Marsh Hammocks along more inland estuaries presumably have a different origin.

Comments: This community needs much more study, as it is less well understood than most. In the 3rd approximation, examples were regarded as small and depauperate Maritime Evergreen Forest occurrences. A similar assumption may have led to them being overlooked in many site-specific descriptions. Differences in vegetation alone are relatively small, since ecotonal or successional Maritime Evergreen Forests can share some of the features otherwise distinguishing Marsh Hammocks. Present interpretation is that the distinctive dynamics and landscape relations indicate a community different enough to be of scientific and conservation interest.

The fit of North Carolina's Marsh Hammocks to the synonymized NVC association is imperfect. The association was described from farther south, and the more southerly examples often have *Sabal palmetto* and other species not shared in North Carolina. The NVC description emphasizes dominance by *Juniperus siliciola*, which is present but rarely dominant in North Carolina's examples. In addition, communities that are not marsh hammocks, such as vegetation along Florida spring run creeks, has also been attributed to the association. The dynamics of such a community would be quite different, and further study is likely to document floristic differences.

Sabal palmetto - (*Juniperus virginiana* var. *silicicola*) Woodland (CEGL003526) is another marsh hammock association defined for South Carolina to Florida; it has been suggested to occur in North Carolina but has not been found. It is classified as a woodland rather than a forest. However, given the natural variability and heterogeneity in vegetation structure in this frequently disturbed community, it does not appear that such a distinction based on narrow differences in structure is appropriate.

Rare species:

References:

Cleary, W.J., P. E. Hosier, and G.R. Wells. 1979. Genesis and significance of marsh islands within southeastern North Carolina lagoons. *Journal of Sedimentary Petrology* 49: 703-710.