



Everglades National Park (Miami-Dade County)

Photo by Amy Jenkins

Marl Prairie

Description: Marl prairie is a sparsely vegetated (20-40% cover), graminoid-dominated community found on marl substrates in South Florida. It is seasonally inundated (two to four months) to a shallow depth averaging about eight inches. It occupies large areas at intermediate elevations between marshes or dome and strand swamps with longer hydroperiod of six to twelve months, and pinelands or oak-palm hammocks that are seldom flooded (USFWS 1999). In contrast to the longer hydroperiod marshes, with which it has sometimes been confused, marl prairie is a diverse community which may contain over 100 species, whereas most marsh types have fewer than 20 species (USFWS 1999). Most of the many species in marl prairie contribute little cover and over 90 percent of the cover is contributed by only two or three dominant species in any given area (Olmsted et al. 1980a). Dominants may include one or more of the following: Gulf hairawn muhly (*Muhlenbergia sericea*), spreading beaksedge (*Rhynchospora divergens*), Florida little bluestem (*Schizachyrium rhizomatum*), black bogrush (*Schoenus nigricans*), Elliott's lovegrass (*Eragrostis elliottii*), sand cordgrass (*Spartina bakeri*), and a short form of sawgrass (*Cladium jamaicense*; Porter, Jr. 1967; Gunderson and Loope 1982). (Taxonomy of *Schizachyrium* and *Muhlenbergia* follows treatments in Flora of North America [2007]). Other characteristic species include southern beaksedge (*Rhynchospora microcarpa*), bluejoint panicum (*Panicum tenerum*), Gulf dune paspalum (*Paspalum monostachyum*), rosy camphorweed (*Pluchea rosea*), starrush whitetop (*Rhynchospora colorata*), alligatorlily (*Hymenocallis palmeri*), arrowfeather threeawn

(*Aristida purpurascens*), and narrowleaf yellowtops (*Flaveria linearis*; Porter, Jr. 1967; Gunderson and Loope 1982).

In the Big Cypress region, widely scattered, stunted pond cypress (*Taxodium ascendens*) is often present in the marl prairie. These trees, sometimes called dwarf, scrub, or hat rack cypress, can have huge buttresses, gnarled bonsai-like crowns, and may be hundreds of years old (Flohrschutz 1978). They are usually less than 12 feet tall with a diameter at breast height of less than 4 inches, and a canopy cover of 33 percent or less (Wade et al. 1980).

Soils are seasonally flooded marls or sandy marls, 2-24 inches deep, underlain by limestone (Craighead 1971). Marls are fine white calcareous muds formed from calcite precipitated by a mixture of green algae, blue-green algae, and diatoms, known as periphyton. These soils are highly alkaline and impermeable, sealing off the underlying limestone and causing water to pond during the wet season. In the rocky glades region of the southeastern Everglades marl prairies occur on exposed limestone bedrock where limestone pinnacles are exposed through the marl soils forming a micro-karst topography (USFWS 1999).

Characteristic Set of Species: purple muhly, sawgrass (stunted), spreading beaksedge, black bogrush, Florida little bluestem

Rare Species: Two rare South Florida endemic species are dependent on marl prairie as their primary habitat: few-flowered fingergrass (*Digitaria pauciflora*) and Cape Sable Seaside Sparrow (*Ammodramus maritimus mirabilis*). Few-flowered fingergrass is a perennial bunchgrass that grows in the ecotone between marl prairie and pine rockland. It is known from only two locations, a large population on Long Pine Key in Everglades National Park and a small, recently discovered population in Big Cypress National Preserve. The Cape Sable Seaside Sparrow is currently found only in marl prairie in the southeastern portion of Big Cypress National Preserve and in the vicinity of Taylor Slough in Everglades National Park.

Other rare plant species endemic to South Florida found in marl prairies include meadow jointvetch (*Aeschynomene pratensis*), narrow-leaved Carolina scalystem (*Elytraria caroliniensis* var. *angustifolia*), and Carter's large-flowered flax (*Linum carteri* var. *smallii*). The dwarf cypress may harbor rare epiphytes, most notably the cowhorn orchid (*Cyrtopodium punctatum*).

Other rare animal species that use marl prairie are southern mink (southern Florida population; *Mustela vison mink*), Florida panther (*Puma concolor coryi*), and the short-tailed hawk (*Buteo brachyurus*), as well as a variety of wading birds that use the shallowly flooded habitat for fishing, including great egret (*Ardea alba*), little blue heron (*Egretta caerulea*), snowy egret (*E. thula*), tricolored heron (*Egretta tricolor*), white ibis (*Eudocimus albus*), and wood stork (*Mycteria americana*). Two West Indian damselflies are found in Florida only in the dwarf cypress in Big Cypress National Preserve, the tail-light damsel (*Chrysobasis lucifer*) and the blue strapped spreadwing (*Lestes tenuatus*).

Range: Within the United States marl prairies are limited to extreme South Florida. Marl prairies with scattered dwarf cypress cover large areas of Big Cypress National

Preserve in Collier and Monroe counties. In the Everglades region marl prairie forms the border between the Miami Rock Ridge and the lower slough and glades marsh and occurs in the narrow finger glades on Long Pine Key.

Natural Processes: Marl prairie depends on a short hydroperiod of two to four months. Longer hydroperiods favor the development of peat and the dominance of sawgrass; shorter hydroperiods permit the invasion of woody species.

Marl prairie normally dries out during the winter and is subject to fires at the end of the dry season; the most acres naturally burn in May (Gunderson and Snyder 1994). Fires at this time (in contrast to dormant season fires) stimulate flowering of the dominant grasses (Main and Barry 2002). The herbaceous species recover rapidly from fire and biomass reaches pre-fire levels at the end of two years. For the first two years after fire this community will burn only patchily, if at all (Herndon and Taylor 1986). Reasons for the presence of dwarf cypress in some marl prairies and not others are unknown (Olmsted and Loope 1984). Wade et al. (1980) estimated dwarf cypress stands in marl prairie burn about once a decade due to low fire-carrying capacity of their sparse understory.

Werner (1975) found that the Cape Sable seaside sparrow ceased nesting in areas of marl prairie unburned for six or more years, suggesting that the natural fire frequency was less than six years and more than one year, since the community will generally not carry a fire within one year post burn (Herndon and Taylor 1986). Marl prairies with sparse cover (generally on shallower soils) may remain suitable for nesting sparrows for longer intervals between fires, up to eight to ten years (Olmsted et al. 1980b; Taylor 1983).

Community Variations: The principal variation in marl prairies is the presence or absence of dwarf cypress.

Associated Communities: Marl prairie is distinguished from calcareous wet prairie, both of which may have Gulf hairawn muhly as the dominant grass, by the presence of calcareous marl, rather than sandy, soil, regular seasonal flooding for several months, and the presence of Gulf dune paspalum and sawgrass. Marl prairie is distinguished from acidic wet prairie by the absence of a sandy substrate and the absence of wiregrass (*Aristida stricta* var. *beyrichiana*; Orzell and Bridges 2006). Marl prairie is distinguished from glades marsh and slough by its shorter hydroperiod, lack of peat substrate, and higher plant species diversity. Glades marshes near marl prairies may include flats dominated by Gulf Coast spikerush (*Eleocharis cellulosa*) or Tracy's beaksedge (*Rhynchospora tracyi*). Glades marshes on peat substrates with longer hydroperiods are usually dominated by a single species including maidencane (*Panicum hemitomon*), tall sawgrass, cattails (*Typha* spp.), bulltongue arrowhead (*Sagittaria lancifolia*), pickerelweed (*Pontederia cordata*), or alligatorflag (*Thalia geniculata*; USFWS 1999).

Management Considerations: Several factors have combined to reduce the area of marl prairie outside Everglades National Park and Big Cypress National Preserve. Hydrological modifications have produced an increase in sawgrass marsh at the expense of marl prairie, drainage and lack of fire have allowed invasion of exotic plants, and rock plowing for agriculture on the eastern edge of Everglades National Park has permanently changed the physical environment that formerly supported it (Hilsenbeck et al. 1979).

Prescribed fire is needed in marl prairie to prevent the buildup of litter to the point where it lowers the nesting frequency of the Cape Sable seaside sparrow and to control shrub invasion by native species from the adjacent pine rockland, as well as by woody invasives, such as Brazilian pepper (*Schinus terebinthifolius*), Australian pine (*Casuarina equisetifolia*), and melaleuca (*Melaleuca quinquenervia*; Hilsenbeck et al. 1979; Gunderson and Snyder 1994). Shrubs can also displace rare plant species, such as few-flowered fingergrass (Bradley and Gann 1999).

Patchy fires are preferable to large scale fires in the Cape Sable Seaside Sparrow habitat, since up to six years after a fire may be needed before the prairie vegetation is again suitable for nesting (Taylor 1983). Since it nests on or within 20 centimeters of the ground from February to July, the breeding success of the Cape Sable seaside sparrow is also sensitive to flooding at the beginning of the wet season. Care should be taken in timing water releases to allow nesting to be completed; timing of water releases also needs to be coordinated with prescribed burns since flooding too soon after a fire can kill resprouting grasses (USFWS 1999). Due to their soft soils during the wet season marl prairies are also subject to scarring from off-road vehicle tracks.

Exemplary Sites: Big Cypress National Preserve (Collier and Monroe counties), Everglades National Park (Miami-Dade County)

Global and State Rank: G3/S3

Crosswalk and Synonyms:

Kuchler	91/Cypress Savanna
Davis	14/Region of open Scrub Cypress 17/Wet to Dry Prairie-Marshes on Marl and Rockland
SCS	16/Scrub Cypress
Myers and Ewel	Freshwater Marshes - marl prairie
SAF	100/Pondcypress
FLUCCS	621/Cypress 641/Freshwater Marshes

Other synonyms: cypress-prairie (Gunderson and Loope 1982), dwarf cypress (Craighead 1971), southern coast marsh prairies and marsh prairies, southern Everglades (Davis, Jr. 1943), muhly or *Muhlenbergia* prairie (Hilsenbeck et al. 1979; Gunderson and Loope 1982), rocky glades (USFWS 1999)

References:

Bradley, K.A., and G.D. Gann. 1999. Status summaries of 12 rockland plant taxa in southern Florida. Institute for Regional Conservation. Report submitted to United States Fish and Wildlife Service, Vero Beach, Florida.

Craighead, F.C. 1971. The Trees of South Florida. University of Miami Press, Coral Gables.

Davis, J.H., Jr. 1943. The natural features of southern Florida, especially the vegetation, and the Everglades. Geological Bulletin No. 25. Florida Geological Survey, Tallahassee, Florida.

- Floherschütz, E.W. 1978. Dwarf cypress in the Big Cypress Swamp of southwestern Florida. Thesis, University of Florida, Gainesville.
- Flora of North America Editorial Committee. 2007. Flora of North America North of Mexico. New York and Oxford.
- Gunderson, L.H., and L.L. Loope. 1982. An inventory of the plant communities within the Deep Lake Strand area, Big Cypress National Preserve. South Florida Research Center T-666. Everglades National Park, Homestead, Florida.
- Gunderson, L.H., and J.R. Snyder. 1994. Fire patterns in the southern Everglades. Pages 291-305 in S.M. Davis and J.C. Ogden, editors. Everglades: The Ecosystem and its Restoration. St. Lucie Press, Delray Beach.
- Herndon, A., and D. Taylor. 1986. Response of a *Muhlenbergia* prairie to repeated burning: changes in above-ground biomass. South Florida Research Center Report# SFRC-86/05. Everglades National Park, Homestead, Florida.
- Hilsenbeck, C.E., R.H. Hofstetter, and T.R. Alexander. 1979. Preliminary synopsis of major plant communities in the east Everglades area: vegetation map supplement. Unpublished Report Department of Biology, University of Miami, Miami, Florida.
- Main, M.B., and M.J. Barry. 2002. Influence of season of fire on flowering of wet prairie grasses in South Florida, USA. Wetlands 22:430-434.
- Olmsted, I.C., and L.L. Loope. 1984. Plant communities of Everglades National Park. Pages 167-184 in P.J. Gleason, editor. Environments of South Florida: Present and Past II. Miami Geological Society, Coral Gables.
- Olmsted, I.C., L.L. Loope, and C.E. Hilsenbeck. 1980a. Tropical hardwood hammocks of the interior of Everglades National Park and Big Cypress National Preserve. Report T-604. South Florida Research Center, Everglades National Park, Homestead, Florida.
- Olmsted, I.C., L.L. Loope, and R.E. Rintz. 1980b. A survey and baseline analysis of aspects of the vegetation of Taylor Slough, Everglades National Park. Report T-586. South Florida Research Center, Everglades National Park, Homestead, Florida.
- Orzell, S.L., and E.L. Bridges. 2006. Floristic composition and species richness of subtropical seasonally wet *Muhlenbergia sericea* prairies in portions of central and south Florida. Pages 136-175 in R.F. Noss, editor. Land of Fire and Water: The Florida Dry Prairie Ecosystem. Proceedings of the Florida Dry Prairie Conference. Painter, DeLeon Springs.
- Porter, C.L., Jr. 1967. Composition and productivity of a subtropical prairie. Ecology 48:937-942.

Taylor, D.L. 1983. Fire management and the Cape Sable seaside sparrow. Pages 147-152 in T. Quay, J. Funderburg, D. Lee, E. Potter, and C. Robbins, editors. *The Seaside Sparrow, its Biology and Management*. North Carolina State Museum of Natural History, Raleigh.

United States Fish and Wildlife Service USFWS. 1999. Freshwater marshes and wet prairies. South Florida multi-species recovery plan - Ecological communities. United States Fish and Wildlife Service. URL:
<http://www.fws.gov/verobeach/images/pdflibrary/marshes%20wet%20prairies.pdf>

Wade, D., J. Ewel, and R. Hofstetter. 1980. Fire in South Florida ecosystems. Forest Service General Technical Report SE-17. Southeastern Forest Experiment Station, Asheville, North Carolina.

Werner, D. 1975. The biology of the Cape Sable seaside sparrow. United States Fish and Wildlife Service, Everglades National Park, Homestead, Florida.