14890

Floridian Highlands Freshwater Marsh

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Vegetation Type

Herbaceous Wetland

Map Zones

55, 56, 99

Geographic Range

This system represents non-tidal marsh vegetation in the peninsula of Florida, and in the Tallahassee area, possibly ranging into adjacent Georgia. These highland marshes occupy different types of depressions such as former lake basins, shallow peat-filled valleys, and zones around existing natural lakes (Kushlan 1990). The marshes and the basins they occur within are unstable over time due to subsurface subsidence and drainage pattern changes. In some examples, surface water flow is generally lacking due to the presence of limestone near the surface, but water levels have fluctuated greatly over time (Patton and Judd 1986). Soils range from mucky surfaces to sandy loams or sands, but slowly permeable subsoils contribute to the presence of standing water for much of the year. This system was originally intended to cover Payne’s Prairie only, but the concept was greatly expanded to include other non-tidal non-riverine marsh vegetation of Florida (NatureServe 2006).

Biophysical Site Description

These highland marshes occupy different types of depressions such as former lake basins, shallow peat-filled valleys and zones around existing natural lakes (Kushlan 1990). The marshes and the basins they occur within are unstable over time due to subsurface subsidence and drainage pattern changes. Soils range from mucky surfaces to sandy loams or sands, but slowly permeable subsoils contribute to the presence of standing water for much of the year, typically around 200 days per year (FNAI 1990, NatureServe 2006).

Vegetation Description

The vegetation is characterized by a diverse assemblage of associated plant communities ranging from open water, to emergent and graminoid marshes, to a mixture of herbaceous plants and shrubs (NatureServe 2006). The occurrence of each association is defined by the hydrologic regime, fire frequency, and soils (Kushlan 1990). Floodplain marshes typically exhibit some level of zonation, with species adapted for longer hydroperiods at the lower elevations or in more organic soil types, and those adapted for shorter periods of inundation at higher elevations or on more permeable soils. Aquatic emergent species are most abundant in the lower marsh, including pickerelweed (*Pontederia cordata*), duck potato (*Sagittaria lancifolia*), smartweed (*Polygonum* spp.) and others. Higher marsh communities are characterized by extensive, dense stands of graminoids including sand cordgrass (*Spartina bakeri*), maidencane (*Panicum hemitomon*) and sawgrass (*Cladium jamaicense*), with widely scattered shrubs and patches of aquatic emergents in areas of deeper organic soils or experiencing longer periods of inundation.

This model includes marshes in the floodplains of lakes, depressions that were formerly shallow lakes and flatwoods marshes which occur throughout the southeast in small seasonally inundated depressions scattered throughout the pine woodland/savannah matrix. Many of the species are identical, and ecological pathways with respect to fire and hydrology are very similar, to the Florida River Floodplain Marsh (CES203.055). Floridian highlands freshwater marsh may also be called basin marsh, emergent marsh, cordgrass marsh, maidencane marsh or sawgrass marsh.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| SPBA | Spartina bakeri | Sand cordgrass |
| PAHE2 | Panicum hemitomon | Maidencane |
| CLADI | Cladium | Sawgrass |
| SACA5 | Salix caroliniana | Coastal plain willow |
| HIGR4 | Hibiscus grandiflorus | Swamp rosemallow |
| MOCE2 | Morella cerifera | Wax myrtle |
| ACRU | Acer rubrum | Red maple |
| CEPHA | Cephalanthus | Buttonbush |

Disturbance Description

Fires typically occur at a higher frequency, every 1-3yrs, in the graminoid marsh types, and may burn into the emergent marsh types during dry conditions. Shrubbier marshes have a longer return interval of 3-10yrs (FNAI 1990). Severe fires during drought periods will often burn the mucky peat, creating pockets of lower marsh vegetated by aquatic emergents. Shorter hydroperiods will permit the invasion of shrubs and trees, resulting in a reduction or loss of the herbaceous marsh. Shrub invasion and dominance can occur in as little as 5-10yrs without fire (Kushlan 1990).

In the absence of fire, portions of stands will become dominated by *Salix caroliniana*. If fire continues to be absent, these areas may succeed to Acer rubrum until a replacement fire or mechanical activity restores the marsh (NatureServe 2006).

If swamp species become established, muck fires and hurricanes become the source of disturbance. Both disturbances can return the community to its herbaceous condition.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 5 | 93 | 3 | 10 |
| Moderate (Mixed) | 69 | 7 | 3 | 150 |
| Low (Surface) |  |  |  |  |
| All Fires | 5 | 100 |  |  |

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

Scale Description

Fires can range from 1-1,000ac.

Non-Fire Disturbances

Wind/Weather/Stress

Adjacency or Identification Concerns

Floridian highlands freshwater marshes are most often intermingled with flatwoods, wet prairies and southern coastal plain nonriverine basin swamp.

This system was originally intended to cover Payne’s Prairie only, but the concept was greatly expanded to include other non-tidal marsh vegetation of Florida, including that around natural lakes, as well as the large Kissimmee and St. Johns River marshes. The Kissimmee and St. Johns River marshes also occur within floodplains but are influenced by somewhat different processes than typical highland marshes. These were formerly considered part of Florida River Floodplain Marsh (CES203.055) (NatureServe 2006).

Issues or Problems

Floridian highlands freshwater marsh can be significantly altered by changes in hydrology, water quality and fire regimes. Ditching or draining highlands freshwater marshes often results in an increase in the shrub and tree component. Severely drained marsh, for agricultural or other uses, often results in a shift from typical hydrophytic herbaceous species to more mesic species. This also permits encroachment by various exotic species such as Brazilian pepper (*Schinus terebinthifolius*) or Chinese tallow (*Sapium sebiferum*). Impounding floodplain marsh communities increases the duration of inundation, and results in dominance by aquatic emergent species such as pickerelweed (*Pontederia cordata*), spatterdock (*Nuphar advena*), duck potato *Sagittaria lancifolia*) or cattails (*Typha* spp.), or open water associations.

Changes to the nutrient regime of floodplain marsh communities, usually coupled with impoundment, results in significant shifts in species composition. Large expanses of cattail dominated marsh now occur in areas previously dominated by other more typical species.

Removing fire from the system usually results in increasing dominance of woody shrubs and trees. Areas where fire has been suppressed for long periods of time have succeeded into dense stands of wax myrtle (*Myrica cerifera*), coastal plain willow (*Salix caroliniana*) or forested wetlands dominated by red maple (*Acer rubrum*) or cypress (*Taxodium distichum* and *T. ascendens*).

Native Uncharacteristic Conditions

Comments

Models and descriptions for MZs 55, 56, and 99 were identified as duplicates during the BpS review process. Note that there were minor differences in the Reference Conditions, but they appear to be rounding errors because the model parameters were the same.

Succession Classes

**Mapping Rules**

**Canopy Cover**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Upper Layer Lifeform** | **Height (m)** | **0 -10%** | **11-20%** | **21-30%** | **31-40%** | **41-50%** | **51-60%** | **61-70%** | **71-80%** | **81-90%** | **91-100%** |
| Herb | 0-0.5 | A | A | A | A | A | A | B | B | B | B |
| Herb | 0.5-1.0 | A | A | A | A | A | A | B | B | B | B |
| Herb | >1.0 | A | A | A | A | A | A | B | B | B | B |
| Shrub | 0-0.5 | B | B | C | C | C | C | C | D | D | D |
| Shrub | 0.5-1.0 | B | B | C | C | C | C | C | D | D | D |
| Shrub | 1.0-3.0 | C | C | C | C | C | C | C | D | D | D |
| Shrub | >3.0 | C | C | C | C | C | C | C | D | D | D |
| Tree | 0-5 | C | C | C | C | C | C | C | D | D | D |
| Tree | 5-10 | E | E | E | E | E | E | E | E | E | E |
| Tree | 10-25 | E | E | E | E | E | E | E | E | E | E |
| Tree | 25-50 | E | E | E | E | E | E | E | E | E | E |
| Tree | >50 | E | E | E | E | E | E | E | E | E | E |

Class A 19 Early Development 1 - All Structures

*Structural Information*

Tree Size Class: Seedling <4.5ft

Tree Size Class: Sapling >4.5ft; <5"

DBH

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| CLADI | Cladium | Sawgrass | Upper |
| PAHE2 | Panicum hemitomon | Maidencane | Upper |
| SPBA | Spartina bakeri | Sand cordgrass | Upper |
| SACA5 | Salix caroliniana | Coastal plain willow | Upper |

Description

Vegetation in this class recovers very quickly to pre-burn stature, typically within six months. Very early phases of this class are characterized by open stands of resprouting grasses and aquatic herbs such as duck potato, pickerelweed and sedges. By one year post burn, grasses have regained their pre-burn dominance. Shrubs are typically top-killed and re-grow from basal shoots. If the root structures of some shrubs such as wax myrtle and groundsel tree (*Baccharis halimifolia*) are inundated for several weeks post-burn, mortality results. Fire typically will not occur within this class.

Class B 70 Mid Development 1 - Closed

*Structural Information*

Tree Size Class: Seedling <4.5ft

Tree Size Class: Sapling >4.5ft; <5"

DBH

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| CLADI | Cladium | Sawgrass | Middle |
| PAHE2 | Panicum hemitomon | Maidencane | Middle |
| SPBA | Spartina bakeri | Sand cordgrass | Middle |
| SACA5 | Salix caroliniana | Coastal plain willow | Upper |

Description

This class is characterized by dense, continuous stands of sand cordgrass, sawgrass or maidencane with few or widely scattered shrubs and small scattered patches of aquatic emergents in pockets of lower marsh. Strata height depends on the dominant species, 3-4ft for cordgrass dominated marshes, 4-6ft+ for sawgrass marsh, and 1-2ft for maidencane dominated marshes. Upland edges of the marsh may include widely scattered sabal palms (*Sabal palmetto*), cypress, red maple or other wetland trees and shrubs. Replacement fires are frequent.

Class C 8 Mid Development 2 - Closed

*Structural Information*

Tree Size Class: Sapling >4.5ft; <5"

DBH

Tree Size Class: Sapling >4.5ft; <5" DBH

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| CLADI | Cladium | Sawgrass | Upper |
| PAHE2 | Panicum hemitomon | Maidencane | Upper |
| SPBA | Spartina bakeri | Sand cordgrass | Upper |
| SACA5 | Salix caroliniana | Coastal plain willow | Upper |

Description

This class retains the dense, continuous herbaceous strata, however, woody shrubs are becoming a prominent component. Upland edges of the marsh are becoming increasingly invaded by shrubs and wetland trees. Replacement fires occur every relatively frequently.

Class D 2 Late Development 1 - Closed

*Structural Information*

Tree Size Class: Sapling >4.5ft; <5"

DBH

Tree Size Class: Sapling >4.5ft; <5" DBH

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| SACA5 | Salix caroliniana | Coastal plain willow | Upper |
| MOCE2 | Morella cerifera | Wax myrtle | Upper |
| ACRU | Acer rubrum | Red maple | Upper |
| CLADI | Cladium | Sawgrass | Low-Mid |

Description

In this class shrubs/small trees have become the dominant life form. Grasses and other herbaceous species remain present in the understory at greatly reduced levels. In the older stages of this class, the herbaceous component is almost completely eliminated. Replacement fires and mixed fires occur.

Class E 1 Late Development 2 - Closed

*Structural Information*

Tree Size Class: Medium 9-21"DBH

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| SACA5 | Salix caroliniana | Coastal plain willow | Upper |
| ACRU | Acer rubrum | Red maple | Upper |
| MOCE2 | Morella cerifera | Wax myrtle | Upper |
| TAAS | Taxodium ascendens | Pond cypress | Upper |

Description

This class represents a small portion of this BpS and generally occurs in fire shadows. In these areas the marsh has been heavily invaded by wetland trees. The shrub component is prominent in the mid-story and the herbaceous component is greatly reduced. In the older stages of this class vegetation has basically shifted to a forested wetland type with a dense overstory, scattered shrubs and small trees in the mid-canopy, and a herbaceous component characteristic of a forested wetland system. Replacement fires and hurricanes are important disturbances.

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:CLS | 1 |
| Mid1:CLS | 2 | Mid2:CLS | 10 |
| Mid2:CLS | 11 | Late1:CLS | 20 |
| Late1: CLS | 21 | Late2:CLS | 40 |
| Late2: CLS | 41 | Late2:CLS | 419 |

Probabilistic Transitions

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Disturbance Type** | **Disturbance occurs In** | **Moves vegetation to** | **Disturbance Probability** | **Return Interval (yrs)** | **Reset Age to New Class Start Age After Disturbance?** | **Years Since Last Disturbance** |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.25 | 4 | Yes | 0 |
| Replacement Fire | Mid2:CLS | Early1:ALL | 0.15 | 7 | Yes | 0 |
| Mixed Fire | Mid2:CLS | Mid2:CLS | 0.1 | 10 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.125 | 8 | Yes | 0 |
| Mixed Fire | Late1:CLS | Late1:CLS | 0.333 | 3 | No | 0 |
| Replacement Fire | Late2:CLS | Early1:ALL | 0.01 | 100 | Yes | 0 |
| Wind Weather | Late2:CLS | Early1:ALL | 0.025 | 40 | Yes | 0 |

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