Rapid Assessment Reference Condition Model

The Rapid Assessment is a component of the LANDFIRE project. Reference condition models for the Rapid Assessment were created through a series of expert workshops and a peer-review process in 2004 and 2005. For more information, please visit www.landfire.gov. Please direct questions to helpdesk@landfire.gov.

Potential Natural Vegetation Group (PNVG)

R9FPMA **Floodplain Marsh**

General Information

Contributors *(additional contributors may be listed under "Model Evolution and Comments")*

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Vegetation Type

Grassland

Dominant Species*

SPBA HIGR4
PAHE2 SACA
CLJA
MYCE

General Model Sources

- [x] Literature
- [x] Local Data
- [x] Expert Estimate

LANDFIRE Mapping Zones

56 58
55
46

Rapid AssessmentModel Zones

- [ ] California
- [ ] Great Basin
- [ ] Great Lakes
- [ ] Northeast
- [ ] Northern Plains
- [ ] N-Cent.Rockies
- [ ] Pacific Northwest
- [ ] South Central
- [x] Southeast
- [ ] S. Appalachians
- [ ] Southwest

Geographic Range

Large expanses of floodplain marsh occur in Florida along the upper St. Johns River floodplain from the headwaters near Vero Beach to Lake Monroe, along the Kissimmee River, and along the Myakka River (FNAI, 1990). Smaller marshes occur throughout peninsular Florida along other river systems, around lakes, and in various low, wet depressions or basins. Marshes also occur throughout the southeast along river systems, lakes, or in low, wet areas at or near sea level. Although there is a considerable amount of overlap, this model does not include tidally influenced freshwater wetlands. It also does not include the Everglades, which is addressed in a separate model.

Biophysical Site Description

Floodplain marshes occur on seasonally inundated sandy alluvial soils containing variable accumulations of peat or marl. They are found where surficial deposits are impermeable, where the water table emerges through the permeable substrate, or where there is hydrological connection to a river or lake (Kushlan, 1990). Marshes are typically inundated for approximately 250 days annually, but there is considerable variability in the duration and depth of inundation depending on rainfall.

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, 2005). 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

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emergents in areas of deeper organic soils or experiencing longer periods of inundation.

Fires typically occur at a higher frequency in the graminoid marsh types, but may burn into the emergent marsh types during dry conditions. They burn on a one to six year frequency under natural conditions, which maintains the open herbaceous community by restricting shrub invasion. 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. Floodplain marshes are associated with, and often grade into hydric hammock or other forested wetland communities, or various upland communities.

Disturbance Description

Fire, disturbance, and class descriptions for this model focus primarily on the higher, graminoid marsh associations. Fires typically occur at a higher frequency in this type. Forb dominated emergent marshes experience fire less frequently than graminoid types, and open water associations rarely burn. Floodplain marshes have a 3 year average fire return interval with a range between 1-6 years to maintain dominance of the grass component (Frost, 1995, Wade et al, 1998). The fire regime is Category II, a short interval, high severity replacement fire.

Marshes are typically flooded approximately 250 days annually. However, in this PNVG, flooding is not considered a disturbance. Although not incorporated into the model, extended periods of drought can promote encroachment of woody shrubs and trees into the herbaceous marsh. The probability of this event occurring is unknown.

Adjacency or Identification Concerns

This model includes marshes in the floodplains of rivers or lakes, highland marshes, 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. Floodplain marsh may also be called river marsh, emergent marsh, cordgrass marsh, maidencane marsh, or sawgrass marsh. It is similar to saltmarsh and often contains similar genera, but different species of vegetation. Fire frequency and severity are similar between the two. Floodplain marshes experience different biophysical conditions from saltmarsh and different alternative successional pathways.

Floodplain marshes can be significantly altered by changes in hydrology, water quality, and fire regimes. Ditching or draining floodplain 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, T. ascendens).

Scale Description

Sources of Scale Data ☐ Literature ☐ Local Data ☑ Expert Estimate

Based on compartment size of the landscape, disturbance scale could range from less than 1 acre for small marshes to 50,000 acres or more for large patches. However, little information has been found to verify this estimate.

Issues/Problems

Additional research is needed to determine or verify probabilities of fire in later successional stages (shrub or tree dominated).

Model Evolution and Comments

*Succession Classes***

Succession classes are the equivalent of "Vegetation Fuel Classes" as defined in the Interagency FRCC Guidebook (www.frcc.gov).

Class A 20 %

Early1 All Struct

Description

Vegetation in this class recovers very quickly to pre-burn stature, typically within 6 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 6 months to 1 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.

Dominant Species* and Canopy Position

SPBA	Upper
PAHE2	Upper
CLJA	Upper

Upper Layer Lifeform

☑ Herbaceous
☐ Shrub
☐ Tree

Fuel Model 3

Structure Data (for upper layer lifeform)

	Min	Max
Cover	5 %	95 %
Height	Herb Short <0.5m	Herb Tall > 1m
Tree Size Class	no data	

☐ Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Class B 8 %

Mid2 Closed

Description

This class retains the dense, continuous herbaceous strata, however, woody shrubs are becoming a prominent component, composing up to 50% of the canopy. Shrubs are typically 4-8 feet in height. Upland edges of the marsh are becoming increasingly invaded by shrubs and wetland trees.

Dominant Species* and Canopy Position

SPBA	Middle
PAHE2	Middle
CLJA	Middle

Upper Layer Lifeform

☐ Herbaceous
☑ Shrub
☐ Tree

Structure Data (for upper layer lifeform)

	Min	Max
Cover	25 %	50 %
Height	Shrub Short 0.5-0.9m	Shrub Medium 1.0-2.9m
Tree Size Class	no data	

☑ Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

The dominant life form remains the grass component of the marsh system although woody shrubs are beginning to invade. Canopy cover would range between 50 and 100%. Canopy height is species dependant: 3-4 feet for cordgrass marsh, 4-6 feet for sawgrass marsh, and 1-2 feet for maidencane marsh.

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Fuel Model 3

Class C 70 %

Mid1 Closed

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, 3-4 feet for cordgrass dominated marshes, 4-6 or more feet for sawgrass marsh, and 1-2 feet 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.

Dominant Species* and Canopy Position

SPBA Upper
PAHE2 Upper
CLJA Upper

Upper Layer Lifeform

- [x] Herbaceous
- [ ] Shrub
- [ ] Tree

Fuel Model 3

Structure Data (for upper layer lifeform)

	Min	Max
Cover	50 %	100 %
Height	Herb Medium 0.5-0.9m	Herb Tall > 1m
Tree Size Class	no data	

☐ Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Class D 1 %

Late1 Closed

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.

Dominant Species* and Canopy Position

MYCE Upper
BAHA Upper
SACA5 Upper

Upper Layer Lifeform

- [ ] Herbaceous
- [ ] Shrub
- [x] Tree

Fuel Model 5

Structure Data (for upper layer lifeform)

	Min	Max
Cover	50 %	100 %
Height	Shrub Tall >3.0 m	Tree Short 5-9m
Tree Size Class	Sapling >4.5ft; <5"DBH	

☐ Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Class E 1 %

Late2 Closed

Description

This class represents a small portion of this PNVG and generally occurs along the upland edges or on slight ridges or higher areas within the marsh. In these areas the marsh has been heavily invaded by wetland trees. The shrub component is prominent in the mid-story and the herbaceous

Dominant Species* and Canopy Position

ACRU Upper
TAAS Upper
SACA5 Upper

Upper Layer Lifeform

- [ ] Herbaceous
- [ ] Shrub
- [x] Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	75 %	100 %
Height	Tree Short 5-9m	Tree Tall 25-49m
Tree Size Class	Medium 9-21"DBH	

☐ Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

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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.

Disturbances

Disturbances Modeled

- [x] Fire
- [ ] Insects/Disease
- [ ] Wind/Weather/Stress
- [ ] Native Grazing
- [ ] Competition
- [ ] Other:
- [ ] Other

Historical Fire Size (acres)

Avg: 25000
Min: 1
Max: 50000

Sources of Fire Regime Data

- [x] Literature
- [ ] Local Data
- [x] Expert Estimate

Fire Regime Group: **2**

I: 0-35 year frequency, low and mixed severity
II: 0-35 year frequency, replacement severity
III: 35-200 year frequency, low and mixed severity
IV: 35-200 year frequency, replacement severity
V: 200+ year frequency, replacement severity

Fire Intervals (FI)

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inverse of fire interval in years and is used in reference condition modeling. Percent of all fires is the percent of all fires in that severity class. All values are estimates and not precise.

	Avg FI	*Min FI*	*Max FI*	*Probability*	*Percent of All Fires*
Replacement	4	3	30	0.25	100
Mixed					
Surface					
All Fires	4			0.25002	

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