

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)

R9SMAR Southern Tidal Brackish to Freshwater Marsh

General Information

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

Modelers

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Reviewers

Vegetation Type

Grassland

General Model Sources

- Literature
 Local Data
 Expert Estimate

Rapid Assessment Model Zones

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

Dominant Species*

JURO TYDO
SPCY TYLA
CLJA SPPA
TYAN DISP

LANDFIRE Mapping Zones

60	56	37
58	46	36
55	45	

Geographic Range

This PNVG occurs in estuarine areas from southeast Virginia to Texas.

Biophysical Site Description

Tidal marsh is found on very wet flats along the edges of estuaries, lagoons, and tidally influenced rivers. It is flooded regularly or irregularly by lunar or wind tides, and is confined to low wave energy zones. The water may be brackish, oligohaline, or fully fresh. This model applies to "high" salt marshes (*Spartina patens* + *Distichlis spicata*) lying above the zone of daily tidal flooding as well.

Vegetation Description

Tidal marsh consists of dense herbaceous vegetation, usually dominated by large grass-like plants. Brackish marshes are usually strongly dominated by black needlerush (*Juncus roemerianus*). Oligohaline marshes may be dominated by giant cordgrass (*Spartina cynosuroides*), sawgrass (*Cladium jamaicense*), cattails (*Typha domingensis*, *Typha angustifolia*, *Typha latifolia*), or a mixture of smaller graminoids and forbs. Freshwater marshes may also be dominated by diverse mixtures of plants, but may contain more forbs. Oligohaline to fresh marshes may contain sparse trees, or may have patches with young trees and shrubs that have grown up where fire has been absent. Brackish marshes are inhospitable to most woody plants and may stagnate in a condition of herbaceous dominance without shrub invasion.

Woody invasion is strongly subject to effects of salinity. In brackish marshes, state C may not be different from state B.

Disturbance Description

Tidal marshes may be flooded regularly or irregularly by lunar or wind tides. Fires are generally moderate in intensity, consuming the above ground herbaceous vegetation and top-killing the woody plants. All fires are replacement fires for above-ground vegetation. All woody species are top-killed in all fires.

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit <http://plants.usda.gov>.

Adjacency or Identification Concerns

This model applies only to larger expanses of marsh connected to other land areas. Small or isolated marsh patches may have no ignition source and not be subject to natural fire.

This model includes "high" salt marshes (*Spartina patens* + *Distichlis spicata*) lying above the zone of daily tidal flooding as well. Low salt marsh, which is subjected to daily tidal flooding, is excluded from this model.

This model represents an average of widely varying fire regimes, because probability of ignition is affected strongly by the presence of open water channels, the presence or absence of connection to uplands, and the nature of adjacent upland vegetation. Lightning increases in importance as an ignition source, and daily tidal amplitude decreases from North to south. These two factors along with longer growing seasons lead to a somewhat higher replacement fire frequency for this PNVG than for the NMAR PNVG.

This model represents an average behavior of marshes that are well connected to flammable vegetation and hence have a high probability of ignition. More isolated marshes or patches within marshes will have less frequent fire. Some marshes will not burn at all.

Hypersaline areas maybe imbedded as small patches within the grassland dominated matrix, but typically are non-vegetated or support nonburnable plants. The upper limit of regular diurnal tidal flooding determines the boundary of this PNVG.

Scale Description

Sources of Scale Data Literature Local Data Expert Estimate

This model applies only to larger expanses of marsh connected to other land areas. Small or isolated marsh patches may have no ignition source and not be subject to natural fire.

Issues/Problems

Uncharacteristic vegetation includes marshes that have gone so long without fire that shrubs or trees have become robust. If burned, this vegetation may resemble natural early post fire vegetation, but sprouting is more vigorous and shrub dominance returns more quickly. Marshes dominated by the invasive *Phragmites australis* are also uncharacteristic; though they superficially resemble natural structure, wildlife usage apparently is different.

Under reference conditions, woody species must re-establish from seed or from small, non-vigorous sprouts. Marshes that have burned little and have robust woody vegetation may return to state C more quickly after a single fire.

Marshes have essentially no vegetation whose above-ground parts can survive fire. All fires are replacement fires, making fire effects simple. However, the natural frequency of fire in marshes is complex due to barriers to fire spread.

Model Evolution and Comments

This model replaces the model R5MRSH and covers the entire distribution of the PNVG.

This model is based on the original FRCC Guidebook SMAR model by Mike Schafale. It includes the less frequently flooded "high" salt marsh zone, but excludes the low (daily tidal flooding) salt marsh zone.

Many common tidal marsh plant species are omitted from the dominant species listing, and none of the shrubs are listed. *Myrica cerifera*, *Baccharis halimifolia*, *Iva frutescens*, and *Acer rubrum* are most common woody invaders of tidal marshes. Chinese tallow tree is now a common woody invasive invader, especially in the fresher marshes.

R9SMAR (Southern Tidal Brackish to Freshwater Marsh was reviewed by one anonymous reviewer. As a result of the editorial review by KEF and the peer review, the following changes were made:

1. No changes were made to the VDDT model.
2. The last sentence in the vegetation description: "In brackish marshes state E may not be different from state B" was changed to read "In brackish marshes state C may not be different from state B" since there is no state E in the VDDT model.
3. The Late 1 Closed condition, Class C in the VDDT model, was originally described under Class E in the database. The database description was moved to Class C to correspond to the model.
4. The last sentence of the Class C description "Note: VDDT model identifies Class C as Late-Closed, therefore have used Class E in this database template" was deleted since it no longer applies.
5. Editorial changes were made to form complete sentences, and correct spelling or other grammatical errors.

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

Class A 59 %

Early1 All Struct

Description

Class A includes recently burned marshes. There is a diverse herb layer, including many smaller herbs, and little litter buildup.

Dominant Species* and Canopy Position

JURO Upper
 SPCY Upper
 CLJA Upper
 TYDO Upper

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model 1

Structure Data (for upper layer lifeform)

	Min	Max
Cover	40 %	100 %
Height	Herb Short <0.5m	Herb Medium 0.5-0.9m
Tree Size Class	no data	

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

Class B 40 %

Mid1 Closed

Description

Class B contains a dense herb layer dominated by larger species, with heavy litter buildup .

Dominant Species* and Canopy Position

JURO Upper
 SPCY Upper
 CLJA Upper
 TYDO Upper

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model 3

Structure Data (for upper layer lifeform)

	Min	Max
Cover	80 %	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:

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit <http://plants.usda.gov>.

Class C 1%

Late I Closed

Description

Class C contains a dense herb layer dominated by larger species, with heavy litter buildup and invading shrubs including, Myrica cerifera, Baccharis halimifolia, Iva frutescens, and Acer rubrum, and trees where salinity permits.

Dominant Species* and Canopy Position

JURO Low-Mid
 SPCY Low-Mid
 CLJA Low-Mid
 TYDO Low-Mid

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	60 %
Height	Shrub Dwarf <0.5m	Tree Medium 10-24m
Tree Size Class	Medium 9-21"DBH	

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:
 The dominant lifeform is the herbaceous stratum. Canopy cover ranges between 60-100% and the herbs are medium to tall in height (>.5meters).

Fuel Model 3

Class D 0%

Late I All Structu

Description

Dominant Species* and Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	0 %
Height	no data	no data
Tree Size Class	no data	

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

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

Fuel Model no data

Class E 0%

Late I Closed

Description

Dominant Species* and Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	0 %
Height	no data	no data
Tree Size Class	no data	

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

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

Fuel Model no data

Disturbances

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit <http://plants.usda.gov>.

Disturbances Modeled

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

Historical Fire Size (acres)

Avg: 1000
 Min: 100
 Max: 10000

Sources of Fire Regime Data

- Literature
- Local Data
- 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.

	<i>Avg FI</i>	<i>Min FI</i>	<i>Max FI</i>	<i>Probability</i>	<i>Percent of All Fires</i>
<i>Replacement</i>	5			0.2	100
<i>Mixed</i>					
<i>Surface</i>					
<i>All Fires</i>	5			0.20002	

References

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