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)

R6FPFOgl **Great Lakes Floodplain Forest**

General Information

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

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Vegetation Type

Forested

Dominant Species*

POPU	ACNEI
SANI	FRPE
CELTI	PLAT
ULAM	ACSA

General Model Sources

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

LANDFIRE Mapping Zones

41	50	62
47	51	
49	52	

Rapid AssessmentModel Zones

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

Geographic Range

Lowland hardwood communities that occur along large rivers which flood periodically. These communities occur throughout the Midwestern states and in much of the eastern U.S., from Minnesota east to Ohio, south to the Ohio River and west to the Mississippi River. Also included in this setting are the upland wet forests scattered throughout this range. Examples would be the "Black Swamp" in northwest Ohio & eastern Indiana, the northern hardwood swamps of Michigan, Wisconsin, and Minnesota, and the perched water areas located in northern hardwood forests.

Biophysical Site Description

This setting is characterized as a strip of relatively smooth land bordering a stream or river and overflowed at a time of high water. This landform lies adjacent to a river or stream composed primarily of unconsolidated depositional material derived from sediments being transported by the related stream or river. The area is subject to periodic flooding by the parent stream. This type in general will be found in a zone extending roughly 200 to 300 miles on either side of the Great Lakes.

Vegetation Description

Prior to significant alteration of river systems and other natural communities, these northern floodplain forests occurred irregularly as groves or narrow bands of trees along the lower river terraces or adjacent to abandoned river channels, lakes and ponds of the floodplain, while the
upper terraces were dominated by more mature species such as black walnut and bur oak.

Disturbance Description

Floodplain systems are produced and maintained by active hydrologic and geomorphic processes such as channel meandering, sedimentation and erosion (Gregory, et al. 1991, Hughes 1994) caused by natural hydrological variation (Richter and Richter 2000). Regeneration of the dominant species (cottonwood and willow) is dependent on flooding and movement of river channels, which creates bare, moist soil needed for seedling establishment (Noble 1979, Johnson et al. 1976, Scott et al. 1997). Oxbow and slough development

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

also influence the floodplain system and create variability in plant community composition. Deposits of sand and other sediments can create low ridges that influence vegetation establishment (Weaver 1960). The flood frequency in a given area is dependent upon its location on the floodplain, with upper terraces having infrequent flooding and scouring events, while the lower terraces nearest the river flood frequently. Scouring caused by ice jams during the winter, channel meandering, and oxbow and slough development greatly influence this system. Biological agents (beaver) also greatly impacted pre-European river systems.

Adjacency or Identification Concerns

Today, bank stabilization, dams and water diversion have significantly altered the northern floodplains.

Scale Description

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

Patches must be adequate in size to contain natural variation in vegetation and disturbance regime. Topographically complex areas can be relatively small (< 1000 acres). Uniform large mesas should be relatively large (> 10, 000 acres).

Issues/Problems

Assumptions: We developed the VDDT model with the recognition that the northern floodplain forest (cottonwood-willow-elm community) is a seral community. This seral community is most affected by flooding, scouring, and channel movement. We modeled the floodplain valley and northern hardwood forest swamps. The model does include wetlands, sloughs or oxbows. We used two flooding regimes in the model: Option 1 – minor flooding/scouring (5-20 year frequency); and Option 2 – major flooding/scouring (20-500 year frequency). Flood frequency for a class is based on location on the floodplain, with higher terraces being subject to longer flood cycles (up to 500 years). We did model attributes such as beaver activity (native grazing), channel migration, oxbow and slough development, and sedimentation. The only impact on our model attributed to the beaver activity was the damming, flooding, and flooding after dam failure. Fire activity had a minor impact, due to low intensity, surface, infrequent intervals, small size, and low fuel loads

Model Evolution and Comments

This is a modification of existing PNVG - NOFP and ELAS.

*Succession Classes***

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

Class A 15 %

Early1 All Struct

Description

Created by deposition, stream meander changes, point bar, and continual scouring typical of Option 1: minor flooding/scouring (5-20 year frequency). Pioneer herbaceous trees, tree form seedlings, herbaceous primary succession. Minor surface fires. Age 0-20 years.

Dominant Species* and Canopy Position

SANI Upper

Upper Layer Lifeform

- ☑ Herbaceous
- ☐ Shrub
- ☐ Tree

Fuel Model 1

Structure Data (for upper layer lifeform)

	Min	*Max*
Cover	70 %	100 %
Height	Herb Short <0.5m	Shrub Tall >3.0 m
Tree Size Class	Seedling <4.5ft	

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

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Class B 15 %

Mid1 Open

Description

This stage develops as the stand starts to mature. Dominate species are cottonwood, willow (sandbar, peach-leaved, black), sycamore, black ash, and American elm. Age 10-30 years.

Dominant Species* and Canopy Position

SANI	Mid-Upper
PLATA	Upper
POPUL	Upper
NVEG	Upper

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 5

Structure Data (for upper layer lifeform)

	Min	Max
Cover	50 %	100 %
Height	Tree Regen <5m	Tree Short 5-9m
Tree Size Class	Seedling <4.5ft	

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

Class C 20 %

Mid1 Closed

Description

Overstory is dominated by cottonwood, American elm, silver maple, red mulberry, box elder, black ash, red maple, and sycamore. Understory species include vines, and poison ivy. Age 30-100 years.

Dominant Species* and Canopy Position

PLATA	Upper
POPUL	Upper
FRNI	Upper
NVEG	Upper

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 10

Structure Data (for upper layer lifeform)

	Min	Max
Cover	60 %	100 %
Height	Tree Short 5-9m	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:

Class D 50 %

Late1 Closed

Description

Found along the upper terraces that have been protected from frequent flooding and on the higher elevated landforms in the hardwood swamps. Species composition increases towards south and east within the region. Overstory species include hackberry, American elm, ash (green and black*), sycamore*, black walnut*, shagbark hickory*, oak* (bur, swamp, white), basswood*, ironwood*, tulip poplar*, and maple (red & silver). Understory species include vines and poison ivy.
* found in the southern part of the region

Dominant Species* and Canopy Position

ACSA2	Upper
JUNI	Upper
FRNI	Upper
QUPAZ	Upper

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 10

Structure Data (for upper layer lifeform)

	Min	Max
Cover	60 %	100 %
Height	Tree Medium 10-24m	Tree Tall 25-49m
Tree Size Class	Large 21-33"DBH	

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

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Class E **0%**

Late1 All Structu

Description

Dominant Species* and Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover	%	%
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

Disturbances Modeled

- ☑ Fire
- ☐ Insects/Disease
- ☑ Wind/Weather/Stress
- ☑ Native Grazing
- ☐ Competition
- ☑ Other: Minor Flooding 5-20 yr.
- ☑ Other Minor Flooding 20-500 yr.

Historical Fire Size (acres)

Avg: 3
Min: 1
Max: 35

Sources of Fire Regime Data

- ☐ Literature
- ☐ Local Data
- ☐ Expert Estimate

Fire Regime Group: **3**

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					
Mixed	833			0.00120	7
Surface	61			0.01639	93
All Fires	57			0.01760	

References

Forest Cover Types of the United States and Canada, SAF 1980, F.H. Eyre, Editor.

Atlas of Current and Potential Future Distributions of Common Trees of the Eastern United States, USDA, NE Research Station, GTR NE-265.

Website: blackswamp.org/BSC.swamp.html.

Expert information from Carlen M. Emanuel, Forest Ecologist,TNC, Logan, OH.
Including all the references from existing PNVG models: NOFP and ELAS

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