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 2004-2005. For more information, please visit www.landfire.gov. Please direct questions to helpdesk@landfire.gov.

Potential Natural Vegetation Group (PNVG):

R6COLLif **Conifer Lowland embedded in Fire Resistant Ecosystem**

General Information

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

Modelers		Reviewers
KellyAnn Gorman	KellyAnn_Gorman@nps.gov	
Robert Wagner	rwagner@fs.fed.us	
Randy Swaty	rswaty@tnc.org	

Vegetation Type

Forested

Dominant Species*

PIMA	PIST
LALA	ACRU
ABBA	POTR5
THOC2	SPAF70

General Model Sources

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

LANDFIRE Mapping Zones

41	64
50	65
51	66

Rapid Assessment Model Zones

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

Geographic Range

This system occurs in Michigan's Upper Peninsula and northern parts of Lower Michigan, Minnesota, and Wisconsin; it also occurs in New York and New England in small bogs.

(This model applies to both the Great Lakes (R7) and Northeast(R6) regions).

Biophysical Site Description

This system is characterized by dense to open, low to medium-tall forests of needle-leaf evergreen and deciduous trees on shallow organic and deep peatland soils, occurring as discontinuous pockets or stringers within upland vegetation communities having long-return-interval fire regimes, such as hardwood mixes. In Minnesota and the eastern UP they may occur in very extensive delineations occupying several hundred acres. The canopy may be sparse and/or stunted, especially in acid (pH < 5.5) peatlands. Low hummocks and water-filled depressions may be present, especially around the edges. These edges tend to be poor fens in an open, acidic peatland and a rich fen in the closed canopy peatland. Forested rich peatlands (pH > 5.5) occur in closed wet depressions, especially in small watersheds or catchment areas, and drains and toe slopes adjacent to streams. Acid peatlands (pH < 5.5) occur in large, flat, poorly drained landscapes, especially peatlands on glacial lake plains, often forming adjacent to fen water tracks or in stagnant areas between heads of peatland streams and drains. Soils are very poorly drained, saturated throughout the growing season in normal years, and may be deep organic peat (acid and rich peatlands) or less than 12” of organic peat over primarily sandy soils (mineral soil bog).

Vegetation Description

The canopy is dominated by any combination of black spruce (Picea mariana), larch or tamarack (Larix laricina), balsam fir (Abies balsamea), and white cedar (Thuja occidentalis). White pine (Pinus strobus) often occurs on drier hummocks, particularly in mineral soil bogs. Broadleaf tree species may be present,

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

especially red maple (Acer rubrum), birch (Betula spp.), and quaking aspen (Populus tremuloides). The surface layer is dominated by mosses, primarily sphagnum. Brown mosses dominate pools. Pleurozium schreberi may also be abundant. Additional indicators for rich peatland include speckled alder (Alnus incana), three-leaved Solomon's seal (Smilacina trifolia), twinflower (Linnaea borealis), and tufted loosestrife (Lysimachia thrysiflora). Additional indicators for acid peatland include bog rosemary, (Andromeda glaucophylla), Indian pipe (Monotropa uniflora), and tussock cottongrass (Eriophorum vaginatum). Additional indicators for mineral soil bogs include snowberry (Symphoricarpos spp.), Labrador tea (Ledum groenlandicum), raspberry (Rubus spp.), wintergreen (Gaultheria procumbens), alder (Alnus spp.), and currant (Ribes spp.). Mineral soil bogs may have a significant herb layer characterized by bunchberry (Cornus canadensis), bracken fern (Pteridium aquilinum), goldthread (Coptis groenlandica), lily-of-the-valley (Maianthemum canadense), sedge (Carex spp.), cinnamon fern (Osmunda cinnamomea), and starflower (Trientalis borealis).

Disturbance Description

Fire Regime Group V characterizes this system. Conifer bogs generally occur as pockets in lowland areas surrounded by upland vegetation, and the fire regime is generally driven by the return interval of these upland vegetation types. Fires may occur following drought cycles and may be severe, but sites are typically very wet and fires are infrequent. Windthrow disturbances occur as a result of shallow rooting, including single-tree and small and large patches. Insect and disease outbreaks occur more frequently, primarily in mature or overmature dominant trees in both closed and open canopies, and mainly in spruce and balsam fir species. These disturbances are not replacement in scale but may be severe enough return to class C to class B every 200 years or so. Also, changes in hydrology, such as flooding or draining due to the construction or destruction of beaver dams, are another important disturbance in this system and typically change the entire unit into a wetland with an open succession pathway. Non-replacement mixed-severity fires can occur randomly in any class and are randomly associated with lightning strikes or small fires in the surrounding vegetation. Frequency will be about twice that of replacement-stand fires. These fires will maintain the A and B class but may return the C class to B. Although severe fire can occur in spruce bogs, it is not common, with a rotation ranging from 220 to over 1,000 years and a mean of 540 years. Severe, catastrophic fires may convert the community to an open bog, rich swamp, or poor fen. Catastrophic windthrow may have occurred on a 400- to over 1,000-year rotation, with a median of 700 years. Light windthrow (small patches) occurred on a rotation of 40 to 380 years, with a median of 85 years.

Adjacency or Identification Concerns

Scale Description

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

This landscape/PNVG unit can range from hundreds of acres to less than 5 acres in size. The larger delineations typically occur in central to northern Minnesota, the eastern Upper Peninsula of Michigan, and the smaller and scattered delineations in the Western Upper Peninsula, northern Lower Peninsula, and northern Wisconsin. These areas are generally homogeneous in vegetation composition, but can vary considerably in overstory coverage even within the same delineation. They may also contain scattered, better-drained islands with mineral soils and hardwoods in the larger delineations.

Issues/Problems

Many of these areas include semi-open to completely open conditions, so discussions centered around the fire response and mappability of this condition at the rapid-response level compared to the primarily forested areas. Separation of a cedar-dominated lowland/peatland was also discussed but it was decided to not attempt to separate at this scale. Fire response was also determined to not be sufficiently different at this time. Present maps of this PNVG were also determined to be lacking in accuracy. There was consensus that a great deal more acres actually exist than are shown for Michigan and Wisconsin.

Model Evolution and Comments

Peer Review by Dave Cleland and Greg Nowacki, USFS Northeast Region 9 Forest Ecologists, at Milwaukee, WI: 21 July, 2004. Assumptions: Native American fire was considered but was not determined to be a significant factor. The disturbance called Optional 1 is a placeholder representing changes in hydrology; it did not receive a probability because it happens infrequently on the scale of individual bogs and because it would be an open pathway, sending stands out of the model rather than resetting succession to A.

Succession Classes

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

Class A 10 %

Early1 All Structures

Description

Less than 55 yrs old. Young stands of mixed tamarack, black spruce, cedar and balsam fir; a shrub layer including leatherleaf, small cranberry, and blueberry; may include red maple.

Indicator Species* and Canopy Position

LALA	Upper
PIMA	Mid-Upper
THOC2	Middle
VACCI	Lower

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	10 %	75 %
Height	Tree Regen <5m	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 B 40 %

Mid1 Closed

Description

55-115 yrs old. Mature stands dominated by cedar with some black spruce, balsam fir, and tamarack; may include red maple; some shrub layer; > 75% canopy closure;

Indicator Species* and Canopy Position

THOC2	Upper
PIMA	Upper
LALA	Upper
ACRU	Mid-Upper

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	75 %	100 %
Height	Tree Short 5-9m	Tree Medium 10-24m
Tree Size Class	Pole 5-9" DBH	

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

Class C 50 %

Late1 Closed

Description

Over 115+ yrs old. Old forests returning to a more mixed tree composition and more shrub layer as the cedar canopy breaks up; > 50% canopy closure.

Indicator Species* and Canopy Position

THOC2	Upper
PIMA	Upper
ACRU	Mid-Upper
BETUL	Mid-Upper

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	50 %	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:

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

Class D **0%**

Late1 All Structures

Description

Indicator 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%**

Late1 All Structures

Description

Indicator 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

Non-Fire Disturbances Modeled

☑ Insects/Disease
☑ Wind/Weather/Stress
☐ Native Grazing
☐ Competition
☐ Other:
☐ Other:

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

Historical Fire Size (acres)

Avg:
Min:
Max:

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 the 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.

Sources of Fire Regime Data

☑ Literature
☐ Local Data
☑ Expert Estimate

	Avg FI	*Min FI*	*Max FI*	*Probability*	*Percent of All Fires*
Replacement	540	220	1000	0.00185	36
Mixed	300			0.00333	64
Surface					
All Fires	193			0.0052	

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