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):

R6COLLff **Conifer Lowland embedded in Fire Prone System**

General Information

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

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

Vegetation Type

Forested

Dominant Species*

PIMA	PIST
LALA	ACRU
THOC2	BETUL
PIBA2	POTR5

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 setting occurs in Michigan's Upper Peninsula and northern parts of Lower Michigan, northern and central Minnesota, and northern Wisconsin. It also occurs in New York and New England in smaller scattered bogs and fens.

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

Biophysical Site Description

This system is typified by dense to open, low to medium-tall forests of needle-leaf evergreen and deciduous trees on shallow organic and deep peatland soils. They occur primarily as discontinuous pockets or stringers within fire-prone upland vegetation communities which are primarily pine communities. 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 very 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 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 combinations of black spruce, tamarack, white cedar, and jackpine with white pine occurring on drier hummocks - particularly in mineral soil bogs. Broadleaf tree species may also be

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

present in the understory, with red maple, quaking aspen, and birch being the most common. The understory is dominated by ericaceous shrubs and fine-leaved graminoids, especially small cranberries, blueberries, wild lily-of-the-valley, willows, bog birch, bog laurel, and sedges. The surface layer is dominated by mosses, primarily sphagnum. Brown mosses dominate pools. Pleurozium schreberi may also be abundant. For rich peatlands, additional indicators include speckled alder, twinflower, and tufted loosestrife. For acid peatlands, additional indicators include bog rosemary, Indian pipe, tussock cotton grass and leatherleaf. Additional indicators for mineral soil bogs are snowberry, labrador tea, raspberry, wintergreen, alder, and currant. Mineral bogs may also have a significant herb layer characterized by bunchberry, bracken fern, goldthread, sedges, and starflower.

Disturbance Description

These conifer lowlands generally occur as pockets in lowland areas surrounded by upland vegetation, and the fire regime is generally driven by the return interval of the upland vegetation. Fires may occur following drought cycles and may be severe, but sites are typically very wet and fires are infrequent. Non-replacement mixed fires occur at a slightly higher frequency than severe fires at once every 100 years and typically do not result in a class change; however, they may result in a structural change from closed to open within a class about half the time. Windthrow as a result of shallow rooting, including single-tree and small and large patches, and changes in hydrology, such as flooding or draining as a result of the construction or destruction of beaver dams, are two other important disturbances in this system. Insects and disease are a secondary disturbance and can occur most frequently in mid to late closed canopy systems and less frequently in mid to late open systems. This typically results in either no change within a class or a change from closed to open within a class, but is not stand-replacing. Frequency can be as often as every 50 years or as infrequent as every 200 years depending on the amount of spruce and balsam density. Although severe fire can occur in fens and bogs, it is not common, with a rotation ranging from 220 to over 1,000 years with a mean of 540 years. Severe, catastrophic fires may convert the community to an open bog, rich swamp, or poor fen. Moderate-severity fires may also be stand-replacing, killing black spruce These are more common at 90-year to 220-year intervals, with a mean interval of 120 years. Catastrophic windthrow may have occurred on a rotation of 400 to over 1,000 years, with a median of 550 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 many 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 delineations 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 on the map for Michigan and Wisconsin.

Model Evolution and Comments

Peer Review by Dave Cleland and Greg Nowacki, UFSF 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. For stand-replacement fires: Whether a shrub layer is present or not, trees have crown ratios nearing 1.0, so low-, moderate-, and high-severity fires all spread through the canopy. For non-replacement fires: Because most species
have thin bark and rarely reproduce vegetatively, non-replacement fires are
effectively non-existent. Assumptions: Open/closed canopy closure breakpoint is 75%.· Native American fire was considered but not determined to be a significant factor. Peer Review by Dave Cleland and Greg Nowacki, UFSF Northeast Region 9 Forest Ecologists, at Milwaukee, WI: 21 July, 2004. Regional differences in distribution and composition of this PNVG exist, especially between Minnesota and Michigan/Wisconsin.

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 Open

Description

0-15 years old. Early post-replacement forest dominated by tamarack and shrub species such as leatherleaf, small cranberry, and blueberry; jack pine may be present.

Indicator Species* and Canopy Position

LALA	Upper
CHAMA5	Lower
VAOX	Lower
VACCI	Lower

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	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:

Shrubs such as bog laurel, bog rosemary, leatherleaf, and willow. Minimum cover is 10% and maximum cover is 50%

Class B 10 %

Mid1 Closed

Description

15-55 yrs old. Young forests generally dominated by tamarack with black
spruce; cedar and possibly balsam fir becoming a significant component; > 75% canopy closure.

Indicator Species* and Canopy Position

LALA	Upper
PIMA	Mid-Upper
THOC2	Low-Mid
ABBA	Middle

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 30 %

Mid2 Open

Description

15-55 yrs old. Young forests generally dominated by tamarack, with lesser amounts of black spruce and possibly jack pine; cedar only a minor component; shrub layer dominated by ericaceous species.

Indicator Species* and Canopy Position

LALA	Upper
PIMA	Mid-Upper
PIBA2	Mid-Upper
KAPO	Lower

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	25 %	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 D 10 %

Late1 Open

Description

55+ yrs old. Mature forest now dominated by black spruce with lesser amounts of tamarack; cedar is a minor component; significant shrub layer of ericaceous species.

Indicator Species* and Canopy Position

PIMA	Upper
LALA	Upper
KAPO	Lower
CHAMA5	Lower

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	25 %	75 %
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 E 30 %

Late2 Closed

Description

55+ yrs old. Mature forest dominated by black spruce with cedar and balsam fir but little tamarack; > 75% canopy closure.

Indicator Species* and Canopy Position

PIMA	Upper
THOC2	Mid-Upper
ABBA	Mid-Upper
CHAMA5	Lower

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:

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

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

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

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

	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
Replacement	120	90	220	0.00833	45
Mixed	100			0.01	55
Surface					
All Fires	55			0.01834	

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