

13440

Boreal Jack Pine-Black Spruce Forest

BpS Model/Description Version: Aug. 2020

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None	None	None	None

Vegetation Type

Forest and Woodland

Map Zones

41

Geographic Range

This biophysical setting occurs in Minnesota and Wisconsin. In Minnesota this system occurs in subsections 212 La, 212 Lb and 212 Mb.

Biophysical Site Description

This community type is found in shallow, loamy to sandy, nutrient-poor soils over glacially scoured granite bedrock of the Canadian Shield. The soil is excessively drained and the soil regime is dry.

Vegetation Description

Vegetation is dominated by jack pine, black spruce, white spruce, trembling aspen, paper birch, and balsam fir. Tree canopy can range from 25-100%, from a patchy open woodland to a continuous forest. The subcanopy is rare to non-existent. Common shrubs include junberries, blueberries, and bush honeysuckle, and shrub-sized saplings of canopy trees. Ground flora includes feathermoss, lichens, Canada mayflower, bunchberry, twinflower, and large-leaved aster (MNDNR 2007).

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
PIBA2	<i>Pinus banksiana</i>	Jack pine
PIRE	<i>Pinus resinosa</i>	Red pine
PIST	<i>Pinus strobus</i>	Eastern white pine
PIMA	<i>Picea mariana</i>	Black spruce
BETUL	<i>Betula</i>	Birch
POTR5	<i>Populus tremuloides</i>	Quaking aspen

Species names are from the NRCS PLANTS database. Check species codes at <http://plants.usda.gov>.

Disturbance Description

Lee Frelich has suggested that this is the second most flammable ecosystem in the United States, behind chaparral (Frelich, personal communication). This dry, excessively drained upland system is a fire-prone forest type. Frelich (2002) suggests that this community type experienced severe crown fires every 50-100yrs.

Infrequent catastrophic windthrow, occurring at an interval >1,000yrs may also occur (Frelich 2002 and MNDNR 2007).

Surface fires are not reported in this system.

There are insect outbreaks in this system, but experts did not provide return intervals and did not think that the succession class structure or percentages would be significantly altered.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	83	100		
Moderate (Mixed)				
Low (Surface)				
All Fires	83	100		

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. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

Scale Description

None

Adjacency or Identification Concerns

Mark White compiled a list of ecological communities and fit under this system:

Since the jack pine-black spruce forest is broadly defined, it occurs across a range of nutrient conditions and soil types, including from shallow to deep, dry, and mesic soils, varying from poor to moderate nutrient availability. However, this system tends to be found more frequently on shallow soils over bedrock or on sand. The soils are moderately to well-drained, and have poor-to-moderate nutrient availability. This matrix-forming forest ecosystem may be thought of as a grouping of individual forest types in various forest classifications. The grouping is defined by the disturbance regime and the general structure and composition of the component associations. Below are tables that list individual forest types in other classification systems that would be considered part of the jack pine-black spruce forest system. Some dominant species are not jack pine or black spruce and represent other successional stages of this forest ecosystem.

MN CBS Native Plant Communities (Class Level of Hierarchy)

FDn32 Northern Poor Dry-mesic Pine Mixed Woodland

ON MNR Forest Ecosystems

V17 Jack Pine Mixedwood / Shrub Rich

V18 Jack Pine Mixedwood / Feathermoss

V19 Black Spruce Mixedwood / Herb Rich

V20 Black Spruce Mixedwood / Feathermoss

V28 Jack Pine / Low Shrub

V29 Jack Pine / Ericaceous Shrub / Feathermoss

V30 Jack Pine - Black Spruce / Blueberry / Lichen

V31 Black Spruce - Jack Pine

V32 Jack Pine - Black Spruce / Ericaceous Shrub / Feathermoss

NVC/ICEC Plant Associations

CEGL002448 Jack Pine - Black Spruce / Feathermoss Forest
 CEGl002483 Boreal Pine Rocky Woodland
 CEGl002519 Jack Pine - Aspen - Black Spruce / Feathermoss Forest
 CEGl002437 Jack Pine / Balsam Fir Forest
 CEGl002518 Jack Pine - Aspen / Bush-honeysuckle Forest
 CEGl002441 Jack Pine / Blueberry / Feathermoss Forest
 CEGl002594 Black Spruce - Jack Pine / Tall Shrub Forest
 CEGl002516 Black Spruce - Aspen Rich Forest
 CEGl002527 Boreal Transition Black Spruce / Lichen Open Woodland
 CEGl002523 Boreal Transition Black Spruce Woodland

On average, stand-replacing fires would burn a given area of this forest ecosystem.

Issues or Problems

Native Uncharacteristic Conditions

Comments

Succession Classes

Mapping Rules

Upper Layer Lifeform	Height (m)	Canopy Cover (%)									
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Herb	0-0.5	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Herb	0.5-1.0	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Herb	>1.0	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Shrub	0-0.5	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Shrub	0.5-1.0	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Shrub	1.0-3.0	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Shrub	>3.0	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	0-5	A	A	A	A	A	B	B	B	B	B
Tree	5-10	A	A	A	A	C	C	C	D	D	D
Tree	10-25	A	A	A	A	C	C	E	E	D	D
Tree	25-50	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	>50	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leafform distinction where a qualifier is added to the class letter: Brdl (broadleaf), Con (conifer), or Mix (mixed conifer and broadleaf). UN refers to uncharacteristic native or a combination of height and cover that would not be expected under the reference condition. NP refers to not possible or a combination of height and cover which is not physiologically possible for the species in the BpS.

Description

Class A	2	Early Development 1 - All Structures
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ABBA	Abies balsamea	Balsam fir	Upper
PIGL	Picea glauca	White spruce	Upper

Description

Seedling fir, spruce, and cedar because of windthrow in the other classes. A replacement fire in this state will result in seedling jack pine (Box B). Frelich reports a fire return interval of 100yrs for this state.

Maximum Tree Size Class

Sapling >4.5ft; <5"DBH

Class B	22	Early Development 2 - Closed
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIBA2	Pinus banksiana	Jack pine	Upper
PIMA	Picea mariana	Black spruce	Upper

Description

Jack Pines Canopy cover is patchy. Understory is feathermoss.

Maximum Tree Size Class

Sapling >4.5ft; <5"DBH

Class C	3	Mid Development 1 - Closed
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ABBA	Abies balsamea	Balsam fir	Upper
PIGL	Picea glauca	White spruce	Upper

Description

Sapling-to-pole spruce, fir, and cedar.

Maximum Tree Size Class

Medium 9-21"DBH

Class D	51	Mid Development 2 - Closed
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Indicator Species

Replacement Fire	Mid1:CLS	Early2:CLS	0.01	100	Yes	0
Wind or Weather or Stress	Mid2:CLS	Early1:ALL	0.001	1000	Yes	0
Replacement Fire	Mid2:CLS	Early2:CLS	0.013	77	Yes	0
Wind or Weather or Stress	Late1:CLS	Early1:ALL	0.001	1000	Yes	0
Replacement Fire	Late1:CLS	Early2:CLS	0.013	77	Yes	0

References

Frelich, L.E. 2002. Forest Dynamics and Disturbance Regimes. Cambridge University Press: Cambridge UK. 266 pp.

Minnesota Department of Natural Resources. 2007. FDn32 Northern Poor Dry-Meisc Mixed Woodland Factsheet.

[Http://files.dnr.state.mn.us/natural_resources/npc/fire_dependent_forest/fdn32.pdf](http://files.dnr.state.mn.us/natural_resources/npc/fire_dependent_forest/fdn32.pdf). Accessed on 05/01/07.

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. Data current as of 10 February 2007.