



FDC23, wildfire and salvage origin, natural regeneration 1975

# Individual Plot Report

**Plot:** FDc23-0021  
**UTM Northing:** 5185843  
**UTM Easting:** 363584  
**Plot Type:** BMK  
**Surveyor(s):** Brian Hoffmann, Harvey Tjader  
**Date:** 28  
**Month Text:** AUG  
**Year:** 2020  
**Azimuth1:** 85  
**Azimuth2:** 0  
**Comments:** Comparison site for FDc23 herbicide recovery case study. Jack pine dominated stand about 45 years old. Fire scars and char on older red pines and the existence of fire plow furrows suggest that the stand originated after a wildfire. [t13933w1360188]

Cumulative Count of Species				
Plot Area (m2)	Native	Introduced	Invasive	
1	8	0	0	
2	11	0	0	
4	13	0	0	
8	16	0	0	
16	23	1	0	
32	28	1	0	
64	29	2	0	
128	42	2	0	
256	44	2	0	
512	52	2	0	
1024	66	3	0	

Species Present by Plot	
<b>Plot area (m2):</b> 1	<ul style="list-style-type: none"> <li><i>Betula papyrifera</i> (Paper-birch)</li> <li><i>Corylus americana</i> (American hazelnut)</li> <li><i>Galium boreale</i> (Northern bedstraw)</li> <li><i>Gaultheria procumbens</i> (Wintergreen)</li> <li><i>Lathyrus ochroleucus</i> (Pale vetchling)</li> <li><i>Maianthemum canadense</i> (Canada mayflower)</li> <li><i>Pleurozium schreberi</i> (Feathermoss)</li> <li><i>Vaccinium angustifolium</i> (Lowbush blueberry)</li> </ul>
<b>Plot area (m2):</b> 2	<ul style="list-style-type: none"> <li><i>Corylus cornuta</i> (Beaked hazelnut)</li> <li><i>Fragaria virginiana</i> (Common strawberry)</li> <li><i>Quercus macrocarpa</i> (Bur oak)</li> </ul>

<b>Plot area (m2):</b> 4	<ul style="list-style-type: none"> <li><i>Melampyrum lineare</i> (Cow-wheat)</li> <li><i>Salix humilis</i> (Prairie willow)</li> </ul>
<b>Plot area (m2):</b> 8	<ul style="list-style-type: none"> <li><i>Amelanchier</i> (Juneberry)</li> <li><i>Andropogon gerardii</i> (Big bluestem)</li> <li><i>Prunus virginiana</i> (Chokecherry)</li> </ul>
<b>Plot area (m2):</b> 16	<ul style="list-style-type: none"> <li><i>Achillea millefolium</i> (Yarrow)</li> <li><i>Anemone quinquefolia</i> (Wood-anemone)</li> <li><i>Campanula rotundifolia</i> (Harebell)</li> <li><i>Epilobium angustifolium</i> (Fireweed)</li> <li><i>Lathyrus venosus</i> (Veiny pea)</li> <li><i>Lithospermum canescens</i> (Hoary puccoon)</li> <li><i>Pinus banksiana</i> (Jack pine)</li> <li><i>Rubus strigosus</i> (Red raspberry)</li> </ul>
<b>Plot area (m2):</b> 32	<ul style="list-style-type: none"> <li><i>Antennaria</i> (Pussytoes)</li> <li><i>Carex pensylvanica</i> (Pennsylvania sedge)</li> <li><i>Galium triflorum</i> (Three-flowered bedstraw)</li> <li><i>Solidago speciosa</i> (Showy goldenrod)</li> <li><i>Viola adunca</i> (Sand violet)</li> </ul>
<b>Plot area (m2):</b> 64	<ul style="list-style-type: none"> <li><i>Oryzopsis pungens</i> (Sharp-pointed rice-grass)</li> <li><i>Taraxacum officinale</i> (Common dandelion)</li> </ul>
<b>Plot area (m2):</b> 128	<ul style="list-style-type: none"> <li><i>Arctostaphylos uva-ursi</i> (Bearberry)</li> <li><i>Aster laevis</i> (Smooth aster)</li> <li><i>Aster oolentangiensis</i> (Sky-blue aster)</li> <li><i>Danthonia spicata</i> (Poverty grass)</li> <li><i>Goodyera tessellata</i> (Tesselate rattlesnake-plantain)</li> <li><i>Krigia biflora</i> (Two-flowered Cynthia)</li> <li><i>Quercus rubra</i> (Northern red oak)</li> <li><i>Rubus flagellaris</i> (Common eastern dewberry)</li> <li><i>Schizachne purpurascens</i> (False melic grass)</li> <li><i>Senecio pauperculus</i> (Balsam ragwort)</li> <li><i>Solidago hispida</i> (Hairy goldenrod)</li> <li><i>Sorghastrum nutans</i> (Indian grass)</li> <li><i>Symphoricarpos occidentalis</i> (Wolfberry)</li> </ul>
<b>Plot area (m2):</b> 256	<ul style="list-style-type: none"> <li><i>Acer rubrum</i> (Red maple)</li> <li><i>Prunus pumila</i> (Sand cherry)</li> </ul>
<b>Plot area (m2):</b> 512	<ul style="list-style-type: none"> <li><i>Aster ciliolatus</i> (Lindley's aster)</li> <li><i>Ceanothus herbaceus</i> (Oval-leaved New Jersey tea)</li> <li><i>Conyza canadensis</i> (Horseweed)</li> <li><i>Elymus trachycaulus</i> (Slender wheatgrass)</li> <li><i>Geranium maculatum</i> (Wild geranium)</li> <li><i>Hieracium scabriusculum</i> (Rough hawkweed)</li> <li><i>Populus tremuloides</i> (Quaking aspen)</li> </ul>





FDc23, natural origin aspen stand 1986

## Individual Plot Report

**Plot:** FDc23-0019  
**UTM Northing:** 5184050  
**UTM Easting:** 359892  
**Plot Type:** SA1  
**Surveyor(s):** Harvey Tjader  
**Date:** 4  
**Month Text:** AUG  
**Year:** 2020  
**Azimuth1:** 90  
**Azimuth2:** 0  
**Comments:** Herbicide recovery case study. This site was clearcut, followed by no site preparation or planting. It is dominated by 30 year old quaking aspen. [t13833w1030055]

### Cumulative Count of Species

Plot Area (m <sup>2</sup> )	Native	Introduced	Invasive
1	11	0	0
2	14	0	0
4	18	0	0
8	23	0	0
16	28	0	0
32	31	0	0
64	35	1	0
128	43	1	0
256	50	1	0
512	52	1	0
1024	61	1	0

### Species Present by Plot

**Plot area (m<sup>2</sup>):** 1

*Anemone quinquefolia* (Wood-anemone)  
*Aster ciliolatus* (Lindley's aster)  
*Carex pensylvanica* (Pennsylvania sedge)  
*Diervilla lonicera* (Bush honeysuckle)  
*Galium boreale* (Northern bedstraw)  
*Lathyrus ochroleucus* (Pale vetchling)  
*Maianthemum canadense* (Canada mayflower)  
*Oryzopsis asperifolia* (Mountain rice-grass)  
*Quercus macrocarpa* (Bur oak)  
*Rubus pubescens* (Dwarf raspberry)  
*Rubus strigosus* (Red raspberry)

**Plot area (m<sup>2</sup>):** 2

*Corylus americana* (American hazelnut)  
*Fragaria virginiana* (Common strawberry)

*Schizachne purpurascens* (False melic grass)

**Plot area (m<sup>2</sup>):** 4

*Rosa acicularis* (Prickly rose)  
*Rubus allegheniensis* (High-bush blackberry)  
*Symphoricarpos albus* (Snowberry)  
*Thalictrum dioicum* (Early meadow-rue)

**Plot area (m<sup>2</sup>):** 8

*Amelanchier* (Juneberry)  
*Aster laevis* (Smooth aster)  
*Osmorhiza claytonii* (Clayton's sweet cicely)  
*Populus tremuloides* (Quaking aspen)  
*Toxicodendron rydbergii* (Western poison ivy)

**Plot area (m<sup>2</sup>):** 16

*Aralia nudicaulis* (Wild sarsaparilla)  
*Aster urophyllus* (Tail-leaved aster)  
*Prunus pensylvanica* (Pin cherry)  
*Prunus virginiana* (Chokecherry)  
*Viburnum lentago* (Nannyberry)

**Plot area (m<sup>2</sup>):** 32

*Galium triflorum* (Three-flowered bedstraw)  
*Muhlenbergia glomerata* (Clustered muhly grass)  
*Symphoricarpos occidentalis* (Wolfberry)

**Plot area (m<sup>2</sup>):** 64

*Achillea millefolium* (Yarrow)  
*Apocynum androsaemifolium* (Spreading dogbane)  
*Astragalus canadensis* (Canada milk-vetch)  
*Convolvulus spithameus* (Upright bindweed)  
*Vaccinium angustifolium* (Lowbush blueberry)

**Plot area (m<sup>2</sup>):** 128

*Lathyrus venosus* (Veiny pea)  
*Prunus pumila* (Sand cherry)  
*Prunus serotina* (Black cherry)  
*Pyrola asarifolia* (Pink-flowered pyrola)  
*Pyrola rotundifolia* (Round-leaved pyrola)  
*Pyrola secunda* (One-sided pyrola)  
*Rubus flagellaris* (Common eastern dewberry)  
*Sanicula marilandica* (Maryland black snakeroot)

**Plot area (m<sup>2</sup>):** 256

*Anemone canadensis* (Canada anemone)  
*Dryopteris carthusiana* (Spinulose shield-fern)  
*Parthenocissus inserta* (Five-leaved Virginia creeper)  
*Prenanthes alba* (White rattlesnake-root)  
*Pyrola chlorantha* (Green-flowered pyrola)  
*Quercus rubra* (Northern red oak)  
*Uvularia sessilifolia* (Pale bellwort)

**Plot area (m<sup>2</sup>):** 512

*Pteridium aquilinum* (Bracken)  
*Smilax* (Greenbrier; Carrion-flower)

**Plot area (m<sup>2</sup>):** 1024

*Agrimonia gryposepala* (Stickweed)





FDc23, mechanical site preparation, planted red pine 1985

## Individual Plot Report

**Plot:** FDC23-0016  
**UTM Northing:** 5183081  
**UTM Easting:** 353722  
**Plot Type:** SA1  
**Surveyor(s):** B. Hoffman, H. Tjdader, I. Guida  
**Date:** 28  
**Month Text:** 7  
**Year:** 2020  
**Azimuth1:** 90  
**Azimuth2:** 0  
**Comments:** FDC23 herbicide recovery case study. Site was mechanically site prepped in 1985. [Convolvulus spp in 1024 is Black Bindweed-Fallopia convolvulus] [t13834w1120081]

### Cumulative Count of Species

Plot Area (m <sup>2</sup> )	Native	Introduced	Invasive
1	12	0	0
2	14	1	0
4	20	1	0
8	24	1	0
16	27	1	0
32	30	1	0
64	36	1	0
128	46	1	0
256	53	3	0
512	64	5	1
1024	72	5	1

### Species Present by Plot

**Plot area (m<sup>2</sup>):** 1

Agastache foeniculum (Blue giant-hyssop)  
 Apocynum androsaemifolium (Spreading dogbane)  
 Asclepias ovalifolia (Oval-leaved milkweed)  
 Campanula rotundifolia (Harebell)  
 Carex pensylvanica (Pennsylvania sedge)  
 Chimaphila umbellata (Pipsissewa)  
 Maianthemum canadense (Canada mayflower)  
 Pleurozium schreberi (Feathermoss)  
 Prunus serotina (Black cherry)  
 Pyrola secunda (One-sided pyrola)  
 Schizachne purpurascens (False melic grass)  
 Symphoricarpos occidentalis (Wolfberry)

**Plot area (m<sup>2</sup>):** 2

Achillea millefolium (Yarrow)

Melampyrum lineare (Cow-wheat)

Prunus virginiana (Chokecherry)

**Plot area (m<sup>2</sup>):** 4

Oryzopsis pungens (Sharp-pointed rice-grass)

Physalis virginiana (Ground-cherry)

Pinus banksiana (Jack pine)

Pinus resinosa (Red pine)

Populus tremuloides (Quaking aspen)

Rubus strigosus (Red raspberry)

**Plot area (m<sup>2</sup>):** 8

Amelanchier (Juneberry)

Fragaria virginiana (Common strawberry)

Quercus macrocarpa (Bur oak)

Viola conspersa (Dog violet)

**Plot area (m<sup>2</sup>):** 16

Corylus cornuta (Beaked hazelnut)

Prunus pumila (Sand cherry)

Rosa acicularis (Prickly rose)

**Plot area (m<sup>2</sup>):** 32

Aster oolentanensis (Sky-blue aster)

Crataegus (Hawthorn)

Quercus rubra (Northern red oak)

**Plot area (m<sup>2</sup>):** 64

Andropogon gerardii (Big bluestem)

Galium triflorum (Three-flowered bedstraw)

Lathyrus ochroleucus (Pale vetchling)

Oryzopsis asperifolia (Mountain rice-grass)

Pyrola asarifolia (Pink-flowered pyrola)

Toxicodendron rydbergii (Western poison ivy)

**Plot area (m<sup>2</sup>):** 128

Agrimonia striata (Roadside agrimony)

Aralia nudicaulis (Wild sarsaparilla)

Aster ciliolatus (Lindley's aster)

Aster laevis (Smooth aster)

Danthonia spicata (Poverty grass)

Muhlenbergia glomerata (Clustered muhly grass)

Poa pratensis (Kentucky bluegrass)

Vaccinium angustifolium (Lowbush blueberry)

Viburnum rafinesquianum (Downy arrow-wood)

Vicia americana (American vetch)

**Plot area (m<sup>2</sup>):** 256

Agropyron repens (Quack grass)

Astragalus canadensis (Canada milk-vetch)

Bromus ciliatus (Fringed brome)

Lactuca biennis (Biennial blue lettuce)

Lathyrus venosus (Veiny pea)

Lithospermum canescens (Hoary puccoon)

Solidago juncea (Early goldenrod)

Stachys (Hedge-nettle, Woundwort)

Taraxacum officinale (Common dandelion)





FDc23, mechanical site preparation, planted red pine 2005

## Individual Plot Report

**Plot:** FDc23-0017  
**UTM Northing:** 5181054  
**UTM Easting:** 357335  
**Plot Type:** SA1  
**Surveyor(s):** M. Huseby, H. Tjader, P. Miksell  
**Date:** 29  
**Month Text:** 7  
**Year:** 2020  
**Azimuth1:** 90  
**Azimuth2:** 0  
**Comments:** Part of the FDc23 herbicide recovery case study, this site had mechanical site prep in 2005. This was a very challenging plot due to the number of non-native and prairie species. [carex in plot 64 is *Carex duriuscula*] [t13833w1160205]

### Cumulative Count of Species

Plot Area (m <sup>2</sup> )	Native	Introduced	Invasive
1	12	1	0
2	15	2	0
4	19	5	0
8	21	6	0
16	28	6	0
32	34	6	0
64	45	6	0
128	52	7	0
256	57	8	0
512	61	8	0
1024	69	11	0

### Species Present by Plot

**Plot area (m<sup>2</sup>):** 1  
*Agropyron repens* (Quack grass)  
*Ambrosia artemisiifolia* (Common ragweed)  
*Aster laevis* (Smooth aster)  
*Fragaria virginiana* (Common strawberry)  
*Lathyrus ochroleucus* (Pale vetchling)  
*Luzula acuminata* (Pointed wood-rush)  
*Muhlenbergia glomerata* (Clustered muhly grass)  
*Physalis virginiana* (Ground-cherry)  
*Rosa acicularis* (Prickly rose)  
*Rubus strigosus* (Red raspberry)  
*Rudbeckia hirta* (Black-eyed Susan)  
*Solidago* (Goldenrod)  
*Viola adunca* (Sand violet)

**Plot area (m<sup>2</sup>):** 2  
*Agrostis scabra* (Rough bent-grass)  
*Apocynum androsaemifolium* (Spreading dogbane)  
*Carex* (Sedge)  
*Crepis tectorum* (Yellow hawk's-beard)

**Plot area (m<sup>2</sup>):** 4  
*Achillea millefolium* (Yarrow)  
*Aster oolentangiensis* (Sky-blue aster)  
*Conyza canadensis* (Horseweed)  
*Corylus americana* (American hazelnut)  
*Hieracium scabriusculum* (Rough hawkweed)  
*Trifolium pratense* (Red clover)  
*Trifolium repens* (White clover)

**Plot area (m<sup>2</sup>):** 8  
*Aster ericoides* (Heath aster)  
*Pleurozium schreberi* (Feathermoss)  
*Potentilla argentea* (Silvery cinquefoil)

**Plot area (m<sup>2</sup>):** 16  
*Maianthemum canadense* (Canada mayflower)  
*Pinus banksiana* (Jack pine)  
*Pinus resinosa* (Red pine)  
*Poa pratensis* (Kentucky bluegrass)  
*Prunus virginiana* (Chokecherry)  
*Solidago nemoralis* (Gray goldenrod)  
*Solidago rigida* (Stiff goldenrod)

**Plot area (m<sup>2</sup>):** 32  
*Amelanchier* (Juneberry)  
*Anemone quinquefolia* (Wood-anemone)  
*Aster urophyllus* (Tail-leaved aster)  
*Comandra umbellata* (Bastard toad-flax)  
*Melampyrum lineare* (Cow-wheat)  
*Toxicodendron rydbergii* (Western poison ivy)

**Plot area (m<sup>2</sup>):** 64  
*Agrimonia striata* (Roadside agrimony)  
*Andropogon gerardii* (Big bluestem)  
*Aster ciliolatus* (Lindley's aster)  
*Carex* (Needleleaf sedge)  
*Carex pennsylvanica* (Pennsylvania sedge)  
*Convolvulus* (Black Bindweed)  
*Danthonia spicata* (Poverty grass)  
*Helianthemum bicknellii* (Hoary frostweed)  
*Prunus serotina* (Black cherry)  
*Quercus macrocarpa* (Bur oak)  
*Symphoricarpos albus* (Snowberry)

**Plot area (m<sup>2</sup>):** 128  
*Asclepias ovalifolia* (Oval-leaved milkweed)  
*Asclepias syriaca* (Common milkweed)  
*Betula papyrifera* (Paper-birch)  
*Lathyrus venosus* (Veiny pea)  
*Quercus rubra* (Northern red oak)  
*Salix humilis* (Prairie willow)





FDc23, herbicide site preparation, planted red pine 1988

## Individual Plot Report

**Plot:** FDc23-0018  
**UTM Northing:** 5183504  
**UTM Easting:** 354016  
**Plot Type:** SA1  
**Surveyor(s):** Harvey Tjader  
**Date:** 3  
**Month Text:** AUG  
**Year:** 2020  
**Azimuth1:** 88  
**Azimuth2:** 357  
**Comments:** FDc23 herbicide recovery case study. Herbicide applied in 1988. Red Pine planted. [t13834w1120075]

### Cumulative Count of Species

Plot Area (m <sup>2</sup> )	Native	Introduced	Invasive
1	11	0	0
2	12	0	0
4	17	1	0
8	23	1	0
16	27	2	0
32	38	2	0
64	42	2	0
128	51	2	0
256	55	2	0
512	62	3	0
1024	71	3	0

### Species Present by Plot

**Plot area (m<sup>2</sup>):** 1

*Anaphalis margaritacea* (Pearly everlasting)  
*Aster laevis* (Smooth aster)  
*Aster urophyllus* (Tail-leaved aster)  
*Carex pensylvanica* (Pennsylvania sedge)  
*Fragaria virginiana* (Common strawberry)  
*Galium boreale* (Northern bedstraw)  
*Oryzopsis asperifolia* (Mountain rice-grass)  
*Physalis virginiana* (Ground-cherry)  
*Pleurozium schreberi* (Feathermoss)  
*Schizachne purpurascens* (False melic grass)  
*Vaccinium angustifolium* (Lowbush blueberry)

**Plot area (m<sup>2</sup>):** 2

*Apocynum androsaemifolium* (Spreading dogbane)

**Plot area (m<sup>2</sup>):** 4

*Amelanchier* (Juneberry)  
*Lathyrus ochroleucus* (Pale vetchling)  
*Lithospermum canescens* (Hoary puccoon)  
*Malaxis unifolia* (Green adder's-mouth)  
*Pulsatilla nuttalliana* (Pasque-flower)  
*Taraxacum officinale* (Common dandelion)

**Plot area (m<sup>2</sup>):** 8

*Andropogon gerardii* (Big bluestem)  
*Antennaria* (Pussytoes)  
*Corylus americana* (American hazelnut)  
*Maianthemum canadense* (Canada mayflower)  
*Prunus serotina* (Black cherry)  
*Spiraea alba* (Meadowsweet)

**Plot area (m<sup>2</sup>):** 16

*Achillea millefolium* (Yarrow)  
*Agrimonia gryposepala* (Stickweed)  
*Oryzopsis pungens* (Sharp-pointed rice-grass)  
*Prunus virginiana* (Chokecherry)  
*Rosa acicularis* (Prickly rose)

**Plot area (m<sup>2</sup>):** 32

*Asclepias ovalifolia* (Oval-leaved milkweed)  
*Campanula rotundifolia* (Harebell)  
*Cornus foemina* (Gray dogwood)  
*Danthonia spicata* (Poverty grass)  
*Pinus resinosa* (Red pine)  
*Quercus rubra* (Northern red oak)  
*Rubus flagellaris* (Common eastern dewberry)  
*Rubus strigosus* (Red raspberry)  
*Solidago hispida* (Hairy goldenrod)  
*Symphoricarpos occidentalis* (Wolfberry)  
*Uvularia sessilifolia* (Pale bellwort)

**Plot area (m<sup>2</sup>):** 64

*Aster laevis* (Smooth aster)  
*Aster macrophyllus* (Large-leaved aster)  
*Muhlenbergia glomerata* (Clustered muhly grass)  
*Quercus macrocarpa* (Bur oak)

**Plot area (m<sup>2</sup>):** 128

*Anemone virginiana* (Virginia thimbleweed)  
*Hieracium scabriusculum* (Rough hawkweed)  
*Picea glauca* (White spruce)  
*Pinus banksiana* (Jack pine)  
*Pyrola secunda* (One-sided pyrola)  
*Rubus allegheniensis* (High-bush blackberry)  
*Symphoricarpos albus* (Snowberry)  
*Thalictrum dioicum* (Early meadow-rue)  
*Toxicodendron rydbergii* (Western poison ivy)

**Plot area (m<sup>2</sup>):** 256

*Anemone canadensis* (Canada anemone)  
*Melampyrum lineare* (Cow-wheat)  
*Populus tremuloides* (Quaking aspen)





FDc23, herbicide & disc trench site preparation, planted red pine 2002

## Individual Plot Report

**Plot:** FDC23-0020  
**UTM Northing:** 5180089  
**UTM Easting:** 357101  
**Plot Type:** SA1  
**Surveyor(s):** Brian Hoffman, Harvey Tjader  
**Date:** 7  
**Month Text:** AUG  
**Year:** 2020  
**Azimuth1:** 90  
**Azimuth2:** 0  
**Comments:** FDC23 herbicide recovery case study. Herbicide applied in 2002. Red Pine plantation, very brushy! It looks like FDC24, but keys out to FDC23. [Dalea spp in plot 256 is Dalea purpurea] [stand t13833w1210570]

### Cumulative Count of Species

Plot Area (m <sup>2</sup> )	Native	Introduced	Invasive
1	14	1	0
2	17	1	0
4	23	1	0
8	25	1	0
16	28	2	0
32	32	2	0
64	37	2	0
128	43	2	0
256	52	2	0
512	57	2	0
1024	66	2	0

### Species Present by Plot

**Plot area (m<sup>2</sup>):** 1

*Achillea millefolium* (Yarrow)  
*Apocynum androsaemifolium* (Spreading dogbane)  
*Carex pensylvanica* (Pennsylvania sedge)  
*Elymus canadensis* (Canada wild rye)  
*Fragaria virginiana* (Common strawberry)  
*Galium boreale* (Northern bedstraw)  
*Lathyrus ochroleucus* (Pale vetchling)  
*Maianthemum canadense* (Canada mayflower)  
*Muhlenbergia glomerata* (Clustered muhly grass)  
*Rubus flagellaris* (Common eastern dewberry)  
*Rubus strigosus* (Red raspberry)  
*Thalictrum dioicum* (Early meadow-rue)  
*Toxicodendron rydbergii* (Western poison ivy)

*Vicia americana* (American vetch)

*Viola adunca* (Sand violet)

**Plot area (m<sup>2</sup>):** 2

*Danthonia spicata* (Poverty grass)

*Heuchera richardsonii* (Alum-root)

*Prunus americana* (Wild plum)

**Plot area (m<sup>2</sup>):** 4

*Anemone quinquefolia* (Wood-anemone)

*Carex bicknellii* (Bicknell's sedge)

*Conyza canadensis* (Horseweed)

*Corylus americana* (American hazelnut)

*Rosa acicularis* (Prickly rose)

*Vaccinium angustifolium* (Lowbush blueberry)

**Plot area (m<sup>2</sup>):** 8

*Amelanchier* (Juneberry)

*Pinus banksiana* (Jack pine)

**Plot area (m<sup>2</sup>):** 16

*Berteroa incana* (Hoary alyssum)

*Elymus trachycaulus* (Slender wheatgrass)

*Quercus macrocarpa* (Bur oak)

*Symphoricarpos albus* (Snowberry)

**Plot area (m<sup>2</sup>):** 32

*Lathyrus venosus* (Veiny pea)

*Oryzopsis asperifolia* (Mountain rice-grass)

*Pinus resinosa* (Red pine)

*Symphoricarpos occidentalis* (Wolfberry)

**Plot area (m<sup>2</sup>):** 64

*Diervilla lonicera* (Bush honeysuckle)

*Physalis virginiana* (Ground-cherry)

*Salix humilis* (Prairie willow)

*Smilax* (Greenbrier; Carrion-flower)

*Solidago gigantea* (Giant goldenrod)

**Plot area (m<sup>2</sup>):** 128

*Agrimonia gryposepala* (Stickweed)

*Aster ciliolatus* (Lindley's aster)

*Aster laevis* (Smooth aster)

*Campanula rotundifolia* (Harebell)

*Lithospermum canescens* (Hoary puccoon)

*Prunus virginiana* (Chokecherry)

**Plot area (m<sup>2</sup>):** 256

*Andropogon gerardii* (Big bluestem)

*Aralia nudicaulis* (Wild sarsaparilla)

*Asclepias ovalifolia* (Oval-leaved milkweed)

*Ceanothus herbaceus* (Oval-leaved New Jersey tea)

*Dalea* (Dahlea; Prairie-clover)

*Hieracium scabriusculum* (Rough hawkweed)

*Pyrola secunda* (One-sided pyrola)

*Quercus rubra* (Northern red oak)

*Trientalis borealis* (Starflower)

**Plot area (m<sup>2</sup>):** 512





FDc24, natural origin jack pine stand 1973

## Individual Plot Report

**Plot:** FDc24-0016  
**UTM Northing:** 5172495  
**UTM Easting:** 347561  
**Plot Type:** BMK  
**Surveyor(s):** Brian Hoffmann, Harvey Tjader  
**Date:** 27  
**Month Text:** AUG  
**Year:** 2020  
**Azimuth1:** 90  
**Azimuth2:** 0  
**Comments:** Yeager Lake WMA-comparison plot for FDc24 herbicide recovery case study. No site prep treatments have been applied to this stand. Thick hazel and fallen jack pine. About 47 years old.

### Cumulative Count of Species

Plot Area (m <sup>2</sup> )	Native	Introduced	Invasive
1	15	1	0
2	18	1	0
4	24	1	0
8	28	1	0
32	31	1	0
64	40	2	1
128	47	2	1
256	49	3	1
512	56	3	1
1024	60	3	1

### Species Present by Plot

**Plot area (m<sup>2</sup>):** 1

*Achillea millefolium* (Yarrow)  
*Amelanchier* (Juneberry)  
*Antennaria* (Pussytoes)  
*Corylus americana* (American hazelnut)  
*Galium boreale* (Northern bedstraw)  
*Gaultheria procumbens* (Wintergreen)  
*Lathyrus ochroleucus* (Pale vetchling)  
*Maianthemum canadense* (Canada mayflower)  
*Melampyrum lineare* (Cow-wheat)  
*Oryzopsis asperifolia* (Mountain rice-grass)  
*Pleurozium schreberi* (Feathermoss)  
*Prunus virginiana* (Chokecherry)  
*Rubus strigosus* (Red raspberry)  
*Schizachne purpurascens* (False melic grass)  
*Trientalis borealis* (Starflower)

*Vaccinium angustifolium* (Lowbush blueberry)

**Plot area (m<sup>2</sup>):** 2

*Anemone quinquefolia* (Wood-anemone)  
*Aster oolentangiensis* (Sky-blue aster)  
*Rosa acicularis* (Prickly rose)

**Plot area (m<sup>2</sup>):** 4

*Acer rubrum* (Red maple)  
*Apocynum androsaemifolium* (Spreading dogbane)  
*Elymus trachycaulus* (Slender wheatgrass)  
*Goodyera tessellata* (Tesselate rattlesnake-plantain)  
*Quercus macrocarpa* (Bur oak)  
*Toxicodendron rydbergii* (Western poison ivy)

**Plot area (m<sup>2</sup>):** 8

*Aralia nudicaulis* (Wild sarsaparilla)  
*Aster laevis* (Smooth aster)  
*Quercus rubra* (Northern red oak)  
*Viburnum rafinesquianum* (Downy arrow-wood)

**Plot area (m<sup>2</sup>):** 32

*Corylus cornuta* (Beaked hazelnut)  
*Lycopodium clavatum* (Running clubmoss)  
*Pinus banksiana* (Jack pine)

**Plot area (m<sup>2</sup>):** 64

*Diervilla lonicera* (Bush honeysuckle)  
*Fragaria virginiana* (Common strawberry)  
*Galium triflorum* (Three-flowered bedstraw)  
*Lathyrus venosus* (Veiny pea)  
*Lonicera canadensis* (Fly honeysuckle)  
*Rhamnus cathartica* (Common buckthorn)  
*Salix humilis* (Prairie willow)  
*Solidago canadensis* (Canada goldenrod)  
*Solidago hispida* (Hairy goldenrod)  
*Sorbus decora* (Showy mountain-ash)  
*Taraxacum officinale* (Common dandelion)

**Plot area (m<sup>2</sup>):** 128

*Aster urophyllus* (Tail-leaved aster)  
*Betula papyrifera* (Paper-birch)  
*Carex pensylvanica* (Pennsylvania sedge)  
*Chimaphila umbellata* (Pipsissewa)  
*Lithospermum canescens* (Hoary puccoon)  
*Quercus ellipsoidalis* (Northern pin oak)  
*Symphoricarpos occidentalis* (Wolfberry)

**Plot area (m<sup>2</sup>):** 256

*Parthenocissus* (Virginia creeper; Woodbine)  
*Populus tremuloides* (Quaking aspen)  
*Sonchus* (Sow-thistle)

**Plot area (m<sup>2</sup>):** 512

*Acer negundo* (Box elder)  
*Astragalus canadensis* (Canada milk-vetch)  
*Pinus resinosa* (Red pine)  
*Prunus pensylvanica* (Pin cherry)





FDC24, natural origin aspen stand 1991

## Individual Plot Report

Plot:	FDC24-0017
UTM Northing:	5179757
UTM Easting:	352151
Plot Type:	SA1
Surveyor(s):	B. Hoffman, H. Tjader, M. Huseby
Date:	7
Month Text:	7
Year:	2020
Azimuth1:	94
Azimuth2:	4
Comments:	FDC24 Herbicide recovery case study-natural regeneration. Aspen dominated stand, 30 years old. [stand t13834w1230212]

### Cumulative Count of Species

Plot Area (m <sup>2</sup> )	Native	Introduced	Invasive
1	8	0	0
2	11	0	0
8	16	0	0
16	18	0	0
32	23	0	0
64	32	0	0
128	37	0	0
256	48	1	2
512	55	1	2
1024	62	2	2

### Species Present by Plot

<b>Plot area (m<sup>2</sup>):</b>	<b>1</b>
Anemone quinquefolia (Wood-anemone)	
Carex pensylvanica (Pennsylvania sedge)	
Maianthemum canadense (Canada mayflower)	
Oryzopsis asperifolia (Mountain rice-grass)	
Thalictrum dioicum (Early meadow-rue)	
Toxicodendron rydbergii (Western poison ivy)	
Uvularia sessilifolia (Pale bellwort)	
Vaccinium angustifolium (Lowbush blueberry)	
<b>Plot area (m<sup>2</sup>):</b>	<b>2</b>
Amelanchier (Juneberry)	
Corylus cornuta (Beaked hazelnut)	
Quercus macrocarpa (Bur oak)	
<b>Plot area (m<sup>2</sup>):</b>	<b>8</b>
Aralia nudicaulis (Wild sarsaparilla)	
Populus tremuloides (Quaking aspen)	

Quercus rubra (Northern red oak)	
Rubus pubescens (Dwarf raspberry)	
Zizia aptera (Heart-leaved alexanders)	
<b>Plot area (m<sup>2</sup>):</b>	<b>16</b>
Galium boreale (Northern bedstraw)	
Pyrola rotundifolia (Round-leaved pyrola)	
<b>Plot area (m<sup>2</sup>):</b>	<b>32</b>
Cornus foemina (Gray dogwood)	
Corylus americana (American hazelnut)	
Lathyrus ochroleucus (Pale vetchling)	
Pyrola secunda (One-sided pyrola)	
Symphoricarpos occidentalis (Wolfberry)	
<b>Plot area (m<sup>2</sup>):</b>	<b>64</b>
Aster urophyllus (Tail-leaved aster)	
Gaultheria procumbens (Wintergreen)	
Parthenocissus (Virginia creeper; Woodbine)	
Prenanthes alba (White rattlesnake-root)	
Prunus virginiana (Chokecherry)	
Rosa (Wild Rose)	
Rubus strigosus (Red raspberry)	
Sanicula marilandica (Mariland black snakeroot)	
Symphoricarpos albus (Snowberry)	
<b>Plot area (m<sup>2</sup>):</b>	<b>128</b>
Aster ciliolatus (Lindley's aster)	
Dryopteris carthusiana (Spinulose shield-fern)	
Pyrola asarifolia (Pink-flowered pyrola)	
Schizachne purpurascens (False melic grass)	
Smilax (Greenbrier; Carrion-flower)	
<b>Plot area (m<sup>2</sup>):</b>	<b>256</b>
Apocynum androsaemifolium (Spreading dogbane)	
Aster oolentangiensis (Sky-blue aster)	
Fragaria virginiana (Common strawberry)	
Galium triflorum (Three-flowered bedstraw)	
Lathyrus venosus (Veiny pea)	
Lonicera bella (Pretty honeysuckle)	
Physalis virginiana (Ground-cherry)	
Poa pratensis (Kentucky bluegrass)	
Prunus pumila (Sand cherry)	
Rhamnus cathartica (Common buckthorn)	
Rubus allegheniensis (High-bush blackberry)	
Sonchus (Sow-thistle)	
Trientalis borealis (Starflower)	
Vicia americana (American vetch)	
<b>Plot area (m<sup>2</sup>):</b>	<b>512</b>
Campanula rotundifolia (Harebell)	
Campanula rotundifolia (Harebell)	
Lithospermum canescens (Hoary puccoon)	
Pedicularis canadensis (Wood-betony)	
Pedicularis canadensis (Wood-betony)	
Polygonatum pubescens (Hairy Solomon's-seal)	
Populus grandidentata (Big-toothed aspen)	





FDc24, mechanical site preparation, planted red pine 1981

# Individual Plot Report

**Plot:** FDc24-0011  
**UTM Northing:** 5184612  
**UTM Easting:** 360316  
**Plot Type:** SA1  
**Surveyor(s):** Hoffman, Wolf, Tjader, Gronewald  
**Date:** 28  
**Month Text:** AUG  
**Year:** 2019  
**Azimuth1:** 90  
**Azimuth2:** 0  
**Comments:** t13833w1030029-Park Rapids case study on native plant recovery after herbicide. Furrowed in 1981; planted Red Pine; thinned in 2017. Not sprayed with herbicide. [Ellen Frondorf also in names field]

## Cumulative Count of Species

Plot Area (m2)	Native	Introduced	Invasive
1	7	0	0
2	13	0	1
4	18	0	1
8	22	0	1
16	26	0	1
32	31	0	1
64	42	0	1
128	51	0	1
256	57	2	2
512	64	3	2
1024	77	7	3

## Species Present by Plot

**Plot area (m2): 1**  
*Carex pensylvanica* (Pennsylvania sedge)  
*Corylus americana* (American hazelnut)  
*Lathyrus ochroleucus* (Pale vetchling)  
*Maianthemum canadense* (Canada mayflower)  
*Prunus virginiana* (Chokecherry)  
*Symphoricarpos albus* (Snowberry)  
*Toxicodendron rydbergii* (Western poison ivy)

**Plot area (m2): 2**  
*Anemone quinquefolia* (Wood-anemone)  
*Aster oolentangiensis* (Sky-blue aster)  
*Cirsium arvense* (Canada thistle)  
*Galium boreale* (Northern bedstraw)  
*Oryzopsis asperifolia* (Mountain rice-grass)

*Populus grandidentata* (Big-toothed aspen)  
*Schizachne purpurascens* (False melic grass)

**Plot area (m2): 4**  
*Conyza canadensis* (Horseweed)  
*Populus tremuloides* (Quaking aspen)  
*Thalictrum dioicum* (Early meadow-rue)  
*Vaccinium angustifolium* (Lowbush blueberry)  
*Viola conspersa* (Dog violet)

**Plot area (m2): 8**  
*Campanula rotundifolia* (Harebell)  
*Pinus banksiana* (Jack pine)  
*Quercus macrocarpa* (Bur oak)  
*Rosa acicularis* (Prickly rose)

**Plot area (m2): 16**  
*Amelanchier* (Juneberry)  
*Pinus resinosa* (Red pine)  
*Pyrola secunda* (One-sided pyrola)  
*Solidago hispida* (Hairy goldenrod)

**Plot area (m2): 32**  
*Lonicera hirsuta* (Hairy honeysuckle.)  
*Prunus pumila* (Sand cherry)  
*Quercus rubra* (Northern red oak)  
*Ribes* (Currant; Gooseberry)  
*Rubus strigosus* (Red raspberry)

**Plot area (m2): 64**  
*Apocynum androsaemifolium* (Spreading dogbane)  
*Aralia nudicaulis* (Wild sarsaparilla)  
*Aster laevis* (Smooth aster)  
*Aster urophyllus* (Tail-leaved aster)  
*Cynoglossum boreale* (Wild comfrey)  
*Fragaria virginiana* (Common strawberry)  
*Lonicera dioica* (Wild Honeysuckle)  
*Prunus serotina* (Black cherry)  
*Salix humilis* (Prairie willow)  
*Smilacina stellata* (Starry false Solomon's-seal)  
*Sorbus decora* (Showy mountain-ash)

**Plot area (m2): 128**  
*Acer rubrum* (Red maple)  
*Betula papyrifera* (Paper-birch)  
*Galium triflorum* (Three-flowered bedstraw)  
*Lactuca* (Lettuce)  
*Melampyrum lineare* (Cow-wheat)  
*Prenanthes alba* (White rattlesnake-root)  
*Pyrola asarifolia* (Pink-flowered pyrola)  
*Solidago canadensis* (Canada goldenrod)  
*Spiraea alba* (Meadowsweet)

**Plot area (m2): 256**  
*Anemone virginiana* (Virginia thimbleweed)  
*Carduus acanthoides* (Plumeless thistle)  
*Ceanothus herbaceus* (Oval-leaved New Jersey tea)  
*Diervilla lonicera* (Bush honeysuckle)





FDc24, mechanical site preparation, planted red pine 1996

# Individual Plot Report

**Plot:** FDc24-0014  
**UTM Northing:** 5177700  
**UTM Easting:** 353231  
**Plot Type:** SA1  
**Surveyor(s):** Hoffmann, Wolf, Tjader, Gronewald  
**Date:** 28  
**Month Text:** AUG  
**Year:** 2019  
**Azimuth1:** 90  
**Azimuth2:** 0  
**Comments:** t13834w1250372  
 Park Rapids case study on native plant recovery after herbicide.  
 Winter sheared in 1996, not sprayed with herbicide.  
 [Ellen Frondorf also on stand]

## Cumulative Count of Species

Plot Area (m <sup>2</sup> )	Native	Introduced	Invasive
1	11	0	0
2	12	0	0
4	16	0	0
8	19	0	0
16	23	0	0
32	28	0	0
64	32	0	0
128	54	1	0
256	65	1	0
512	77	1	0
1024	93	4	0

## Species Present by Plot

**Plot area (m<sup>2</sup>):** 1  
 Amelanchier (Juneberry)  
 Carex pensylvanica (Pennsylvania sedge)  
 Corylus americana (American hazelnut)  
 Fraxinus pennsylvanica (Green ash)  
 Galium boreale (Northern bedstraw)  
 Maianthemum canadense (Canada mayflower)  
 Oryzopsis asperifolia (Mountain rice-grass)  
 Quercus macrocarpa (Bur oak)  
 Toxicodendron rydbergii (Western poison ivy)  
 Trientalis borealis (Starflower)  
 Vaccinium angustifolium (Lowbush blueberry)

**Plot area (m<sup>2</sup>):** 2  
 Fragaria virginiana (Common strawberry)

**Plot area (m<sup>2</sup>):** 4  
 Aster urophyllus (Tail-leaved aster)  
 Betula papyrifera (Paper-birch)  
 Prunus virginiana (Chokecherry)  
 Quercus rubra (Northern red oak)

**Plot area (m<sup>2</sup>):** 8  
 Aquilegia canadensis (Columbine)  
 Aralia nudicaulis (Wild sarsaparilla)  
 Corylus cornuta (Beaked hazelnut)

**Plot area (m<sup>2</sup>):** 16  
 Lathyrus venosus (Veiny pea)  
 Rosa blanda (Smooth wild rose)  
 Symphoricarpos albus (Snowberry)  
 Uvularia sessilifolia (Pale bellwort)

**Plot area (m<sup>2</sup>):** 32  
 Bromus ciliatus (Fringed brome)  
 Heuchera richardsonii (Alum-root)  
 Quercus ellipsoidalis (Northern pin oak)  
 Rubus strigosus (Red raspberry)  
 Ulmus americana (American elm)

**Plot area (m<sup>2</sup>):** 64  
 Athyrium angustum (Lady-fern)  
 Diervilla lonicera (Bush honeysuckle)  
 Smilax (Greenbrier; Carrion-flower)  
 Viola (Violet)

**Plot area (m<sup>2</sup>):** 128  
 Achillea millefolium (Yarrow)  
 Agastache foeniculum (Blue giant-hyssop)  
 Agrimonia (Agrimony)  
 Andropogon gerardii (Big bluestem)  
 Apocynum androsaemifolium (Spreading dogbane)  
 Asclepias ovalifolia (Oval-leaved milkweed)  
 Aster ciliolatus (Lindley's aster)  
 Aster laevis (Smooth aster)  
 Aster macrophyllus (Large-leaved aster)  
 Campanula rotundifolia (Harebell)  
 Ceanothus herbaceus (Oval-leaved New Jersey tea)  
 Cornus foemina (Gray dogwood)  
 Lithospermum canescens (Hoary puccoon)  
 Monotropa uniflora (Indian pipe)  
 Panicum xanthophyllum (Yellowish panic grass)  
 Pedicularis canadensis (Wood-betony)  
 Pinus banksiana (Jack pine)  
 Pinus resinosa (Red pine)  
 Populus tremuloides (Quaking aspen)  
 Prunus serotina (Black cherry)  
 Salix humilis (Prairie willow)  
 Solidago canadensis (Canada goldenrod)  
 Vicia americana (American vetch)

**Plot area (m<sup>2</sup>):** 256  
 Antennaria (Pussytoes)





FDC24, herbicide site preparation, planted to red pine in 1986

# Individual Plot Report

**Plot:** FDc24-0013  
**UTM Northing:** 5178941  
**UTM Easting:** 352640  
**Plot Type:** SA1  
**Surveyor(s):** Hoffman, Wolf, Tjader, Gronewald  
**Date:** 29  
**Month Text:** AUG  
**Year:** 2019  
**Azimuth1:** 90  
**Azimuth2:** 0  
**Comments:** t13834w1240223. Park Rapids herbicide recovery case study. Roundup, patch scarified in 1986. [Frondorf also on plot]

## Cumulative Count of Species

Plot Area (m2)	Native	Introduced	Invasive
1	6	0	0
2	12	0	0
4	14	1	0
8	16	1	0
16	22	2	0
32	34	5	1
64	48	6	1
128	55	7	1
256	69	9	2
512	79	10	4
1024	86	12	5

## Species Present by Plot

**Plot area (m2):** 1

*Carex pensylvanica* (Pennsylvania sedge)  
*Corylus americana* (American hazelnut)  
*Galium boreale* (Northern bedstraw)  
*Maianthemum canadense* (Canada mayflower)  
*Symphoricarpos albus* (Snowberry)  
*Vaccinium angustifolium* (Lowbush blueberry)

**Plot area (m2):** 2

*Anemone quinquefolia* (Wood-anemone)  
*Aster oolentangiensis* (Sky-blue aster)  
*Lathyrus ochroleucus* (Pale vetchling)  
*Oryzopsis asperifolia* (Mountain rice-grass)  
*Pinus resinosa* (Red pine)  
*Toxicodendron rydbergii* (Western poison ivy)

**Plot area (m2):** 4

*Apocynum androsaemifolium* (Spreading dogbane)  
*Hieracium* (Hawkweed)  
*Pteridium aquilinum* (Bracken)

**Plot area (m2):** 8

*Galium triflorum* (Three-flowered bedstraw)  
*Quercus rubra* (Northern red oak)

**Plot area (m2):** 16

*Aralia nudicaulis* (Wild sarsaparilla)  
*Hieracium scabrum* (Sticky hawkweed)  
*Prunus pensylvanica* (Pin cherry)  
*Prunus serotina* (Black cherry)  
*Quercus macrocarpa* (Bur oak)  
*Taraxacum officinale* (Common dandelion)  
*Viola conspersa* (Dog violet)

**Plot area (m2):** 32

*Agastache foeniculum* (Blue giant-hyssop)  
*Betula papyrifera* (Paper-birch)  
*Carex brevior* (Short sedge)  
*Cirsium vulgare* (Bull thistle)  
*Conyza canadensis* (Horseweed)  
*Corylus cornuta* (Beaked hazelnut)  
*Danthonia spicata* (Poverty grass)  
*Fragaria virginiana* (Common strawberry)  
*Lactuca* (Lettuce)  
*Panicum* (Panic grass)  
*Polygonum convolvulus* (Black bindweed)  
*Potentilla argentea* (Silvery cinquefoil)  
*Rubus strigosus* (Red raspberry)  
*Solidago gigantea* (Giant goldenrod)  
*Uvularia sessilifolia* (Pale bellwort)  
*Verbascum thapsus* (Common mullein)

**Plot area (m2):** 64

*Acer rubrum* (Red maple)  
*Agrostis stolonifera* (Redtop)  
*Amelanchier* (Juneberry)  
*Aster ciliolatus* (Lindley's aster)  
*Campanula rotundifolia* (Harebell)  
*Dryopteris intermedia* (Glandular wood-fern)  
*Elymus canadensis* (Canada wild rye)  
*Heuchera richardsonii* (Alum-root)  
*Panicum lanuginosum* (Hairy panic grass)  
*Picea glauca* (White spruce)  
*Populus tremuloides* (Quaking aspen)  
*Prunus virginiana* (Chokecherry)  
*Rubus flagellaris* (Common eastern dewberry)  
*Sanicula marilandica* (Maryland black snakeroot)  
*Schizachne purpurascens* (False melic grass)

**Plot area (m2):** 128

*Anemone canadensis* (Canada anemone)  
*Diervilla lonicera* (Bush honeysuckle)





FDC24, herbicide & patch scarify site preparation, planted jack pine 1995



# Individual Plot Report

**Plot:** FDC24-0010  
**UTM Northing:** 5183991  
**UTM Easting:** 352804  
**Plot Type:** SA1  
**Surveyor(s):** Brian Hoffmann, Edwin Koepp, Nick Jensen  
**Date:** 30  
**Month Text:** AUG  
**Year:** 2019  
**Azimuth1:** 90  
**Azimuth2:** 0  
**Comments:** t13834w1010044. Park Rapids herbicide recovery case study. Accord, patch scarified in 1995.  
 [Plot 64-unknown graminoid]  
 [Plot 1024-unknown opposite leaved forb]

## Cumulative Count of Species

Plot Area (m <sup>2</sup> )	Native	Introduced	Invasive
1	11	0	0
2	17	0	0
4	23	1	0
8	28	1	0
16	35	1	0
32	44	1	0
64	51	1	0
128	55	2	0
256	70	3	0
1024	81	3	0

## Species Present by Plot

**Plot area (m<sup>2</sup>):** 1

*Andropogon gerardii* (Big bluestem)  
*Bromus ciliatus* (Fringed brome)  
*Campanula rotundifolia* (Harebell)  
*Carex pensylvanica* (Pennsylvania sedge)  
*Fragaria virginiana* (Common strawberry)  
*Galium boreale* (Northern bedstraw)  
*Maianthemum canadense* (Canada mayflower)  
*Oryzopsis asperifolia* (Mountain rice-grass)  
*Rubus strigosus* (Red raspberry)  
*Solidago* (Goldenrod)  
*Vaccinium angustifolium* (Lowbush blueberry)

**Plot area (m<sup>2</sup>):** 2

*Aster ciliolatus* (Lindley's aster)  
*Aster urophyllus* (Tail-leaved aster)  
*Danthonia spicata* (Poverty grass)

*Phlox pilosa* (Prairie phlox)  
*Prunus pensylvanica* (Pin cherry)  
*Uvularia sessilifolia* (Pale bellwort)

**Plot area (m<sup>2</sup>):** 4

*Achillea millefolium* (Yarrow)  
*Melampyrum lineare* (Cow-wheat)  
*Populus tremuloides* (Quaking aspen)  
*Potentilla simplex* (Old-field cinquefoil)  
*Rosa acicularis* (Prickly rose)  
*Senecio pauperculus* (Balsam ragwort)  
*Toxicodendron rydbergii* (Western poison ivy)

**Plot area (m<sup>2</sup>):** 8

*Aster laevis* (Smooth aster)  
*Pinus banksiana* (Jack pine)  
*Poa pratensis* (Kentucky bluegrass)  
*Quercus rubra* (Northern red oak)  
*Rubus flagellaris* (Common eastern dewberry)

**Plot area (m<sup>2</sup>):** 16

*Amelanchier* (Juneberry)  
*Apocynum androsaemifolium* (Spreading dogbane)  
*Calamagrostis canadensis* (Bluejoint)  
*Lathyrus venosus* (Veiny pea)  
*Osmorhiza claytonii* (Clayton's sweet cicely)  
*Teucrium canadense* (Germander)  
*Vicia americana* (American vetch)

**Plot area (m<sup>2</sup>):** 32

*Agastache foeniculum* (Blue giant-hyssop)  
*Elymus trachycaulus* (Slender wheatgrass)  
*Galium triflorum* (Three-flowered bedstraw)  
*Hieracium scabriusculum* (Rough hawkweed)  
*Prunus virginiana* (Chokecherry)  
*Rubus pubescens* (Dwarf raspberry)  
*Salix humilis* (Prairie willow)  
*Solidago hispida* (Hairy goldenrod)  
*Solidago nemoralis* (Gray goldenrod)

**Plot area (m<sup>2</sup>):** 64

*Corylus americana* (American hazelnut)  
*Lactuca* (Lettuce)  
*Muhlenbergia glomerata* (Clustered muhly grass)  
*Oryzopsis pungens* (Sharp-pointed rice-grass)  
*Quercus macrocarpa* (Bur oak)  
*Vaccinium myrtilloides* (Velvet-leaf blueberry)  
*Viola conspersa* (Dog violet)

**Plot area (m<sup>2</sup>):** 128

*Agrimonia* (Agrimony)  
*Corylus cornuta* (Beaked hazelnut)  
*Prunus serotina* (Black cherry)  
*Taraxacum officinale* (Common dandelion)  
*Thalictrum dioicum* (Early meadow-rue)

**Plot area (m<sup>2</sup>):** 256

*Aquilegia canadensis* (Columbine)





FDc24, herbicide & disc trench site preparation, planted jack pine 1998

# Individual Plot Report

**Plot:** FDc24-0012  
**UTM Northing:** 5183088  
**UTM Easting:** 353034  
**Plot Type:** SA1  
**Surveyor(s):** Hoffman, Tjader, Gronewald, Frondorf  
**Date:** 5  
**Month Text:** SEP  
**Year:** 2019  
**Azimuth1:** 90  
**Azimuth2:** 0  
**Comments:** t13834w1120076  
 Sprayed with Accord in 1998, disc  
 trenched and planted to Jack Pine

## Cumulative Count of Species

Plot Area (m <sup>2</sup> )	Native	Introduced	Invasive
1	12	0	0
2	14	0	0
4	16	0	0
8	21	0	0
16	28	0	0
32	33	1	1
64	45	2	1
128	52	2	1
256	56	2	1
512	61	6	3
1024	68	7	3

## Species Present by Plot

**Plot area (m<sup>2</sup>):** 1

*Andropogon gerardii* (Big bluestem)  
*Aster urophyllus* (Tail-leaved aster)  
*Bromus ciliatus* (Fringed brome)  
*Carex pensylvanica* (Pennsylvania sedge)  
*Corylus americana* (American hazelnut)  
*Fragaria virginiana* (Common strawberry)  
*Galium boreale* (Northern bedstraw)  
*Oryzopsis asperifolia* (Mountain rice-grass)  
*Prunus pensylvanica* (Pin cherry)  
*Quercus macrocarpa* (Bur oak)  
*Rubus strigosus* (Red raspberry)  
*Vaccinium angustifolium* (Lowbush blueberry)

**Plot area (m<sup>2</sup>):** 2

*Aster ciliolatus* (Lindley's aster)

*Lathyrus ochroleucus* (Pale vetchling)

**Plot area (m<sup>2</sup>):** 4

*Maianthemum canadense* (Canada mayflower)  
*Prenanthes alba* (White rattlesnake-root)

**Plot area (m<sup>2</sup>):** 8

*Populus tremuloides* (Quaking aspen)  
*Prunus virginiana* (Chokecherry)  
*Quercus rubra* (Northern red oak)  
*Rosa blanda* (Smooth wild rose)  
*Uvularia sessilifolia* (Pale bellwort)

**Plot area (m<sup>2</sup>):** 16

*Amelanchier* (Juneberry)  
*Anemone quinquefolia* (Wood-anemone)  
*Melampyrum lineare* (Cow-wheat)  
*Physalis virginiana* (Ground-cherry)  
*Pyrola secunda* (One-sided pyrola)  
*Symphoricarpos occidentalis* (Wolfberry)  
*Zizia aptera* (Heart-leaved alexanders)

**Plot area (m<sup>2</sup>):** 32

*Chimaphila umbellata* (Pipsissewa)  
*Danthonia spicata* (Poverty grass)  
*Lactuca* (Lettuce)  
*Lonicera bella* (Pretty honeysuckle)  
*Smilax* (Greenbrier; Carrion-flower)  
*Taraxacum officinale* (Common dandelion)  
*Toxicodendron rydbergii* (Western poison ivy)

**Plot area (m<sup>2</sup>):** 64

*Achillea millefolium* (Yarrow)  
*Aster oolentangiensis* (Sky-blue aster)  
*Campanula rotundifolia* (Harebell)  
*Ceanothus herbaceus* (Oval-leaved New Jersey tea)  
*Euthamia graminifolia* (Grass-leaved goldenrod)  
*Gaultheria procumbens* (Wintergreen)  
*Osmorhiza claytonii* (Clayton's sweet cicely)  
*Pinus banksiana* (Jack pine)  
*Symphoricarpos albus* (Snowberry)  
*Vaccinium myrtilloides* (Velvet-leaf blueberry)  
*Viburnum rafinesquianum* (Downy arrow-wood)  
*Vicia americana* (American vetch)  
*Viola conspersa* (Dog violet)

**Plot area (m<sup>2</sup>):** 128

*Agastache foeniculum* (Blue giant-hyssop)  
*Aralia nudicaulis* (Wild sarsaparilla)  
*Calamagrostis canadensis* (Bluejoint)  
*Polygala paucifolia* (Gaywings)  
*Prunus serotina* (Black cherry)  
*Ribes cynosbati* (Prickly gooseberry)  
*Sanicula marilandica* (Maryland black snakeroot)

**Plot area (m<sup>2</sup>):** 256

*Amorpha canescens* (Lead-plant)  
*Diervilla lonicera* (Bush honeysuckle)





FDC24, herbicide & disc trench site preparation, planted red pine 2000

# Individual Plot Report

**Plot:** FDc24-0015  
**UTM Northing:** 5178115  
**UTM Easting:** 353600  
**Plot Type:** SA1  
**Surveyor(s):** Hoffmann, Wolf, Tjader, Gronewald  
**Date:** 29  
**Month Text:** AUG  
**Year:** 2019  
**Azimuth1:** 90  
**Azimuth2:** 0  
**Comments:** t13834w1250232  
 4C-treated with Accord and Garlon,  
 planted with Red Pine and Jack Pine in  
 treches.  
 [Ellen Frondorf also on plot]  
 [Plot 128 Panicum spp. Is Dichanthelium  
 ovale-Stiff leaved panic grass]

## Cumulative Count of Species

Plot Area (m2)	Native	Introduced	Invasive
1	16	1	0
2	19	1	0
4	21	1	0
8	33	2	0
16	40	2	0
32	46	2	0
64	52	3	0
128	58	4	0
256	63	4	0
512	71	4	1
1024	78	5	1

## Species Present by Plot

**Plot area (m2):** 1  
*Achillea millefolium* (Yarrow)  
*Apocynum androsaemifolium* (Spreading dogbane)  
*Aster ciliolatus* (Lindley's aster)  
*Aster oolentangiensis* (Sky-blue aster)  
*Carex pensylvanica* (Pennsylvania sedge)  
*Convolvulus spithameus* (Upright bindweed)  
*Fragaria virginiana* (Common strawberry)  
*Galium boreale* (Northern bedstraw)  
*Helianthus tuberosus* (Jerusalem artichoke)  
*Lathyrus ochroleucus* (Pale vetchling)  
*Maianthemum canadense* (Canada mayflower)  
*Oryzopsis asperifolia* (Mountain rice-grass)

*Poa pratensis* (Kentucky bluegrass)  
*Populus tremuloides* (Quaking aspen)  
*Rubus strigosus* (Red raspberry)  
*Schizachne purpurascens* (False melic grass)  
*Solidago* (Goldenrod)  
**Plot area (m2):** 2  
*Asclepias ovalifolia* (Oval-leaved milkweed)  
*Rubus flagellaris* (Common eastern dewberry)  
*Toxicodendron rydbergii* (Western poison ivy)  
**Plot area (m2):** 4  
*Quercus macrocarpa* (Bur oak)  
*Rosa blanda* (Smooth wild rose)  
**Plot area (m2):** 8  
*Amelanchier* (Juneberry)  
*Andropogon gerardii* (Big bluestem)  
*Arenaria lateriflora* (Side-flowering sandwort)  
*Campanula rotundifolia* (Harebell)  
*Corylus americana* (American hazelnut)  
*Danthonia spicata* (Poverty grass)  
*Elymus canadensis* (Canada wild rye)  
*Elymus trachycaulus* (Slender wheatgrass)  
*Muhlenbergia glomerata* (Clustered muhly grass)  
*Oryzopsis pungens* (Sharp-pointed rice-grass)  
*Pinus resinosa* (Red pine)  
*Thalictrum dioicum* (Early meadow-rue)  
*Verbascum thapsus* (Common mullein)  
**Plot area (m2):** 16  
*Agrimonia* (Agrimony)  
*Prunus pensylvanica* (Pin cherry)  
*Quercus rubra* (Northern red oak)  
*Rubus pubescens* (Dwarf raspberry)  
*Solidago gigantea* (Giant goldenrod)  
*Vicia americana* (American vetch)  
*Viola conspersa* (Dog violet)  
**Plot area (m2):** 32  
*Aralia nudicaulis* (Wild sarsaparilla)  
*Asclepias lanuginosa* (Woolly milkweed)  
*Ceanothus herbaceus* (Oval-leaved New Jersey tea)  
*Prunus virginiana* (Chokecherry)  
*Symphoricarpos albus* (Snowberry)  
*Vaccinium angustifolium* (Lowbush blueberry)  
**Plot area (m2):** 64  
*Bromus kalmii* (Kalm's brome)  
*Erigeron philadelphicus* (Philadelphia fleabane)  
*Heuchera richardsonii* (Alum-root)  
*Lithospermum canescens* (Hoary puccoon)  
*Panicum xanthophysum* (Yellowish panic grass)  
*Polygonum convolvulus* (Black bindweed)  
*Salix humilis* (Prairie willow)  
**Plot area (m2):** 128  
*Aster urophyllus* (Tail-leaved aster)





FDc24, mechanical site preparation, planted red pine 1996

## Individual Plot Report

**Plot:** FDc24-0014  
**UTM Northing:** 5177700  
**UTM Easting:** 353231  
**Plot Type:** SA1  
**Surveyor(s):** Hoffmann, Wolf, Tjader, Gronewald  
**Date:** 28  
**Month Text:** AUG  
**Year:** 2019  
**Azimuth1:** 90  
**Azimuth2:** 0  
**Comments:** t13834w1250372  
 Park Rapids case study on native plant recovery after herbicide.  
 Winter sheared in 1996, not sprayed with herbicide.  
 [Ellen Frondorf also on stand]

### Cumulative Count of Species

Plot Area (m <sup>2</sup> )	Native	Introduced	Invasive
1	11	0	0
2	12	0	0
4	16	0	0
8	19	0	0
16	23	0	0
32	28	0	0
64	32	0	0
128	54	1	0
256	65	1	0
512	77	1	0
1024	93	4	0

### Species Present by Plot

**Plot area (m<sup>2</sup>):** 1

Amelanchier (Juneberry)  
 Carex pensylvanica (Pennsylvania sedge)  
 Corylus americana (American hazelnut)  
 Fraxinus pennsylvanica (Green ash)  
 Galium boreale (Northern bedstraw)  
 Maianthemum canadense (Canada mayflower)  
 Oryzopsis asperifolia (Mountain rice-grass)  
 Quercus macrocarpa (Bur oak)  
 Toxicodendron rydbergii (Western poison ivy)  
 Trientalis borealis (Starflower)  
 Vaccinium angustifolium (Lowbush blueberry)

**Plot area (m<sup>2</sup>):** 2

Fragaria virginiana (Common strawberry)

**Plot area (m<sup>2</sup>):** 4

Aster urophyllus (Tail-leaved aster)  
 Betula papyrifera (Paper-birch)  
 Prunus virginiana (Chokecherry)  
 Quercus rubra (Northern red oak)

**Plot area (m<sup>2</sup>):** 8

Aquilegia canadensis (Columbine)  
 Aralia nudicaulis (Wild sarsaparilla)  
 Corylus cornuta (Beaked hazelnut)

**Plot area (m<sup>2</sup>):** 16

Lathyrus venosus (Veiny pea)  
 Rosa blanda (Smooth wild rose)  
 Symphoricarpos albus (Snowberry)  
 Uvularia sessilifolia (Pale bellwort)

**Plot area (m<sup>2</sup>):** 32

Bromus ciliatus (Fringed brome)  
 Heuchera richardsonii (Alum-root)  
 Quercus ellipsoidalis (Northern pin oak)  
 Rubus strigosus (Red raspberry)  
 Ulmus americana (American elm)

**Plot area (m<sup>2</sup>):** 64

Athyrium angustum (Lady-fern)  
 Diervilla lonicera (Bush honeysuckle)  
 Smilax (Greenbrier; Carrion-flower)  
 Viola (Violet)

**Plot area (m<sup>2</sup>):** 128

Achillea millefolium (Yarrow)  
 Agastache foeniculum (Blue giant-hyssop)  
 Agrimonia (Agrimony)  
 Andropogon gerardii (Big bluestem)  
 Apocynum androsaemifolium (Spreading dogbane)  
 Asclepias ovalifolia (Oval-leaved milkweed)  
 Aster ciliolatus (Lindley's aster)  
 Aster laevis (Smooth aster)  
 Aster macrophyllus (Large-leaved aster)  
 Campanula rotundifolia (Harebell)  
 Ceanothus herbaceus (Oval-leaved New Jersey tea)  
 Cornus foemina (Gray dogwood)  
 Lithospermum canescens (Hoary puccoon)  
 Monotropa uniflora (Indian pipe)  
 Panicum xanthophyllum (Yellowish panic grass)  
 Pedicularis canadensis (Wood-betony)  
 Pinus banksiana (Jack pine)  
 Pinus resinosa (Red pine)  
 Populus tremuloides (Quaking aspen)  
 Prunus serotina (Black cherry)  
 Salix humilis (Prairie willow)  
 Solidago canadensis (Canada goldenrod)  
 Vicia americana (American vetch)

**Plot area (m<sup>2</sup>):** 256

Antennaria (Pussytoes)