

SPECIES AREA CURVE COMPARISON

Benchmark plot: FDC24-0002 SPAC for Roy Lake AFMP site. Deeply furrowed JP plantation, 45 year-old stand, very brushy, some recent mortality of jack pine, crown closure is about 75%.

Comparison plot: FDC24-0002 Roy Lake AFMP post-harvest jack pine strip cut. Log landing established on the plot, involving stumping, scraping, piling and burning. A large area of ash and slash lay in the N. part of subplot 512 and the E. part of 1024 (see sketch). The ash was pioneered with mounds of *Coydalis aurea*. Grasses and weeds (*Berteroa*, *Conyza*) abundant. Pin flags for the smaller subplots found, others moved during logging.

SUMMARY OF CUMULATIVE NUMBER OF SPECIES BY PLOT AREA

This compares the total number of species in each subplot between the benchmark and comparison plots.

Negative difference indicates species loss due to treatment at that scale.

Positive difference indicates species gain due to treatment at that scale.

Area (m2)	Benchmark	Comparison	Difference
1	6	16	+10
2	11	20	+9
4	16	23	+7
8	21	27	+6 max
16	27	37	+10
32	36	44	+8
64	43	56	+13
128	52	67	+15
256	60	78	+18
512	69	89	+20 max
1024	76	96	+20 max

Species Apparently Lost Due to Treatment

These are plants present in the benchmark plot but not the treatment plot.

For re-sampling of permanent plots, this is direct evidence of extirpation.

For benchmark comparisons, it suggests species loss in 1024 m2 patches.

SEC	M	N	H	L	PLANT NAME
STA	3	2	1	3	Balsam fir, U -- <i>Abies balsamea</i>
STA	1	1	3	5	Big bluestem -- <i>Andropogon gerardii</i>
STA	2	4	4	3	Side-flowering sandwort -- <i>Arenaria lateriflora</i>
STA	1	2	3	5	Harebell -- <i>Campanula rotundifolia</i>
STA	2	2	2	5	Field bindweed -- <i>Convolvulus arvensis</i> Exotic
STA	2	3	3	3	Round-leaved dogwood -- <i>Cornus rugosa</i>
STA	2	2	2	3	Beaked hazelnut -- <i>Corylus cornuta</i>
					. . . Spinulose shield-fern -- <i>Dryopteris carthusiana</i>
STA	3	5	5	3	Virginia wild rye -- <i>Elymus virginicus</i>
STA	2	2	2	3	Hairy honeysuckle. -- <i>Lonicera hirsuta</i>
STA	3	5	5	1	Virginia creeper; Woodbine -- <i>Parthenocissus</i>
					. . . Clammy ground-cherry -- <i>Physalis heterophylla</i>
					. . . Bluegrass; Meadow-grass -- <i>Poa</i>
STA	2	4	3	2	Northern red oak, U -- <i>Quercus rubra</i>
STA	4	2	2	2	Swamp red currant -- <i>Ribes triste</i>
STA	2	2	2	4	False melic grass -- <i>Schizachne purpurascens</i>
					. . . Hairy-nerved carrion-flower -- <i>Smilax lasioneura</i>
					. . . Goldenrod -- <i>Solidago</i>
STA	3	5	4	1	American elm, U -- <i>Ulmus americana</i>

UNKNOWN
UNKNOWN
UNKNOWN
UNKNOWN

STA 2 1 1 4 Lowbush blueberry -- *Vaccinium angustifolium*
STA 3 3 3 3 High-bush cranberry -- *Viburnum trilobum*

Species Conserved at a Coarser Scale

These are plants present in both plots, but now their distribution seems coarser due to treatment.

For re-sampling of permanent plots, this means that the plant has been extirpated from one of the smaller plots.

For benchmark comparisons, it suggests species loss at a fine-scale, but not at coarser scales.

SEC M N H L PLANT NAME

STA 1 2 3 5 Yarrow -- *Achillea millefolium* Exotic
. . . Sunflower -- *Helianthus*
STA 1 2 3 5 Alum-root -- *Heuchera richardsonii*
STA 3 3 4 2 White campion -- *Silene latifolia* Exotic
STA 3 3 3 3 Lettuce -- *Lactuca*
STA 3 3 3 3 Lettuce -- *Lactuca*
STA 1 1 2 5 Jack pine -- *Pinus banksiana*
STA 2 4 4 2 Black cherry -- *Prunus serotina*
STA 3 2 1 4 One-sided pyrola -- *Pyrola secunda*
STA 2 3 3 2 Wood-anemone -- *Anemone quinquefolia*
STA 3 5 5 2 Common buckthorn -- *Rhamnus cathartica* Exotic

Species Conserved at the Same Scale

These are plants present in both plots at the same scale.

This suggests that the treatment had no effect on the plant in either re-sampled plots or benchmark comparisons.

SEC M N H L PLANT NAME

STA 1 2 2 4 Spreading dogbane -- *Apocynum androsaemifolium*
STA 2 2 3 4 Lindley's aster -- *Aster ciliolatus*
STA 2 4 3 2 Pennsylvania sedge -- *Carex pensylvanica*
STA 2 4 4 3 Hawthorn -- *Crataegus*
STA 2 2 2 3 Common strawberry -- *Fragaria virginiana*
STA 3 3 3 2 Three-flowered bedstraw -- *Galium triflorum*
STA 3 3 3 3 Lettuce -- *Lactuca*
STA 1 2 3 4 Pale vetchling -- *Lathyrus ochroleucus*
STA 2 2 2 3 Canada mayflower -- *Maianthemum canadense*
STA 2 3 2 3 Mountain rice-grass -- *Oryzopsis asperifolia*
STA 3 2 2 3 Red raspberry -- *Rubus strigosus*
STA 3 5 4 1 Red-berried Elder -- *Sambucus pubens*
STA 4 4 3 3 Woundwort -- *Stachys palustris*
. . . Snowberry -- *Symphoricarpos albus*
STA 3 5 5 1 Stinging nettle -- *Urtica dioica*
. . . Violet -- *Viola*

Species Conserved at a Finer Scale

These are plants present in both plots, but now their distribution seems finer due to treatment.

For re-sampling of permanent plots, this means that the plant has ingressed onto a smaller plot.

For benchmark comparisons, it suggests that the plant has expanded its local population due to treatment.

```
SEC M N H L PLANT NAME
STA 2 2 3 5 American vetch -- Vicia americana
STA 1 1 2 5 Prairie willow -- Salix humilis
    . . . Bull thistle -- Cirsium vulgare Exotic
    . . . Stickweed -- Agrimonia gryposepala
STA 2 4 4 3 Common plantain -- Plantago major Exotic
    . . . Quaking aspen -- Populus tremuloides
STA 1 2 2 4 Pin cherry -- Prunus pensylvanica
STA 4 2 2 4 Bluejoint -- Calamagrostis canadensis
STA 3 2 2 5 Meadowsweet -- Spiraea alba
STA 2 3 3 3 Bur oak -- Quercus macrocarpa
STA 2 4 4 2 Early meadow-rue -- Thalictrum dioicum
STA 2 4 4 4 Virginia thimbleweed -- Anemone virginiana
    . . . Prickly rose -- Rosa acicularis
STA 2 4 3 2 Mariland black snakeroot -- Sanicula marilandica
STA 2 3 3 3 Downy arrow-wood -- Viburnum rafinesquianum
STA 2 3 3 3 Columbine -- Aquilegia canadensis
    . . . Field pussytoes -- Antennaria neglecta
    . . . Hoary alyssum -- Berteroa incana Exotic
    . . . Common dandelion -- Taraxacum officinale Exotic
STA 2 2 3 4 Northern bedstraw -- Galium boreale
STA 1 2 3 5 Blue giant-hyssop -- Agastache foeniculum
STA 4 2 2 3 Swamp gooseberry -- Ribes hirtellum
STA 2 4 4 3 Poison ivy -- Rhus radicans
STA 2 4 4 3 American hazelnut -- Corylus americana
STA 2 5 4 1 Clayton's sweet cicely -- Osmorhiza claytonii
STA 2 4 3 2 Chokecherry -- Prunus virginiana
```

Species Appearing Due to Treatment

These are plants appearing after treatment due to seedbank release or ingress.

For re-sampling of permanent plots, this is direct evidence of establishment.

For benchmark comparisons, it suggests species gain in 1024 m2 patches.

```
SEC M N H L PLANT NAME
STA 3 1 2 5 Rough bent-grass -- Agrostis scabra
    . . . Bent Grass -- Agrostis
STA 2 2 2 3 Juneberry -- Amelanchier
STA 2 2 2 3 Juneberry -- Amelanchier
STA 2 3 2 2 Wild sarsaparilla -- Aralia nudicaulis
STA 2 2 2 3 Large-leaved aster -- Aster macrophyllus
STA 3 4 3 1 Lady-fern -- Athyrium angustum
STA 3 2 2 4 Fringed brome -- Bromus ciliatus
    . . . Spotted knapweed -- Centaurea biebersteinii Exotic
STA 2 3 4 5 White lamb's quarters -- Chenopodium album Exotic
STA 2 3 3 3 Maple-leaved goosefoot -- Chenopodium simplex
STA 2 2 3 5 Canada thistle -- Cirsium arvense Exotic
    . . . Field thistle -- Cirsium discolor
STA 1 1 2 5 Upright bindweed -- Convolvulus spithameus
STA 2 3 3 5 Horseweed -- Conyza canadensis
STA 4 2 2 4 Red-osier dogwood -- Cornus stolonifera
    . . . Golden corydalis -- Corydalis aurea
    . . . Yellow hawk's-beard -- Crepis tectorum Exotic
STA 1 1 2 5 Poverty grass -- Danthonia spicata
STA 2 2 2 3 Bush honeysuckle -- Diervilla lonicera
```

STA 3 3 3 4 Dragonhead -- *Dracocephalum parviflorum*
 . . . Northern willow-herb -- *Epilobium glandulosum*
 STA 3 2 2 5 Hemp-nettle -- *Galeopsis tetrahit* Exotic
 STA 2 2 2 4 Bicknell's cranesbill -- *Geranium bicknellii*
 STA 1 2 3 4 Veiny pea -- *Lathyrus venosus*
 STA 4 2 2 3 Northern bugleweed -- *Lycopus uniflorus*
 STA 3 4 4 1 Woodland millet grass -- *Milium effusum*
 STA 4 2 2 2 Naked miterwort -- *Mitella nuda*
 . . . Common evening-primrose -- *Oenothera biennis*
 STA 1 3 4 5 False gromwell -- *Onosmodium molle*
 STA 3 5 5 1 Anise-root -- *Osmorhiza longistylis*
 STA 1 2 3 5 Ground-cherry -- *Physalis virginiana*
 STA 2 2 3 4 Black bindweed -- *Polygonum convolvulus* Exotic
 STA 3 3 3 4 Rough cinquefoil -- *Potentilla norvegica*
 STA 4 4 3 2 Wild black currant -- *Ribes americanum*
 STA 3 2 3 5 Black-eyed Susan -- *Rudbeckia hirta*
 . . . Bladder campion -- *Silene vulgaris* Exotic
 STA 2 3 3 4 Canada goldenrod -- *Solidago canadensis*
 STA 1 1 2 5 Hairy goldenrod -- *Solidago hispida*
 . . . Spiny sow-thistle -- *Sonchus asper* Exotic
 STA 1 2 3 5 Red clover -- *Trifolium pratense* Exotic
 STA 1 2 3 5 White clover -- *Trifolium repens* Exotic
 STA 2 3 3 4 Common mullein -- *Verbascum thapsus* Exotic
 . . . Yellow violet -- *Viola pubescens*

SHIFTS IN SYNECOLOGICAL SCORES DUE TO TREATMENT

Compare benchmark and treatment scores for a general sense of synecological shifts.

Compare lost and new scores to see how extinctions and gains affected the site.

Compare the coarser and finer scores to get a feel for what abundance shifts might indicate.

Significant shifts should probably be consistent among all 3 comparisons.

Group	M	N	H	L
Lost	2.3	2.8	2.8	3.1
Coarser	2.2	2.8	3.1	3.3
Same	2.4	3.1	2.9	2.8
Finer	2.1	3.0	3.1	3.4
New	2.3	2.4	2.7	3.8
Benchmark	2.2	2.9	3.0	3.2
Treatment	2.2	2.7	2.9	3.4