

APPENDIX I

Vegetative Response to Past Timber Treatments Echo Trail, Whyte, and Inga South Project Areas

Introduction

In October 2005, personnel from the Forest Monitoring Program conducted vegetation surveys within previously treated timber stands in the Echo Trail, Whyte, and Inga South Project Areas. Objectives of these visits were to (1) Assess how vegetation has responded to managed treatments over the years and (2) Classify the stands according to the Minnesota Department of Natural Resources (DNR) native plant community classification (NPCC). Timber stands were selected for analysis based on forest type, age, and how well stands represented the forest at large. Forest types of most interest were black spruce and pine. Attributes documented included regeneration success (planted and natural regeneration) and vegetation frequency and cover. The age of stands visited ranged from 3 to 11 years old. Project area maps and complete species lists and regeneration data are found at the end of this write up.

These visits portray how landscapes have responded to previous management actions. This documentation should provide managers and resource specialists insight on how today's landscapes can be expected to respond to similar future management actions. Such knowledge should strengthen NEPA decisions particularly discussions on predicted environmental effects resulting from proposed actions.

Methodology

Surveys were designed by Foresters, biologists, and the Forest Monitoring crews. Regeneration surveys were based on standardized agency regeneration surveys and vegetation classification data collection was based on protocols established by Minnesota Biological Survey personnel of the DNR (Vegetation relevés). Vegetation relevés capture species frequency, percent cover, and size. Two stocking survey transects were conducted per plot and captured tree species and percent stocking within the stand. Photos were taken at the beginning and end of each relevé and stocking survey transect. DNR based native plant community classification was assigned to each site by using data from the vegetation relevé and careful observation of pre and post-harvest site characteristics. This allowed for the direct comparison of data and information contained within the *Field Guide to the Native Plant Communities of Minnesota*.

Echo Trail

SITE 1

ID: District: 06 **Compartment:** 14 **Stand:** 30: **Stand ID.** 09090600014030

Size: 36.11 acres. **Past Treatment:** Clear cut

Forest Type: 12, Lowland Conifer. **Year of Origin:** 1999

DNR Native Plant Community Classification: FPn62a



Site 1-Stocking Survey Transect 1



Site 1-Stocking Survey Transect 2

Vegetation Classification

In the CDS database this stand is typed as lowland conifer. Based on our use of the DNR *Native Plant Community Classification*, this stand was classified as **FPn62a: System**, Forested Rich Peatland System; **Class**, Northern Rich Spruce Swamp; **Type**, Rich Black Spruce Swamp (basin). Based on cover, this site was dominated by Black Spruce, Tamarack, Alder, Leatherleaf, Lady Fern, and Bluejoint). See appendix D for more complete species lists.

Stand Regeneration

At the time of this survey, site one was in its sixth year of regeneration after timber harvest. The original stocking survey was conducted in 2003 and the stand was found to be <16% stocked with black spruce. In 2005, our surveys found the stand to be 32% stocked with black spruce. The stand was also 29% stocked with *Larix laricina* and included minimal *Pinus strobus* and *Abies balsamea* on an upward slope near the edge of the stand. Minimal deciduous trees were observed with 30% total stocking for *Populus tremuloides*, *Betula papyrifera*, and *Acer rubrum*.

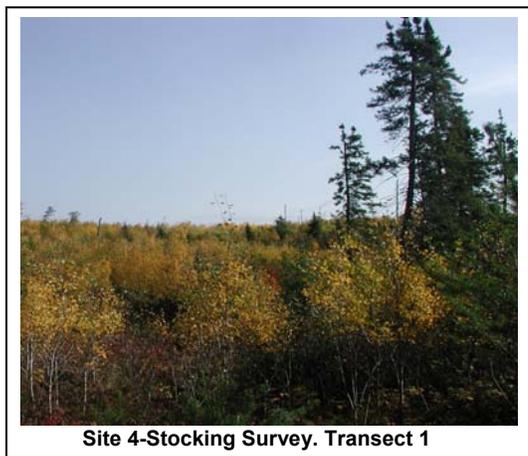
Site 4

ID: District: 05 **Compartment:** 27 **Stand:** 04; Stand ID-09090500027004

Past Treatment: Clear cut. **Size:** 57.40 acres

Forest Type: 1, Jack Pine **.Year of Origin:** 1997

DNR Native Plant Community Classification: FDn32c1



Site 4-Stocking Survey. Transect 1



Site 4-Stocking Survey. Transect 2

Vegetation Classification

In the CDS database this stand is typed as jack pine. Based on our use of the DNR *Native Plant Community Classification*, this stand was classified as **FDn32c1: System**, Fire-Dependent Forest/Woodland; **Class**, Northern Poor Dry-Mesic Mixed Woodland; **Type**, Black Spruce – Jack Pine Woodland; **Subtype**, Jack Pine-Balsam Fir. Based on cover, this site was dominated by Aspen, White pine, Jack Pine, Hazel, Blueberry, bracken fern, and poverty oat grass). See appendix D for more complete species lists.

Stand Regeneration

Site four is in its eighth year post timber harvest and had been classified as a Jack Pine stand pre harvest. Spatial variation in topography and species composition was prominent throughout this stand. Surveys found the stand to be only 8% stocked with *Pinus banksiana* regeneration, which was concentrated in a few areas. Total coniferous regeneration was at 32% stocked, including 18% stocking of *Pinus strobus*, with lesser amounts of *Abies balsamea*. Deciduous species were at 45% stocked, with *Populus tremuloides*, very abundant, at 35% stocked. Other deciduous species observed included *Betula papyrifera* and *Acer rubrum*. Significant amounts of *Corylus cornuta* and *Alnus crispa* were established.

Site 5

ID: District: 06 **Compartment:** 21 **Stand:** 95; **Stand ID-** 09090600021095

Past Treatment: Clear cut. **Size:** 174.71 acres

Forest Type: 1, Jack Pine. **Year of Origin:** 1997

DNR Native Plant Community Classification: FDn32a



Site 5-Stocking Survey Transect 1



Site 5-Stocking Survey Transect 2

Vegetation Classification

In the CDS database this stand is typed as jack pine. Based on our use of the DNR *Native Plant Community Classification*, this stand was classified as **FDn32a: System**, Fire-Dependent Forest/Woodland; **Class**, Northern Poor Dry-Mesic Mixed Woodland; **Type**, Red Pine – White Pine Woodland (Canadian Shield). Based on cover, this site was dominated by White pine, Red Maple, Aspen, Jack Pine, Hazel, Blueberry, bracken fern, and Indian Rice grass).

Stand Regeneration

Site 5 is in its eighth year post timber harvest. This stand covered a significantly large land area and therefore was variable in regeneration. The coniferous regeneration for this stand was high due to pine planting at 62% stocked, with planted *Pinus strobus* the dominant species at 46%, other species included *Abies balsamea* and *Picea mariana* both at 12% stocked. *Pinus banksiana* regeneration was observed, however only 2% stocked. Deciduous trees were observed at 40% stocked with *Populus tremuloides* and *Acer rubrum* both at 18%, *Betula papyrifera* and *Quercus rubra* were also noted.

Site 6

ID: District: 06 **Compartment:** 16 **Stand:** 25; **Stand ID-** 09090600016025

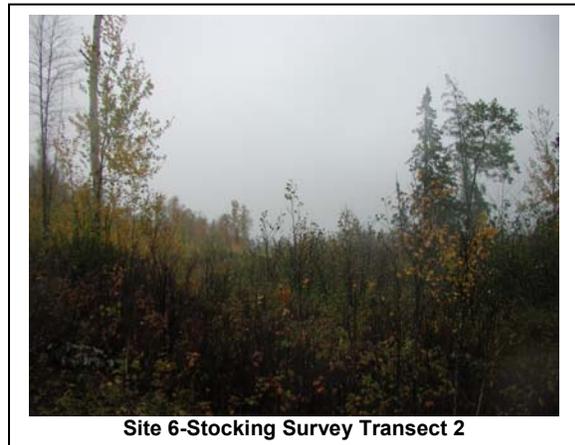
Past Treatment: Clear cut. **Size:** 208.30 acres

Forest Type: 3, White Pine. **Year of Origin:** 1998

DNR Native Plant Community Classification: FDn32c1



Site 6-Stocking Survey Transect 1



Site 6-Stocking Survey Transect 2

Vegetation Classification

In the CDS database, this stand is listed as Forest Type 3, White Pine. Based on our use of the DNR *Native Plant Community Classification*, this stand was classified as **FDn32c1: System**, Fire-Dependent Forest/Woodland; **Class**, Northern Poor Dry-Mesic Mixed Woodland; **Type**, Jackpine-Balsam Fir subtype). Based on cover, this site was dominated by White pine, Paper Birch, Jack pine, Raspberry, Blueberry, bracken fern, and Indian Rice grass).

Stand Regeneration

Site 6 is in its seventh year post timber harvest. This stand was partially planted with *Pinus strobus*. The stand was 32% stocked with conifers, *Pinus strobus*, was only at 15% stocked within our transect, due to species concentration. *Pinus banksiana* was at 12% stocked, *Abies balsamea* was also present in lesser quantities. Deciduous regeneration was at 38% stocking and included *Betula papyrifera* at 26%, with *Populus tremuloides* and *Acer rubrum* also present

Site 7

ID: District: 05 **Compartment:** 25 **Stand:** 51; **Stand ID-** 09090500025051

Size: 24.23 acres **Past Treatment:** Clear cut.

Forest Type: 3, White Pine **Year of Origin:** 1994

DNR Native Plant Community Classification: FDn32c3



Site 7-Stocking Survey Transect 1



Site 7-Stocking Survey Transect 2

Vegetation Classification

In the CDS database this stand is listed as Forest Type 3, White Pine. Based on our use of the DNR *Native Plant Community Classification*, this stand was classified as **FDn32c3: System**, Fire-Dependent Forest/Woodland; **Class**, Northern Poor Dry-Mesic Mixed Woodland; **Type**, Jackpine-Black Spruce-Aspen subtype). Based on cover, this site was dominated by Jack pine, Red Maple, White Spruce, Hazel, Wintergreen, Bunchberry, bracken fern, and Clubmoss).

Stand Regeneration

Site 7 is in its eleventh year post timber harvest* and was typed as a White Pine stand prior to harvest. Through our site observations the stand's *Native Plant Community* class was found to be FDn32c3, Jack Pine-Black Spruce-Aspen Subtype. Conifer regeneration was at 38% percent stocked, with *Pinus banksiana* 20%, *Pinus strobus* at 3%, and other species noted were *Picea glauca*, *Abies balsamea* and *Picea mariana*. Deciduous trees were at 40% stocked regeneration with *Acer rubrum* as the dominant species at a 28% stocking, other observed species included *Betula papyrifera*, *Populus tremuloides* and *Populus grandidentata*.

Site 9

ID: District: 06 **Compartment:** 21 **Stand:** 49; Stand ID-09090600021049

Past Treatment: Clear cut. **Size:** 26.87 acres

Forest Type: 2, Red Pine. **Year of Origin:** 1995

DNR Native Plant Community Classification: FDn22b



Site 9-Stocking Survey Transect 1



Site 9-Stocking Survey Transect 2

Vegetation Classification

In the CDS database this stand is listed as Forest Type 2, Red Pine. Based on our use of the DNR *Native Plant Community Classification*, this stand was classified as **FDn22b: System**, Fire-Dependent Forest/Woodland; **Class**, Northern Dry-Bebrook Pine Woodland; **Type**, Red Pine – White Pine Woodland. Based on cover, this site was dominated by Quacking Aspen, Balsam Fir, Red Maple, Raspberry, Hazel, Big leaf aster, Blueberry, bracken fern, and Poverty oatgrass).

Stand Regeneration

Site 9 is in its tenth year post timber harvest. Coniferous regeneration was at 32% stocked with a varied mix of *Pinus resinosa*, *Pinus banksiana*, *Abies balsamea*, and *Picea glauca*. *Abies balsamea* was establishing at the highest rate with 16% with *Pinus resinosa* at only 3%. Deciduous species were more significant in this stand currently, with a total percent stocking of 55%. Populous tremuloides was dominant at 32% stocked, with *Betula papyrifera*, *Acer rubrum*, and *Quercus rubra* also present.

Site 11

ID: District: 06 **Compartment:** 15 **Stand:** 49; Stand ID-09090600015049

Past Treatment: Clear cut. **Size:** 515.08 acres

Forest Type: 11, Balsam Fir/Aspen/Paper Birch. **Year of Origin:** 2002

DNR Native Plant Community Classification: FDn33a2



Site 11-Stocking Survey Transect 1



Site 11-Stocking Survey Transect 1

Vegetation Classification

In the CDS database this stand is listed as Forest Type 3, White Pine. Based on our use of the DNR *Native Plant Community Classification*, this stand was classified as FDn33a2. Based on our use of the DNR *Native Plant Community Classification*, this stand was classified as **FDn22b: System**, Fire-Dependent Forest/Woodland; **Class**, Northern Dry-Bebrook Pine Woodland; **Type**, Red Pine – White Pine Woodland-Mountain Maple subtype. Based on cover, this site was dominated by White Pine, Balsam Fir, Paper Birch, Mountain Maple, Raspberry, Hazel, Blueberry, bracken fern, and Blue joint grass).

Stand Regeneration

Site 11 is in its third year post timber harvest. The coniferous regeneration at this stand was at 36% stocked, with *Abies balsamea* at 13% stocked. *Pinus strobus* was more dominant at 22% due to minimal planting, with some *Picea glauca*, *Picea mariana* and *Pinus resinosa* also present. Deciduous species were only 17% stocked, with species of *Betula papyrifera*, *Populus tremuloides* and *Quercus rubra*.

Whyte Project Area

SITE 1

ID: District: 01 **Compartment:** 425 **Stand:** 0909010042521

Size (in acres): 13 **Past treatment:** Stand clear cut

Forest Type: Black Spruce-Lowland. **Year of Origin:** 1996

DNR Native Plant Community Classification: FPn62a



Site 1-Stocking Survey Transect 1



Site 1-Stocking Survey Transect 2

Vegetation Classification

Within the CDS database this stand is typed as lowland conifer. Based upon the Native Plant Community Classification (NPCC), this stand was classified as **FPn62a; System**, Forested Rich Peatland System; **Class**, Northern Rich Spruce swamp (basin); **Type**, Rich Black Spruce Swamp. Site one was typed as a lowland pre timber harvest. Our survey found *Alnus incana rugosa* dominated the shrub layer, with *Ledum groenlandicum*, *Gaultheria hispidula*, and *Chamedaphne calyculata* dominant in the forbs layer. The dominant graminoids include *Glyceria sp.* and *Calamagrostis canadensis*. *Sphagnum sp.* was also noted as a dominant sp.

Stand Regeneration

Site one was typed as a Black Spruce Lowland pre timber harvest. The coniferous species are at 39% stocked regeneration with *Picea mariana* the dominant species at 32% stocked. *Larix laricina* was establishing at 18% stocked, with *Pinus strobus* and *Abies balsamea* also present. Deciduous species were at 39% stocked with *Betula papyrifera* the dominant species. *Populus tremuloides* was also observed in the stand.

Site 2

ID: District: 01 **Compartment:** 490 **Stand ID:** 0909010049019

Size (in acres): 23 **Treatment Type:** None

Forest Type: Black Spruce-Lowland. **Year of Origin:** 1999

DNR Native Plant Community Classification: APn81a



Site 2-Stocking Survey Transect 1



Site 2-Stocking Survey Transect 2

Vegetation

Site two was typed as a lowland pre timber harvest. The dominant shrub species include *Alnus viridis crispa*, *Corylus cornuta*, and *Salix sp.* In the forb layer *Iris versicolor*, *Gaultheria hispidula* and *Maianthemum canadense* are dominant. Dominant graminoid species include *Calamagrostis canadensis*, *Glyceria sp.*, and *Glyceria canadensis*. Other notable species include *Sphagnum sp.* and *Lycopodium annotinum*. The Native Plant Community Classification for this stand is APn81a, Poor Black Spruce Swamp.

Stand Regeneration

Site two was classified as a Black Spruce Lowland pre timber harvest. *Picea mariana* is stocked at 30% and *Larix laricina* at 48%. No deciduous regeneration was noted within this stand.

Site 3

ID: District: 01 **Compartment:** 165 **Stand:** 54, **Stand ID:** 0909010016554

Size (in acres): 30. **Past Treatment:** CC Salvage/Mortality

Forest Type: Black Spruce-Lowland. **Year of Origin:** 1996

DNR Native Plant Community Classification: FDn43b



Site 3-Stocking Survey Transect 1



Site 3-Stocking Survey Transect 2

Vegetation

Site three is in its ninth year post timber harvest and was typed as a lowland pre timber harvest. The dominant species in the shrub layer are *Rubus strigosus*, *Corylus cornuta*, and *Alnus incana rugosa*. The dominant forbs include *Cornus canadensis*, *Aster Macrophyllus*, *Rubus pubescens*, and *Cirsium arvense* with *Calamagrostis canadensis* and *Carex arctata* as the dominant graminoid species. Other dominant species worth noting include *Lycopodium dendroideum* and *Lycopodium sp.* The dominant species did not fit in the lowland classification and site observation agreed that the stand was an upland stand. The Native Plant Community classification for this stand is FDn43b; Aspen-Birch Forest with a 1 or 2 subtype, uncertainty is based on an equal occurrence of the dominant species of both subtypes present in this stand.

Stand Regeneration

Site three was typed as a Black Spruce-Lowland pre timber harvest. A site visit and assessment of species present proved the site to be more of an upland stand. The coniferous regeneration was at 42%, the only species present within the transect being *Abies balsamea*, however in the vegetation releve *Picea mariana* and *Picea glauca* were also present. Deciduous regeneration was at 63% with *Populous tremuloides* stocked at 58% and *Betula papyrifera* at 33%.

Site 4

ID: District: 01 **Compartment:** 164 **Stand:** 53, **Stand ID:** 090910016453

Size (in acres): 228. **Past Treatment:** CC Salvage/ Mortality

Forest Type: Aspen/W. Spruce/Fir **Year of Origin:** 1995

DNR Native Plant Community Classification: FDn43b



Site 4-Stocking Survey Transect 1



Site 4-Stocking Survey Transect 1

Vegetation

Site four is an upland stand with deciduous trees dominant. In the under story the shrub layer includes *Alnus incana rugosa*, *Acer spicatum*, *Diervilla lonicera* and *Rubus strigosus* as the dominant species. The dominant forbs include *Fragaria vesca*, *Cornus canadensis*, and *Linnea borealis*, *Lycopodium clavatum* was also noted. The dominant graminoids are *Calamagrostis canadensis* and *Bromus ciliatus*. The Native Plant Community classification for this site is FDn43b; Aspen-Birch Forest with a 1 or 2 subtype, uncertainty is based on an equal occurrence of the dominant species of both subtypes present in this stand.

Stand Regeneration

Site four was typed as a Aspen/ White Spruce/Balsam Fir stand pre timber harvest. The stand seemed to be regenerating accordingly. The total coniferous regeneration was at 20% stocked with *Abies balsamea* and *Picea glauca* as the present species. The total deciduous regenerations were at 47% stocked including *Populous tremuloides* at 11% stocked and *Betula papyrifera* at 24%.

Site 5

ID: District: 01 **Compartment:** 426 **Stand:** 67, **Stand ID:** 0909010016453

Size (in acres): 5 **Past treatment:** Stand Clear cut

Forest Type: Yellow Birch? **Year of Origin:** 1995

DNR Native Plant Community Classification: FDn43b2



Site 5-Stocking Survey Transect 1



Site 5-Stocking Survey Transect 2

Vegetation

Site five was typed as an upland with deciduous trees dominating the Over story. It is in its tenth year post timber harvest and has *Rubus strigosus*, *Ribes hirtellum*, and *Salix sp.* as the dominant shrubs. Dominant forbs include *Cornus canadensis*, *Epilobium angustifolium* and *Anaphalis margaritacea* with *Calamagrostis canadensis* and *Scirpus cyperinus* as the dominant graminoids. Other notable species include *Sphagnum sp.*, *Dryopteris sp.*, and *Athyrium filix-femina*. The Native Plant Community classification for this stand is FDn43b2, Aspen-Birch Forest with a Hardwood subtype.

Stand Regeneration

Site five was typed as a Yellow Birch stand with uncertainty pre timber harvest. The total coniferous regeneration was found to be 14% stocked with *Abies balsamea*, *Picea glauca* and *Larix laricina* present. The coniferous regeneration was at 41% stocked with *Populus tremuloides* the dominant species at 22% stocked. *Betula papyrifera* was also present at 16% stocked. *Quercus Rubra* was also noted in the transect. There was no *Betula alleghaniensis* present in the stand.

Site 6

ID: District: 01 **Compartment:** 164 **Stand:** 76, **Stand ID:** 0909010016476

Size (in acres): 7 **Past Treatment:** CC Salvage/Mortality

Forest Type: Red Oak? **Year of Origin:** 1995

DNR Native Plant Community Classification: FDn43b1



Site 6-Stocking Survey Transect 1



Site 6-Stocking Survey Transect 2

Vegetation

Site six was typed as an upland stand with deciduous species dominant in the Overstory pre timber harvest. The dominant species in the shrub layer include *Rubus strigosus*, *Corylus cornuta*, *Salix sp.*, and *Cornus sericea*. *Cornus canadensis*, *Aster ciliatus*, *Fragaria vesca*, and *Anaphalis margaritacea* dominate the forbs layer with dominant graminoids *Phalens arundinacia*, *Oryzopsis asperfolia*, *Calamagrostis canadensis*, and *Agrostis stolonifera*. Other notable species include *Sphagnum sp.*, *Lycopodium dendroideum*, and *Lycopodium clavatum*. The Native Plant Community classification for this stand is FDn43b1, Aspen-Birch Forest with Balsam Fir subtype.

Stand Regeneration

Site six was typed as a Red Oak stand pre timber harvest with some uncertainty. The total coniferous regeneration for this stand is at 36% stocked with *Abies balsamea* and *Picea glauca* as the dominant species, with lesser amounts of *Larix laricina*. The total deciduous regeneration was at 36% with *Populus tremuloides* the dominant species. No *Quercus rubra* was noted in this stand.

Site 7

ID: District: 01 **Compartment:** 425 **Stand:** 57, **Stand ID:** 0909010042557

Size (in acres): 11 **Past Treatment:** Stand Clearcut

Forest Type: Red Oak? **Year of Origin:** 1996

DNR Native Plant Community Classification: FDn33b



Site 7-Stocking Survey Transect 1



Site 7-Stocking Survey Transect 2

Vegetation

Site seven was typed as an upland stand with deciduous species dominant in the Overstory pre timber harvest. The dominant species in the shrub layer is *Rubus strigosus*. *Cornus canadensis* and *Polygonum cilinode* dominate the forbs layer with *Calamagrostis canadensis* as the dominant graminoid in the stand. Other notable species include *Sphagnum sp.*, *Lycopodium obscurum* and *Cladina sp.*. The Native Plant Community classification for this stand is FDn33b, Aspen-Birch Woodland.

Stand Regeneration

Site seven was typed as a Red Oak stand pre timber harvest with some uncertainty. The total coniferous regeneration for this stand is at 40% stocked with *Abies balsamea* the dominant species at 15% stocked. Also noted in the stand was *Pinus strobus*, *Picea glauca*, and *Larix laricina*. The total deciduous regeneration was at 40% with *Populus tremuloides* the dominant species, with lesser amounts of *Betula papyrifera*. *Quercus rubra* was regenerating in the stand, however was found to be only 6% stocked within the transects.

Inga South Area

SITE 1

ID: District: 07 **Compartment:** 257 **Stand:** 73

Size (in acres): 3 **Forest Type:** Lowland Conifer

Year of Origin: 2003

DNR Native Plant Community Classification: FDn32c3



Site 1-Stocking Survey Transect 1



Site 1-Stocking Survey Transect 2

Vegetation

Site one was typed out as a lowland conifer stand, however our site observations found the stand to contain more upland topography with minimal lowland. The dominant vegetation was found to be more upland, with *Corylus cornuta* and *Rubus strigosus* dominating the shrub layer; the dominant forbs include *Aster macrophyllus*, *Cornus canadensis*, and *Polygonum cilinode*; graminoids were well established with *Calamagrostis canadensis* and *Carex sp.* dominant; a few *Lycopodium sp.* were also noted within the stand. The Native Plant Community class for this stand was typed as FDn32c3 through our site observations.

Stand Regeneration

Site one is in its second year post timber harvest and was considered lowland conifer pre timber harvest. The stand was surveyed in 2003 and was found to be <16% stocked and was noted as being in the process of regeneration. The stand was burned in July 2003 and seeded with Black Spruce and Jack Pine. Our observations found that the stand was only 13% stocked with conifers and *Picea mariana* was the only observed species. Deciduous regeneration was at 81% with *Populus tremuloides* and *Betula papyrifera* as the dominant species.

Site 3

ID: District: 07 **Compartment:** 268 **Stand:** 24

Size (in acres): 13 **Forest Type:** Jack Pine-Black Spruce

Year of Origin: 1997

DNR Native Plant Community Classification: FDn32c3



Site 3-Stocking Survey Transect 1



Site 3-Stocking Survey Transect 2

Vegetation

Stand two contains upland vegetation with *Amalanchier sp.*, *Diervilla lonicera*, and *Rosa sp.* dominating the shrub layer. Abundant forbs include *Aster macrophyllus*, *Vaccinium myrtelloides*, and *Fragaria virginianum*; with *Calamagrostis canadensis* and *Oryzopsis asperfolia* as the dominant graminoids and *Lycopodium sp.* also present. The Native Plant Community classification for this stand is FDn32c3, Jack Pine-Black Spruce, Aspen subtype.

Stand Regeneration

This stand was typed a Jack Pine-Black Spruce stand pre timber harvest. Dominant coniferous regeneration in this stand includes *Pinus strobus* at 34% with *Picea glauca* and *Abies balsamea* each at 13%, other species noted were *Pinus banksiana*, *Picea mariana* and *Larix laricina*. Total coniferous stocking was at 41%. Deciduous species are at 13% stocked with *Betula papyrifera* as the dominant species.

Site 4

ID: District: 07 **Compartment:** 286 **Stand:** 3

Size (in acres): 116 **Forest Type:** Mixed Hardwoods

Year of Origin: 2003

DNR Native Plant Community Classification: MHn45a



Site 4-Stocking Survey Transect 1



Site 4-Stocking Survey Transect 2

This stand is dominated by upland vegetation with *Rubus strigosus*, *Corylus cornuta*, *Amalanchier sp.* and *Prunus pennsylvanica* dominant in the shrub layer. *Aster macrophyllus* dominates the forbs layer, with *Oryzopsis asperfolia* and *Carex sp.* as the dominant graminoids. Other notable species include *Lycopodium dendroidicum* and *Dryopteris sp.* The Native Plant Community Classification for this stand is MHn45, Northern Mesic Hardwood Forest.

Stand Regeneration

Stand four was typed as a Mixed Hardwoods stand pre timber harvest. The stand contained only *Abies balsamea* for coniferous regeneration at 20% stocked. The deciduous species were at 25% stocked with *Betula papyrifera* dominant, *Betula alleghaniensis* was also found to be regenerating in this stand.

Site 6

ID: District: 07 **Compartment:** 230 **Stand:** 95

Size (in acres): 3 **Forest Type:** White Pine

Year of Origin: 2001

DNR Native Plant Community Classification: FDn43a



Site 6-Stocking Survey Transect 1



Site 6-Stocking Survey Transect 2

Vegetation

Stand six contains upland vegetation with dominant shrub species of *Corylus cornuta*, *Rubus strigosus*, and *Salix sp.* The dominant forbs include *Fragaria virginianum* and *Aster macrophyllus*; established graminoids observed include *Calamagrostis canadensis* and *Oryzopsis asperfolia*. *Lycopodium dendroidicum* was also noted at this site.

Stand Regeneration

Stand six was typed as a White Pine stand pre timber harvest. The stand is four years post harvest and has coniferous regeneration at 59% stocked. The dominant conifer is *Pinus strobus* at 23% stocked with *Pinus resinosa* and *Picea glauca* also present. There was no notable deciduous regeneration in this stand.

Site 7

ID: District: 07 **Compartment:** 31 **Stand:** 40

Size (in acres): 40 **Forest Type:** Red Pine

Year of Origin: 2003

DNR Native Plant Community Classification: FDn43a



Site 7-Stocking Survey Transect 1



Site 7-Stocking Survey Transect 2

Vegetation

Stand seven is dominated by upland vegetation with *Rubus strigosus* and *Corylus cornuta* dominating the shrub layer. Dominant forbs include *Cornus canadensis* and *Fragaria virginianum* with dominant graminoids *Oryzopsis asperfolia* and *Calamagrostis canadensis*. *Lycopodium sp.* was also noted. The Native Plant Community Classification for this stand is FDn32a, Red Pine-White Pine woodland.

Stand Regeneration

The stand was typed as a Red Pine stand pre timber harvest, however our observations found no Red Pine regeneration. The total coniferous regeneration was at 56% stocked with *Pinus strobus* dominated the stand with 36% stocked and *Abies balsamea* was at 26% stocked with *Picea glauca* also present. There was high deciduous regeneration at 68% stocked dominated by *Betula papyrifera* at 36% stocked. *Populus tremuloides* was also present in the stand.

Site 8

ID: District: 07 **Compartment:** 268 **Stand:** 41

Size (in acres): 45 **Forest Type:** White Pine

Year of Origin: 1998

DNR Native Plant Community Classification: FDn43a



Site 8-Stocking Survey Transect 1



Site 8-Stocking Survey Transect 2

Vegetation

Site eight is dominated by upland vegetation with *Corylus cornuta* and *Rubus strigosus* dominant in the shrub layer. The dominant forbs include *Fragaria vesca* and *Aster reciliolatus*. Graminoids present include *Calamagrostis canadensis*, *Bromus ciliatus*, and *Agrostis stolonifera*. *Lycopodium dendroidicum* and *Cladina sp.* were also present in the stand. The Native Plant Community classification for this stand is FDn43a, White Pine-Red Pine forest.

Stand Regeneration

Stand eight was typed as a White Pine stand pre timber harvest. The conifer regeneration is at 52% stocked with *Pinus strobus* dominant at 36% stocked. *Abies balsamea* and *Picea glauca* were also establishing. The deciduous species are at 38% stocked with *Betula papyrifera* dominant at 29% stocked, *Populus tremuloides* is also present in the stand.

Overall Project Evaluation

Stands visited were representative of a variety of forest types with variation in age and size. The surveys were conducted in an effort to document reestablishment of forest types after timber harvest. Of the stands visited, Black Spruce regeneration was of specific interest to find evidence of natural regeneration within harvested stands older than 5 years. The 3 to 5 year stocking survey may be too short to adequately measure black spruce stocking. A seven to ten year survey point may be more appropriate.

Echo Trail

Of the three Black Spruce stands visited, only two were found to be lowland stands comprised of regenerating black spruce. Understory plants particularly the forbs layer varied slightly between the two stands. Both sites had significant *Sphagnum sp.* in the ground layer along with *Calamagrostis canadensis* as the dominant graminoid. **Both sites were approximately 30% stocked with *Picea mariana* regeneration.**

Site three had been typed a Black Spruce-Lowland pre timber harvest, however our site visit found it to be mostly an upland stand falling into the Aspen-Birch Native Plant Community classification along with sites four, five and six. These sites all fell into this category due to the mix in regeneration of *Abies balsamea* as the dominant coniferous species with *Populus tremuloides* and *Betula papyrifera* also establishing.

Site seven was found to belong to the Native Plant Community FDn33b, Aspen-Birch woodland. The distinguishing characteristic in this stand to separate it from the FDn43 stands is the presence of *Quercus rubra* in the under story.

Whyte Project Area

Site 1- lowland conifer type proved to be most successful at self-regeneration among the stands at the time of our post harvest visits. **The greater spruce abundance in this year's survey compared to the 2003 survey (16% vs. 32%) is most likely a reflection of the seedlings being more visible because of greater height.** Spruce regeneration surveys should be conducted at year 7 rather than year 5.

Sites 5, 6, and 11 were planted to white pine and hence were reflected in higher stocking percentages. Site 6 and Site 7 provides a good comparison between natural and planted white pine. Site 6 had been planted and demonstrated a much higher percentage (15% stocked) than Site 7 (3%) where natural regeneration was prescribed. stocking was only natural regeneration at 3% stocked. Site 7 was also a significantly older stand and it appears that without pine planting, deciduous species would become established and dominate the site.

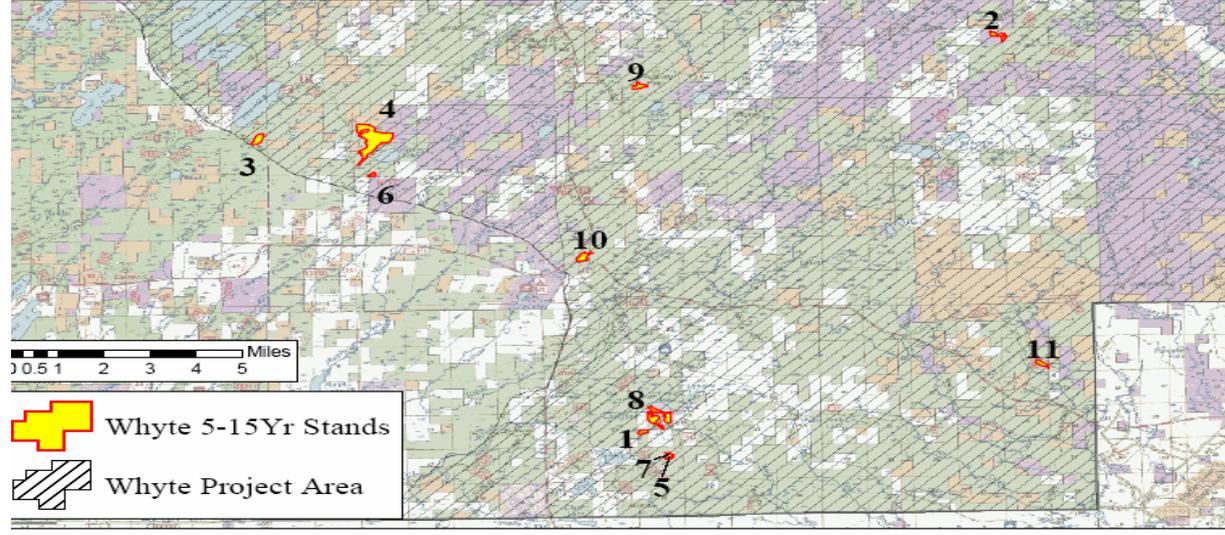
Red Pine and Jack Pine stands (sites 4, 5, and 9) proved to be slower in naturally regenerating specifically in Site 5 where White Pine had been planted and was significantly higher in numbers at 46% stocked. Mature trees had been left in all these stands, but were not reestablishing the stand to its original forest type.

Inga South Project Area

Of the three Black Spruce stands, only two were visited, due to inaccessibility on the other. **Site one and Site three both had black spruce regeneration**, and had been typed as FDn32c3, Jack Pine-Black Spruce, Aspen subtype. In site one black spruce was dominant however, site three had significant white pine regeneration with other coniferous species also establishing. The deciduous regeneration was significantly high in Site 1, with much less established in site 3. Site four was the only mixed hardwoods stand surveyed. The classification for this stand is MHn45, Northern Mesic Hardwood forest. This stand was showing regeneration of hardwoods with paper birch the dominant species. Yellow birch was of particular interest in this stand regenerating and at 10% stocked. The last three stands were all Red Pine or White Pine stands. In all three stands the white pine had the most success in regeneration. Site 7 was typed as a

Priority Old Timber Sales - Whyte Project Area

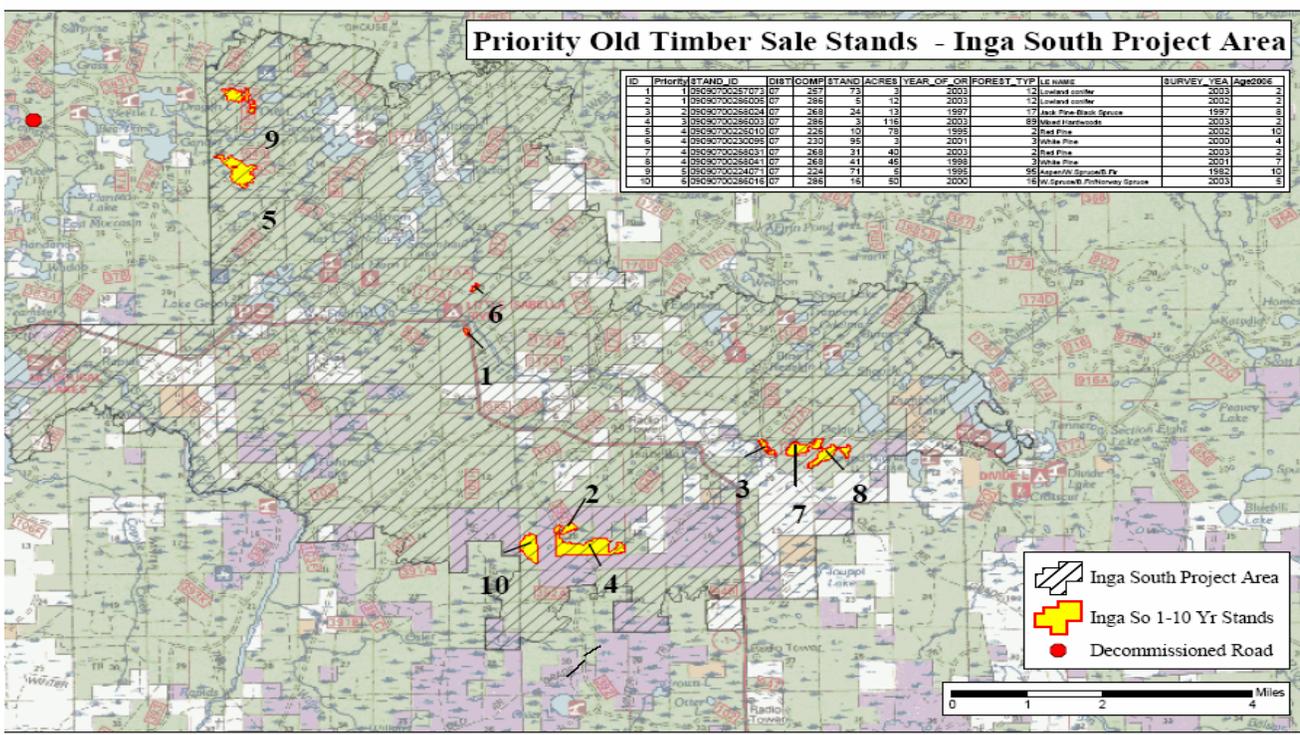
ID	Priority	DIST	COMP	STAND	ACRES	YEAR_OF_OR	STAND_AGE	Forest Type	SURVEY	REMARKS
1	3	01	435	213000	13.0	1969	3	Black Spruce-Aspen	2003	PART 20 + MARBLE SALE - SEE NOTES 1969
2	3	01	493	183000	23.0	1969	3	Black Spruce-Aspen	2004	Marble on structure nearby. 244 checks
3	4	01	485	543000	26.0	1969	3	Black Spruce-Aspen	2003	PEWEE SALVAGE SALE. 26 acres. Sawed 82 acres. 242 AS added to the site 20
4	4	01	184	513000	23.0	1969	13	Aspen/White Spruce	1985	FLY DOWNER AND PART SALMON WEEF SALVAGE SALE. 105 15.88 89 acres to 23 Jan 04
5	4	01	436	473000	8.0	1969	13	Yellow Birch?	2003	PART 20 + MARBLE SALE - PLANTED 1969 VS + 2 ac planted 2002
6	4	01	184	763000	17.0	1969	13	Red Cedar	1985	PART SALMON WEEF SALE. SAC3 PLANTED NOV-1985
7	4	01	435	613000	11.0	1969	3	Red Cedar	1985	PART 20 + MARBLE SALE - PLANTED 1969 VS +
8	4	01	435	513000	78.0	1969	15	Red Pine	2003	WCS 5 AND 150 740 0-13. 10 ac 61 ac observed 2003
9	4	01	474	543000	23.0	1969	7	White Pine	2003	PART 20 + MARBLE SALE. 22 ACRES PLANTED 1969
10	4	01	474	530000	28.0	2000	1	White Pine	2003	White Pines 28 ac. Oct 1988. Set to be burned after Harvest with right. WIP region project. 26 ac. Marbles planted 2000
11	4	01	448	373000	18.0	1969	13	M. Spruce/Fr	1985	MIXED SPECIES PLANTED 1982



7 x 11 in

Priority Old Timber Sale Stands - Inga South Project Area

ID	Priority	STAND_ID	DIST	COMP	STAND	ACRES	YEAR_OF_OR	FOREST_TYP	LS NAME	SURVEY_YEA	Age2006
1	1	09090700257073	07	267	73	3	2003	13	Lowland conifer	2003	3
2	1	09090700258208	07	268	5	13	2003	13	Lowland conifer	2003	3
3	2	09090700268024	07	268	24	13	1997	17	Jack Pine-Black Spruce	1997	8
4	3	09090700268003	07	268	3	116	2003	89	Mixed Hardwoods	2003	3
5	4	09090700265010	07	224	10	79	1995	20	Red Pine	2002	10
6	4	09090700230098	07	230	98	3	2001	3	White Pine	2000	4
7	4	09090700268031	07	268	31	40	2003	2	Red Pine	2003	2
8	4	09090700265041	07	268	41	46	1998	2	White Pine	2001	2
9	5	0909070022407	07	224	71	8	1995	56	Aspen/White Spruce/Fr	1982	10
10	5	0909070036016	07	284	16	80	2000	76	Jack Spruce/W. White Pine	2003	8



x 11 in

Forest Regeneration/Plant Community Classification

Echo Trail							
	Site 1	Site 4	Site 5	Site 6	Site 7	Site 9	Site 11
FOREST TYPE (based on pre-harvest)	Lowland conifer	Jack Pine	Jack Pine	White Pine	White Pine	Red Pine	Balsam/Aspen/Birch
DNR Native Plant Community Classification	FPn62a	FDn32c1	FDn32a	FDn12	FDn32c3	FDn22b	FDn33b
Stand Age (in years)	6	8	8	7	11	10	3
Stand Size (in acres)	36.11	57.40	174.71	208.30	24.23	26.87	515.08
TOT CONIFER % Stocked	70%	34%	72%	39%	41%	35%	52%
Red Pine						3%	6%
Jack Pine		8%	2%	12%	20%	10%	
White Pine	3%	18%	46%	15%	3%		22%
Balsam Fir	6%	8%	12%	6%	5%	16%	13%
Black Spruce	32%		12%		5%		
White Spruce				3%	8%	6%	11%
Tamarack	29%			3%			
TOTAL DECIDUOUS % STOCKED	35%	43%	52%	41%	46%	54%	17%
Quaking Aspen	13%	35%	18%	9%	5%	32%	6%
Big Tooth Aspen					3%		
Paper Birch	19%	5%	14%	26%	10%	6%	8%
Red Maple	3%	3%	18%	6%	28%	10%	
Red Oak			2%			6%	3%
Inga South							
	Site 1	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8
Forest (based on pre-harvest)	Lowland conifer	JackPine-Black Spruce	Mixed Hardwoods	Red Pine	White Pine	Red Pine	White Pine
Stand Age (in years)	2	8	2	10	4	2	7
Stand Size (in acres)	3	13	116	78	3	40	45
CONIFERS	13%	41%	20%		59%	56%	52%
Red Pine					19%	0%	
Jack Pine		9%					
White Pine		34%			23%	36%	36%
Balsam Fir		13%	15%		4%	26%	21%
Black Spruce	13%	9%					
White Spruce		13%			15%	12%	2%
Tamarack		6%					
DECIDUOUS	81%	13%	25%		0	68%	38%
Quaking Aspen	69%		5%			4%	2%
Yellow Birch			10%				
Paper Birch	19%	13%	15%			36%	29%
Whyte							
	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7
Forest Type (based on pre harvest)	Black Spruce-Lowland	Black Spruce-Lowland	Black Spruce-Lowland	Aspen/W. Spruce/Fir	Yellow Birch?	Red Oak?	Red Oak?
Stand Age (in years)	9	6	9	10	10	10	9
Stand Size (in acres)	13	23	30	228	5	7	11
CONIFERS	39%	30%	42%	20%	41%	36%	40%
White Pine	4%						6%
Balsam Fir	4%		42%	18%	8%	12%	15%
Black Spruce	32%	30%	0%			12%	
White Spruce				2%	3%		6%
Tamarack	18%	48%			3%	2%	2%
DECIDUOUS	39%	0	63%	47%	41%	36%	40%
Quaking Aspen	7%		58%	11%	22%	20%	23%
Paper Birch	32%		33%	24%	16%		9%
Red Oak					5%	0%	6%
Yellow Birch					0%		