Forest Stand Revival

Through pine and aspen thinning in Duluth

January, 2021

WHAT ARE NATIVE PLANT COMMUNITIES?

- A **native plant community** (NPC) is a group of **native plants** that interact with each other and with their environment in ways not greatly altered by modern human activity or by introduced organisms.

WFn53

MHn35

WHAT MAKES PLANT COMMUNITIES (DIFFERENT)?

- Soil
  - Bedrock, important for NE MN
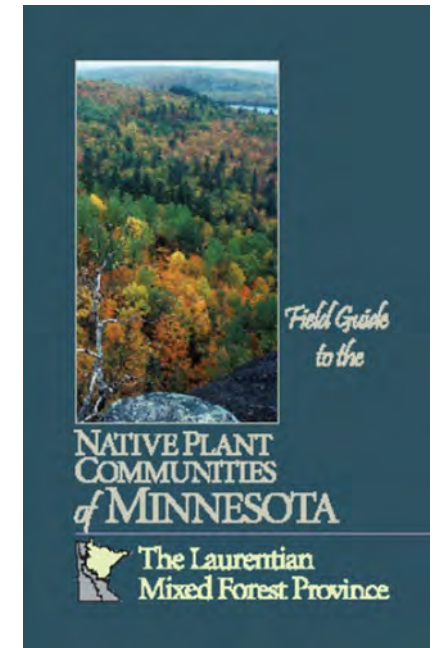- Water
- Slope
- Aspect

WHAT IS THE BASIS OF NPCs?

- Data collected from ~10,000 vegetation plots

- ~1,200 soil pits dug

- Results published in 3 field guides

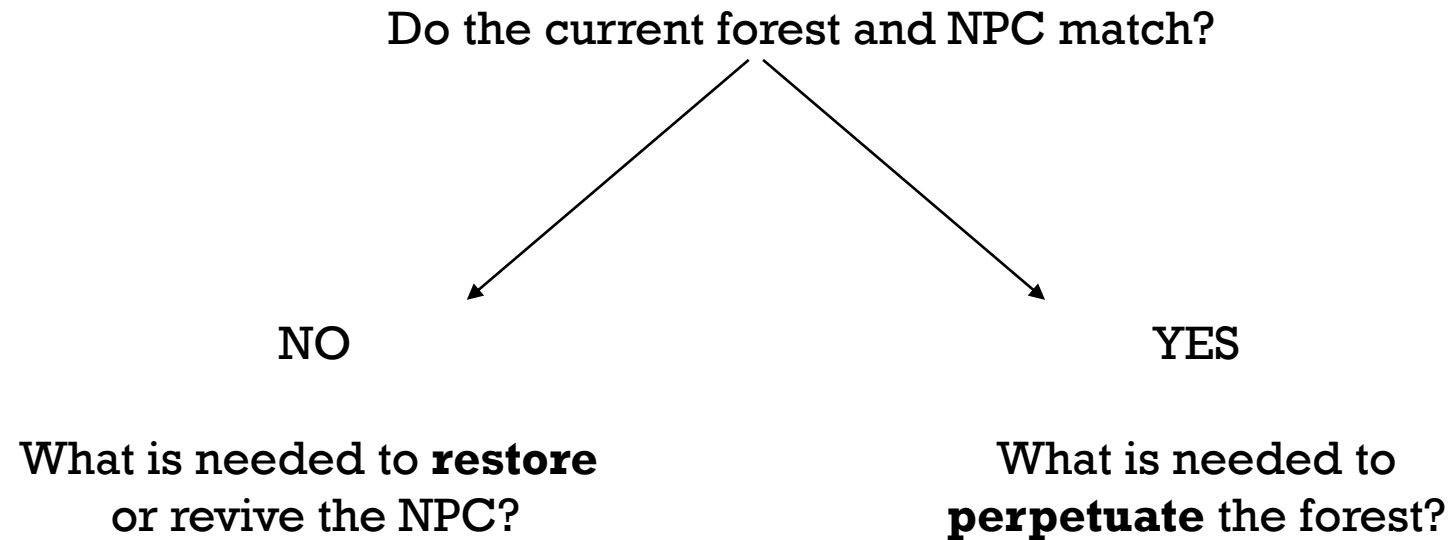- Numerous online resources with more detail

WHY CARE ABOUT NPCs?

- NPCs are the best guide we have for intact or degraded sites in MN

- NPC information allows us to see the future of a forest

  - Natural succession

  - Disturbance type and regime

  - Patterns of regeneration

Field Guide to the
NATIVE PLANT
COMMUNITIES
of MINNESOTA
The Laurentian
Mixed Forest Province

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How are we applying NPC data?

- Identify NPC
    - Overstory and understory species
        - Overstory reveals more about recent (last 30-80 years) human activity
        - Understory reveals more about NPC type
    - Invasive species

Do the current forest and NPC match?

NO

YES

What is needed to **restore** or revive the NPC?

What is needed to **perpetuate** the forest?

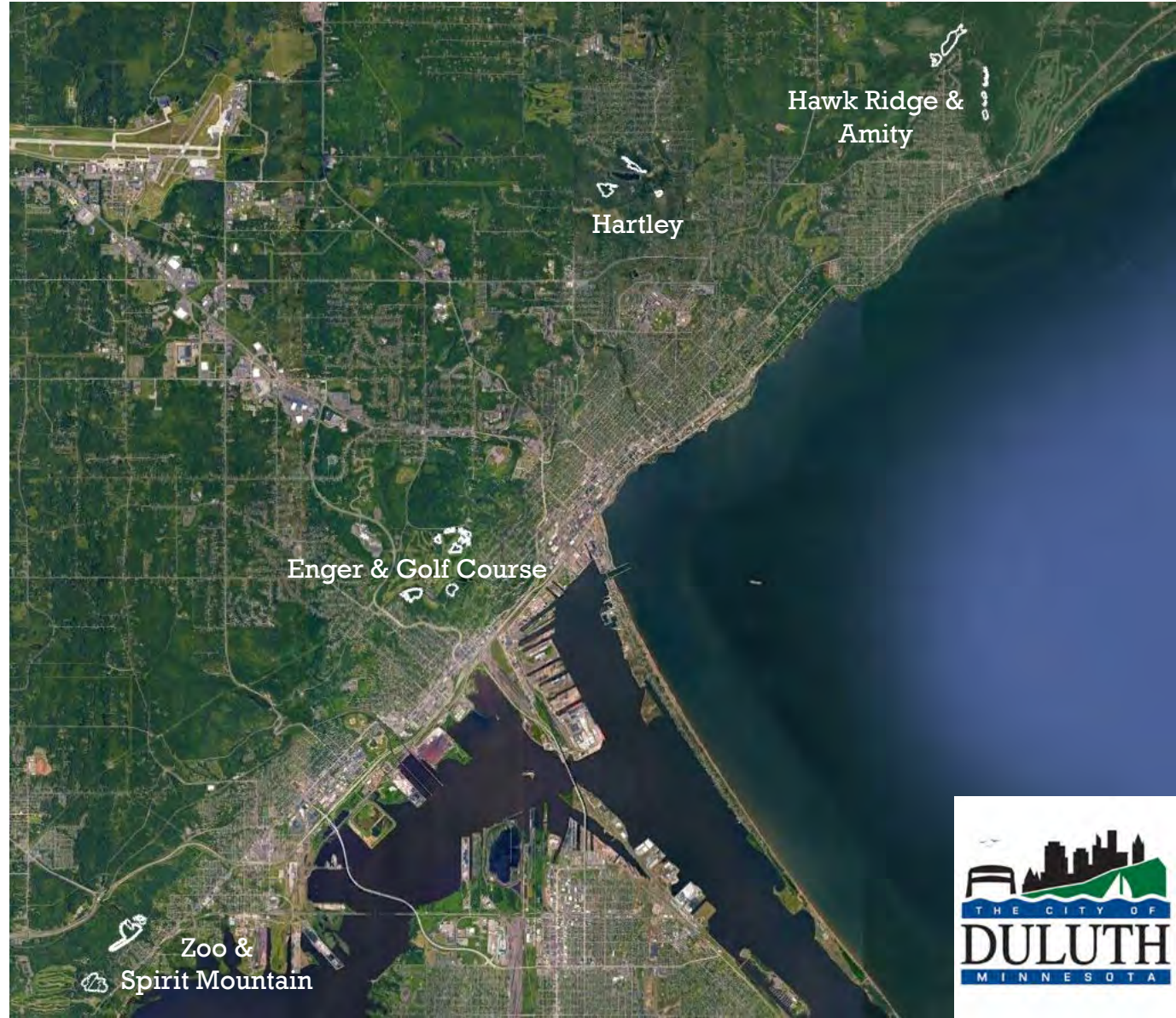| Restore	Perpetuate
1. Control invasive species	
2. In all forest types, thin by removing ¼ to ½ the trees A. More moisture available to remaining trees makes them healthier and more resilient B. Sunlight makes it to the forest floor allowing the next cohort of trees to grow	
3. Sow or plant "missing" species as determined by NPC	*3. Prepare site then monitor for natural regeneration*
4. Install browse protection as needed	
5. Monitor site for invasive species and regeneration success	

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Questions?

Overview Map

Proposed acres to thin: **108**
Total greenspace acres in Duluth: **10,000**

Hawk Ridge & Amity

Hartley

Enger & Golf Course

Zoo & Spirit Mountain

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Amity Creek Pine

Forest Types

1. Red pine plantation, never thinned (2.2, 1.3, .5, 2.3)

NPC: FFn57, FDn43, MHn44

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Dense red pine plantation

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~18'' DBH red pine

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Amity Creek Pine

Desired outcomes
1. Establish NPC appropriate tree species in understory
2. Grow large, long-lived trees to shade Amity Creek

Actions
1. Thin red pine, increasing the likelihood they will become large and more resilient
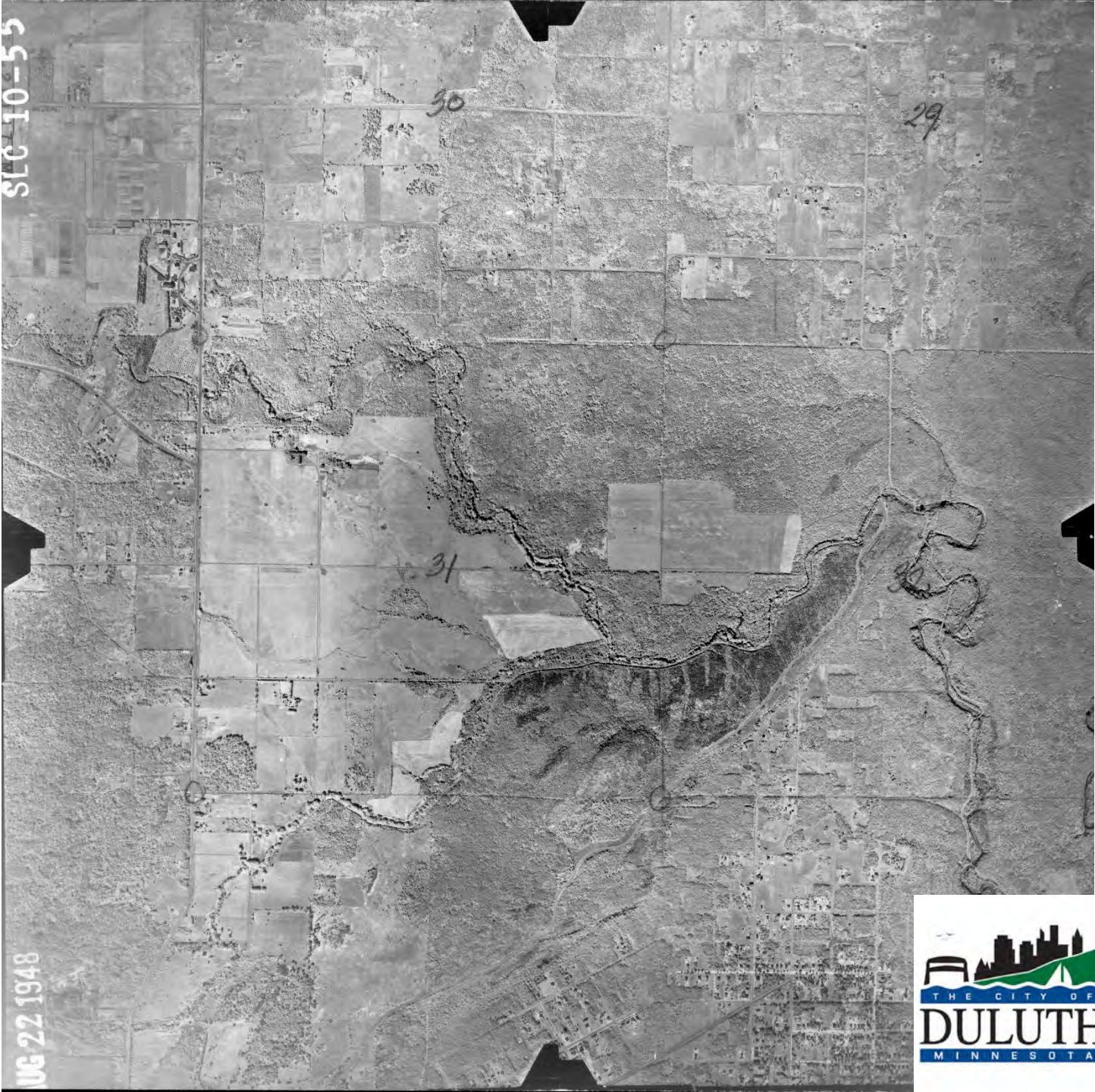2. Monitor for invasive species and natural regeneration

Acres:

    Restore: 6.5
    Add'l thinning: 6.5
    Perpetuate: 0

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Hawk Ridge aerial photo,
August 22nd, 1948

January, 2021

1948

2015

January, 2021

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Hawk Ridge Pine

Forest Types
1. Red pine, never thinned (3.5)
2. Scot's pine (12.2)
3. White spruce (5.0)

NPC: FDn43, ROn23, MHn44

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Scot's pine overstory,
white spruce understory
(in places)

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Bluejoint grass

January, 2021

Average red pine for Hawk Ridge

Scot's pine regeneration

January, 2021

Red pine in NE corner

January, 2021

Hawk Ridge Pine

Desired outcomes
1. Establish NPC appropriate tree species in understory (red oak, white pine, paper birch)
2. Grow large, long-lived trees to shade Amity Creek
3. Remove Scot's pine through thinning and replace with native species

Actions
1. Thin stand 1 at least 2x, monitor for natural regeneration
2. Thin stand 2 with emphasis on removing Scot's pine
3. Thin stand 3 and leave the healthiest, biggest trees
4. Seed in birch, oak and white pine

Acres:

Restore: 20.7
Add'l thinning: 3.5
Perpetuate: 0

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Hartley Pine

Forest Types

1. Red pine, previously thinned (8.3)
2. Red pine, never thinned (1.3)
3. Red pine, previously thinned (4.7)

NPC: MHn35

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Stand 1

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Stand 1

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Stand 2

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Stand 3, previously thinned

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Hartley Pine

Desired outcomes

1. Establish NPC appropriate tree species in understory (sugar maple, red oak, white pine, paper birch)
2. Provide varied wildlife habitat
3. Create pulse of regen thick enough to choke out invasive species

Actions

1. Thin stand 1 and 2 at least 2x, evaluate regeneration
2. Thin stand 3 once, seed in appropriate species

Acres:

Restore: 14.3
Add'l thinning: 9.6
Perpetuate: 0

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Enger Pine

Forest Types

1. Red pine plantation, (1.7)
2. Aspen and ash (4.9)
3. White pine (5.0)

NPC: MHn35, MHn44

Pine Plantation,
30 years old

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Aspen and ash

Scott's and white pine

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White pine

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Aspen and paper birch

January, 2021

Red oak

January, 2021

Enger Pine

Desired outcomes

1. Reduce invasive species presence
2. Promote long-lived species
3. Increase conifer presence where appropriate
4. Reduce hazard trees along Skyline

Actions

1. Thin red pine in stand 1
2. Invasive species treatment in stand 2
3. Thin aspen and remove ash from stand 2
4. Seed in NPC appropriate species (oak, pine)
5. Thin stand 3, remove Scot's pine, allow white pine, paper birch and red oak to seed in

Acres:

Restore: 11.6
Add'l thinning: 1.7
Perpetuate: 5.0

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Golf Course Pine

Forest Types

1. Red pine plantation, (4.1 total)
2. Aspen (8.6 total)

NPC: FDn32, FDn43, MHn44, ROn23

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Red pine plantation

January, 2021

Aspen

January, 2021

Golf Course Pine

Desired outcomes
1. Increase conifer presence as appropriate for NPC
2. Promote long lived species

Actions
1. Thin red pine at least 2x
2. Remove invasives from aspen stands
3. Thin aspen, seed in white pine, oak, (maple?)

Acres:
Restore: 12.7
Add'l thinning: 4.1
Perpetuate: 0

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Zoo Pine and Aspen

Forest Types
1. White pine (1.9)
2. Red pine (2.6)
3. Aspen and birch (18)

NPC: MHn35, FDn33(?), MHn44

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White pine east of creek

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Red pine plantation

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Aspen with recent
buckthorn removal

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Norton Park in the distance

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Zoo Pine and Aspen

Desired Outcomes

1. Use dry MHn35 site to promote conifers

    A. Create a block of coniferous cover for bird habitat

    B. Create long-lived conifer buffer between houses and snowmobile trail

Actions

1. Thin aspen 1x then seed in conifer species (w. pine, w. spruce, balsam fir, cedar)
2. Thin white pine 1x, allow it to seed in
3. Thin red pine 2-4x, evaluate regeneration

    Acres:

    Restore: 18
    Add'l thinning: 2.6
    Perpetuate: 4.5

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Spirit Mountain Complex

Forest Types
1. Hardwoods (3.5)
2. Cedar, etc. (5.8)
3. Cedar, white pine, spruce, aspen (7.1)
4. Aspen (3.1)

NPC: MHn35, MHn45

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Hardwoods

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White cedar

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Cedar, pine, aspen, etc.

January, 2021

Aspen

January, 2021

Spirit Mountain Complex

Desired outcomes

1. Maintain and expand conifer influence by establishing conifers in understory along Knowlton Creek and tributary
2. Reduce trail maintenance by removing senescing trees
3. Give white pine and white cedar room to grow

Actions

1. Thin in stands 1, 2 and 3 by removing aspen, white spruce, paper birch, poor white pine; give space to long-lived species; few cedar will be removed
2. Thin stand 4 to create broken canopy that will allow sunlight to reach the forest floor and white pine to grow above deer

Acres:
 Restore: 4.3
 Add'l thinning: 0
 Perpetuate: 16.4

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Just the Numbers

- 108 acres treated
  - Restore – 84 acres (79%)
    - 56 acres to be seeded or planted with NPC appropriate species
    - 28 acres will need to be thinned at least 1 more time
  - Perpetuate – 23 acres (21%)
    - Wide variety of forest and NPC types
      - White pine, white cedar, hardwoods, red pine
      - MHn35, MNh45

- 10,000 greenspace acres in Duluth

Public Outreach

- Stakeholder Committee Meetings
  - Initial Contact with Stakeholders December, 2020 - Done
  - Stakeholder meeting #2, 5-6pm January 26th, 2021
- Press release for public meeting and website on January 27th
- Presentation to NRC (February 3rd)
- Virtual Public Meeting, February 11th, 2021 (comments from February 12-25)
- NRC March 3rd, 2021 for approval
- Parks Commission March 10th, 2021 for information, no action necessary