

RE-INITIATE APn80 FORESTS AS WOULD STAND-REPLACING DISEASE/PEST WAVE EVENTS TO CREATE VERY LARGE GAP HABITAT

Emulating stand-replacing outbreaks of defoliating insects or disease to favor black spruce

The primary goal when re-initiating an APn80 forest using this strategy is to promote black spruce to seed into the newly opened areas. The silvicultural focus is to establish a fully-stocked forest using either a seed tree or clearcut with reserve method to release seed. Please note that forest health concerns may determine the regeneration system used in this community. Forest health pests in this community include eastern dwarf mistletoe, tamarack sawfly, and eastern larch beetle.

Re-initiation Concept

The broad expanses and monotypic nature of APn80 forests left them vulnerable to widespread mortality caused primarily by defoliating insects. Such outbreaks could go on for years creating a wave-front of dying trees that would go unchecked until the insect populations were diminished by a lack of food, equally impressive outbreaks of their predators, or fortuitous climatic circumstances. Throughout recorded history, these outbreaks have affected tamarack far more so than black spruce. Such events 1) released advance regeneration of black spruce and any surviving tamarack, and 2) encouraged the expansion of Labrador tea and leatherleaf populations, which considerably delayed and diminished black spruce recovery by seed.

Silviculture Prescription Highlights (see table on next page)

- Favor black spruce for natural regeneration
- Reduce the black spruce canopy to create very large habitat for seed establishment
- In stands where eastern dwarf mistletoe is not present, retain legacy trees of high quality black spruce or tamarack as natural seed sources
- Forest health concerns from eastern dwarf mistletoe may reduce the silvicultural options on site; MN DNR Forestry does not recommend any regeneration methods that retain greater than 5% of black spruce legacy trees in the harvest area

Photo

Figure 1. Clearcut with reserves in APn80 native plant community.

Very Large Gap Silviculture Prescription Summary Table

Objective:

- Even-aged forest, with occasional patches or clumped residuals concentrated on edges of stands.

Species Favored:

- Black spruce is dominate overstory tree
- Tamarack as a desired component

Species to Diminish:

- Any tree that is damaged or experiencing forest health issues, especially eastern dwarf mistletoe

Canopy Removal:

- 95% of canopy – emulate natural disturbance by using clearcut, seed tree, or clearcut with reserves silvicultural system

Forest Health Concerns:

- APn80 has a high hazard rating for eastern dwarf mistletoe
- If eastern dwarf mistletoe is present in the stand, and the goal is to regenerate black spruce, implement felling practices during timber harvest to minimize spread and impact to future timber productivity
- Tamarack sawfly and eastern larch beetle are also present in this system

Legacy Considerations:

- Protection of black spruce advance regeneration in stands without forest health issues
- Retention of desirable black spruce or tamarack as seed trees
- Preserving *Sphagnum* peat as a seed bed for natural or artificial regeneration

Management Concerns and Risk:

- Forests occupy sites with deep peat and require winter frozen ground conditions for harvest equipment
- Rutting and damage to *Sphagnum* peat poses a risk of converting forested peatlands into non-forest wetlands

Site Preparation:

- Site prep is not common in these communities
- If eastern dwarf mistletoe is present after harvest, control methods such as hand felling, shearing, mulching, or roller-chopping may be necessary

Artificial Regeneration:

- Black spruce and tamarack
- Techniques: direct seeding

Climate Change Considerations:

- Acid peatlands have a low adaptive capability due to specific hydrologic regimes, low species diversity, and slow response to disturbance
- Black spruce and tamarack are both expected to decrease in suitable habitat; assess site-level factors to determine management and regeneration risk
- Maintaining hydrologic regime is important to keep *Sphagnum* on site for suitable seeding substrate
- Winter frozen ground conditions may decline significantly and require modifications to timber harvest operations or longer permit durations

Future Actions:

- Evaluate eastern dwarf mistletoe presence one growing season after treatment
- Conduct ground or aerial regeneration survey after seven years post-treatment to determine regeneration and stocking success

Case Studies:

- None

Literature:

- [MN DNR Forestry Black Spruce Timber Sale Design and Control Guidelines for Minimizing the Threat of Eastern Dwarf Mistletoe](#)