

Spruce Budworm in Balsam Fir and White Spruce Stands: Treatment and Replanting

The threats to the balsam fir and spruce on your woodland include spruce budworm, heart rot and root rot, and wind damage.

Dense areas or stands of balsam fir are subject to decline and death from spruce budworm. The dying and dead trees increase fire risk. Removal of all balsam fir will reduce fire risk and create openings for the future forest. Thinning can be an alternative option but may not provide the reduction in fire risk desired and even selecting the healthiest balsam to remain may not prevent the death of these trees.

See the Minnesota Department of Natural Resources fact sheet on [Eastern Spruce budworm management](#).

Treatment for Spruce Budworm

While removal of all balsam fir is the preferred option, thinning will open space for new trees, and may reduce the impact of spruce budworm. If reduction in fire risk is desired removal of all balsam is the best approach.

How much to remove

How many trees should be removed? Remove a third of the trees in the stand or treatment area. If a majority of the trees have less than 50% crown and are heavily impacted by spruce budworm, remove all trees.

Trees that are healthy may or may not survive after a spruce budworm outbreak. Healthy trees typically have more than 50% live crowns. When deciding which trees to cut, leave trees with more than 50% live crown and leave all healthy spruce except in areas where the spruce is closer than 6 feet apart. In these areas, thin the spruce to a 12 to 15 foot spacing with clusters of trees that are closer together. When deciding between a balsam and a hardwood tree, leave all hardwoods.

Examples of balsam removal

- Camp Voyageur story - [Why we cut down the Balsams](#)
- USDA NRCS – [Two Harbors Spruce Budworm Forestry Project](#)
- Jim Widen, landowner Lake County and the NRCS video, [Forest Management of Private Land in NE Minnesota](#)

How to get the Work Done

Doing this work yourself is possible but is physically challenging and time consuming. It may take years to accomplish when working on your own. An alternative is to focus on conducting as much balsam fir treatment (removal) as financially possible through contractors.

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Replanting after spruce budworm

The species recommended for planting after treatment of stands impacted by spruce budworm vary depending on the site. Follow the Minnesota Native Plant Communities species lists when possible.

On FDn43 sites that have aspen and paper birch, plant (or rely on natural regeneration) a combination of white pine, paper birch, aspen, white spruce and cedar. Seedling protection from deer browse will likely be needed.

On mesic hardwood stands (mixed forest) stands that have maple or are surrounded by maple Sarah Poznanovic USDA Forest Service Superior National Forest described the following:

Northern Mesic Hardwood Forest (MHn45) plant community that was converted to spruce plantation . . . It can be difficult to tell what a stand was prior to conversion because conversion practices used heavy handed techniques that eliminated normal habitat typing clues and 40 years of thick spruce/fir growth and subsequent conifer needle deposition to the soil further alters natural condition.

MHn communities that exist on the North Shore (which these units could be) include:

- *MHn45a – canopy is dominated by sugar maple and paper birch (or sometimes quaking aspen).*
- *MHn45b – canopy is dominated by cedar, typically with yellow birch, heart-leaved birch, or sugar maple.*
- *MHn45c – canopy is dominated by sugar maple, sometimes with yellow birch as codominant.*

Examine the surrounding landscape, particularly the areas that have the same kind of soil that is in the plantation or stand impacted by spruce budworm. That might help decide if the landowner would want to mimic the vegetation that is surrounding. Is the plantation a monoculture of just white spruce or are there other species that make up the stand? Are these species in good condition?

You may not be able to rely on natural regeneration for aspen so monitor for success. Add to the mix of species that might naturally regenerate (aspen and white spruce) by planting

- White pine,
- Paper birch,
- White cedar,
- Yellow birch and
- potentially sugar maple.

Follow-up treatment to release the seedlings from brush competition may be needed.

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