

Choosing Which Trees to Keep & Which to Take

How to use crop tree selection and tree marking to achieve your management goals

Crop tree selection and tree marking are relatively new concepts that can be very useful if you want to improve the growth and quality of individual trees on your woodlot. They are particularly helpful in applying the Category 7 Quality Improvement Silviculture treatments. (Crop tree release, crop tree pruning, and selection management are explained in our handout titled “Growing High Value trees”.) This handout will discuss general principles that guide crop tree selection and tree marking. This will help you choose which trees to keep and which to leave.

What is crop tree selection?

Woodlot owners who are practicing uneven-aged management typically want to improve the growth and quality of trees that have the potential to grow into high-value wood products. In order to achieve this goal, you will need to identify and manage your best trees. You will select individual trees, known as *crop trees*, based on factors that determine whether they can be expected to increase in size and improve in value. This is crop tree selection.

Why is crop tree selection important?

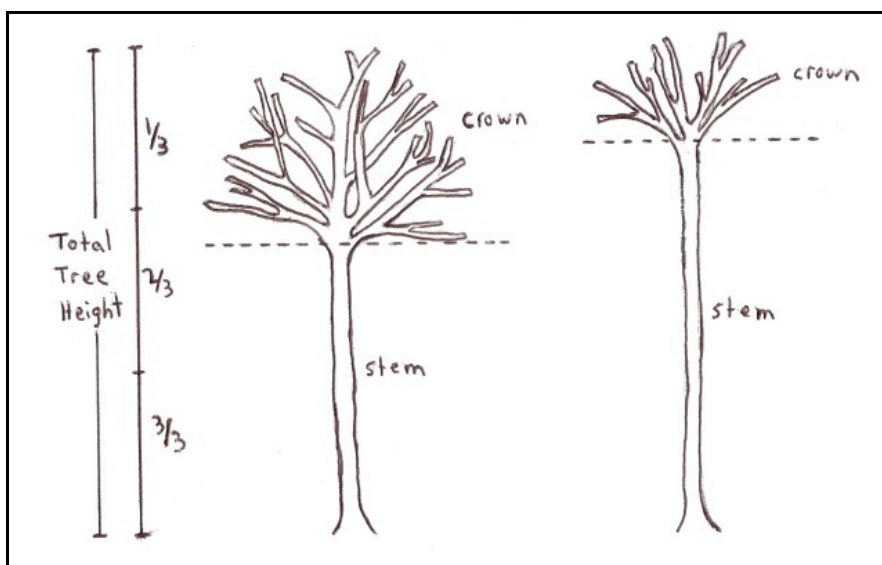
As a woodlot owner, you can only work with what you have. So it is important for you to be familiar with your woodlot and what it contains. (A forest inventory can be very helpful. This is usually done as part of developing a management plan.) When you select crop trees prior to harvest, you have an opportunity to decide which areas have the most potential, what treatment is appropriate, and where to concentrate your efforts in order to achieve reasonable economic returns in the future.

How do I identify crop trees?

Crop trees must be healthy and vigorous. (*Vigor* refers to a tree’s ability to increase in size.) Indicators that the tree is growing well include long terminal leaders and a straight trunk, lacking limbs, scars, cracks, and fungi. Bark can also be a very helpful indicator of vigor. Look for firm bark with thin furrows. The more smooth the bark, the more vigorous the tree.

The crown (top) of the tree is another good indicator of its future potential. A large crown with dense foliage (numerous small, fine branches and twigs) provides greater leaf area for food production.

Species marketability must also be considered. In the Acadian Forest, crop trees are usually long-lived species that grow well in at least partial shade. (These trees are referred to as *shade tolerant* or *intermediate to shade tolerant*.) These species include Red spruce, Red pine, White pine, Eastern hemlock, White ash, Yellow birch, Sugar maple, and Red oak.



Crop trees should have a good *crown-to-stem ratio* to ensure they will grow well after release. In other words, the crown should be approximately one third of the total tree height. If the crown is one fourth or less of the size of the stem, the tree probably will not have enough foliage to benefit from exposure to more sunlight. Illustration by Patricia Amero, RPF.

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Current and potential risks also must be considered when selecting crop trees. Low-risk crop trees will have no canker or root infections, borer wounds, crown dieback, severe leaning, forks, crown damage, or serious injury. Crop trees will be at low risk of windthrow, splitting, and limb breakage, and should be minimally exposed to threats such as leaning trees, wind, and drought. Specific site conditions that may put a tree at risk include wet or saturated soil, rocky soil, a ledge, or an exposed area at high elevation.

While selecting crop trees, evaluate each tree individually based on these factors, paying particular attention to whether each tree is likely to increase value after release, and even more importantly, whether it will withstand weather-related damage.

Plan to keep not only crop trees but also at least some of the trees growing nearby. Nearby trees protect crop trees from damage due to harvesting or weather and can be recruited as replacement crop trees if one you selected is damaged. Shade from nearby trees will encourage regeneration and growth of desirable, shade-tolerant species while limiting the germination, establishment, and persistence of less desirable species that tend to grow quickly and aggressively in sun. Crop trees should be released gradually—not all at once.

Marking of crop trees is required for successful funding of Crop Tree Release under the Category 7 Quality Improvement Silviculture program.

What is tree marking?

In this approach, trees are selected for harvest or retention based on a wide range of considerations, including timber production, wildlife habitat, conservation of biodiversity, beauty, and maintaining or improving the forest genetic base. These decisions are made on the ground, in the woodlot, prior to harvesting. Individual trees are physically marked—typically with paint or flagging tape—before any harvesting takes place.

How is tree marking different from crop tree selection?

In crop tree selection, trees are chosen based on their potential economic value. Tree marking includes crop tree selection, but also takes many other factors into account. You might say that tree marking takes a more holistic view of the forest.

In tree marking, trees are always marked prior to harvest. Although this practice is recommended for crop tree selection, it is not required unless you plan to apply for funding of Crop Tree Release under the Category 7 program.

What are the benefits of tree marking?

Tree marking encourages woodlot owners, contractors, and forest managers to spend time in the forest prior to

Maintaining biodiversity

Biodiversity helps to make forest stands more resilient in the face of natural disturbances such as insects and high winds, and is essential if you are managing natural forest. Tree marking is an important tool for woodlot owners and forest managers who wish to maintain biodiversity on a piece of land.

Tree marking can be used to protect the biodiversity of tree species on your woodlot and even within stands. For example, if only one Yellow birch or hemlock is present in a maple-dominated stand, you might retain this tree no matter how economically valuable it is.

Tree marking can be used to keep harvesting operations away from unusual stands, wet areas, rare plants, and other sensitive areas.

Tree marking can be used to protect cavity nesting trees, nut-bearing (mast) trees, raptors' nests, and other important wildlife habitat features.

By treating each tree and group of trees on its own merit, tree marking also helps to maintain diversity in stand structure. A diverse woodlot will not have uniform, "cookie cutter" stand conditions.

harvest. This time is used to assess each tree within a stand or area based on a wide range of considerations, including ecological concerns. Time spent in the area prior to harvest is also used to identify sensitive areas and determine ways to avoid predictable hazards. Thus tree marking fits very well with an ecosystem-based approach to management.

By physically marking trees prior to harvest, you can help to ensure the success of any partial harvest. Once trees are marked, it's easier to identify the best locations for trails and make other plans for felling and extraction. Once harvesting begins, most of the decisions about what to take and what to keep have already been made. This can make operations more efficient and help to prevent damage to crop trees, soil, and overall ecosystem health.

As a woodlot owner, you will benefit from being able to see the marked trees because you will be able to visualize what the site will look like after harvest. This allows you to make sure that you are satisfied with the choices that have been made.

Above all, tree marking helps ensure that the cutters will respect the choices of the woodlot owner and/or forest manager.

How do you decide which trees to harvest, which to keep?

Tree marking is new in Nova Scotia, so there are no formal guidelines here as yet. Woodlot owners, contractors, and forest managers who use tree marking are free to make decisions based on the factors they consider important. It is crucial for the tree marker to know what these factors are and understand them well enough to be able to interpret them on the ground. For factors that you may want to consider, see the section of this handout on crop tree selection and the sidebar titled "Tree Marking Tips".

This handout was created by the Uneven-Aged Management Outreach Project, 902-673-2278 or outreach@asforestry.com. This project is administered by the Association for Sustainable Forestry. Funding is provided by the Nova Scotia Department of Natural Resources.

Tree marking tips

Here are some tips to help you make good choices about which trees to keep and which to harvest:

- ☞ Know your woodlot—what you have to work with, what you value about it, and how you want it to look in the future. This will help you decide where you want to concentrate your work.
- ☞ Identify the boundaries of any treatment area.
- ☞ Inspect every tree. Consider walking through the area using *transects*, which divide the area into narrow strips, to make sure you don't miss one.
- ☞ Try to get a sense of the quantity and distribution of trees you may wish to retain. Use this information to decide whether you want to mark the trees to be retained or whether it would be better to mark trees to be harvested.
- ☞ Select crop trees by following the guidelines set out elsewhere in this handout.
- ☞ The key is to give your desired trees enough sunlight to improve their growth, but also retain appropriate levels of shade.
- ☞ As a guide to how many trees you should harvest, determine your site's *basal area*, or density. Our handout "How to Determine Basal Area" will tell you how to do this. In general, never remove more than one third of the basal area of your woodlot at one time.
- ☞ Each species responds differently when exposed to more sunlight and less competition. For example, White ash and Yellow birch like more sunlight and will benefit from larger openings. But hemlock has difficulty adapting to sudden exposure, so openings should be small. An understanding of tree *silvics*—how different species grow under different conditions—is very helpful in making decisions about which trees to harvest and which to retain.
- ☞ Retain trees of various sizes and ages so that you always have a new generation coming up. Trees in the understory may be potential crop trees, provide protection for other trees, and are habitat for birds and other wildlife.
- ☞ Protect your forest ecosystem's long-term health. For more information on this, see our handout "Managing the Natural Forest".