

## Forest Types of Michigan

# Tree Planting

MSU Forestry Extension Team

How hard is it to plant a bunch of trees? Not very. Getting them to survive is another thing.

Many forest owners plant trees. The reasons vary. Planting a few fruit trees “for wildlife” is common. On the other end of the spectrum is establishing a plantation or adding tree species to the composition of an existing forest stand. The goals of planting will determine the process to follow to maximize tree seedling survival. Planting is more involved than simply sticking a few trees in the ground, although that sometimes works.

Tree planting is a risky business because young trees are quite vulnerable. In nature, the vast majority of seedlings die — billions of them each year. Only a few survive to reach sapling size. Correctly done, planting can shift the odds in favor of survival.

Most of Michigan’s forest types regenerate naturally following a harvest. Ensuring regeneration is, in fact, one of the primary goals of a silvicultural system. In some circumstances, however, planting is required, such as when converting one forest type to another or when natural regeneration fails.



There are four major steps for a successful planting project:

- Planning
- Site preparation
- Planting
- Monitoring and vegetation control

### Planning

A forest owner needs to have a goal in mind. Wildlife food or

shelter? Reforestation? Forest health? Visual quality? Diversity? Matching the tree species to the soils, site conditions, hardiness zones and forest owner goals is essential. Trees have variable habitat requirements, which are mostly about soils, light, water and vegetation competition for nutrients. These are biological constraints that cannot be ignored.

Planting projects can be done anytime during the non-frozen months. Common times are spring (dormant bare-root seedlings) and fall (containerized seedlings).

**Afforestation:** Establishing trees in locations where trees were not living before, like an old field.

**Reforestation:** Establishing trees in locations where a forest recently existed and was removed through either harvest or natural catastrophe.

Unless the project is simply a few apple trees in a sunny location, then a bit of math is needed to figure out how many trees are needed and how they'll be spaced in the landscape. Of course, even just a few apple trees need some additional thought, such as proper planting technique, watering and caging to protect them from deer. Large projects may need extra labor and tools — maybe even a planting machine. Really large projects might need a commercial planting crew.

After deciding which species and sizes to buy, finding a reliable source of planting stock is essential. Many conservation districts have tree seedling sales. Quite a few conservation nurseries have wide ranges of options, and some will mail order. Ordering any substantial quantity will need to be done in advance — often several months ahead. Seedlings received should have moist (not wet) root systems, and tops should appear healthy.

Planting under the canopy of an existing forest requires seedlings that are tolerant of shady conditions. Commonly, forest owners like to underplant with white pine or hemlock to enhance future habitat for songbirds and other species. Nursery stock has been well-nourished and is rich in nutrients, and browsers will often selectively eat planted seedlings over natural regeneration.

Working with a consulting forester with planting experience can be helpful. Much of the effort to successfully implement a project involves site preparation and follow-up treatments. Planting without site considerations and adequate planning is a recipe for failure. Lastly, remember that planting costs — up to \$10,000 — are deductible on federal income taxes on a prorated schedule.<sup>1</sup>

## Site preparation

Seedlings — and sometimes larger planting stock — cannot typically outcompete other vegetation for nutrients and water. Heavy sod, in particular, is a hostile environment. Therefore, mineral soil usually needs to be exposed before the trees are planted. Large projects are best prepared with ground-breaking machinery, but this can be expensive. An alternative is one person (or more) with a backpack sprayer using

herbicide to create open patches, circles about 4 to 5 feet in diameter. The area would need to be marked with flags or stakes in advance to accommodate desired spacing requirements.. Another alternative is scraping competing vegetation clear using hand tools. This is physically more difficult and takes more time, but it works for small projects. Killing competing vegetation is important for any site, either in an old farm field or under a forest canopy. Fencing or caging newly planted trees is often required when deer or rabbit densities are high.

## Planting Techniques

Planting can be done with a machine or by hand. Hand tools include shovel, dibble, planting bar and post-hole digger. The technology used will depend on the project and personal preferences.

Bare-root seedlings are more subject to drying from exposure to open air than containerized stock, particularly on a sunny day. Stock stored in bags should always be kept in cool storage and in the shade until planting. Sometimes only a few minutes of exposure to the sun and/or wind are needed to kill the delicate root hairs. Stock that will be planted within a few days should be stored in a cool, dry environment. For longer periods, the seedlings should be “heeled-in” — the bundles of trees should have roots covered with soil and packed tight, as if already planted.

**Bareroot:** Seedlings have exposed root systems after being pulled from nursery beds.

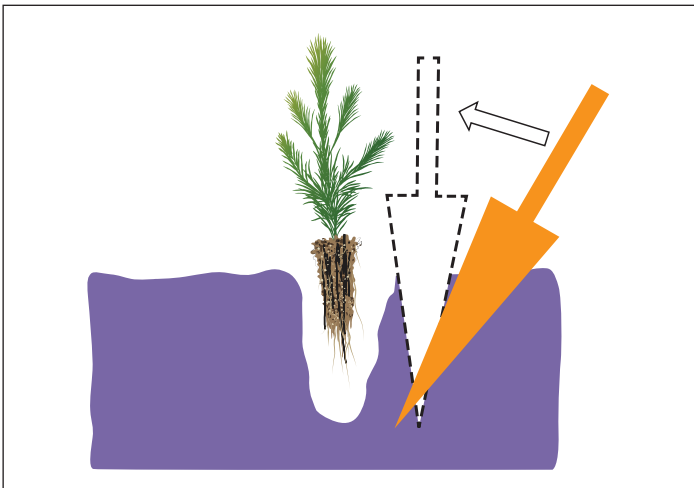
**Containerized:** Seedlings and soil are grown in small spaces in containers that hold multiple seedlings. The plug of both roots and soil is planted.

**Ball & Burlap:** For larger trees, packed individually with roots in a minimum of soil held together with a fabric, traditionally burlap.

Planting holes need to accommodate the full length of the root system without bending the root ends (J-rooting). Soil needs to be firmly packed around the roots without damaging them. Retain as much soil on

### Using a Planting Bar

One of the more common planting tools. The blade is pushed into the ground and then rocked back and forth. A seedling is carefully inserted into the open space. The space is closed by inserting the bar within a few inches parallel to the first hole, and then pushing the first hole closed. Tight closure is important. This tool can be difficult to use in sandy soils or saturated heavier soils.



the roots as possible. Do not rinse the roots. Planting depth should be to the root collar, a ring between the roots and the seedling stem — not too high and not too deep. For larger planting stock, it's better to put a \$1 tree in a \$10 hole than a \$10 tree in a \$1 hole. Holes should be larger than the root ball, deep enough to hold the root system and packed tightly. Again, proper depth is crucial.

If possible, the fresh planting should be watered unless the soil is already saturated. Fall planting should be done at least two weeks before an anticipated frost. When shopping for seedlings, buyers might find number codes such as 2-0 or 3-1. These numbers define the age of the seedlings. The first number is the number of years the seedling was in the ground. The

second number is the years since the seedling was root pruned. Root pruning helps concentrate root systems in a smaller area, which facilitates planting and increases seedling survival. So, “2-0” stock would be a 2-year-old seedling that has not been root pruned. The “3-1” stock would be 3 years old plus an additional year after root pruning for a total of age of 4 years. Older seedlings and root-pruned seedlings are usually more expensive but more likely than younger ones to survive the planting process.

### Monitoring and vegetation control

Getting the trees in the ground is a great accomplishment, but the job isn't over. In fact, it's just starting. For at least the first five years, the trees need to be monitored, and follow-up treatments are often necessary, though good site preparation can minimize the need for follow-up treatments. In droughty years, especially the first growing season, watering may be needed, if possible. Encroaching competing vegetation may have to be killed. The backpack sprayer may again come in handy, but be careful not to spray the seedlings. Seasonal timing may be an issue. Unless the trees have been fenced or caged, watch for browse damage. If browsing becomes a significant factor, fencing or caging may be required at that point. Alternatively, critical buds can be protected using light cardboard and staples, or sometime duct tape. This works especially well with conifers. The covers need to be removed right around the time the buds begin to expand. Should losses occur, fill-in planting may be needed.

If you're working with a professional forester or other natural resources professional, expertise is readily available. If not, then information gathering may take a bit more energy, but it can be done and should be done to reduce the chances of disappointment. The act of planting trees is neither the beginning nor the end of the story. The fruits of that labor will require more labor. However, a high level of satisfaction can be anticipated a few years down the road.

**Care errors**

- Exposing roots to air and wind.
- Allowing direct sun to overheat seedlings.
- Temporary storage covers blow away, exposing seedlings to sun and wind.
- Roots dry out from not planting soon enough.
- Storing stock in a hot vehicle, garage or outbuilding.

**Planting errors**

- Soil packed too loosely.
- Planting too deep or too shallow.
- J-rooting.
- Planting more than one tree per hole.
- Holes not completely closed.
- Planting in duff rather than mineral soil.
- Failure to allow good root distribution in hole

**Other errors**

- Poor site preparation.
- Improper spacing (many potential long-term problems).
- Failure to control competing vegetation, especially grasses.
- Planting in low spots and frost pockets.
- Incorrect match of species and site.
- Planting at the wrong time of the year.
- Failure to provide full sunlight for species that need it.

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<sup>1</sup> The Forest Landowners Guide to the Federal Income Tax. USDA Agricultural Handbook No. 731. Chapter 4, “Cost Considerations.” Available at [www.timbertax.org/publications/aghandbook731/](http://www.timbertax.org/publications/aghandbook731/).

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See the Michigan Society of American Foresters’ publication, *Forest Management Guidelines for Michigan*, on their website: <http://michigansaf.org>.