


## Woodland Stewardship Online

### 3: How Trees and Woodlands Grow – Activity


#### How this helps you:

This chapter and its activities help you learn about the parts of a tree so you can better communicate with a forester, logger or other woods worker. It will help you determine which tree characteristics you want to encourage on your land by considering genetically controlled characteristics, live-crown ratio, and shade tolerance. Learn how soil type, topography, and climate must be considered when determining the most appropriate tree species to encourage on your land. Finally you will learn that managing a stand is easier when you let the natural ecological trajectory occur.

#### Step 1: Learn more about the parts of a tree

- **Step 1A:** Read How Trees Grow: Parts of a Tree. ( PDF, page 26)
- **Step 1B:** Review Figure 3-1, then find a standing tree and a fresh-cut log or stump and identify their parts:
  - Crown
  - Trunk
  - Roots
  - Outer Bark (Phloem)
  - Inner Bark (Xylem)
  - Cambium Layer
  - Sapwood
  - Heartwood
- **Step 1C:** If you are not certain about the location of these tree parts, talk to a forester when one visits your property. Knowing these terms and being able to find these tree parts is helpful for communicating with a forester, logger, or other woods worker and these terms are used elsewhere in this book.

#### Step 2: Learn the effects of tree characteristics

- **Step 2A:** Read How Trees Grow: Effects of Tree Characteristics. ( PDF, page 26)

### Step 3: Find out how genetics affects tree form and growth


- **Step 3A:** Genetics affects many aspects of tree form and growth, including, but not limited to, the rate of height and diameter growth, stem form, crown form, tendency to self-prune, angle of branch attachment, and tolerance to insects and diseases. Considering your goals for the property, make a list of tree attributes that you want to encourage in your woodland. Discuss these attributes with your forester and agree on which ones are best for your property.
- **Step 3B:** Use these attributes when conducting timber stand improvement (TSI) practices (see Chapter 5: Woodland Improvement Practices) and timber harvests (see Chapters 8: Marketing Timber and 9: Harvesting Timber). They will guide which trees are cut because of poor quality and which trees are left because they exhibit the traits you want to encourage in the present stand or through natural reproduction. For example:

During TSI, remove trees with undesirable attribute because they are competing with other trees with more desirable attributes.

During a harvest that leads to natural regeneration, remove undesirable trees so they do not pass on their poor genetic attributes in their seeds, stump sprouts, or root suckers.

- **Step 3C:** When planting seeds, seedlings, or cuttings, order planting materials from a reputable tree nursery that collects seed or cuttings from high quality trees growing as close to your planting site as possible.

### Step 4: Live-Crown Ratio


- **Step 4A:** Knowing the live crown ratio of your trees, especially conifer trees (e.g., pine, spruce, fir, tamarack), will help you judge whether a tree crown is too small or too large to foster rapid tree growth while producing as much knot-free wood on the main stem as possible. If you have a stand of conifers, evaluate the live crown ratio of that stand. Use the text and Figure 3-2 ( PDF, page 27) as a guide to measuring live-crown ratio. Go to the internet or ask a forester what live-crown ratio is best for the tree species you are growing.

If the live-crown ratio is too big (say 60%), that may mean the stand is fairly young and the crowns have not begun to compete. You may need to allow the stand to continue growing. Or to produce high quality wood on potentially valuable trees, you could consider clear-stem pruning to eliminate limbs and encourage more knot-free wood in the main stem (see Chapter 5: Woodland Improvement Practices).

If the live-crown ratio is too small (say less than 30%), tree growth may be too slow. Thinning the stand will provide more space for crowns to expand and thus stimulate growth of your best crop trees (see Chapter 5: Woodland Improvement Practices).

- **Step 4B:** Ask your forester for guidance on how to manage your stand with thinning and/or pruning to achieve a desirable live-crown ratio for optimum growth and wood quality.



## Step 5: Determine shade tolerance

- **Step 5A:** Review the text on shade tolerance and Table 3-1. ( PDF, page 28)
- **Step 5B:** Note the shade tolerance rating for tree species that you want to favor in your woodland.
- **Step 5C:** If there are important tree species on your land that are not listed here, you can look up those species in *Silvics of North America* and read about their shade tolerance (see Links & Reference section).
- **Step 5D:** Shade tolerance is an especially important factor when you are trying to regenerate a stand. If you have a stand that is ready to regenerate, walk through the stand and identify the species of seedlings and saplings growing there.

If the canopy is very dense, the seedlings and saplings will likely be shade tolerant tree species. Depending on your objectives and the site conditions, these may or may not be the most desirable species. If these are desirable species, a harvest will release them to produce your next stand. If these are undesirable species, you may need to control them and open the stand to give adequate light to desirable species. Planting trees or seeds is another means to regenerate desirable species, but they must have appropriate amounts of light to sustain growth. Regeneration systems are explained in Chapter 4: Regenerating Woodland Stands and regeneration systems appropriate for each forest type are explained in Chapter 6: Managing Important Forest Types.

- **Step 5E:** Ask a forester to help you develop a plan to regenerate a stand. That plan should spell out how light will be managed to encourage the new trees.


## Step 6: Effects of Site Characteristics

- **Step 6A:** Read Effects of Site Characteristics: Soil Depth, Texture, Moisture, Fertility, and pH. ( PDF, page 28)
- **Step 6B:** It is important to match tree species to the soils on which they grow best, but soil types vary across the landscape, especially as topography changes. Learn about the soil types on your land. A good source for soil type maps and descriptions is the USDA Natural Resources Conservation Service (NRCS), Web Soil Survey in the Links & Resources section of this chapter. If you have difficulty using this Web site, ask your local soil and water conservation district for a soil type map that covers your property and a description of each type, including which tree species grow best.
- **Step 6C:** Read Effects of Site Characteristics: Topography. ( PDF, page 29)
- **Step 6D:** Soil typing has been done more accurately on agricultural land than on forest land, so do not trust soil maps entirely when making decisions about which trees to grow on a particular site. To help verify your soil types, read the Definitions of Basic Soil Texture Classes (Adobe PDF icon PDF, page 29) and study Figure 3-3 (Adobe PDF icon PDF, page 29) showing different landscape positions. Then go to your woodland and evaluate soil texture in different areas where there is a change in landscape position, slope, and aspect. It helps to dig a hole 3 feet deep where possible to verify soil texture


at different depths and match that information with the soil descriptions for your property.

- **Step 6E:** Using NRCS information about the tree species best suited to soils that occur on your property, make a list of those tree species for each soil type. Review this list with your forester to verify its accuracy.
- **Step 6F:** Next read about each forest type on your property in Chapter 6: Managing Important Forest Types. Pay attention to the descriptions of soil conditions and landscape positions where each forest type grows best. Soil information in Chapter 6 is much more generalized than in the NRCS soil maps and classifications.
- **Step 6G:** Make a list of which tree species to encourage on each part of your property, taking into consideration, the forest type, soil type, landscape position, and your property goals.

## Step 7: Effects of Climate

- **Step 7A:** Read: Effects of Climate. ( PDF, page 29-30)
- **Step 7B:** Trees that are native to your woodland are naturally adapted to the climate, but when you acquire seeds, seedlings or other types of planting stock, use sources that originate as close to your woodland as possible. This guideline is most critical when your land is near the edge of a species natural range. As a rule of thumb, trees or their seeds growing on the northern limits of their natural range usually should not be moved more than 50 miles north.
- **Step 7C:** If you are considering planting species not native to your woodland, look at a plant hardiness zone map on the Web to determine your zone, then find tree species suited to that zone (see Links & Resources section). Plant hardiness zones are based on the average annual minimum temperature. They do not take into consideration other factors affecting tree survival such as summer temperatures, precipitation, number of frost-free growing days, humidity, and snow cover.
- **Step 7D:** Go to Chapter 6: Managing Important Forest Types and find the forest types that occur on your woodland. Look for maps showing the geographic range where various tree species naturally occur. Use these maps to supplement plant hardiness zone maps when choosing which species to plant.
- **Step 7E:** Due to the apparent changing climate worldwide, if you are near the edge of a plant hardiness zone for the species you want to grow, you may wish to reconsider those species in light of the changing climate. A warmer climate and the species associated with it are slowly moving northward.
- **Step 7F:** Take into consideration the plant hardiness zone map, tree species range map, and climate change information that you may find to make a list of tree species (including nonnative species) you may want to grow and geographic areas from which you could obtain seed sources suitable for your property. As a rule of thumb, trees or their seeds growing on the northern limits of their natural range usually should not be moved more than 50 miles north.

## Step 8: Determine how your woodland grows

- **Step 8A:** Read How Woodlands Grow ( PDF, page 30-31)
- **Step 8B:** Ask your forester to evaluate the natural ecological trajectory of each stand on your property. Consider that information when choosing goals for each stand on your property.

It usually is appropriate to choose management practices that encourage tree species that are best adapted to your sites. Sometimes management practices can interrupt the natural ecological trajectory to encourage a different species mix that better meets your goals for a stand, but this may come at a higher cost and with ecological tradeoffs.

- **Step 8C:** Ask your forester to recommend different management options for each stand that considers its ecological condition and your management goals.