Timber Stand Improvement / Invasive Species Application Methods:

Cut-stump treatments, apply the herbicide around the perimeter of the stump immediately after felling the tree. ***(Not recommended for tree-of-heaven or paulownia)***

Girdling is utilized to control trees when we are concerned with felling due to safety concerns, potential damage to the residual stand, or harm to the Indiana bat, a federally listed endangered species. To girdle a tree, make a 1" to 2" deep cut all the way around the circumference of the tree, being sure to start and end your cut at the same point. Double girdling is recommended. Immediately spray an approved herbicide into the girdle.

Basal-bark treatments may also be applied to saplings and pole size trees. Only triclopyr ester (an oil soluble formulation) herbicides can be used for basal-bark treatments. With a basal bark treatment, apply a mixture of **triclopyr ester** herbicide mixed with oil completely around the circumference of the lower 15" of the stem. This method works best on young trees with smooth bark, such as beech, maple, hickory, and tree-of-heaven. Only apply basal bark treatments to woody stems, application to leaves is ineffective and a waste of chemical and effort.

Environmental note: Many herbicides are labeled to be mixed with a penetrating basal oil, diesel fuel, or kerosene as their carrier agent. The choice to utilize a vegetable-based basal oil (particularly a methylated seed oil) instead of diesel fuel or kerosene will result in a more environmentally-friendly practice.

Foliar treatments are applied to the leaves of short (less than 4' tall) seedlings and stump sprouts. Use a foliar treatment of glyphosate at a 3 - 5% solution of the herbicide mixed with water. Be sure to avoid using a solution that is stronger than 5% because it will kill the leaves before they have a chance to translocate the herbicide to the roots. Avoid using diesel fuel for the same reason. A surfactant is needed to help the active ingredient stick to and penetrate the surface of the leaves. Drift control additives are also available to reduce the number of fine droplets produced. If applying in spring, make sure the leaves have fully opened before applying the herbicide. If applying in the late growing season, be sure to complete the practice before the tree begins to enter dormancy (before the leaves begin to change color).

Timber Stand Improvement / Invasive Species Control Recommendations:

Glyphosate herbicides are mixed with water at a rate of 75% herbicide and 25% water for **cut-stump** treatments. Check the herbicide label to make sure it contains at least 40% of the active ingredient; glyphosate. Some glyphosate herbicides, such as Roundup-Pro & Roundup-Ultra, already have the surfactant added to the mixture. A surfactant is necessary for effective control when applying to foliage. Whereas, several of the generic glyphosate herbicides do not. Check with the distributor when purchasing the herbicide. If not already included, surfactants can be purchased separately.

Surfactants are not needed for cut stump applications with glyphosate, the preceding statement may cause confusion, cut stump glyphosate treatments only require the herbicide, or herbicide and water mix see: **What herbicide should I use, and how much should I mix? https://www.aces.edu/blog/topics/forestry-wildlife/cut-stump-herbicide-treatments-for-invasive-plant-control/** The necessity of mixing with water depends on the % active ingredient (% glyphosate).

Triclopyr ester herbicides (oil soluble formulation) are mixed with diesel fuel or crop oil at a rate of 25% herbicide mixed with 75% diesel fuel for cut-stump and basal-bark treatments. Check the herbicide label to make sure it contains at least 60% of the active ingredient; triclopyr. Surfactants are not needed when applying triclopyr herbicides to cut stumps. *Pathfinder II is a premixed ready to go formula.*

Be sure to follow the timelines for each practice. Glyphosates work best in the spring and fall. Triclopyrs may be used any time of the year, except in the heat of summer. Neither the glyphosate nor triclopyr herbicides work well when temperatures are above 85 degrees. There's a chance that the herbicides will volatilize (evaporate) in high temperatures, and possibly drift onto trees and non-target plants that you did not intend to treat.

I strongly suggest you add a chemical dye to your herbicide mixtures. This will make it possible to check that all leaves have been sprayed; the entire circumferences of the stems and girdles have been sprayed, and the surfaces of all cut stumps have been treated.