Managing the Hardwood Understory

By Tim Albritton, State Staff Forester, Natural Resources Conservation Service, and E. A. "Bud" Truett, Consultant Forester

All forests require a certain level of management to fully utilize the site potential. Things happen that increase the level of management required: hurricanes, tornados, wildfires, encroachment of invasive species, and more. Events such as these require some level of involvement by the land manager to get things back on a productive track.

This is especially true with hardwood management. It is common, however, for land managers, landowners, and even foresters to shy away from making a decision. They may rationalize their indecision by saying things such as, "it's difficult to manage hardwoods," or "it's best to let nature take its course."

Photo by Tim Albritton

I recently received a call from a forester that does not hold to these beliefs. E.A. "Bud" Truett of Livingston, Alabama, is a Registered Forester and a member of the Association of Consulting Foresters. Bud wanted me to see some of the understory release treatments he was applying in Greene County, and I was eager to see what he was doing.

Through the Environmental Quality Incentives Program (EQIP), the Natural Resources Conservation Service (NRCS) has provided assistance for understory treatment in mid-rotation pine stands for some time. This is fairly common practice and has multiple benefits; however, I had not heard of many people conducting this type of practice in hardwoods. So Bud and I set a date to get together and spend a day in the woods reviewing his treatment areas.

I asked Bud some questions that I felt many landowners would ask if they received a similar visit.

1) What type of hardwood stands (species, age, density, etc.) could benefit from such a treatment?

Many types of hardwood stands – varying in species composition, age, and density – could benefit from a reduction of non-desirable vegetation (less than 10 feet in height) in the understory via directed spray of leaf surfaces with non-soil active herbicides. Perhaps the stand type offering the biggest bang for the buck is a 50- to 80-year-old bottomland hardwood stand of dominant full-crowned mixed-oak species left after an improvement, shelterwood, or storm-damaged salvage cut completed two or three years earlier.

A stand of 40 to 60 square feet of basal area per acre (or about 20 to 35 trees per acre) should let a sufficient amount of sunlight reach the forest floor. This would accomplish the primary objective of establishing advanced oak regeneration prior to final harvest of the high-grade "leave" trees providing the seed source. A trained crew using backpack sprayers offers the advantage of selective stem treatment, preserving a lot of the oak regeneration that may already be in place. If more than three years have passed since the improvement cut, the rough may be too thick for adequate access of ground crews.

2) What are the forestry-related benefits of this treatment?

a. Reduced competition promotes sunlight, moisture, and nutrient availability for acorn germination and growth of oak seedlings.
b. Reduction of sweetgum sprouts through application should help accomplish "a" above, but the sweetgum should return to the oak stand later via wind-blown seed to help develop the form and grade of the oak saplings.
c. Improved access within the stand should facilitate removal of the overstory within three or four years if oak regeneration is sufficient. Further deferral of final harvest may require retreatment.
d. This treatment may be the cheapest way to establish advanced oak regeneration. Low stand establishment cost is critical in growing grade hardwood long-term profitability.
e. Any undesirable stems greater than 10 feet in height, but non-merchantable for pulpwood and not removed in the improvement cut, could and probably *should* be injected either at the time direct spray is applied or later in a separate pass, as access improves (but probably at greater expense). Soil-active herbicides should probably not be used for injection in

this case due to the risk of damage to non-target leave trees.

3) What are other non-forestry-related benefits from this treatment?

- Reduction of invasive or other undesirable plants (privet, cherry laurel, switch cane, sea myrtle, etc.) promotes growth of more desirable herbaceous plants beginning the season following treatment, thus improving wildlife habitat to include nesting and brood habitat for turkeys and deer browse volume.
- Improved access in open stands increases "huntability" of the area, especially for turkeys.
- Aesthetics of the stand is enhanced in the year following treatment as annual weeds, grasses, herbs, and forbs replace undesirable woody vegetation.

4) What is the cost?

Although the cost of a directed spray understory treatment with ground crew varies with the chemicals used, the cost per gallon, gallon per acre applied (water and chemical), size of area, and accessibility should range from $60-$80 per acre.

For example, I used 6 quarts per acre of 4# generic glyphosate (a 15% rate), at $12 per gallon in 2007 before the price increase, at a 10 gallon per acre rate on a small test plot of 20 acres. Chemical cost per acre was $19, plus $51 per acre labor, for a total of $70 per acre.

In 2008, due to the cost increase of glyphosate and the presence of waxy leaf species such as cherry laurel, I used 10 gallons per acre with 4% Accord XRT (5.4# glyphosate), or 1.6 quarts per acre plus 2.5% 4# generic triclopyr, or 1 quart per acre on 176 acres. Both chemicals cost $38 per gallon for a total chemical cost of $25 per acre. Labor was discounted to $35 per acre due to the larger size of the parcel. Total cost for this treatment was then $60 per acre.

5) Could both bottomland sites and upland sites benefit, or is there a difference?

Both upland and bottomland sites should benefit from this treatment. Because of generally greater fertility and available moisture in the bottoms leading to a denser understory, the expense is probably more easily justified on this site.

6) What does the treatment involve (hand crews with backpacks, skidders with boom-sprayers, aerial, or other)?

- Aerial applications are not feasible, of course, because of a desire to protect the overstory. Mist-blown applications via skidder mounts might work for dense roughs with minimal desirable oak reproduction in place and an overstory with excellent crown heights. A boom type sprayer might be tough to keep in one piece while moving through an existing stand. Therefore, ground crews with backpacks and adjustable spray tips are probably the best fit here, because you can put the chemical where you want it, in the volume that you need it.

7) What time of year is this practice applied?

According to the licensed herbicide applicators I've talked to (I am not one), glyphosate and triclopyr uptake in plants is most efficient from May through July. This time period in the second or third growing season following an improvement cut usually provides a large amount of leaf surface on target stems. Vegetation density may well restrict access to a ground crew if application is later than July of the third growing season after the cut.

8) Do you have any additional comments you would like to share with landowners?

Due to the long rotation periods required to grow 20" + DBH, #2+ oak for grade lumber and flooring (55-80 years), minimizing stand establishment costs and management costs during the rotation is paramount to producing grade hardwood at a profit. Therefore, establishing advanced oak reproduction prior to final harvest avoids expensive artificial regeneration attempts. Site prep and planting of bare-root hardwood seedlings is likely not even economically feasible without cost-share dollars. However, if an understory treatment is approved for cost share, natural regeneration is promoted at an absolute minimum cost. In fact, based on a recent tax tip article by the USDA Forest Service, the cost-share payment may not even be taxed as ordinary income if certain conditions are met.

I recently read an article describing mechanical scarification with a root rake to encourage germination of acorns in existing hardwood stands. This method may be a plausible alternative to selective direct spray of competition with non-soil active herbicides, but I foresee the following negatives: 1) cost: current one pass operations with a root rake run $125-$150 per acre; 2) risk of feeder root damage in the residual stand of dominant oaks; and 3) root systems of non-desirable species are still living and will resprout.

Following my visit with Bud, the understory release in mid-rotation hardwood stands was added to the EQIP program. Below is the description of the practice as it appears in the EQIP Handbook.

Bud has provided some very insightful answers to my questions and I hope this article will spark some interest in one of the many timber stand improvement practices available to landowners. Many of these practices have merit with or without cost share. I hope you will take advantage of this advice and improve your hardwood forest.

Understory release in mid-rotation hardwood stands:

Removal of invasive hardwood midstory and/or understory in mature hardwood stands using the herbicide glyphosate, in combination with other non-soil active herbicides, to release highly desirable vegetation benefits wildlife and improves species composition for natural regeneration.

While herbicides are by far the most effective and economical method, mechanical means can also be utilized as long as the landowner understands they will only receive payment that is set up in the contract.

This practice should only be recommended in stands with a thick, low-quality hardwood midstory and understory. The program payment rate for this practice is $60 per acre.

For more information about getting assistance for this practice, visit your local USDA NRCS Office.