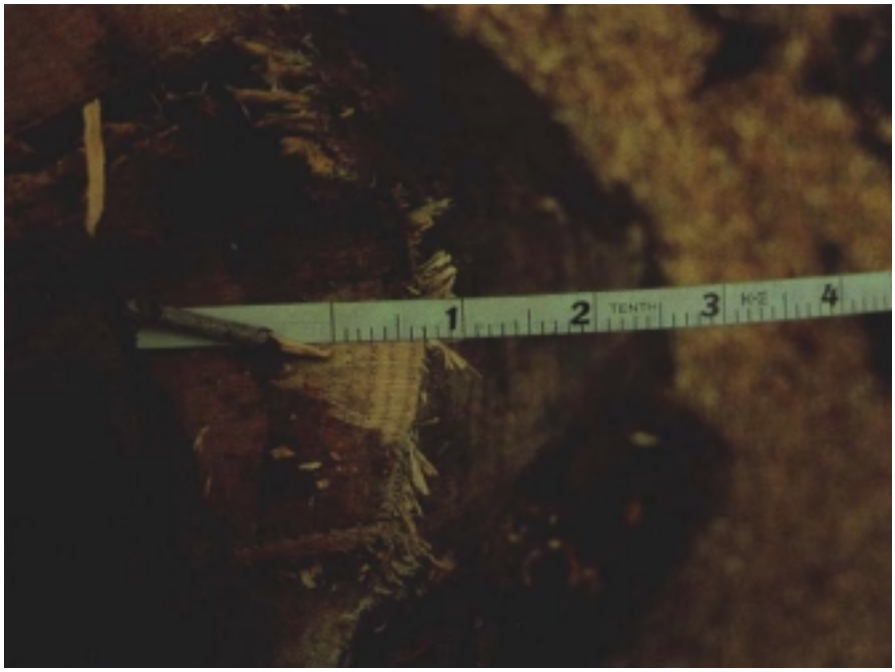
VIII. Evaluating Growth of Released Crop Trees

Because Crop Tree Management focuses on individual trees, it is important for us to have an appropriate way of evaluating growth. Individual tree diameter growth expressed in inches per decade is a viable means of measuring growth rates and responses. It is also easy to explain to landowners.

One way to estimate the growth of various species in a general area is to look at stumps of recently cut trees. Select one, and measure the width of the last five growth rings. For example, if the five-year radial growth is 0.7 inches, then the diameter growth would be double that, or 1.4 inches for the five-year period. Because we want to express growth in inches per decade, we must multiply that figure by two to get an estimate of 2.8 inches overall diameter growth per decade. In other words, diameter growth in inches per decade can be estimated by simply measuring the last five growth rings and multiplying by four.



Another method of estimating growth is to establish permanent paint marks at dbh on 10 trees of the same species with similar diameter, crown size, and degree of release. Measure these trees before leaves appear in the spring and again after growth has ceased in the fall. The sum of annual growth for these 10 trees gives you an estimate of the per decade growth of individual trees for that species, size, and free-to-grow category.

Individual tree diameter growth expressed in inches per decade is a viable means of measuring crop tree growth rates and responses. It is also easy to explain to landowners.

One way to estimate crop tree growth is to measure the five-year radial growth and multiply by four.

A real advantage of this method of measuring crop tree diameter growth is that it is something landowners can do themselves. It gives them an accurate and easy way to monitor the progress of selected crop trees over time. Periodic remeasurement of these 10 trees by the landowner helps maintain interest and promotes a sense of stewardship as the crop trees grow and produce the desired benefits. *(**Note**: A form, **Crop Tree Growth**, has been developed for landowners to use to monitor how well their crop trees are growing. A reproducible copy of it is included in the back pocket of this publication.)*

An annual measurement of selected crop trees enables landowners to monitor the growth rate of released crop trees.

What growth rates can we expect from individual crop trees? As an indication of the upper limit of growth, we have recorded an open-grown yellow-poplar with a growth of five inches in diameter in five years. If this growth were projected for an additional five years, it would have an estimated growth rate of 10 inches per decade. This example is a yard tree with little crown or root competition. It is not expected that comparable growth could be obtained in the forest environment with a complete release.

The photograph on the left shows a red oak crown at the beginning of the first growing season after it received a crown-touching release.

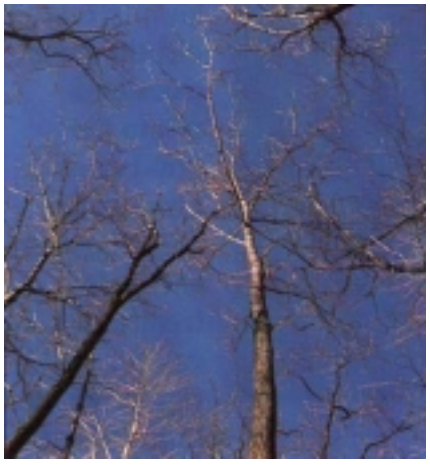
The picture on the right is the same tree at the end of the fourth growing season. Crop trees that develop deep, wide crowns like this are capable of rapid growth.

However, in another case, a forest-grown red oak in an unthinned stand was once growing at the rate of six inches per decade. That is certainly an indication that individual trees of the right species, with healthy crowns and a good release, can produce such growth.

What is a realistic average diameter growth we could expect? Research at the Fernow Experimental Forest near Parsons, WV, gives an indication of how fully released trees on good growing sites are likely to respond. We can expect 10-year growth rates of about 3.5 inches per decade for yellow-poplar and red oak, 2.8 inches for black cherry, 2.6 inches for white oak, and 1.8 inches for chestnut oak.

Both of these crop trees have good, healthy crowns and are well-adapted to the site. The smaller red oak on the left has grown at an average rate of 4 inches per decade. The slower-growing chestnut oak on the right has averaged 2.8 inches per decade.

What influence would this kind of growth have on the rate of return and crop tree income for an individual tree? Let's compare two 12-inch trees that are growing on the same one-half-acre plot.



The unreleased, 12.0-inch dbh red oak on the left has a growth rate of 2.0 inches per decade. Its rate of return is 14 percent and its income is $12.

The 12.2-inch dbh red oak on the right, which was fully released, has a growth rate of 3.8 inches per decade. Its rate of return is 20 percent and its income is $24.

Growth of the released tree is nearly double that of the unreleased tree, its rate of return is much greater, and its income is twice as much as the unreleased tree.