Natural Resources Conservation Service

Tennessee Job Sheet
Forest Stand Improvement (CROP TREE RELEASE)
Conservation Practices No. 666
Environmental Quality Incentive Program (EQIP)

FOREST STAND IMPROVEMENT USING CROP TREE RELEASE

Photo courtesy of US Forest Service, Northeastern Forest Experiment Station Timber and Watershed Laboratory.

Background

The purpose of this job sheet is to improve the services provided by a forest stand by using **Crop Tree Release** (**CTR**). This practice will be used where stand habitat characteristics can be improved for wildlife 'Greatest Conservation Need' species with this technique. This practice will benefit species in one of the following four targeted wildlife groups: **(A) Forest bats, (B) Forest canopy species, (C) Forest understory species, or (D) Forest floor species**. The habitat characteristics to be improved in this stand are amount of vertical structure and canopy cover. This improvement cut technique is designed to reduce competition around selected (crop) trees to increase vigor, competitiveness in the stand, and provide desired future benefits. Trees removed from the stand will include immediate competitors to the crop trees. The number of stems selected for retaining or release will be based upon habitat needs specified in the cutting/management guidelines in **Table 1**.

Crop Tree Considerations

The term "crop tree" suggests a tree that has been selected for **future** harvest. CTR still considers trees that will be both harvested or deadened immediately (cull trees) and those retained for any number of years (crop trees), depending on how they provide desired benefits or meet management objectives.

Crop trees must possess a crown structure and canopy position that allows them to respond to release and remain competitive as the stand matures. At least 30% of each crop tree's height should be live crown to retard epicormic branching (sub-par stem buds on lower limbs or the trunk).

Crop trees are found only in the dominant, co-dominant or strong intermediate crown classes. In limited cases, valuable mid-tolerant species in strong intermediate crown classes can be released if they are critical for meeting management objectives.

The value of the species for providing forest benefits is the main criteria used in selecting crop trees. The criteria may be local market value, but the species may be selected for its wildlife or other benefits. Crop trees should be healthy, with good form, relatively straight, and with few forks. Trees of less desirable form may also be released to improve wildlife habitat.

Crop trees can first be released in younger, pre-commercial stands (trees too small for market), with diameters ranging from 4 to 8 inches (measured at 4.5 feet above the ground which is DBH, diameter at breast height).

Consider full crown-touching release (all four sides released) for rapidly growing species (e.g. yellow-poplar) and young trees in sapling or pole stage.

Use a less than full crown-touching release (three sides released) for small sawtimber crop trees to limit risk of epicormic branching when timber quality is a concern.

Sub-canopy trees should be retained around crop trees to protect them and add other benefits to the stand, unless conflicting with management objectives.

Bat habitat concerns require releasing or retaining crop trees with bark favored for roosting. Target species include scaly bark trees such as **shagbark (most important)** and shellbark hickory, white oak, chestnut oak, post oak, sugar and silver maple.

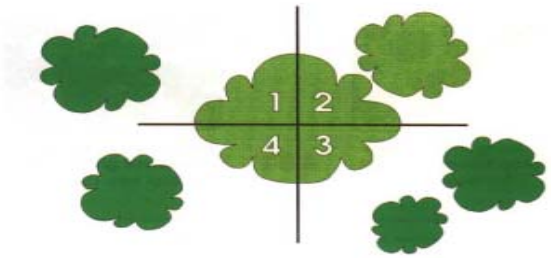
It is not necessary to remove from the site cut or deadened trees. Leaving them will contribute to nutrient recycling, buildup of the soil, and provide cover for small wildlife, or create snags for perches or dens, as in the case of deadened standing trees.

Forest Stand Improvement (Crop Tree Release)

Construction Specifications

From 20, up to 60 to 70 crop trees per acre will be selected for CTR depending on objectives and the age of the stand (see Table 1).

Crop trees will be released by cutting or deadening all crown touching competitors on at least 3 sides.



The crop tree crown in the center of the above illustration has been separated into four quadrants, or sides. This released crop tree is now free to grow on three sides (1, 3, and 4).

Cut trees may be utilized when of commercial size. Trees may be cut (felled) and left on site, left standing and girdled, or deadened with a herbicide as is demonstrated in the 'hack and squirt' photograph.

Trees may be girdled with a single deep girdle at least 3 inches deep completely around the tree. Trees may also be girdled with two 1-inch deep rings cut around the tree six inches apart. The hack and squirt calls for one hack per diameter inch of the tree, evenly spaced around the tree.

Hack and Squirt Method. Photo courtesy of University of Tennessee Extension Service

Harvest roads and trails will be located and installed according to design criteria contained in *Guide to Forestry Best Management Practices in Tennessee* (http://www.tennessee.gov/agriculture/forestry/bmps/html).

Use of chemicals will be in strict accordance to the manufacturer's label.

Operation and Maintenance

The stand will be inspected the year following CTR to determine if the release was successful. Re-treat the site if release was not achieved.

Roads, trails and areas of ground disturbance un-vegetated at this first inspection will be sown with a wildlife-friendly erosion control mixture of grasses and legumes that should be partial to shade tolerant. Possible species include subterranean clover, Virginia wildrye, annual lespedeza, or Deertongue panicum.

Examine stand for follow up release after 10 years.

TABLE 1.

Wildlife Group	Cutting Guidelines / Management Components			
Forest Bats	Maintain 5-25 scaly bark crop trees per acre >8 in. DBH.	Post cut canopy >70%; 20-60 crop trees per acre. Balanced crowns.	CTR not allowed within 100 ft. of streams or 1000 ft. of caves or cliffs.	No cutting allowed between August and December.
Forest Canopy Species	Maintain hickory, oak, and maple crop trees.	Post cut canopy >70%; 50-70 crop trees per acre.	Post cut minimum Basal Area 70.	To retain larger crop trees; not release intermediates.
Forest Understory Species	Maintain deciduous hardwoods of medium age.	Post cut canopy >40%; 20-40 crop trees per acre.	Target bottomland hardwood forests.	To release intermediates; not retain larger crop trees.
Forest Floor Species	Maintain deciduous hardwoods of older age.	Post cut canopy >60%; 50-70 crop trees per acre.	Target CTR near seeps, streams, wetter soils.	Leave debris after cut; logs > 12 in. DBH at least 15 in. long.

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