NRCS Natural Resources Conservation Service

Upland Wildlife Habitat Management
Mast Tree Release

Vermont Conservation Practice Job Sheet VT-645

Client Name:	**Town:**
Land Units:	**# Trees to Release:** **# Acres:**
Planned By:	**Date:**
Trees Species to be Released:	

Site Specific Guidelines and Recommendations

Background and Purpose

A common forest management practice called "crop or mast tree release" can be used to improve the amount of 'mast' or food that trees produce for wildlife. 'Mast' is the seed and fruit produced by trees and shrubs and is critical food for many species of wildlife. Consider the importance of beech nuts to bears trying to fatten up for winter or of fall fruits to a wood thrush preparing for migration to Central America. The practice is relatively simple – select a healthy tree with good growth potential and cut or girdle the trees that are competing with it. By lessening the competition, the tree is allowed to grow a larger crown which will result in greater fruit or seed (nut) production.

Types of Mast

There are two types of mast: hard and soft. **Soft mast** includes berries, fruits and catkins (actually a cluster of flowers). Important soft mast producing species in Vermont include apple, hawthorn, cherries, dogwoods, viburnums (e.g. nannyberry, high bush cranberry, etc.), elderberry, raspberry and blackberry, serviceberry, mountain ash, and birches and aspen (catkins). Fruits and berries provide high energy in the form of sugars and carbohydrates and it is usually available through the summer and fall with some species used as a winter or early spring food (e.g. high bush cranberry). These are generally the less desirable fruiting species that are left for last. Wildlife that can be expected to benefit from increase in soft mast would include bear, grouse, turkey, squirrels, chipmunks, fisher, fox, rodents and many songbirds.

Hard mast includes hard shelled seeds and nuts. Important hard mast producing species in Vermont include beech, oaks, and hickories. Other species that produce hard mast include hazelnuts, ashes, maples, and pines. Acorns and other nuts are high in fat, protein and carbohydrates. They are an important fall and winter food source for wildlife; particularly with Vermont's hard winters. Often, these nuts will be fed upon in the spring as well, even after

germination. Wildlife that can be expected to benefit from an increase in hard mast would include deer, bear, grouse, turkey, squirrels, chipmunks, fisher, rodents, blue jays, woodpeckers, grosbeaks, nuthatch, wood duck, etc.

Target Trees

While there are many species of trees and shrubs (e.g. ash, maple, birch, cherry, etc.) that provide food for wildlife and would benefit from this management, this job sheet will focus on releasing mast trees with an emphasis on valuable hard mast producers, specifically: beech, oak, and hickory. Black cherry will also be targeted although it is considered soft mast. Where there is an abundance of mast producers, favor the hard mast producing trees to the soft mast trees as the hard mast is less perishable and is available to wildlife for a longer period of time. **Note:** Inspect beech trees for beech bark disease (also known as beech nectria) which is a common disease that is easily recognizable by the presence of dark, rough spots on the bark. Release disease free trees or, if beech are limited, those with very limited sign of the disease.

Tree and Area Selection

When evaluating your property to determine where to focus your efforts, decide where you can provide the best wildlife habitat for the effort. If possible, choose productive sites with good soils. Sites where the trees grow well and fast should be productive mast producers. Choose trees that are healthy with large crowns that are **dominant or co-dominant** (crown classes) in the canopy. The greatest production of mast within a stand comes from dominant and co-dominant trees. Intermediate and suppressed trees produce very little mast because the crowns receive limited sunlight. See **Figure 1** below for more information concerning crown classes.

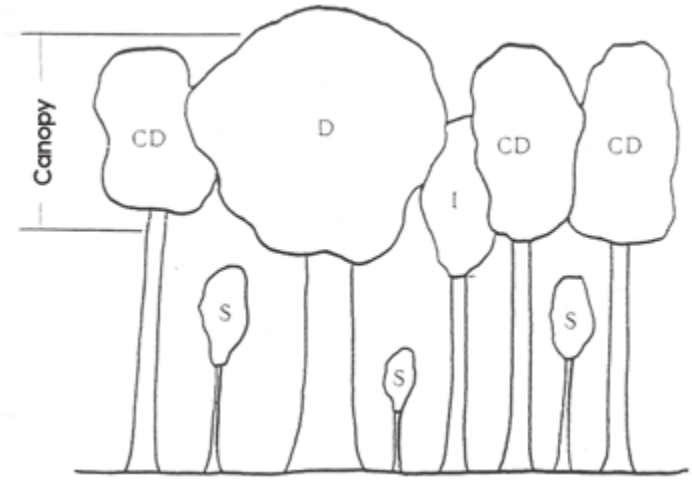


Fig. 1 - Crown Classes *(Maryland DNR Image)*

Dominant **(D)** – Trees receive full sunlight from above and some from the sides, crown extends above canopy

Co-dominant **(CD)** – Trees receive full sunlight from above and partial sunlight from the sides, forms the general level of the canopy crown cover

Intermediate **(I)** – Shorter than D and CD, little direct sunlight from above and usually none from the sides

Suppressed **(S)** – (AKA Overtopped) Crowns entirely below canopy, little to no direct sunlight

After identifying a potential mast tree, visualize the trees that would be cut. These are the trees with crowns that are competing for space with the mast tree's crown. If they are live den or nest trees, do not cut or girdle them. Snags (dead or dying standing trees) should rarely need to be removed. Wildlife cover trees such as den and nest trees and snags are an important cover (cavities, large nests) and food source (insects) for wildlife. If competing trees are large,

straight, sawtimber sized trees such as sugar maple, black cherry, oak, ash or yellow birch, consider the monetary value before making a decision to cut. In some cases, the best decision will be to complete only a partial release or to select a different mast tree to release. When considering releasing roosting or potential roosting trees for Indiana bat, first consult with the Vermont Fish and Wildlife Department.

For this practice, trees must be 25 feet tall or taller. Ten or more trees should be released per acre if possible. Trees with some dead branches and cavities are suitable since this practice is intended for wildlife habitat and not timber production. If possible, manage for a variety of mast producers on the property including large trees, small trees (e.g. serviceberry) and shrubs to increase the chances of some seed production every year. Early successional habitat management (disturbance) can often provide abundant soft mast shrubs and small trees.

The key point of the practice is to expose as much of the crown's surface area to sunlight as possible. This will increase the amount of growth and production of nuts and fruit and increase the overall amount of food on the parcel. Releasing mast trees will make mast production better in both poor and good mast years. Studies have found that released oak trees may produce up to seven times more acorns than un-released trees. Even in poor acorn years, released red oak has been found to produce twice the amount of acorns as un-released trees. At a stand level this difference can be significant, particularly to wildlife experiencing a 'bad' acorn year.

Release Techniques and Guidelines

Release target tree crowns from competition by cutting surrounding trees. Look up at the prospective tree and visualize the crown with four quadrants or sides to determine a "free to grow" rating. This is simply determining how many sides of the crown are free from competition from neighboring crowns. A "0" rating means the crown has no room to grow. A "4" rating means the crown is free to grow on all four sides. Look for competing trees; those with crowns that are touching or within a couple feet of the mast tree's crown.

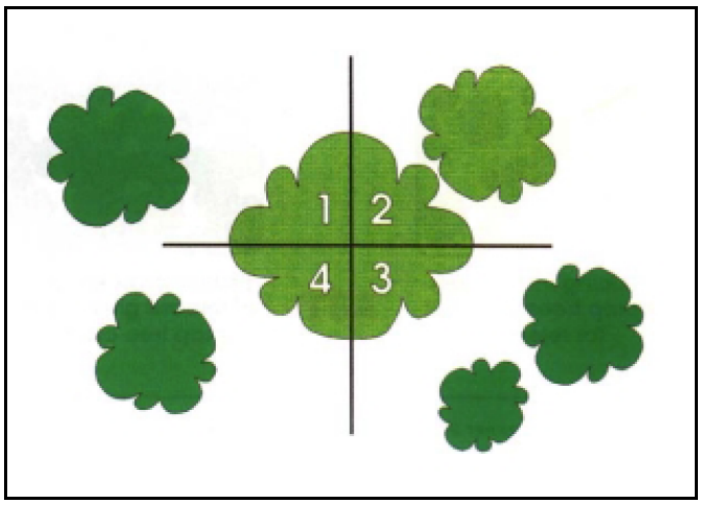


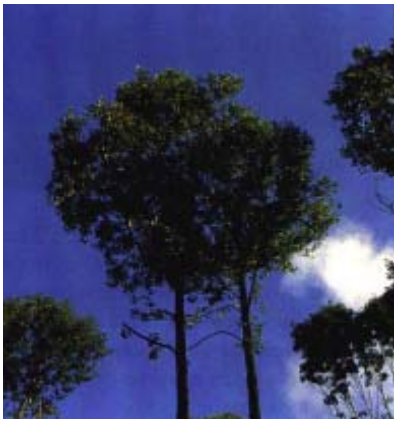
***Figure 2**. The crop tree crown has been separated into four quadrants, or sides. A free-to-grow rating is determined by evaluating each side for competition from neighboring crowns. This crop tree is free to grow on three sides (USFS Crop Tree Management in Eastern Hardwoods).*

Competing trees should be marked for cutting so that adjacent crowns are not left within 10 feet of the mast tree crown. **Release the mast tree on all four sides** unless there is a shared or "dual" crown with another desirable mast tree. **Figure 2** above shows the mast tree (at center),

with the four quadrants drawn, where the only competition is in quadrant or side two. Thus, the tree is free to grow on three sides (rating of "3"). Only one tree must be removed and that is from side two. An alternative to complete removal of competing trees is girdling. Girdling involves the removal of bark and cambium from the target tree through the use of cuts that encircle the entire tree.

Other Habitat Benefits

The forest canopy will be opened up as the trees surrounding the mast or crop trees are cut. This increase in sunlight to the forest floor will improve forest structure by stimulating understory development of forbs, shrubs and trees that were previously shaded. This will increase the amount of woody browse and shrub fruit production and will improve habitat for forest songbirds that prefer to nest in the understory shrub layer. Further enhancement of large mast trees may also provide opportunity for large cavities to develop which are important for denning and nesting for a variety of wildlife.



Left – Dual crown of mast trees that were released on all four sides.

Right – Mast tree with free to grow rating of "2" – Room to grow on 2 sides, needs release on 2 sides - USFS

Considerations

Where there is an objective for sawlog production, consultation with a forester is warranted. Often, foresters will recommend release of timber crop trees on 2-3 sides. This will lessen the potential for "epicormic branching" which occurs when branches sprout from dormant buds on the trunks of trees and which consequently lowers the value of potential sawlogs. In Vermont, oaks are particularly susceptible to epicormic branching. For more information about individual species of mast/crop trees and more in depth information about this forestry practice see links to 'Crop Tree Field Guide' and 'Crop Tree Management in Eastern Hardwoods' respectively below.

Resources for More Information - Much of the information and figures found in this document were adopted from these publications

Crop Tree Field Guide – Selecting and Managing Crop Trees in the Central Appalachians – USFS NA-TP-10-01
http://www.na.fs.fed.us/pubs/ctfg/index.pdf

Crop Tree Management in Eastern Hardwoods – Forest Resources Management - USFS NA-TP-19-93
http://www.fs.fed.us/na/morgantown/frm/perkey/ctm/ctm_index.html

Silvics of North America – USFS Agricultural Handbook 654
http://www.na.fs.fed.us/spfo/pubs/silvics_manual/table_of_contents.htm