


Pierpont Twp. Forest Management Plan



Prepared by: **Frontier Woodland Services, LLC**
 Dan Castellucci, Certified Forester 330-596-1213
 868 W Bayton St. frontierwoodland@gmail.com
 Alliance, OH 44601 www.frontierwoodland.com

Signature:  *Date:* 11/1/18

Landowner Information:

Name(s): Pierpont Twp.
Address: 1109 SR 7
City: Pierpont **State:** Ohio **Zip:** 44082

Signature(s): _____ **Date:** _____

Property Location:

Parcel Number(s): 58-904278
Address: 6587 Turner Road
City: Pierpont **State:** Ohio **Zip:** 44082
Twp: Pierpont **Lot:** **County:** Ashtabula
Coordinates: Lat. 41°44'23.27"N Long. 80°32'50.40"W
Woodland Acres: 71 **Homesite:** N/A **Total Acres:** 71

Purpose of Management Plan:

CAUV _____ American Tree Farm Program _____ EQUIP _____
OFTL _____ Other: Plan to ensure sustainable management

Landowner Objectives:

1. Harvest timber when appropriate on a sustainable yield basis
2. Wildlife
3. Hiking
4. Improve forest for future

General Property Description:

The property was donated to the township to be used as a forested park in 1983 by the late Russel Horner. Mr. Horner was a long time resident and enjoyed managing his forestland. He planted and later harvested Pine trees on the southern portions of the property as well as harvesting portions of the remaining forest. Mr. Horner added a deed restriction that future timber harvests be completed on a sustainable yield basis; however he did not indicate the number of years between harvests. Therefore, it is very difficult to know exactly how he wanted the property managed.

The property consists of four forested stands totaling 68.5 acres and a pond with parking area totaling 2.5 acres.

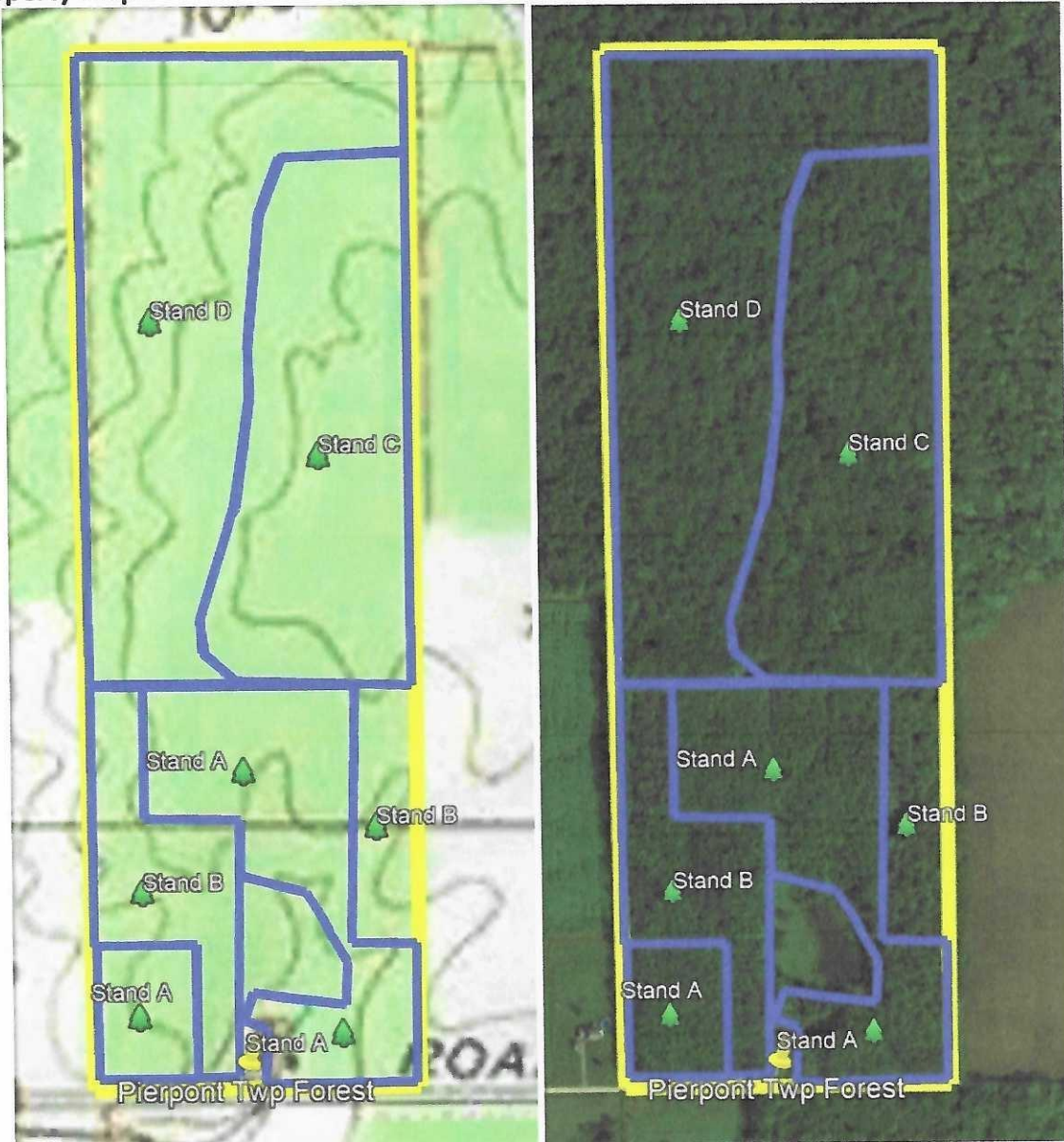
Stands A and B were Pine plantations that were planted in the 1950's. About half of the area was clearcut in the 1980's, which creates the distinction between Stand A and Stand B. Stand A consists of the young growth that followed the clearcutting, while Stand B is the result of the Pines dying off naturally and being replaced by native hardwoods.

Stand C is dominated by Red Maple and Red Oak. The stand has been thinned in the past, but it has been several decades. There is a higher than usual percentage of damaged/diseased trees in the stand due to the overcrowding. I recommend the area be thinned with an Improvement/Salvage Harvest.

Stand D is in a similar condition as Stand C, but it is dominated by Hickory and Sugar Maple. This stand is slightly younger, but shows signs of an old fire or snowpack that has damaged the base of many of the trees and started to rot the trees out from the base. I recommend the area be thinned with an Improvement/Salvage harvest.

Mr. Horner added a deed restriction that future timber harvests be completed on a sustainable yield basis; however, he did not indicate the number of years between harvests. Therefore, it is very difficult to know exactly how he wanted the property managed. The harvest that is proposed will be well within the bounds of a sustainable yield from the time of the last harvest and will improve the overall health of the forest moving forward. I recommend reaching out to the local ODNR Service Forester prior to harvesting to have them sign off on the harvest and verify that the harvest is within the bounds of a Sustainable yield.

Property Maps:



Property Boundary

Stand Boundary

Map intended for informational purposes only. Boundary lines are approximate. If unsure, contact a surveyor. Map not to scale. Imagery from Google Earth 2018.

Stand: A- 14.5 Acres

Dominant Species: American Beech, Ash, Aspen, Black Cherry, Red Maple, Red Oak, Sugar Maple, and Mixed Pines

Forest Type: Mixed Hardwood Forest

Stand Size: Poletimber

Stocking: Full/Overstocked

Basal Area: 165 sqft/acre

Topography/Aspect: Very little slope

Invasive Plants/Pests: N/A

Stand Description: Stand A consists of a mixture of pioneer and intermediate hardwood species, but is dominated by Red Maple. The stand was a Pine plantation that was clearcut in the 1980's. The resulting stand has filled in nicely and is now full/overstocked, meaning that the trees are fighting for sunlight and some will soon express their dominance, killing others. This stand is a prime candidate for a Crop Tree Release. Crop Tree Release is nothing more than a precommercial thinning of the forest where you chose the trees that you want to grow into the future and remove their competition. This is much like weeding or thinning out plants that are too close together in your garden.

Desired Future Conditions: The landowner wants to grow the stand and encourage a more diverse stand. They may complete the Crop Tree Release as time/funds allow.

Recommendations:

1. Crop Tree Release- This stand has just started forcing the trees in the stand to compete for light and nutrients. Crop Tree Release is the process of selecting the trees that you want to grow into the future, and removing the competing trees by girdling or cutting down. You can leave the material on site for wildlife habitat or remove it for firewood.

Harvest Recommended: No

Year:

Stand: B- 9.5 Acres

Dominant Species: American Beech, Ash, Aspen, Black Cherry, Hickory, Pin Oak, Pines, Red Maple, Red Oak, Sugar Maple

Forest Type: Pine plantation reverting to mixed hardwoods

Stand Size: Pole/Small Sawtimber

Stocking: Low/Moderate

Basal Area: 80-125sqft/acre

Topography/Aspect: Very little slope

Invasive Plants/Pests: N/A

Stand Description: Stand B consists of several smaller pine plantations that were planted with a wide variety of Pine Species including Red Pine, Pitch or Pitch Loblolly Hybrid, and White Pine. Of the Pine species, planted on the site only the White Pine are in good shape. The others are all reaching the end of their life or have succumb to the wet conditions present in most of Ashtabula County. The stand was fairly dense before the pines started declining. At this point, the stand varies in density from low to moderate stocking. As the pine continue to decline, the hardwoods in the stand will continue to express their dominance, and eventually the pines will no longer be relevant. Unfortunately, there is no commercial market for most of the Pines. The White Pine could be sold, but they make up too small of a portion of the Pines to be commercially viable. Near the end of this plan, it may be feasible to conduct a Crop Tree Release much like in Stand A.

Desired Future Conditions: The landowner wants to allow this stand to naturally revert into a mixed hardwood forest, to grow the stand, and encourage a more diverse forestland.

Recommendations:

1. Grow- This stand needs nothing more than additional time to grow.
2. Crop Tree Release- This stand has just started forcing the trees in the stand to compete for light and nutrients. Crop Tree Release is the process of selecting the trees that you want to grow into the future, and removing the competing trees by girdling or cutting down. You can leave the material on site for wildlife habitat or remove it for firewood.

Harvest Recommended: No

Year:

Stand: C- 19.5 Acres

Dominant Species: American Beech, Ash, Black Cherry, Hickory, Red Maple, Red Oak, Sugar Maple, Sycamore, White Oak, Yellow Poplar

Forest Type: Mixed Hardwood Forest

Stand Size: Medium/Large Sawtimber

Stocking: Full/Overstocked

Basal Area: 165 sqft/acre

Topography/Aspect: Mild slope, primarily west facing slope

Invasive Plants/Pests: Grapevines (light)

Stand Description: Stand C is highly variable. As you pass through the stand, the species composition seems to change every hundred feet. One moment the forest is dominated by Oak and Hickory, the next may be Elm and Red Maple, then back to Oak and Sugar Maple. The changes in dominance appear without rhyme or reason. The forest was thinned fairly lightly 40-50 years ago. The resounding theme of this stand is a very dense overstory and almost non-existent understory. There is also a higher than expected percentage of damaged/diseased trees in the stand. The lack of harvesting over the last 40+ years has created a situation where every windstorm adds another tree to the poor quality list and they are never removed. The stand is very densely stocked and needs to be thinned, both to remove damaged trees, and to allow more of an understory to develop and provide for future generations of trees. The thinning should be marked as an Improvement/Salvage Harvest and take between 40-50 sqft of basal area out of the stand. After the harvest, the stand should be allowed to recover for 10-15 years. The stand should be monitored for invasive species and grapevines every 2-3 years post-harvest.

Desired Future Conditions: The landowner wants to conduct an Improvement/Salvage Harvest and then allow the stand to recover.

Recommendations:

1. Improvement/Salvage Harvest- Stand C is ready for an Improvement/Salvage Harvest. The focus should be on removing the less desirable tree species, damaged/diseased trees, trees with poor form, and trees that may not survive until the next harvest. I recommend marking the timber with a light touch, no more than 40-50 sqft of Basal Area to be harvested at any given point. Without a harvest, less than desirable trees will continue to compete with the trees that we want to grow for future harvest, and some larger trees may become overmature.
2. Monitor- Monitor the stand to ensure that invasive species and grapevines do not become established.

Harvest Recommended: Yes

Year: 2018-2020

Stand: D- 25 Acres

Dominant Species: American Beech, Ash, Black Cherry, Hickory, Red Maple, Red Oak, Sugar Maple, Yellow Poplar

Forest Type: Mixed Hardwood Forest

Stand Size: Small/Medium Sawtimber

Stocking: Full/Overstocked

Basal Area: 155 sqft/acre

Topography/Aspect: Mild slope, primarily west facing slope

Invasive Plants/Pests: Grapevines (light)

Stand Description: Stand D is dominated by a mixture of Hickory and Sugar Maple, with American Beech, Ash, Red Oak, and Yellow Poplar sprinkled consistently throughout. The trees are slightly smaller than those in Stand C, and there is even less understory. The trees also show signs of an old fire that has caused many of the stumps to have rot started at the base, typically on the same side. The combination of the dense overstory and the high level of damage makes this stand a prime candidate for an Improvement/Salvage Harvest along with Stand C. The stand should be monitored for invasive species and grapevines every 2-3 years post-harvest.

Desired Future Conditions: The landowner wants to conduct an Improvement/Salvage Harvest and then allow the stand to recover.

Recommendations:

1. Improvement/Salvage Harvest- Stand C is ready for an Improvement/Salvage Harvest. The focus should be on removing the less desirable tree species, damaged/diseased trees, trees with poor form, and trees that may not survive until the next harvest. I recommend marking the timber with a light touch, no more than 40-50 SQFT of Basal Area to be harvested at any given point. Without a harvest less than desirable trees will continue to compete with the trees that we want to grow for future harvest, and some larger trees may become overmature.
2. Monitor- Monitor the stand to ensure that invasive species and grapevines do not become established.

Harvest Recommended: Yes

Year: 2018-2020

Management Schedule

Year	Activity	Required?	Stand(s)	Year Completed
2018-	Improvement/Salvage Harvest		Stands C & D	
2020	Improvement/Salvage Harvest		Stands C & D	
2021	Monitor for Invasives		Entire property	
2022	Crop Tree Release		Stand A	
2023	Crop Tree Release		Stand A	
2024	Paint Boundary Lines		Entire property	
2025	Grow		Entire property	
2026	Woodland Review w/Forester		Entire property	
2027	Grow		Stand A	
2028	Grow		Entire property	
2029	Monitor for Invasives		Stand A	
2030	Crop Tree Release		Stand B	
2031	Crop Tree Release		Stand B	
2032	Crop Tree Release		Stand B	
2033	New Management Plan		Entire property	

General Forestry Information (modified from ODNR)

Timber Information- Timber production is practical and possible for this property. The woodlands are stocked with a variety of marketable timber species that can produce valuable wood products now and into the future. Timber stand improvement (TSI) management practices such as grapevine control, cull tree & undesirable hardwood species control, and Crop Tree Release will certainly enhance the quality and value of your timber resources over time, and are important tasks to implement in order to maximize the timber potential in your woodland.

Wildlife- Your forestland provides valuable habitat for wildlife, including mammals, birds, and amphibians. Many of the tree species are used by this wildlife for food, cover and nesting sites. Some of the more valuable wildlife food trees species include oaks, beech, cherry, dogwood and hickory. Many other tree species are critically important to certain species of wildlife. Grapevines also are an important food and cover for birds.

Cover, food, and water are all necessary to attract wildlife. Different species use different cover types, and maintaining a diversity of cover is key to attracting a wide variety of wildlife. A mixture of sapling areas, pole areas and sawtimber areas will help meet the need for habitat diversity. Small openings in the forest and/or open areas along woodland roads help provide areas for birds and their young to come and catch insects. Openings can also be seeded to grass and clover mixes to provide an additional variety of food.

Please note all habitats don't necessarily have to be present on your property...your neighbor's land may offer a habitat type different than what is available at your forest. You can extend habitat benefits using complimentary cover types beyond your boundaries...the wildlife don't mind.

Water- Soil and water conservation practices can be applied to this property. Perennial streams should always be buffered with trees. Livestock should be kept out of streams. Water control structures should be used in areas where access trails and roadways are present. The water and soil resources on your property should be protected and enhanced. Using the information in this plan and information available through your local Soil and Water Conservation District can help you implement sound soil and water conservation practices on your property.

Best Management Practices- Basic protection measures used to guard your forest soils against problems related to soil/site limitations and equipment usage - rutting, excessive disturbance and compaction, erosion, and sedimentation - are commonly referred to as Best Management Practices (BMP's). One very easy BMP landowners may use is simply to limit heavy equipment access to dry weather periods. Hilly to steeply sloped terrain is more subject to site disturbance and subsequent soil erosion and sedimentation. Forest management may still be accomplished on these steep areas with the use of BMP's. Even when the forest terrain is nearly level to gently rolling, and where slope does not present a hindrance to access for management activities, it is important to keep the trails up away from the small drainages where possible. This helps protect water quality by providing a buffer strip of undisturbed soil and leaf litter where any sediment can be trapped before reaching the drainage, if some should get washed off the path. During timber harvest activities, follow the

Best Management Practices outlined in the Ohio State University Bulletin #916 – BMP's for Erosion Control for Logging Practices in Ohio. This booklet is available online at www.ohiodnr.gov/forestry/ or at your local Division of Forestry office. Practically speaking, the use of BMP's to prevent soil loss is a sound agricultural practice that helps maintain site & timber productivity. Also, implementing BMP's helps you comply with Ohio's Agricultural Pollution Abatement Law (HB 88) standards for Silvicultural Operations.

Forest Health- Emerald Ash Borer was the only insect pests or diseases noted during the woodland review. This woodland shows good overall health and vigor. Control of grapevines on selected crop trees will guard those crop trees from the damage risks posed by this woody native vine. However, native grapevines are part of the forest ecosystem; keeping selected vines may be considered a part of maintaining overall forest health.

Oak species are preferred food sources for the Gypsy moth. The good news is that after the initial wave of Gypsy moths showed up in Ohio, a fungus showed up that keeps these critters in pretty good check. The fungus is named *Entomophaga mima*... "Em" for short. Still, it's a good idea to keep tabs on any oaks present in the forest to see if any egg masses start to show up in July-August - identified as a characteristic tan fuzzy oval mass that looks like Velcro. If you see egg masses, and can count more than 50 during a five minute walk around the oaks, then your trees are at risk of being partially or completely defoliated if the spring is very dry and therefore not conducive to development of the Em fungus for natural control. There are options for control of Gypsy moth using aerial application of pesticides to the tree leaves, so that larvae ingesting such pesticides then die. One such pesticide is actually a "biocide" - the bacteria *Bacillus thuringiensis* (Bt).

Another woodland pest of great concern is the Emerald Ash Borer (EAB), an invasive insect from Asia that only attacks Ash trees. The larvae eat the living tissue of ash trees just underneath the bark. With a large enough infestation, this process essentially chokes off the flow of water and nutrients within the tree which leads to the tree's mortality. This insect can spread naturally from tree to tree, as well as artificially through the movement of Ash material, such as firewood.

You can reduce the risk of losses by gradually reducing the Ash component of your woodlot. When doing a forest thinning or a Crop Tree Release, if you have a choice between an ash and another desirable species, you may choose to cut the ash and let the other species grow. By gradually doing this Ash reduction throughout your woods, you can avoid any serious impact on your woods if the Emerald Ash Borer does eventually get there.

The best thing you can do now is to stay informed. The following websites should be checked periodically for the most up to date information on the emerald ash borer:

<http://www.agri.ohio.gov/eab>

<http://www.emeraldashborer.info/>

<http://ashalert.osu.edu/>

<http://www.ohiodnr.com/forestry/health/eab.htm>

Wetlands- Wetlands are extremely important for water quality, and they provide unique habitats for fish and wildlife. These are an important forest resource component for overall

health of the forest system. Ephemeral or seasonal wetlands – also called vernal pools - are typically small, and tucked within the forest cover. Vernal pools periodically dry up and do not contain fish. This drying may occur annually or just during drought years. However, these ephemeral pools provide unique habitat for amphibians like salamanders and frogs, as well as many other species of wildlife. Many landowners find that wetlands improve the aesthetics and overall enjoyment value to their land. It is very important to protect permanent and ephemeral wetland areas for the health of the forest and the environment.

Threatened & Endangered Species- No Threatened & Endangered species were observed during the woodland review.

Specific information on threatened or endangered species may be obtained by contacting the Ohio Department of Natural Resources Division of Wildlife directly to access the "Ohio Biodiversity Database":

ODNR - Division of Wildlife
2045 Morse Road, Bldg. G-3,
Columbus, OH 43229-6693
Phone: (614) 265-6452

Archeological/Historical Resources- Historical and cultural resources are nonrenewable and can never be replaced once destroyed. These resources provide us a unique glimpse into the past and a look at the people and how they cared for the land. Good stewardship involves recognizing these resources and protecting them. These resources should be conserved whenever possible when they are present on the property. No sites were discovered during the woodland review.

Recreation/Aesthetics- Each forest has a unique history and character...and this continues to build under your stewardship. This forest could be used for hunting, picnicking, or wildlife watching. Many landowners find enjoyment in doing improvement work in their woods. Others find pleasure in watching the birds. Some folks gain gourmet foods from the woods, gathering fruits, nuts, or wild mushrooms. Flowering trees like dogwood, redbud and serviceberry, whenever present, add to the beauty of the forest. Maintaining some trails will improve access and your opportunities for use of the area. A walk in the forest provides a time of learning, but also a time to relax. The woodlands can be a quiet place of solitude after a busy day at work, or anytime for that matter.

Other Resources – Associated forest resources vary somewhat from forest to forest, but typically include a variety of herbaceous plants present within the woodlands or old fields within a property. Spring, summer, and fall wildflowers provide non-timber benefits to anyone who takes the time to enjoy the blossoms. Along with the flowers, there is a vast array of insect life – pleasant and sometimes unpleasant – that is essential to good ecosystem function. Native and non-native honey bees and butterflies are examples of beneficial insects. Medicinal shrubs and herbs and maple syrup are more examples of other beneficial forest resources.

Fire – Properties and homes in Ohio are not immune to the risks of fire and fire-related damage. Spring and fall are Ohio's main "fire seasons". A step one may take to protect one's forest is to have a system of paths that may double as fire breaks. For the home site, maintain good access for fire vehicles, create a defensible space around your home and outbuildings by removing flammable materials such as brush, leaves, sticks, and twigs; remove these from roofs and gutters too. Landscape around buildings with less flammable plants and materials, avoid evergreens by or near the home, keep an outdoor water source, and avoid outdoor burning. For more information on outdoor fire safety and fire safety around your home, Firewise brochures are available from the Ohio Division of Forestry (toll-free 877-247-8733). You may also contact your local fire department with questions about Firewise and home safety regarding wildfire.

Ohio Fire Laws: ORC 1503.18 regarding kindled fires prohibits outdoor open burning statewide in unincorporated areas during the months of March, April, May, October, and November between the hours of 6:00 am and 6:00 pm. ORC 1503.18 is administered by the Ohio Division of Forestry; call toll-free 877-247-8733 with questions. OAC 3745.19 regarding outdoor burning is administered by the Ohio Environmental Protection Agency (EPA); EPA notification is required for many types of open burns in Ohio. Call 614-644-2270 with questions, or visit www.epa.ohio.gov/dapc/general/openburning.aspx.

Carbon Cycle – When you as a forest landowner choose to maintain your forest land rather than convert it to a non-forest use, you are making a significant contribution to the carbon cycle equation; healthy forests generally take in (sequester) more carbon than they release. Forest landowners that hold an interest, or focus upon the carbon cycle, have opportunities to enhance carbon sequestration on the property by conducting various silvicultural practices that enhance the forest's ability to capture and hold carbon, and by re-establishing woodlands on non-forested land.

Efforts to reduce carbon dioxide emissions have resulted in carbon now being a priced environmental commodity in the global marketplace. Active forest managers may find opportunities for carbon trading under participation in "ecosystem services" markets. For further information about carbon sequestration and voluntary carbon markets, plus other potential forest ecosystem services, visit the US Forest Service web site at <http://www.fs.fed.us/ecosystems-services/>.

Forestry Terms – Consistent forestry terminology is essential to anyone interested and involved in the science, management, and conservation of forests. The Society of American Foresters (SAF) offers a great resource for such forestry terminology: "The Dictionary of Forestry". This dictionary is an excellent tool available for anyone to learn more about the language used in forestry. The dictionary provides precision, clarity, and consistency in communication of forestry terms. You may access "The Dictionary of Forestry" for free from SAF at www.dictionaryofforestry.org. If internet access is not available, one may purchase a printed version from SAF (toll free 866-897-8760).

Forests of Recognized Importance (FORI) – Forests of Recognized Importance are considered critically important because they contain a unique combination of values. These can be social, cultural, biodiversity and environmental values:

- Social or cultural values are aspects of a forest that are critical to the surrounding community's identity. They can range from significant historical features (such as sacred sites or burial grounds) to the forest's role within the community, for example, whether residents have traditionally depended on the forest for berries, firewood, or other products.
- Biodiversity values are critical to preserving local flora and fauna. Such values could include rare ecosystems or habitats, or unusual communities of plant or animal species. Keep in mind that these ecosystems and species need not be on state or federal Threatened or Endangered Species lists, they may just be considered rare regionally or locally. Environmental values can benefit the whole community. Some examples are forests whose presence helps protect local watersheds or prevent erosion in vulnerable areas.
- When forestry professionals and other experts evaluate a forest as a potential Forest of Recognized Importance, they look at the entire landscape, not just a single stand of trees, and consider these values. Places that combine and contain these features are rare, so it's especially important to protect them. There's another important point to keep in mind. Most Forests of Recognized Importance in the U.S. that are globally, nationally or regionally significant have already been identified and protected by state or federal government or have been put under a conservation easement by an environmental nonprofit organization. So you're more likely to be near a Forest of Recognized Importance than to have one. But even if that's the case, there are still steps you can take in your own woods to help protect that Forest of Recognized Importance.
- Given this Standard for the Tree Farm program, you do not have any FORI on your property, but your property is still vital to protecting the water quality of Ohio.

APPENDIX AND PROJECT INSTRUCTIONS (MODIFIED FROM ODNR DIVISION OF FORESTRY)

Management practices outlined in the Management Activity Schedule of this plan need to be completed, or progress made, in order to retain your status in the Ohio Forest Tax Law Program. Your

Forest Management Activity Schedule will outline "Required" projects from those where progress needs to be made. The following appendices and addendums explain how to accomplish the various tasks outlined in this plan.

Ohio Forest Tax Law properties are inspected for compliance periodically by foresters from the Division of Forestry.

Woodland Projects to Complete:

Accomplishing the projects below, if relevant to your specific woodland, will: protect your land from timber trespass, give you access to enjoy your woods, greatly increase the wildlife habitat on your property, triple the board footage of wood grown annually on the property, double the value of the grade of lumber you are producing on the property, insure that the land has the ability to reproduce new young trees, and insures that you select the correct trees for harvest at the right time to do so, and get the most value out of them.

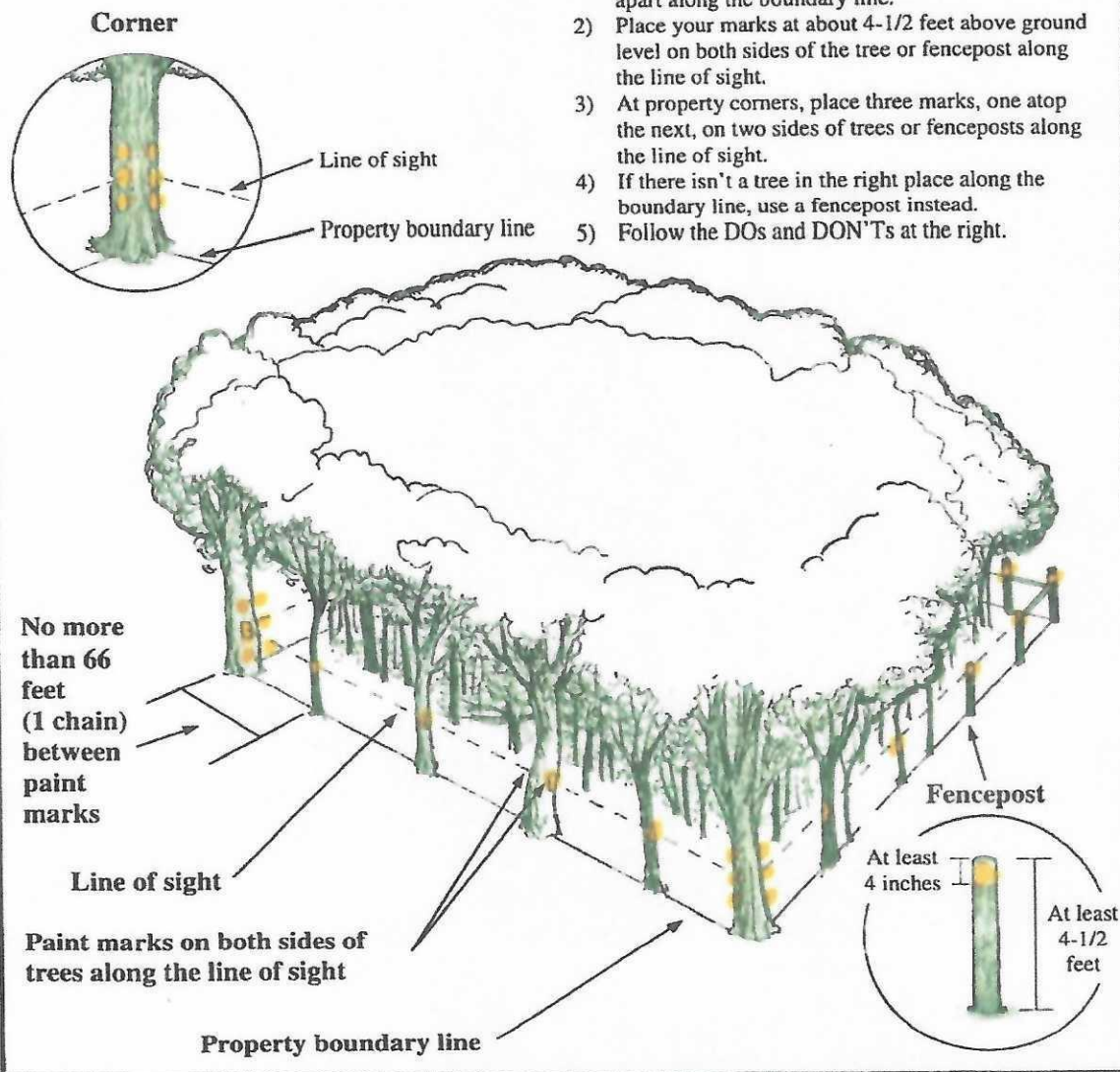
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By marking your property boundary lines properly the first time, you'll avoid delays in the application or recertification process and the possibility of losing your status under OFTL. The essentials for doing it right:

- 1) Mark trees and/or fenceposts no more than 66 feet apart along the boundary line.
- 2) Place your marks at about 4-1/2 feet above ground level on both sides of the tree or fencepost along the line of sight.
- 3) At property corners, place three marks, one atop the next, on two sides of trees or fenceposts along the line of sight.
- 4) If there isn't a tree in the right place along the boundary line, use a fencepost instead.
- 5) Follow the DOs and DON'Ts at the right.



#1 - MARKING PROPERTY BOUNDARIES

It is highly recommended that before you have any timber harvesting or timber stand improvement practices performed in your woodlot, that you mark your boundaries. Having your boundaries marked is required by law before your property can be entered or retained under the Ohio Forest Tax Law Program.

Boundary marking is for your protection, to avoid trespassing and timber theft problems. If you are unsure of exactly where the boundaries are located, first contact your neighbor for assistance. If it is still unclear, or if there is a discrepancy, then you should have a surveyor locate the lines for you. Having the boundaries surveyed is not specifically

required for this program, but it could save you expensive litigation in the future.

DO's:

- Use good quality high visibility oil based paint.
- If using spray paint, use tree marking paint.
 - Place marks close enough to see from mark to mark **during the summer.**
- As a courtesy, notify your neighbors that you will be marking line for the OFTL Program.
- **Mark no more than 66 feet between marks. Surveyor stakes are generally placed too far apart for this program and are easily removed.**

DONT'S:

- Mark dead trees.
- Use cheap spray paint.
- Use ribbons, flags, wire flags, or anything easily pulled down, off, or out of the ground.

Paint on boundary trees is considered the minimal “permanent” marking allowable. Ribbons do NOT qualify as permanent marking of boundaries. Posts can also be used but avoid stakes that can easily be pulled out of the ground. Boundaries of the perimeter of the property need marked. Existing roads, that are property boundaries, do not need to be painted along the road, but any intersection of the property boundary with a road should be marked and easily seen from the road.

Purchase quality oil based paint. Machinery yellow is recommended but blue, orange, and red work also. Boundary marking paint is available through major paint suppliers, forestry supply companies, or farm supply stores. Don't use inexpensive aerosol cans of spray paint as they do not often last for very long.

Place the marks on either side of the tree in the direction the line is going. If there is no tree on the line, locate a tree that is within 6 feet of the property line without going over on your neighbor or place a post on the line and paint it.

Refresh as needed to maintain highly visible property lines.

#2 - CONTROLLING GRAPEVINES

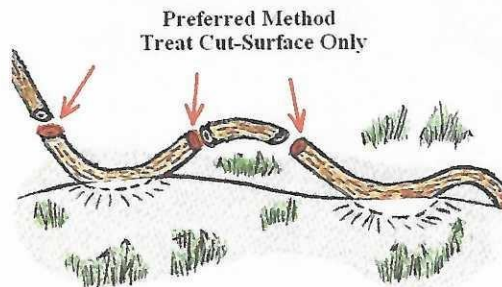
Controlling wild grapevines in your woods is one of the single most important tasks to accomplish in your woodland if you want to grow quality timber. Controlling vines does not always mean the total elimination of vines. Vines are a good source of food for wildlife, but you will need to control where and how many there are in your woods.

Grapevines often cause severe damage and can kill trees if they are not controlled. They have the ability to severely inhibit tree growth because they create a canopy of leaves over a trees crown and steal the sunlight from the infested tree. Their weight can tear apart weaker species, especially during ice storms.

Cutting Methods:

Cutting the vines with a lopper, chainsaw, or pole saw and treating with an acceptable herbicide is the best method of control. **Cut the vines at eye level** and then wherever they root into the ground. Cutting them high allows you to see where you have been much more easily and you will not constantly be re-visiting vines that you have already cut. Vines often root into the ground at multiple places and you will need to cut these “loops” in order to kill the root system of the vine.

It will take two to five years for the cut vines to fall out of the trees. There is no need to pull them from the trees once they are cut. In heavily infested woods, it is more efficient to work in two man groups with one person cutting vines and one treating them.



Herbicide Treatment Methods:

The use of herbicide is not always required to kill vines, especially in a mature woods with mature vines. Vines are not tolerant of being in the shade and will often die after being cut when underneath a heavy canopy created by bigger trees. In bigger woods, cutting alone will often kill the vines, except in open areas where sunlight gets to the forest floor.

In a woods with small and medium sized trees, vines will need to be cut and treated with an herbicide. Vines are fairly easy to kill with a variety of herbicides that are labeled for killing woody plants. It is the “active ingredient” in the herbicide that kills the plant and brand names are not necessarily worth noting. OSU Extension Fact Sheet F- 51-02 lists that grapevines are susceptible to herbicides with the active ingredients of Picloram, Triclopyr, 2 4-D, Imazapyr, and they are moderately susceptible to Glyphosate. Check labels for the presence of any of these chemicals before you buy the product.

Treatment can be done using a spray bottle or brush.

Herbicides come in two forms. Those designed to mix with water and those designed to mix with an oil base such as basal oil or diesel fuel. Pay attention which type you are buying.

Timing:

Any time you can take to cut vines is good for the trees. The work is easiest done in the late fall and winter months after the leaves have fallen and you can see the vines more easily, but summer cutting and treating works just as well. The optimum time frame to cut and treat vines is June 1, through when the spring sap flow begins. If you do the job thoroughly once, you will not need to re-visit it much in the future.

If you are cutting vines when the sap is flowing heavily in the spring, don't waste your money on herbicide treatment as the vines will flush the herbicide onto the ground. By June 1, the major flush of spring sap flow has slowed enough that herbicide treatment is effective.

Getting the Work Done:

If you are physically unable to do the work yourself or simply cannot take the time to complete this work, there are several professional Timber Stand Improvement (TSI) vendors working in the state that can do the work for a fee.

If you need to get the work done but do not want to hire a vendor, ask those people that have permission to hunt on the property to help you with the project as a condition of their hunting privileges. Many people are glad for the opportunity to help.

Retaining Some Vines for Wildlife:

There are a few acceptable methods if your goal includes retaining some vines. First, natural arbors can be created utilizing areas where vines have already heavily infested a group of trees. Create the arbor by cutting down the infested trees in an area approximately fifty to sixty feet in circumference. Leave the vines to grow over the downed trees. Control all vines around these arbors. An arbor or two every 15 to 30 acres is enough.

You can also choose to leave one or two vines per acre, but don't leave any in trees that are producing nuts and berries for wildlife. A nut or berry producing tree species, such as oaks or cherry, will produce much more food for wildlife if the vines are cut from them. An exception to this rule is where you have Beech trees infested with vines. Beech can tolerate vines and still produce a good crop of nuts periodically.

Another option is to leave vines along the edge of the woodland where the woods meets a field or open area. Woodland edges are a difficult place to grow quality trees so this is an area to retain some vines if so desired.

Summary:

Grapevines need to be controlled on all woodland properties if it is called for in any Forest Management Plan that is used for the Ohio Forest Tax Law Program. Wild grapevine control should be accomplished five years prior to a timber harvest. If they are not treated prior to a harvest, they will quickly run rampant after a harvest once the stand has been opened up to the sunlight.

#3 - BUILDING WOODLAND ROADS AND TRAILS

In order to efficiently manage your property and to fully utilize all the resources available on the property, it is important to improve access by establishing a road or trail system throughout. A good road or trail system improves the access for hunting, hiking, collecting firewood, or accomplishing any tasks that need to be completed in the woodland.

The first consideration will be to determine what the road or trail will be used for. If it is planned to be used mainly as a walking trail, then construction requires little more than clearing a path through the woodland using a chainsaw.

If a tractor or vehicle route is to be constructed, then more planning for a wider roadway will be necessary. A roadway that will be used for a timber harvest will need to be carefully planned and will need to be 10 to 12 feet wide. In order to create a roadway that is accessible and maintainable to tractor travel, there are several considerations to think about.

The slope and topography of the property are primary concerns when choosing a roadway site as are any wet areas or obstructions. The roadway must be designed to control water runoff. Rainwater is one of the most destructive forces on a poorly designed roadway. If the roadway is not sloped or located properly, with adequate water diversion and control structures, you can expect to be faced with more maintenance than you bargained for.

Stream beds do not make good roadways and should be avoided all together. If they are used there is potential for pollution from gasoline, oil, grease, and hydraulic fluids being carried by tractors or logging equipment. House Bill 88 addresses the penalties that may be incurred if



this activity is allowed to occur on a property.

An established trail or roadway through your woodland will greatly enhance your ability to utilize your property. Again, Ohio State University Extension Bulletin 916 - 'BMP's for Erosion Control for Logging Practices in Ohio contains very good information on road construction in woodland settings.

Once you determine the width needed for you access trail, the trees along the trail will need to be taken down. Once the trees are down, removing the wood from the trail can be a task. Utilize this material for firewood, or better yet, establish some quality brush piles in dry areas along your trail for wildlife by placing the larger diameter material for the base of the brushpile, and piling finer material on top. Inexpensive slab wood

purchased from local sawmills can also act as a great top cover for wildlife brushpiles. See brushpile construction instructions in the wildlife habitat enhancement section of this plan.



After the trees have been removed from the trail, consider spraying the trail with a 2-4-D or Glyphosate mix to kill the vegetation along the trail. A broadcast application of herbicide will kill plants that will be in the way of the next step of the process. Plants such as poison ivy will likely be present and if you are allergic to this plant, then it is best to kill it all prior to doing the next step.

Wait approximately a week after an herbicide application to proceed with the next step of cutting stumps. Stumps will have to be cut as flush to the ground as possible to avoid damaging any equipment used to maintain the trail. This task is laborious, blows fumes and sawdust into your face, and dulls many a chain. Always wear chaps and other safety equipment and sharpen and switch chains often. Many accidents occur when forcing dull chains through wood so don't take the risk. Be patient and cautious at this

stage of the construction process.

The final step of construction will be a general raking of the trail and a killing of sprouting stumps. A good woody plant killer such as a Triclopyr based product with dye in it is good for the final application of herbicide on sprouting stumps.

Your Soil and Water Conservation District or the Best Management Practices (BMP) for Logging Practices book will have information and can assist in determining species mix to use to seed the roadway. The establishment of vegetation on the roadway will be important to reduce the potential for erosion of the roadway. This is particularly important in soils that are easily eroded. You will need a shade tolerant mix of grass and legumes for this purpose.



#4 – INVASIVE PLANT CONTROL

There are several invasive plant species in Ohio that can severely impact a woodland in a negative fashion. This section will deal with those species that can have an effect on the ability to manage a woodland and an effect on tree growth.

Invasive Species in Ohio Woodlands:

The most problematic invasive species in Ohio include the ailanthus tree, Asian bush honeysuckle, buckthorn, Autumn olive, and privet. Multiflora rose, Asian bittersweet, Japanese knotweed and several other problem plants have also been found to cause problems in varying parts of the state.

Some invasive species can impact your ability to work in and enjoy the woodland. Multiflora rose is one such plant. The rose itself does not do much physically to the trees and it often dies when under a heavy canopy but it can be a problem for access if it is well-established. Controlling grapevines can go a long way toward controlling multiflora rose. The shade generated by a tree canopy released from the restrictive grapevine will eventually cause the rose to decline in size and vigor.

Other species can severely impact your access to the woods as well but the real damage they cause is in their ability to inhibit new tree seedlings in the woodland. Honeysuckle, buckthorn, olive, and privet all have the ability to do this. These species can flourish in the shade. If left uncontrolled and in combination with a poorly planned sale, invasive species can become the dominant plant in what was once productive woodland.

Control Methods:

Some people opt for physical control of invasives and will pull the plants from the ground with specialized tools. The smaller plants of some species such as honeysuckle and buckthorn can actually be pulled out by hand fairly easily when the soil is well saturated. Either way, this is a laborious task.



Chemical treatment is often the only answer to controlling invasive species effectively. Cut stump treatment, basal bark spraying, and foliar spraying are common methods of control. Many people use a combination of these methods depending on the size of the plants they are dealing with. Herbicides that are effective for woody species are not inexpensive and they will kill non-target woody stems so minimizing their use is a good option.

Cut stump treatments are often used on the larger stemmed plants. Stumps smaller than an inch in diameter are difficult to treat without a

considerable amount of overspray even when using a small spray bottle applicator.

Basal bark treatment is a method that is especially effective and economical on smaller diameter plants using oil based herbicides when the herbicide is mixed with a commercial basal oil or diesel fuel. A blue dye is added to the mix so the applicator can keep track of their progress and make sure coverage is good. Basal bark treatment is simply spraying the bark of the plant near the base of the plant. Coverage needs to be all around the stem but often takes only a couple squirts from a spray bottle on a semi-mist setting.



Foliar spraying is another avenue to kill invasive plants. It is highly effective and economical on smaller plants but not a good choice for larger plants. One method used to combat the expense is to physically cut the plant stem, let them sprout, and then hit them with a foliar spray when the canopy of the plant is much smaller. Using this technique minimizes the amount of chemical needed to complete the project.

Not all species are equal when it comes to control. Ailanthus, or “Tree of Heaven” as it is commonly known, must be chemically treated and it should not be girdled or cut down. Ailanthus is a prolific root sprouter and it is stimulated to root sprout if its circulation is cut off and comes back with a vengeance if it is cut down or girdled and not treated.

Controlling invasive species can be a real challenge. They can be controlled, but it takes a concerted effort and an annual follow up once the vast majority are killed in the initial control effort. Seed from some invasive species can be viable in the ground for many years and continual sprouting will occur.

*Basal Bark Treatment
on Buckthorn*

Read herbicide labels to see if the plant you need to control is on the list and follow the application instructions on the label.

A multitude of information is available for specific invasive species. Contact your forester if you have trouble locating any additional information you need to control invasive species and check your plan folder for related addendums.

Common Woody Invasive Shrubs and Control Measures:

Species	Chemical Options	Treatment Delivery Options
Autumn Olive	2% Garlon 4 Ultra	Foliar (when growing)
	2oz. Escort XP	Foliar (when growing)
	20% Garlon 4 Ultra + Bark Oil	Basal Bark and Cut Stump (Mid-summer - late fall)
Buckthorn	20% Garlon 4 Ultra + Bark Oil	Basal Bark (Mid-summer – late fall)
	Pathfinder II (RTU)	Cut Stump (Mid-summer – late fall)
	2% Garlon 4 Ultra, spray to thoroughly wet	Foliar (when growing)
Multiflora Rose	3.3 oz. Opensight	Foliar (when growing)
	1 oz. Escort IP or 1 gram/gal	Foliar (when growing)
	2% Garlon 4 Ultra	Foliar (when growing)
	3% Crossbow at flowering	Foliar (when flowering)
	6-12% Stalker + Oil	Basal Bark (year round)
Honeysuckle	2 oz. Escort XP	Foliar (when growing)
	5% Accord XRT II	Foliar (when growing)
	20% Glyphosate	Cut Stump (year round)
	15% Garlon 4 Ultra + Oil	Cut Stump (year round) Basal Bark (fall)

Common Name:

Roundup
Rodeo
Roundup Weathermax
Accord

Chemical Name:

Glyphosate

Garlon (3A, 4, 4 ultra)
Pathfinder*
Crossbow*

Triclopyr

***May contain additional chemicals**

Escort

Metsulfuron methyl

Stalker

Imazapyr

For applications in/near water look into products such as Garlon 3A or Rodeo

Always follow label instructions!

#5 - THINNING THE WOODS TO IMPROVE WOOD QUALITY, QUANTITY, HEALTH, AND WILDLIFE HABITAT

Thinning your woods requires the selective killing of live undesirable trees in your woods. Thinning re-directs the growth to the more desirable trees effectively "releasing" the tree from the stress of competition. You, as the woodland owner, choose which species you want to grow and how fast you want to grow them. Forestry is simply gardening on a big scale. The vegetation in your woods, especially the trees, can be heavily manipulated to meet your goals.

Thinning is one of the most useful tools you can utilize to grow the trees you want to grow. Proper thinning improves the species composition of the woods, the quantity of the wood grown, the quality of the wood grown, it improves seed and nut production, and the material that is killed can be utilized for a number of wildlife habitat enhancement projects and for firewood.

Thinning Defined:

Thinning, whether through natural competition or managed by a landowner, is going to happen in every timber stand, continually, throughout the life of the woodland. Trees remain in competition with one another throughout their lives.

To understand thinning it is necessary to have some knowledge of the natural development of a hardwood forest in this area. A typical forest begins with thousands or tens of thousands of seedlings per acre after a disturbance of some kind in the woodland. Disturbances can be man-made, such as harvests, or natural, such as storms and fire. Trees are prolific seeders and seed can remain viable on the ground for several seasons.

After a disturbance, which allows sunlight into a wooded area, and after the initial germination and establishment of seedlings, the number of trees per acre declines rapidly as the saplings grow larger and compete against each other for growing space. This happens rapidly at first, but more slowly with each passing decade. Initially, a new stand of trees can sprout as many as 20,000 trees per acre, but competition will quickly reduce this number to 4000 trees per acre within twenty years.

Over the next forty year period, these trees grow into the pole and small sawtimber size classes and all will grow slowly until one tree gets an advantage over another for sunlight. Then begins the long gradual decline of the tree that lost the battle. The growth put into that tree for decades will once again be reduced to organic matter in the woods. The stand of trees will continue to thin itself to the point where it is reduced to a few hundred, or even less than one hundred, trees per acre over many decades.

This continual reduction in numbers is an expression of one of the most basic laws of nature: those trees that are the most vigorous or best adapted to the environment are most likely to survive the competition for light, moisture and nutrients.

Unfortunately, the trees that may be the fittest from the natural selection point of view may not be the most desirable from a landowner's or forester's point of view. A poor

quality multiple stemmed red maple may out compete a potentially high quality red oak and a large low value beech tree may easily outcompete a higher value sugar maple.

Thinning of the woodland is going to occur either naturally or on purpose. Thinning on purpose, and at the right time, insures that the species composition, quality, health, and quantity of wood grown will meet the goals of the managing landowner.

Managed Thinning:

Managed thinning insures that **you** determine which trees will thrive in your woods. You will choose the tree species and tree condition that will meet your goals, and you will choose which species will not be allowed to inhibit the growth of your selected trees.

Foresters often disagree on definitions and techniques when it comes to thinning trees. Such terms as "crop tree release", "free thinning", "pre-commercial thinning" and residual basal area levels are argued ad nauseum at times among foresters and these continuing argument do not lend itself to presenting a solid front on how to get thinning projects completed in your woods.

Knowing When to Thin the Woods - Ask your Forester:

Your Forester should indicate to you the timing and type of thinning that your stand of woods needs in your Forest Management Plan. Your forester will assess the health, stocking level, form, and species composition and outline what thinning needs done in your plan. The condition of and characteristics of the individual trees in the woodland tell the forester when a thinning is going to prove beneficial in your woods.

Trees, like any plant, react to sunlight throughout their lives. If the sunlight they are receiving is reduced through competition, a tree will grow more slowly and will eventually die. If they are given some room to grow, they will prosper.

It is possible to thin a stand too early or to over-thin a stand of trees. Overexposing trees to too much sunlight will insure that they will stop the self-pruning process that competition promotes and often they will respond by sprouting branches from the trunk to take advantage of the newly available sunlight. Growing quality trees is a balancing act between giving the trees enough room to expand their canopies without unduly exposing their trunks to too much sunlight.

Ideally, the first thinning can be carried out in your woods just as soon as the crowns of individual trees begin to interfere with each other. Generally you would like to see a log or a log and a half in height, (16' to 24') in a self-pruned trunk before initiating the first major thinning. Sometimes it is pertinent to thin "form" and "species" culls from a heavily stocked stand when you see the culls interfering with the potential crop trees.

Two of the main signs that a thinning is needed is small canopy size and branching off the trunk. Branching off the trunk occurs under two conditions, either a trees trunk is exposed to the sun and the tree is taking advantage of it, or when a tree is very stressed it will branch from the trunk to collect any sunlight it can just to stay alive until something happens to its neighbor. Often, entire stands of trees are stressed due to being overcrowded.

Trees will fit their canopy into the space they have available to them. If they cannot expand their crown size, they cannot grow any faster. Their leaves and canopy are their “factory” to produce wood. If they have a small crown, the health and vigor of a tree is limited.

Choosing Which Trees to Kill - Canopy Level Trees:

Initially, many landowners are uncomfortable cutting down or killing live trees. It can take some time to visually see the effects of thinning and to understand the good you are doing in your woods. Always remember that the focus of thinning is to deaden the correct trees that are competing AT THE CANOPY LEVEL. Smaller diameter trees under the canopy have generally already lost the battle and are not affecting the canopy level trees. The only time that understory trees are killed in a thinning is because the species is undesirable, or you want to use the material for habitat or firewood. Killing too many small trees in the woods can expose your better trees to too much sunlight on their trunks. This will result in a sprouting of limbs on an overexposed trunk.

When choosing which trees to thin, a person must know their trees species, must know the physical characteristics and reactions to sunlight for those species, and must be able to visualize what will happen when they remove certain trees.

A confident landowner may be able to have an example set of trees marked by their Service Forester and then proceed to mark the rest of their property on their own.

Making the decisions on which trees to kill is very difficult for the average landowner. It is much more prudent to periodically hire a forester for a day to mark the trees to be killed. If you are taking advantage of the property tax reduction programs, invest some of that tax savings in hiring a forester.

If you attempt to do this project on your own, start by marking the “form” culls, (defined below), with paint. Don’t go into the woods with a running chainsaw thinking you are going to make good decisions on the fly. It is much better to study what you are doing in a quiet environment when marking trees to thin.

- *Cull trees* are those trees that are and will be unmarketable for timber at this time and into the future. Determining which trees are cull trees can sometimes be a difficult task. We do not always know which of the commercial tree species will have the best market value in the future, therefore determining cull trees should be primarily based on the form and condition of the tree.
- *Form Culls:* Deformed, low forked, severely damaged, crooked, and many multiple stemmed trees are often considered “cull” trees based on their poor form.
- *Species Culls:* Species culls include the list of tree species that are not often sold commercially. Iron wood and ailanthus, (the misnamed “tree of heaven”), are two tree species which can be culled based on species alone. Box elder, locust, aspen,

gum, and a variety of other less commercial species are often culled due to their lack of marketability and their competition with a more desirable species.

- *Overstocked Woodland:* It is very common to still have an over-stocked woodland that needs more thinning even after the competing form and species culls have been killed in the woods. Having “too much of a good thing” in the woods is not that uncommon and makes thinning decisions even more difficult.

In these cases, the tree selection is based on recognizing slightly better characteristics in certain trees and spacing the residual trees so as to give them some room to grow. These decisions should be made by your forester but can be made by a landowner experienced in species characteristics and correct stocking levels.

Thinning Techniques:

You have two options for deadening the trees that need killed in your woods. They can be mechanically killed by felling or girdling, or chemically killed by a variety of methods.

The most commonly used methods of deadening undesirable trees, shrubs, and vines are girdling (with or without herbicide), frilling, herbicide injection (hack and squirt), basal herbicide spraying, and cut stump herbicide application. These techniques are described in a variety of publications, including Ohio State University Extension (OSUE) Fact Sheet F-45.

- **Mechanical Methods: Felling or Girdling or Both?**

Felling of trees does release the canopy level trees to sunlight as soon as it is completed, so the “released” tree does see an immediate effect. The downside of felling is that it can be dangerous, time consuming, and, if done extensively, can overexpose the released trees to too much sunlight at once causing their quality to decline.



Physical Girdling will kill trees eventually but only if done correctly. Some species may take several growing seasons to actually die even with a well done girdle while other species wilt like flowers. Some species may react to the girdle by sprouting numerous root sprouts. If the girdle is not completed 100% around the tree and the circle is not completed and deep enough, then the tree may heal itself.

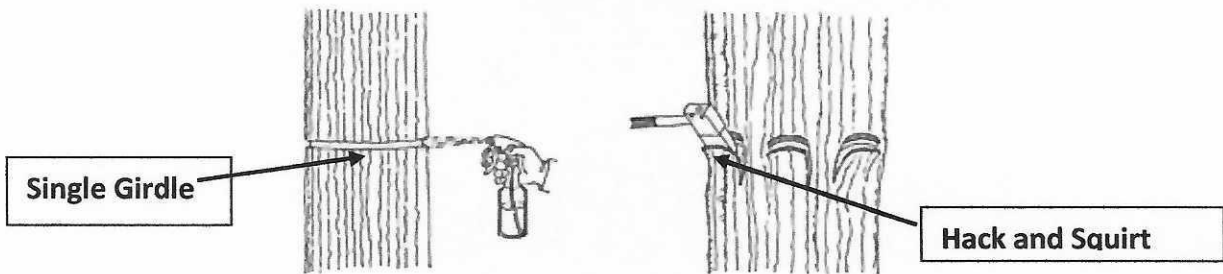
The advantages of physical girdling are that several more trees can be girdled in the time it takes to fell one tree. Girdling without chemical treatment also does not “shock” the stand with too much sunlight all at once. It effectively speeds up the natural thinning process by decades and the deadened stem still keeps some shade on the trunks of the released trees. If the girdled tree dies over time, the released tree slowly takes over

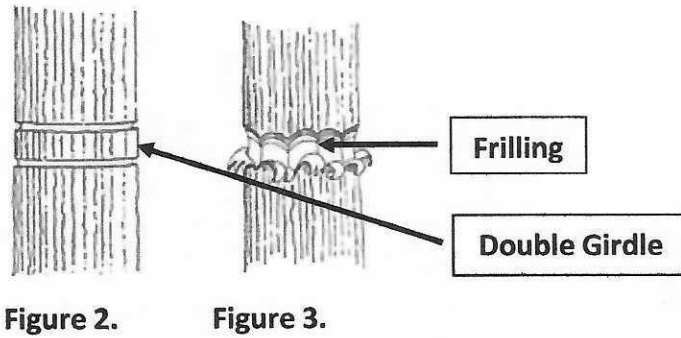
the canopy space of the deadened tree.

Girdled Beech / No Chemical

Chemical Methods: Girdling, Hack and Squirt, Frilling, Cut Stump, Basal Bark Spray

Chemical Girdling, when done correctly using the right herbicide for the species, will kill trees right away but leaving the deadened tree stand will provides some shade on the trunks of the released tree. Occasionally a tree chemically treated through a girdle can pass the chemical to a non-target tree that you wanted to keep.





Spray Cut Stumps to Avoid Stump Sprouts and Root Sucker Sprouts: Thoroughly douse the stump with the applicable herbicide that will kill the particular species you are working on.

Utilizing the Dead Trees:

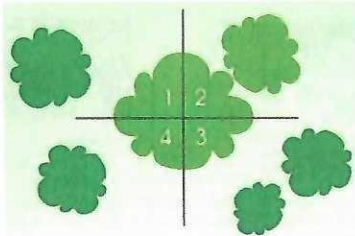
Any trees deadened from a thinning will be utilized for a better purpose than they currently serve in your woodland. Cull trees are often taking up valuable crown space that could be occupied by healthy well-formed trees. The wood in cull trees can be used for several purposes that may meet a variety of your management goals.

There are several ways to utilize the material from cull trees:

- A. Cull trees can be cut down and utilized for firewood.
- B. They can be cut down and constructed into brush piles for wildlife cover. This practice works best along the edge of the woodland where openings and woodland meet.
- C. Cull trees can be cut down and cut into small enough pieces so that they are lying on the ground where they will rot and return nutrients to the ground as well as provide habitat for a variety of smaller woodland inhabitants such as salamanders, snakes, insects etc.

- D. Culls can be left as standing dead snags and wildlife will utilize them. Insects will invade the dead tree; woodpeckers will follow, excavating cavities while searching for the insects. The cavities will be utilized as nesting sites by birds, bats, and squirrels for shelter and to raise their young.

Crop Tree Release Thinning Technique: Explained



Crop tree release thinning is a commonly cited and required thinning technique that is largely misunderstood among landowners. Foresters also often question its level of application.

In theory, you choose which trees that you want to grow and you kill the competition on all four sides of the crop tree.

Proponents of the technique do show that the diameter growth of the crop tree does indeed increase greatly, but it also has been noted that a four sided release can overexpose trees to too much sunlight and the upper logs will branch from the trunk and re-create knots in the lumber, which lowers its grade.

Crop tree release thinning can be modified to release a portion of your crop trees canopy. There are instances when a landowner has “too much of a good thing” or too many good quality commercial species packed into one area. In this case, a modified version of crop tree release thinning, where you give your crop trees some room to grow, but not on all four sides, will allow you to retain more than one good quality stem but accept the fact that you will be growing two quality stems a little slower than one good quality stem.

In Summary: Properly thinning the woodland greatly enhances the quality, quantity, species composition, habitat, and looks of your woods.

Using Herbicides to Kill Trees:

Using herbicides is often required to kill certain species of trees. Some species wilt like flowers after a single girdle is applied without the use of any herbicide. Other species respond with a vengeance to a girdle and root and stump sprout when you try to kill them. Other trees simply seem to refuse to die even after a double girdle but they eventually succumb if the techniques and herbicide are used correctly.

Navigating the herbicide options can be a daunting task. This brief review gives a simple summary of the options and issues to be aware of.

- Oil Base Herbicides vs. Water Base Herbicides:

Herbicides come in two forms, ones that mix with water, and ones that are mixed with an oil base. The oil base can be a purchased oil mix made specifically to mix with the herbicide or the oil base can be diesel fuel. The advantage of oil based herbicides is that they do not wash off the plant easily after application. The disadvantage is that they can be a bit messy to work with and can be expensive.

- Active Ingredient:

Trade names of herbicides mean very little. The item to look for on the label is the active chemical ingredient and the percentage of it in the product. There are several active chemical ingredients commonly used to kill plants of all kinds from grasses to trees. The most commonly used chemicals in herbicides are Glyphosate, Imazapyr, 2 4-D, Triclopyr, and Picloram.

A good source of information on herbicides is available through The Ohio State University Extension Service. The tables that follow show the relative effectiveness of each of the above listed herbicides in killing specific species.

Too often woodland owners and forest managers select an herbicide because it is readily available or is the least expensive, only to be disappointed later when control is unacceptable. Certainly cost and availability are important but it is most important to select an herbicide that will be effective, even if it is not the least expensive.

Read the attached addendum: "Chemical Control of Unwanted Shrub and Tree Vegetation" from ISU Forestry Extension. Author Jesse A. Randall

#6 - WILDLIFE HABITAT IMPROVEMENT PROJECTS

Woodlands provide valuable habitat for many species of animals, including mammals, birds, and amphibians. Many tree species are used by wildlife for food, cover, and nesting sites. Some of the more valuable wildlife food tree species include oaks, beech, cherry, dogwood, and hickory. Many other tree species are critically important to certain species of wildlife. Grapevines are also an important source of food and cover for birds and other wildlife.

Cover, food, and water are all necessary to attract wildlife. In Ohio, water and food are generally not deciding factors on which type of wildlife are using your property regularly. Having adequate cover and nesting areas, on the other hand, is another matter. Fortunately, completing forest management practices for timber production can also significantly improve the cover available for wildlife and can substantially increase the available food as well.

Different species of animals use different cover types to live and raise their young. Creating and maintaining a diversity of cover is the key to attracting a wide variety of wildlife. Woodland cover types can range from thick sapling and briar patches through sawtimber sized trees. Having a variety of cover types will help attract a variety of species. Large pole sized and small sawtimber sized stands of trees do not create very much cover for wildlife. Unfortunately, this size of woodland is the dominant cover type currently existing in this region of the state (2015).

There are several projects that can be done in your woods that will improve the cover for wildlife but also improve the growth, quality, nut, and fruit production of your trees.

Thinning the woodland: Improve Tree Health and Vigor to Improve Mast Production

The woodlands of Ohio are generally naturally overstocked with many trees of varying species, varying form, varying condition, height etc...In general, most woodlands are overstocked with trees. The trees are competing with each other for sunlight and eventually (over 30 to 40 years often) one wins out over another and the loser dies.

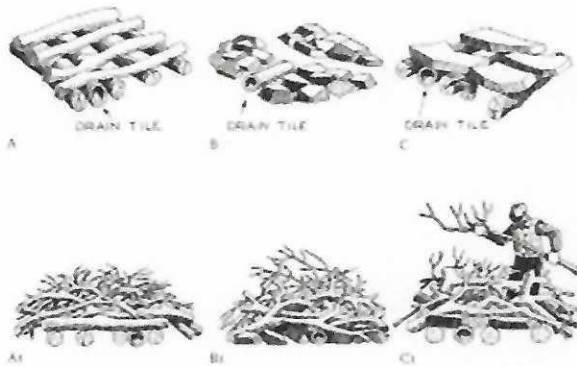
Thinning, through natural competition, is going to occur in every timber stand, continually. Managed thinning insures that you will determine which species will be retained in your woods and which trees will be given the opportunity to thrive. You will choose the tree species which will meet your goals, and you will choose which species will not be allowed to inhibit the growth of your selected trees.

Thinning is a great tool that will benefit wildlife in a variety of ways. Giving nut and fruit (mast) producing trees some room to grow and expand their canopy increases their ability to produce food for wildlife. A healthy tree produces a bigger crop of seed more often than a tree competing for its existence in a crowded and stressed condition.

The material from trees that are killed can be used for a variety of structures for wildlife. They can be used to create brushpiles, used as downed woody debris on the forest floor, they can be girdled and left as standing dead snags which are extensively used by a variety of birds and mammals such as flying squirrels.

It makes perfect sense to thin the poor quality and low value species in a woodland and use the woody material as cover for wildlife. The trees you leave will be healthier and produce more seed available as food for wildlife.

- **Brushpiles for Rabbit and other Mammals:** Use Wood from Thinning Jobs to Create Nesting Cover



Anyone who has hunted rabbits knows that this species is quite adaptable. Rabbits also need heavy cover in order to reproduce and prosper. Fortunately, it is possible to create quality brushpiles for them to thrive in on a variety of landscapes. It is still true that they like the heavy cover created by former clearcuts.

Creating useful brushpiles for rabbits requires that there is space under which the animal can dive into and stay out of the

weather. Many landowners will use 8 to 12 inch logs three to five feet in length to construct the base of the brush pile. They place the logs in a pattern much like the spokes of a wheel with the center open enough that there are multiple exits or like a log cabin. Laying slabs on top of this structure much like a roof and then placing finer branches works great for this species.

Small openings in the forest and/or open areas along woodland roads also help provide areas for rabbits to forage for legumes and other plants. Openings can also be seeded to grass and clover mixes to provide an additional variety of food.

- **Nesting Boxes:** Construct a Variety of Nesting Boxes for Birds, Wood Ducks, and Squirrels

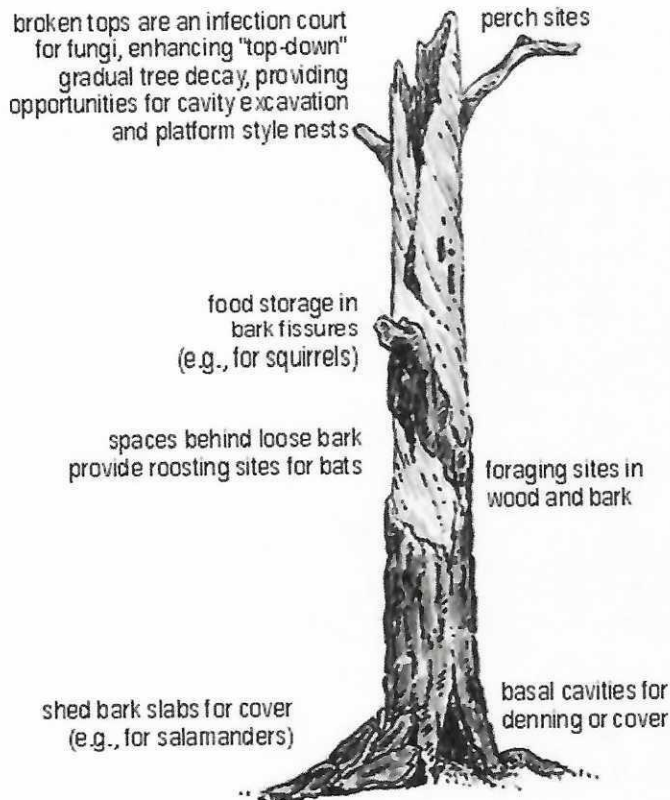
One of the most limiting factors for wildlife in predominantly pole and small sawtimber sized stands is the lack of nesting cavities. Young trees have not developed holes and hollowness needed for many species to thrive. This problem can be remedied by constructing and erecting nesting boxes in the woodland.

Nesting boxes should be made of rot resistant wood such as cedar, the heartwood of black locust, or hemlock. Nesting box designs area available online at the Ohio Division of Wildlife or other sites. Instructions for the desired density of boxes needed per species can be found on wildlife sites as well.

Attach nesting boxes to those trees that you are retaining specifically for this purpose. The trees will be damaged where the box is attached and it should not be looked at as a commercial tree in the future. Boxes screwed into the outside of the tree will eventually be pushed out and broken by the growing tree. It is possible, with some effort and the right equipment, to remove the bark and flatten off the side of the tree where the box is placed so that as the tree grows, it encapsulates the box. Remember that these trees to be used for this purpose are sacrificial trees retained for wildlife and will not be utilized for sawtimber. Place the boxes in low quality trees that you plan to retain for this purpose.

Placing boxes in this fashion will require a secure platform on which to work. Small portable lifts, towable to the site with a tractor, can be rented to accomplish this.

Dead Snags for Wildlife: Girdle Poor Quality Trees for Birds and Bats



Killing poor quality trees in the woodland does many things to improve wildlife habitat.

Standing dead trees provide a literal condominium of cavities for a variety of species to utilize.

Killing these trees also “releases” better quality surrounding trees from competition. Less competition means that the tree can concentrate on seed production and growth.

Kill trees by double girdling with a chainsaw. Girdling cuts off the circulation to a tree and the tree eventually dies. Proper girdling techniques are explained in the “Timber Stand Improvement” Section

of the Appendix.

- **Vernal Pools:** Vernal pools are standing pools of water that provide critical habitat for a variety of amphibians and reptiles. It is important that the pools fill with and retain water during the critical spring breeding season for these animals.

- **Food Plots:** The Hunting Food Plot

Food plots are often constructed in order to attract deer and turkey to a property. Plots do work to this end but it does require some effort to choose the right grasses or legumes for the soil type and sunlight availability where the plot is to be located. A simple soil test can give you some needed information telling you what the nutrient needs are to grow a specific legume or grass and they can save you considerable cost by directing you as to the correct amount and type of fertilizer needed on your plot to grow the crop you want to grow.

Food plots designed to hunt over come in a variety of patterns to fit various topographies. Some of the most common are below. There is a lot of information pertaining to food plot design on the internet from various sources.



The Skinny Rectangle: This long, thin food plot may be one of the most popular designs for food plots today. The basic idea behind this plot is to keep the distance across the skinny part of the rectangle to within bow range. This allows you as a hunter a good shot across the plot at any deer moving through. Having the plot be long allows you to still get the acreage you want, and also helps to funnel deer down past your stand location. Given the small width of the plot, deer will typically feel safer feeding, as escape cover is never too far away. A quick note on food plot size, all of these hunting plot designs mentioned here should typically be used on "small plots". A small plot is one that is from .25 to 1 acre.

The Hour Glass: Another popular design for food plots is the "hour glass", shown in the middle of the image above. Again the idea here is to get the deer into the plot and move them past your stand location. With the hour glass design, your tree stand should be located near the pinch point of the hour glass. Deer will naturally want to move throughout the plot, and will be curious to see what lies in the other section beyond the pinch.

The Boomerang: The Boomerang plot (pictured on the right) takes advantage of a curve or pinch to funnel deer past a stand. This time the plot is shaped just like a boomerang, with a stand typically placed at the bend. Deer will naturally feed along the length of the skinny legs of the boomerang, and eventually will move through the neck to get to the other side. Typically, a stand would be placed on the inside of the boomerang, so in the example pictured above the stand would be on the south side of the plot.

Clearcuts for deer, grouse, rabbits, and songbirds:

- **Deer**

Deer, grouse, rabbits, and certain songbirds need heavy cover to thrive. In order to grow older and larger, deer need heavy cover. For bucks to get large, they need to be able to thrive in a place where they can reach four to five years old. Most bucks you see are less than three years old. It is very difficult for them to reach four or five years of age if the cover is not there to protect them during the heavy pressure seasons. Heavy cover is vegetation predators, including people, do not want to go into.

For the deer hunter nothing is better at creating cover than a five to fifteen year old clearcut that has grown back to trees. For deer, clearcuts need to be at least three acres in size in order to help much in the way of concealable cover. Many landowners

managing for big deer, who have the available land base, will put in 15 to 30 acre clearcuts.

- **Songbirds**

Many types of songbirds use clearcuts that are growing back to trees for nesting and foraging. It is an important habitat type for many species. The small saplings within the midst of briars created when clearcuts are done create very good habitat for songbirds.

Read "Managing for Forest Songbirds" OSU fact sheet W-6-2001 for specific information on this topic. Available online at Ohio Line OSU Extension.

- **Grouse**

Grouse have long been in decline in most parts of Ohio due to the fact that a high percentage of our woodlands are growing into the large pole and small sawtimber size classes. Many old farm fields have been reverting back to trees naturally after the marginal agricultural land has been abandoned. Once ideal for grouse habitat, these old fields now consist of pole and small sawtimber sized trees and grouse cannot stay alive in this type of cover.

This species needs a very specific habitat type to thrive and raise a successful brood. In general, grouse need overhead protection from small predatory hawks and enough open ground on the forest floor to "bug" and move around, yet be able to slip away from other ground based carnivores. Grouse do not readily fly from place to place unless disturbed so they rely on the small trees to give them that overhead protection. As soon as the stand of trees is large enough that the small hawks can fly through them, the grouse have to leave.

A second problem for these birds is that when they do have a successful nest, the young "disperse" in the fall of the year. If those young birds do not find suitable habitat close enough and very quickly, they get picked off by predators. The lack of suitable habitat close enough together, has led to the decline of the grouse population.

Grouse can thrive in former clearcuts that are between ten to twenty years old. After the stand grows larger, they have to leave it or die. In Michigan, the grouse are managed by placing five to ten acre clearcuts across the landscape in order to allow the dispersed young grouse a better chance to find suitable habitat. The presence of spruce and other conifers in that region also helps give the birds the needed overhead protection.

#7 - TREE PLANTING

Tree planting can be a helpful tool for landowners wanting to convert a current yard, pasture, or field into a forest as well as establish specific species after a regeneration harvest. Planting trees to establish a new forest is a considerable laborious task but it is equally rewarding to create new habitat with specific management goals in mind.

Selecting the Right Tree:

Selecting the right tree for your purpose is the first step in a successful planting. Although some general guidelines can be given, every situation is unique. Soil properties, moisture levels, and available light vary on every site. Species to plant should be selected carefully based on site conditions, planting objectives, species requirements, and diversity. Planting a diversity of species will limit potential negative impacts from unforeseen pest and disease outbreaks.

To help you select the right tree for your planting it is recommended that a professional forester or conservation professional be consulted beforehand. A directory of ODNR Service Foresters is found on our website at www.forestry.ohiodnr.gov/serviceforesters.

The ODNR Division of Forestry encourages all woodland owners to have a written woodland management plan for their property that details their objectives, goals, and future management activities. We recommend maintaining a natural diversity of native species. Tree planting is great way for landowners to increase species diversity.

Research has shown that tree planting in existing woodland areas is generally not necessary, practical, or cost effective. There are exceptions for very special objectives where a landowner is committed to the process of weeding and releasing the planted trees for 10 to 15 years. Landowners that want to introduce a new species to their woods should look for woodland canopy gaps or dying trees to plant under and control competing trees as needed. This may be necessary in a woods dominated by ash, dying from EAB. Without planting, ash seedlings may grow back just to die again when they are larger.

The Division of Forestry recommends native species. On non-forested sites we encourage planting hardwoods alone or mixed with pine depending on soils and topography. Hardwoods can have more desirable growth characteristics with pine mixed in. If site conditions are favorable the following species are good options: red oak, white oak, bur oak, swamp white oak, bitternut hickory, shagbark hickory, tuliptree (yellow poplar), black cherry, and black walnut.

Ordering and Planting:

WHEN TO PLANT

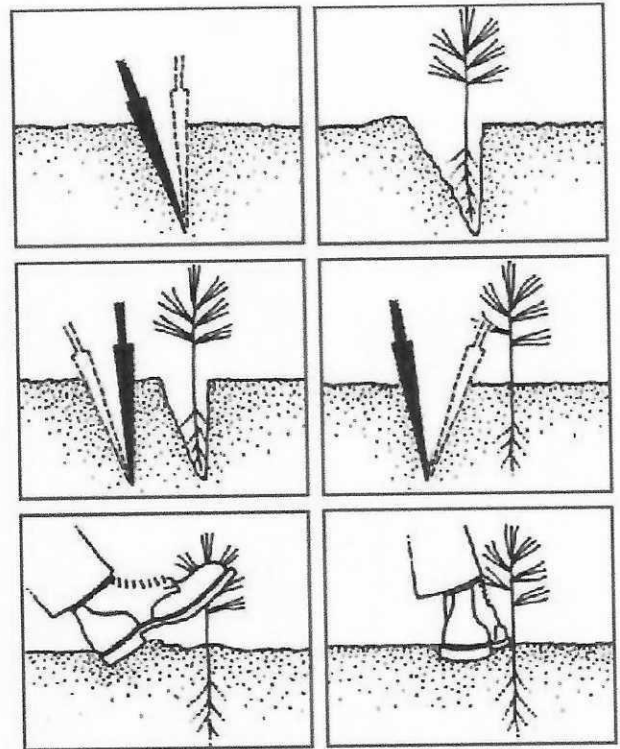
Spring planting is recommended for bare-root seedlings. Fall planting is not recommended because recently planted seedlings are usually not able to withstand severe frost heaving. Bare-root evergreens planted in the fall may not be able to fully establish their root system until spring, which can cause needles to dry out from winter winds and frozen conditions.

ENHANCED SEEDLINGS - Mycorrhizal Inoculated Trees (PT Stock)

Some tree seedlings are inoculated at planting with a mycorrhizal fungi to enhance seedling growth rate and survival on harsh sites such as strip mine land. Check with your local service forester if you believe your site needs this stock.

How to Plant:

1. Insert dibble at angle shown & push forward to upright position.
2. Place seedling in hole, pull up to nursery depth, & straighten roots.
3. Insert dibble 2 inches from seedling & pull handle toward planter.
4. Push handle toward seedling (3 & 4 → packs soil at bottom & top).
5. Fill in second hole by stomping with heel.
6. Pack soil around seedling with feet.



Seedling Spacing:

Before planting consider the purpose of the planting and the growth potential of seedlings in height and width to determine the appropriate tree spacing. Your local service forester can provide you with specific recommendations for your property and planting objectives. As a general rule, seedlings should be spaced as follows:

Purpose	Spacing
Reclamation	4-6'
Timber	8-12'
Wildlife	3-6'
Windbreaks	5-10'

Quantity Needed Per acre:

Spacing	6'x 6'	7'x 7'	8'x 8'	9'x 9'	10'x10'	11'x11'	12'x12'
Quantity/Acre	1,210	889	681	538	436	360	302

Seedling Care:

CARE ON ARRIVAL

After receiving your tree seedlings they need to be kept damp and stored in a cool location until planting. If you intend to plant the trees within a week, keep them in the shipping package in a cool shaded location, such as a cooler (above freezing), basement, outbuilding or on the north side of a building. If planting will be delayed longer than a week, open the package, make sure that the roots and packing materials are damp, reseal, and store the package in a cool place, periodically checking the condition of the trees' roots. Or, dig a trench deep enough to accommodate the roots, carefully place roots in the trench, and cover with topsoil. Do not allow the roots to dry out. Spring seedlings are at the end of their dormant season. Like all trees they need sunlight, carbon dioxide, oxygen and water to get a fresh start each spring. The longer you wait to plant your trees the fewer will survive regardless of the care given.

CARE OF ROOTS

When planting bare root seedlings it is important that the roots are planted straight up and down, and not bunched up at the bottom of the planting hole, or "J" rooted. A "Y-shaped" stick may be used to straighten roots in the hole while planting. Sometimes it may be necessary to prune the roots prior to planting if the seedling's roots are longer than the depth of the hole you are making. A dibble or tree planting bar makes a hole about 8 to 10 inches deep. If the roots are longer a sturdy spade may be substituted for the dibble bar to make a deeper hole. If the roots need to be pruned they should be trimmed so they are no longer than the depth of the planting hole. Pruning shears or another sharp tool may be used. It is never recommended to remove more than 25% of the root system. If you notice white issues forming at ends of the roots, the roots have started to elongate prior to planting and it is not recommended to prune them at this point.

SEEDLING PROTECTION

Young trees can be damaged by a variety of animals including rabbits, squirrels, groundhogs, voles, and deer. However the most common culprits are deer. In areas where deer are abundant it can be a real challenge to establish tree seedlings.

Actions that discourage deer from damaging seedlings include but are not limited to tree shelters, hunting, fencing, bud caps, chemical repellents, scare tactics, and selecting species that deer are less likely to prefer. Tree shelters are one of the most effective methods. Tree shelters are plastic tubes 2-6 feet long that protect seedlings from animal browse, herbicide, and mowing. They also create a mini-greenhouse maintaining moisture and a more stable temperature.

Another threat is damage from wildfires. In Ohio wildfires are most common in the spring and fall seasons, especially during dry windy conditions. Besides killing trees, fire can expose roots and leave scars that may lead to fungal infections like root and butt rot. To minimize this threat, fire lanes should be established around the edges of the planting and disked once a year. Disking or plowing should be done "on the contour" to minimize erosion.

CARE AFTER PLANTING

After planting, it is necessary to take certain precautions to protect this investment of time, money, and effort. Mowing and weed control around seedlings is needed for two or three years after planting to keep weeds from competing with the young seedlings and to help keep rodents away.

Tree plantings should also be protected from livestock. Grazing destroys more timber in Ohio than fire does. Livestock not only eat young seedlings, they trample the protective leaf cover and topsoil, which results in erosion and loss of soil moisture.

Diseases and insect pests can become a serious threat to your trees. It is important to regularly monitor the health of your trees. If excessive damage is found contact your local service forester to help identify the cause and best treatment options.

If practical it is good to mulch around trees to help keep weeds down until lower branches of the trees cover the area. A layer of aged straw, peat, and/or woodchips at a depth of 2 to 3 inches and for a distance of 4 feet is effective.

For additional information on care after planting or seedling protection contact your local service forester.

#8 - SELL AND MARKET YOUR TIMBER CORRECTLY

The what, when, why, and how of selling timber is one of the most misunderstood aspects of managing a forest for long term sustainable production. What follows is the basic information that all landowners need to know before selling trees from you property.

All you really need to know about harvesting is this: **You need to know how to express your goals for having the harvest done to your forester. (Do not confuse "Forester" with "Timber Buyer" or "Logger").**

Some common goals for conducting a harvest are: you need to generate "X" amount of dollars, you want the woods to be healthy and look better after the harvest, you want a trail system through the woods, you want periodic income from the woods, you want to create good wildlife habitat. All of these can be accomplished through a managed harvest.

There is a harvesting technique that can be used that does not inhibit the lands ability to produce another quality crop of trees and meet any goal you may have.

Three things a landowner should NEVER do when selling timber:

- 1. Never let the buyer decide which trees are going to be cut in your woods.**
- 2. Never sign a contract presented by a buyer.**
- 3. Never sell directly to one individual without the advice of your Forester.**

Species: Commercial vs. Non-commercial species

Ohio is blessed with a wide variety of tree species. Some of the best hardwood species make up the primary market for furniture grade lumber in the state. Some hardwood species are primarily used for railroad ties, blocking, pallets and a variety of other non-furniture related products. Several counties in east central Ohio now make up the center for hardwood furniture production in the United States.

The commercial hardwood species utilized for furniture and flooring, as listed in weekly hardwood market reports for the Appalachian region, include red oak, white oak, cherry, walnut, hickory, soft maple, hard maple, ash, poplar, beech, and in the northern Appalachian pricing zone, basswood, aspen, and yellow birch prices are added to the report.

There are many species that are commercially marketable for other non-furniture related products. These include aspen, sycamore, black gum, scarlet oak, pin oak, silver maple, cucumber, box elder, honey locust, black locust, elm, sassafras, hackberry, buckeye, and a variety of others.

Ohio also has a variety of softwood (spruce, pine, hemlock, and fir) species. Eastern white pine and hemlock are native and occur naturally in a few limited areas within the state. Most softwood stands in the state have been planted. Stands of Eastern white pine are most common but red pine, Scotch pine, Norway and a variety of other spruces have also been planted over the years.

The softwood market is quite limited in the state. White pine can usually be sold commercially if the size and quantity warrant a sale, but the other species only have niche markets and can be difficult to sell even if they are large and numerous.

When to Sell:

There are a variety of reasons to sell timber but when to sell is a topic that is very misunderstood. Most people consider selling timber when there is a knock at the door or a flyer coming in the mail requesting a review of your timber. Some landowners are prompted to look into selling because there is an operator working on the neighbor's property and the operator has asked to look at your trees. Nearly everyone can find a reason to generate income. With timber, the question should be, is it time to sell, why is it time to sell, what trees should be sold and why, what are the long term effects of a sale done today, and how long will it be before I can sell timber again?

Keep in mind that it takes a hardwood tree 80 to 120 years to grow from a seed to a 24" diameter (at chest height) tree. One poorly timed harvest, where the wrong trees are sold, can drastically reduce the marketability and productivity of the woodland for several generations.

The time to sell trees is when it is evident that some trees are at risk of being lost to damage, storms, structure, lean, being over-mature for the species, or a variety of other problems.

The second parameter of when to determine when to sell is when the woodland is overstocked. When a woodland is overstocked, diameter growth slows drastically. Overstocking leads to greatly reduced lumber production. Determining that a woodland is overstocked and that the trees that are in your woods are marketable is not always easy for a landowner to determine. There is a drastic difference in which trees "could" be sold vs. which trees "should" be sold in your woodland.

As soon as a landowner is approached to sell timber or thinks that they need to sell timber for whatever reason, their first call should be to an ODNR Service Forester. Service Foresters can quickly review the woodland and make an assessment as to whether your woods needs some harvesting attention or not. They can then give you some direction as to which trees should be sold, why, and to what stocking level the woodland should be cut.

Conducting the Sale:

After the Service Forester has advised you that they feel a harvest is needed and which trees should be the focus of the harvest, they will likely point you to a consulting forester to actually conduct the sale. Many Service Foresters will write up a simple summary letter on what they saw in your woods. You can use the letter to inform your consulting forester of the potential to conduct a commercial sale.

Once a consulting forester reviews your woods and accepts the job, they will mark and inventory each tree to be sold based on your goals and needs. They will compile a list of the board footage of lumber marked for each species of tree that is for sale. They will send out a bid packet to several prospective buyers. The bid packet includes the number and list of which trees are for sale, the basics of location of the timber, access, quality of the timber etc.

Consulting foresters only send the packet to good operators as a rule. It does not pay to deal with operators who do poor work in the woods or have trouble abiding by a contract. There are enough good operators in the industry. Potential buyers are given a chance to review the trees that are for sale and submit a sealed bid on a specific date.

On the day the bids are opened, your consulting forester will review the bids and advise you on the quality of the bids. The forester can compare the bids to current prices reported in the hardwood market reports. You retain the right to refuse any and all bids in your initial contract with the consulting forester.

Once a bid is accepted, your forester will assist you with developing a contract with the buyer, the forester will get a percentage of a down payment for the sale when the contract is signed and the rest of the money for the trees is paid up front before a tree is cut.

Your forester will also monitor the sale in case any problems arise with access, bad weather, and to insure that all aspects of the contract be fulfilled. Often a forester will hold a bond on the operator until the sale is complete, the reclamation of the trails and landing is finished, and the landowner is happy with the results.

Occasionally landowners have some timber that should come out of the woods but they don't have enough to entice a consulting forester to mark and administer a sale nor is there enough for sale to solicit several bids. These small sales can still often be sold. The key is getting the correct trees marked for sale and finding a buyer willing to harvest just the marked trees. Ask your Service Forester for help with this task. Most are very busy and can only do small marking jobs, but often they can assist.

Types of Harvests:

The most common harvest type recommended in most woodlands that are having their first "managed sale", (where a forester is making the decisions on which trees are cut) is an "improvement cut". In the past, the term "Select Cut" has been commonly used but the definition of a select cut has been so misrepresented that it is no longer a viable marking technique unless done by a forester. The term "Improvement Cut" is much more difficult to re-define to a buyers liking.

When deciding which trees and how many to cut in an improvement cut, a forester uses a variety of guidelines when making decisions on whether to paint a tree or not. Form, condition, species, diameter for the species, maturity, will the tree improve over the next fifteen years to the next cut or decline in value, and stocking level are all thoughts that go through a foresters mind as they are marking trees for a sale.

When marking an improvement cut, the forester should focus the marking on removing any damaged, high risk, leaning, poorly formed, and low value trees as a priority. In addition to marking potential problem trees, there may be room to mark a few others in order to improve the spacing, and species composition in the woods.

There also may be some trees that are simply prime to be removed during this harvest. There comes a time when trees can get so large that they will be difficult to cut without causing some collateral damage. This possibility also must be considered when conducting an improvement cut.

Your forester should leave the stocking level, after the cut, where it averages 80 to 90 square feet of basal area per acre. Basal area is a term readily understood and visualized by foresters. The trees that are left in the stand should be of good quality commercial species.

If a stand is cut to a basal area less than 70 square feet per acre, bad things happen to the trees left in the stand. Some begin to branch off the trunk, re-creating knots in the lumber, some will blow over in the wind, some may sun scald and die over time.

It is better for the woodland to do a true clearcut than to overcut below a basal area of 70 square feet per acre. A true clearcut cuts down every tree that is 2" in diameter and larger right down to the ground. Commercial clearcutting is not an acceptable harvesting method and can get you disqualified from the Ohio Forest Tax Law Program.

If a marking is done correctly, you should be able to conduct an increasingly higher quality timber sale every 15 years or so once your timber is in the sawtimber size classes. Occasionally the cutting interval may extend to 20 years.

The Basic Economics of a Timber Sale:

A typical managed sale will see 3 to 10 trees removed per acre in any one cut. Occasionally in very heavily stocked stands a forester may mark more than 10 trees per acre but it is not easy to retain the correct stocking level needed for quality growth when the numbers get much higher than ten trees per acre.

An average well managed timber sale removes approximately 3 to 10 trees per acre and can generate 2000 to 3000 board feet per acre in lumber. The competitive bids for hardwood lumber, depending on the market, the quality, and species being sold, can run anywhere from \$0.15 per board foot to \$1.50 a board foot. Sales can average \$0.30 to \$0.50 a board foot when most of the trees are of average quality and species and can increase to an average of \$0.70 to a \$1.00 a board foot when the trees are of high quality. 2500 board feet bid out at \$0.50 a foot garners \$1250 per acre. This type of harvest can be done approximately every 12 to 15 years.

These examples are just averages. Markets are very dynamic and can change drastically and rather quickly. In the past there have been historic highs for certain species and those prices have yet to be seen again. In times like this you will want to consult with your forester to identify such extraordinary markets as he will be able to compare current pricing to historic trends. When situations like this arise you may consider altering your harvest plans by accelerating your harvest schedule to capture such favorable pricing as the current timber market may drastically outweigh the value from a future harvest even with an increase of tree volume.

Depend on your consulting forester to guide you through the marking and marketing process.

Summary:

Always seek the advice of a forester before making a decision to sell your timber. Preferably your first call should be to an ODNR Service Forester. Service Foresters will listen to your goals, assess your resource, and lay out your options. Once you have chosen an option, hire a consulting forester to mark and administer the timber sale for you. Too much can and does go wrong in an unmanaged timber sale.