TIMBER MANAGEMENT FOR QUALITY PROPERTIES AND QUALITY DEER
Importance of Proper Timber Management

- Major driver of overall habitat quality (sunlight, seed source, wind break, successional transitions, etc.)
- Enhance huntability
- Likely the only significant revenue generator on the property
Habitat Management - The Basics

- Provide a diversity of stand types (species composition)
  - Pine
  - Hardwood
  - Open/Field
- Provide a diversity of age classes
- Smaller is generally better; higher diversity of age classes is better
- Habitats well interspersed
A Deer’s Diet

1. Hard Mast Species

- Beechnuts - very sporadic
- Acorns
  - White Oak
  - Red Oak
- Hickory – overrated?
- Hardwoods - if it won’t make a nut, then make fruit or salad
2. Soft Mast Equally Important… or More So

- Blackberry
- Raspberry
- Black raspberry
- Elderberry
- Blueberry
- Grape
- Rose hips
- Crabapple
- Honeylocust
- Blackgum
- Black Cherry

Collectively, VERY important
3. Forbs - The Backbone of Quality Nutrition

Too many to list:
- Goldenrod
- Hawkweed
- Ragweed
- Native legumes
- Meadowsweet
- Jack-in-the-pulpit
- Trillium
- Dog-tooth violet
4. Vines & Shrubs - Very Important

- Honeysuckle
- Greenbrier
- Poison Ivy
- Hobblebush
- Maple leaf viburnum
- Wild raisin
- Hazelnut
5. Hardwood Browse Plants

- Red maple
- Sugar maple
- Dogwoods
- Oaks
- Birches
- Poplar (aspen)
- Willow
- White ash
6. Softwood Browse Plants

- Northern white cedar
- Hemlock
- Balsam fir
KISS- Timber Mgmt Rules of Thumb

- Develop a plan
  - Define objectives
  - Assess (before you act or before you buy)
  - Develop your vision
  - Develop goals/timelines
- Involve a professional!!
KISS- Timber Mgmt Rules of Thumb

- Understand timber markets/outlets
  - Example: poles vs pulp
  - High quality (veneer) hardwood sawtimber
  - Timing (season)
  - Sustained yield
- Keep practices operationally viable (follow BMP’s and your state’s wetland regulations)
KISS- Timber Mgmt Rules of Thumb

- Manage pines and hardwoods, but management styles may differ

- Pine stands- manage intensively for **winter cover**; AND/OR target forbs, vines and soft mast

- Hardwoods- aesthetics are nice, but mast and browse (aka food) is priority
Some simple definitions…

- Diameter at Breast Height (DBH)
Some simple definitions…

- Basal Area (BA)

\[
\text{DBH (inches)} = \frac{C}{3.14}
\]

\[
\text{BA (square feet)} = \text{DBH}^2 \times 0.005454
\]
Some simple definitions…

- **Crown Dominance**

Figure 1. Tree crown position as it relates to dominance in a forest stand. D = Dominant, C = Codominant, I = Intermediate, S = Suppressed
Some simple definitions…

- Conventional vs. Mechanical Logging
Some simple definitions…

- Log Size Classes

Seedling/Sapling  < 4” DBH
Pulp (soft or hardwood)
Pole-timber  4 – 10”
Small Sawlog  10 – 18”
Large Sawlog  18” +
Some simple definitions...

- Even-aged vs. Uneven-aged

**Even-aged**: a stand composed of a single age class of trees in which the range of tree ages is usually plus or minus 20% of the rotation age.

**Uneven-aged**: a stand with trees of three or more distinct age classes, either intimately mixed or in small groups.
General Considerations In Harvesting Timber

- Measure twice, cut once
  - Well planned/designed
  - Identify features you want to leave or features you want to create
    - Funnels
    - Food plots
    - Tree plots
Even-aged Vs. Uneven-aged

Even-aged Management

Regeneration  Pre-commercial  Commercial  Mature

Intermediate

(          )

Regeneration Cut  Regeneration Cut  happens here

Pre-commercial

Weeding

Thinning

Pruning

Commercial

Improvement Cut

Thinning

Crown Free

Low Selection

Mature

Clearcut

Seed Tree Cut

Shelterwood
The Clearcut system...

1. A stand of mature, "shade-intolerant" trees.
2. Most of the trees in a selected area are removed.
3. More clearcuts are performed in subsequent years, as the regeneration continues in the previously cut area.
4. The trees on the site of the original clearcut near maturity after 30-35 years. The stand will then be ready for another harvest.

Regeneration is Complete

Cycle Continues

http://www.nipissingforest.com
The Clearcut system...

1. A stand of mature, "shade intolerant" trees.

2. Most of the trees in a selected area are removed.

3. More clearcuts are performed in subsequent years, as the regeneration continues in the previously cut areas.

4. The trees on the site of the original clearcut may take 20-30 years to regrow. The stand will again be ready for another harvest.

http://www.nipissingforest.com
Clearcut method...

Hardwood and pine forests
Increased browse 1 – 5 years
~ 1,000 lbs / acre
Increased soft mast 2 – 5 years
Decrease in hard mast
High stem density / escape cover
10 – 25-acre cuts recommended
Shelterwood method...

Hardwood forests (primarily)
Increased browse 1 – 5 years
  - on avg, similar to clearcut
Increased soft mast 2 – 5 years
Hard mast retained 6 – 8 years
  - according to spp and ba
High stem density / escape cover

2-year-old shelterwood

8-year-old shelterwood

reduced visual impact
2-aged management...

- Same characteristics as clearcut and shelterwood
- Retain *quality* mast producers
- “Overwood” retained longer
- Best to retain \( \geq 40 \) years
- Provides food *with* cover
- 10 – 25 acres recommended

8-year-old shelterwood with reserves
Even-aged Vs. Uneven-aged

Uneven-aged Management

Selection  Strip  Dauerwald  Coppice

Single-tree selection

SELECTION....not SELECTIVE!!

Group selection

Regeneration Cut always happens here
What about “select” cuts?

Do you want to ruin your forest?
Avoid *diameter-limit harvests*!
- preferred species decline
- genetically superior trees removed
- mast production may be eliminated
- little hope for stand improvement
The Selection system…

1. Mature Tolerant Hardwood Forest

2. First Cut
   - Over-mature and poor quality trees (up to 30% of the total) are marked and then cut.

3. After 20-30 Years
   - The remaining trees have thrived and the next generation is well-established.

4. Second Cut
   - Once again, up to 30% of the mature trees are cut, focusing on the removal of poor quality trees.

5. After Another 20-30 Years
   - The forest is ready for a third cut with removal of another 30% of the trees.

Cycle Continues

http://www.nipissingforest.com
Timber Stand Improvement (TSI)

**Thinning** — cuttings to decrease stand density

**Release operation** — regulate composition of young stands

**Improvement cutting** — improve older stands

**Prescribed fire** — to control fuel, structure, & composition

**Influence composition**
- release favored species
- kill undesirable species

**Influence structure**
- stimulate understory
- increase available nutrition

*Retention cut for wildlife*
Timber Stand Improvement (TSI)

Retention Cut for Wildlife (aka Crop Tree Release)

- **Cut-and-fell**: Reduce canopy cover to ~ 60%
- **Girdle-and-spray**: Release favored crowns
- **Hack-and-squirt**: Stimulate understory

25% Arsenal AC  OR  50% Garlon-4
TSI Article – QDMA Website

http://www.qdma.com/what-we-do/articles/certification-program-readings/what-is-tsi/

Home>Articles>Certification Page
Do your woods look like this?
They don’t have to!
More mast potential

More sunlight = larger crowns
More mast potential
Larger crowns = more acorns
Fertilization ≠ more acorns

White Oak Crown Area

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square meters

Jackson et al. 2007
Increased soft mast

This data courtesy of Dr. Craig Harper

Soft mast availability following silvicultural treatments,
Chuck Swan SF & WMA, 2008

- **Control**
- **Shelterwood**
- **Shelterwood w/ fire**
- **Retention cut w/ fire**
- **Retention cut w/ herbicide**

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<tr>
<td>Retention cut w/ herbicide</td>
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Increase forage availability

This data courtesy of Dr. Craig Harper

Selected forage available following silvicultural treatments, Chuck Swan SF, 2007-2008

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<td>RC &amp; Herb &amp; Fire</td>
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Pine Stand Management - Establishment of New Stands

- Must be planned before harvest
- **Natural Regeneration:**
  - Shelterwood (leave 20-40 trees per acre)
  - Seed tree (leave 6-10 trees per acre)
  - Rely on natural seeding
  - Limited control over stocking/spacing
  - Often requires pre-commercial thinning
Pine Stand Management - Establishment of New Stands

- Artificial Regeneration:
  - Site Preparation (chemical, mechanical, combination, fire)
  - Tree planting or direct seeding (species selection)
Pine Stand Management - Artificial or Natural Regeneration…Which is Best?

- The ability to provide better genetics and control over spacing and stocking are advantages to artificial regeneration

- For the average forest landowner with small acreage, this is typically not a necessary practice

- North v South? Most desired timber species ($) regenerate naturally and are either shade tolerant or intermediate (except white pine)
Advanced Regeneration

When thinning hardwood or pine stands, keep your eyes open to what the forest “wants” to grow and/or for opportunities to help it realize its future.

Note the abundant white pine seedlings that could be released to improve year-round, ground-level cover, and will be your next stand.
Advanced Regeneration

Young softwoods provide ideal cover in otherwise open stands

Cut poor-quality hardwoods to release this entire group of young pines

Look for opportunities to remove over-topping trees to encourage small softwoods to grow into the stand
Mid-rotation Pine Stand Management - Thinning

- Thinning Benefits
  - $ sooner
  - Anticipate mortality
  - Improve habitat
  - Leave best performers

- What is the correct thinning intensity
  - Rules of thumb-BA
  - Rules of thumb-sunlight
Managing pine stands for wildlife

Thinning and herbicides

Pre-commercial thinning
- thin to <300 trees / acre

Commercial thinning (12 – 20 yrs)
- thin to ~ 70 sq ft / ac

Kill undesirable hardwood stems
- imazapyr (Arsenal / Chopper)
Managing pine stands for wildlife
Managing pine stands for wildlife

28 Apr 2006
Litter consumed; seedbank stimulated
Managing pine stands for wildlife

18 July 2006

Nutritious forage and brooding cover available
Managing pine stands for wildlife

29 Nov 2006
Seed and winter cover available
Managing pine stands for wildlife

Managing to sawtimber

Maintain ba ~ 60 – 80 sq ft / ac
- deer/wild turkey/forest songbirds
- burn on 3 – 4-yr rotation

Maintain ba ~ 40 – 50 sq ft / ac
- bobwhite / scrub-shrub birds
- burn on 2 – 4-yr rotation

Herbicides to control woody spp.
- imazapyr (Arsenal / Chopper)
Nutritional Carrying Capacity
Number of days 1 deer can be supported on 1 acre

Edwards et al. 2004
Hardwood Management

- Can serve an aesthetic purpose
- If deer is priority, hard mast should be a priority
- Important to remember, if it's not producing mast there are still benefits from coppice and root sprouts from some hardwoods
Hardwood Management

- Decision Criteria
  - Do you have proper stocking of crop trees to release them (desirable species, codominants, 70-80 BA of crop trees)?
  - If so, crop tree release
  - If not, then plan for regeneration or conversion to other types
Hardwood Management

- Uneven-aged Management
  - Single-tree selection
  - Group Selection: \( \frac{1}{2} - 2 \) acre openings
  - Oaks are shade intermediate, needs lots of sunlight for regeneration
Hardwood Management

- Even-aged Management
  - Clearcut (up to BA=5-20 sq. ft. left)
  - Patch/strip clearcut (2-10 acres)
  - Seed tree (6-12 tpa)
  - Shelterwood (BA=20-30 sq. ft. left)
“How do I mark my stand”?

LOOK UP, NOT DOWN!

- retain favorable species
- retain trees with good form
- retain trees with good crowns

Money is **NOT** the object!
“How do I burn my woods?”

With care!
With low intensity!
With experienced help
Prepare written plan
Obtain burning permit
Contact local fire dept
Only under correct conditions
Only with adequate firebreak
When and how often?

Growing-season fire
- September – October
- reduces woody understory
- stimulates herbaceous cover
- best adapted to drier sites
- every 3 – 5 years

Dormant-season fire
- reduces litter
- stimulates woody sprouting
- dry or relatively moist sites
- every 3 – 4 years
“Won’t I kill my trees?”

Fire may damage hardwoods
Fire may damage pines also!
*Low intensity is key!*
Don’t burn to mineral soil
Burn with moist duff layer
Move debris from around trunk
Special Considerations

- Early Successional Habitat Areas
  - Areas dedicated to maximum native forage production.
  - Often not stocked with trees; allows for use of all chemical and mechanical treatment tools
Special Considerations

- **Deer Wintering Areas (DWA’s)**

  Deer in northern regions require areas of dense softwood cover during the winter.
Managing Winter Cover for Deer

Specifically, they require stands of:

- Hemlock
- Cedar
- Spruce/fir
- Pine

In general:

- Hemlock and cedar provide better cover than spruce & fir
- Spruce & fir provide better cover than pines
Managing Winter Cover for Deer

Northern deer require softwood stands that have:

- trees that are at least 35 feet tall
- softwood crown-closure of at least 65-70%

...means that when you’re in the stand and look up, at least 65% of the sky will be blocked by live softwood branches.
Managing Winter Cover for Deer

Softwood stands greater than 10 acres in size are especially important as winter cover because they provide the best protection from wind and cold temperatures.

- often referred to as deer “wintering areas” or “deer yards”

- high quality wintering areas will be used by deer for decades

However:

Softwood stands as small as an acre or less are often used by deer during the winter for cover.
Managing Winter Cover for Deer

When managing winter cover for deer your two main goals are to:

- maintain or increase the amount of dense softwoods on your property
- improve food availability immediately adjacent to winter cover

This stand is too open and the crowns are too thin to provide good winter cover

A new browse opening immediately adjacent to good winter cover
Managing Winter Cover for Deer - Maintaining Softwood Cover

On small-acreage properties:

removal of any softwoods from a wintering area generally results in at least a temporary loss of winter cover ...

Crown-closure in this pine stand is already low, removal of any trees will further reduce this stand’s ability to provide adequate winter cover for deer
Managing Winter Cover for Deer - Maintaining Softwood Cover

Instead of cutting softwoods I try to remove poor-quality hardwoods from within and along the edges of a wintering area to:

- increase softwood cover in the stand (softwoods often grow into the small openings you create)
- improve food availability to deer (stump sprouts)

Removal of hardwoods results in little or no loss of thermal cover in the winter

Remove this red maple
Managing Winter Cover for Deer - Maintaining Softwood Cover

Remove hardwoods as single trees or in small groups (2-5 trees) adjacent to mature softwoods to encourage softwood regeneration…

- ideally, softwoods will seed into the openings and eventually grow into the gaps you create
- exposing the mineral soils with logging equipment (removing the leaf layer) will further encourage good softwood regeneration

To encourage softwoods (rather than hardwoods) in your openings:
- Openings to regenerate spruce/fir should be no larger than 20 to 40 feet in diameter
- Openings to regenerate hemlocks should be no more than ½ the height of the surrounding dominant trees
Managing Winter Cover for Deer - Maintaining Softwood Cover

Usually, the most successful way to increase softwood cover is to...

- Cut these hardwoods to release these young hemlocks
- Remove small groups of hardwoods that are over-topping pockets of softwood regeneration
Managing Winter Cover for Deer – Improving Food Availability

Create browse openings immediately adjacent to softwood cover

Make your openings so all browse is within 200 feet of softwood cover

Means deer won’t have to travel far from cover to get food
Managing Winter Cover for Deer – Improving Food Availability

Whenever possible:

Remove competing hardwoods rather than softwoods to release oaks in a wintering area.

Release oaks within and immediately adjacent to deer wintering areas to provide acorns within or close to the wintering area.

Red oak with a healthy, well-exposed crown in a hemlock wintering area.
Special Considerations

Locate log decks on potentially good sites for food plots
Special Considerations

Convert log decks to food plots in a variety of soil types to allow a diversity of cultvars across the property.
Log decks can be cleared for food plots with “arms” extending into thinned pines.
Special Considerations

Create food plots along roads in conjunction with timber harvest operations.
Special Considerations

Establishment of long, linear wildlife openings following a 5th-row pine thinning
Special Considerations

Plant soft and hard mast trees in log decks, food plots, along roads and in other openings.
The End

Special thanks to Dr. Craig Harper at UT (for photos and data)
Quality Deer Management Association

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