TREE PLANTING

Mike Long
Long Forestry Consultation
4 Crucial Aspects of a Successful Tree Planting

1. Proper site preparation
2. Care and proper planting of growing stock
3. Weather
4. Post planting maintenance
Landowner Objectives

- Common tree planting objectives
  - Income
  - Windbreak
  - Shelterbelt/Noise buffer
  - Wildlife
  - Reforestation/Afforestation
Define the Site

- Agricultural field
- Pasture/Grass
- Shrub/Trees
- Forest

- Determines what kind of site preparation is needed
- Proper site preparation is one of the most crucial aspects of having a successful tree planting
Site Preparation

- Controlling competition
  - Prepare the site for maintaining tree species
  - Making nutrients, water, and sunlight available
  - Survival and height growth are directly correlated with proper site preparation
  - Begins the year before planting
Site Preparation

- Agricultural field
  - Very little site prep when planted the spring following abandonment
  - Weeds are controlled from residual herbicide activity
  - Soil is loosened from past plowing and planting
  - Past fertilization is a bonus
    - Has to be done the spring after abandonment to take advantage of these conditions
Site Preparation

- **Grassland/Pasture**
  - **Objective – Control grass competition**
    - Grasses are very aggressive to tree seedlings
      - Create high competition for nutrients and water
  - Control grass through disking and herbicide application
    - Broadcast spray/Row spray/Spot spray
  - **Compaction**
    - Plowing
Site Preparation

- Grassland/Pasture
  - **Objective** – Control grass competition
    - Glyphosate at 2%
      - Non-selective
    - Glyphosate with pre-emergent herbicide
      - Princep, Oust
    - Grass selective herbicide
      - Poast
Site Preparation

- Grassland/Pasture
  - Alternatives to herbicides
    - Mulching
    - Tree mats
Site Preparation

- Early successional field
  - **Objective** – *Control shrub and grass competition*
    - Forestry mulcher or bulldozer
      - *Removes shrubs completely for better access*
    - Cut stump treatment
      - *Cut with a chainsaw, treat stumps*
      - *20% triclopyr mixed in basal bark oil*
      - *50 to 100% glyphosate*
      - *Tordon RTU*
  - Treat grasses
    - *Spot treatment for cut stump*
    - *Broadcast or strip with mulcher*
Site Preparation

- Early successional field
  - Objective – *Control shrub and grass competition*
    - Forestry mulcher or bulldozer
      - *Removes shrubs completely for better access*
    - Follow up strip spray with glyphosate and pre-emergent
Site Preparation

- Forest understory
  - Objective – Increase sunlight levels by manipulating forest stocking levels
    - Invasive shrubs need treated
    - Mid-story trees need removed
      - Treat stumps to control future competition
    - Overstory cull and non-commercial trees need removed
      - Makes canopy gaps
Site Preparation

- Forest understory
  - 2-acre group opening
    - Lots of sunlight to maintain growing stock of shade intolerant trees
      - Shortleaf pine
  - Mid-story removal
    - Increased sunlight to maintain growing stock
      - Oak and hickory
Species Selection

- Objectives
  - *Income*
    - White oak, black walnut, black cherry, northern red oak, sugar maple
  - *Wildlife*
    - Oak and hickory species – Hard mast producers
    - Sugar maple, black cherry, blackgum – Soft mast producers
    - Diversification
    - Incorporate wildlife trees and shrubs
      - *Persimmon, hazelnut, elderberry, dogwood, choke cherry*
  - *Aesthetics*
    - Sugar maple, blackgum, dogwood, redbud, red oak, red maple
  - *Shelterbelt/Windbreak/Noise buffer*
    - Evergreens, vertical structure
Species Selection

- Soil types – Primary factor in species selection
  - Secondary factors –
    - Upland vs. bottomland soils
    - High quality vs. low quality soils
    - Aspect, topography, drainage
  - Soil survey - NRCS
The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Coordinate System: Web Mercator (EPSG:3857)
Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Jackson County, Illinois
Survey Area Date: Version 14, Sep 13, 2014
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Web Soil Survey Images were photographed: Sep 13, 2011—Oct 7, 2011
Cooperative Soil Survey
### Map Unit Legend

**Jackson County, Illinois (IL077)**

<table>
<thead>
<tr>
<th>Map Unit Symbol</th>
<th>Map Unit Name</th>
<th>Acres in AOI</th>
<th>Percent of AOI</th>
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<tr>
<td>76E</td>
<td>Menfro silt loam, 18 to 25 percent slopes</td>
<td>1.8</td>
<td>4.9%</td>
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<tr>
<td>214B</td>
<td>Hosmer silt loam, 2 to 5 percent slopes</td>
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<td>214C3</td>
<td>Hosmer silt loam, 5 to 10 percent slopes, severely eroded</td>
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<td>214D3</td>
<td>Hosmer silt loam, 10 to 18 percent slopes, severely eroded</td>
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<td>Hickory-Menfro silt loams, 18 to 35 percent slopes</td>
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<td>797D</td>
<td>Hickory-Menfro silt loams, 10 to 15 percent slopes</td>
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<td>976G</td>
<td>Neotoma-Rock outcrop complex, 35 to 70 percent slopes</td>
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<td>16.4%</td>
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<td>Wheeler-fluvial complex, 18 to 35 percent slopes</td>
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<td>8333A</td>
<td>Waulkash silt loam, 0 to 2 percent slopes, occasionally flooded</td>
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<td>8427B</td>
<td>Durand silt loam, 1 to 4 percent slopes, occasionally flooded</td>
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<td><strong>Totals for Area of Interest</strong></td>
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<td><strong>36.1</strong></td>
<td><strong>100.0%</strong></td>
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### Forestland Productivity

This table can help forestland owners or managers plan the use of soils for wood crops. It shows the potential productivity of the soils for wood crops.

**Potential productivity of merchantable or common trees on a soil is expressed as a site index and as a volume number.** The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that forestland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability. More detailed information regarding site index is available in the “National Forestry Manual,” which is available in local offices of the Natural Resources Conservation Service or on the Internet.

The volume of wood fiber, a number, is the yield likely to be produced by the most important tree species. This number, expressed as cubic feet per acre per year and calculated at the age of culmination of the mean annual increment (CMA), indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

Trees to manage are those that are preferred for planting, seeding, or natural regeneration and those that remain in the stand after thinning or partial harvest.


### Report—Forestland Productivity

<table>
<thead>
<tr>
<th>Map unit symbol and soil name</th>
<th>Potential productivity</th>
<th>Trees to manage</th>
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</thead>
<tbody>
<tr>
<td>Natural Resources Conservation Service</td>
<td>Site index</td>
<td>Volume of wood fiber</td>
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<td>79E—Menfro silt loam, 18 to 25 percent slopes</td>
<td>Northern red oak 68 — Black oak, Chinkapin oak, Hickory, Northern red oak, Southern red oak, White oak</td>
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<td>Whitetail 66 —</td>
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<td>Whitetail 53 —</td>
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<td>Hickory</td>
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<td>Hickory</td>
<td>Whiteoak 75</td>
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### Forest Productivity—Jackson County, Illinois

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<th>Map unit symbol and soil name</th>
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### Data Source Information

Soil Survey Area: Jackson County, Illinois  
Survey Area Data: Version 14, Sep 13, 2014
Web Soil Survey

- Soil survey - NRCS
  - [https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm](https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm)
  - Info needed to do a web soil survey
    - State, township and range, and section number
Planting Stock

- Containerized growing stock
- Bare root seedlings
- Seed
Planting Stock

- Containerized growing stock
  - *Come in 3 gallon pots*
  - *Developed root system*
  - *Higher survivability*
  - *Expensive*
  - *Logistically challenging*

- Plant in fall or spring
Planting Stock

- **Bare Root Seedlings**
  - **Cheaper**
  - **Planted in higher numbers**
  - **Plant higher rates per day**
  - **Uses simple hand tools**
  - **Lower survival rates**

- Plant in early spring
Planting Stock

- Direct Seeding
  - Cheapest method
  - Highest planting rates
  - Lowest survivability

- Plant in spring
Planting Stock

- **Delivery and Storage**
  - Inspect upon delivery
    - Should be moist, but free of fungus
  - Store seedlings in a dry, cool place
    - Out of direct sunlight or freezing temps
  - Cover seedlings during transportation
    - Prevent wind desiccation
  - Plant as soon as possible
Design

- **Objectives**
  - **Income**
    - Uniform plant spacing to reduce expenses
    - *Improves efficiency of site prep, planting and post planting maintenance*
    - Tight spacing to promote upward growth
  - **Wildlife**
    - Random planting to promote diversity and structure
      - *Incorporating trees and shrubs*
    - Wide spacing to promote crown development
    - Tight spacing to promote cover and concealment
  - **Width of equipment**
Design

Number of Trees Per Acre by Various Spacings

<table>
<thead>
<tr>
<th>Spacing (Feet)</th>
<th>Trees (No.)</th>
<th>Spacing (Feet)</th>
<th>Trees (No.)</th>
<th>Spacing (Feet)</th>
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Number of Seed per Acre by Various Spacings

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<tr>
<th>Row Spacing</th>
<th>Seed Spacing in the Row (Inches)</th>
<th>6 inch</th>
<th>12 inch</th>
<th>24 inch</th>
<th>36 inch</th>
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<td>8 feet</td>
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<td>5,445</td>
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<td>9,680</td>
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<td>10 feet</td>
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<td>7,260</td>
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<td>1,815</td>
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<td>15 feet</td>
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<td>5,808</td>
<td>2,904</td>
<td>1,452</td>
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</table>

For broadcast seed, count the number of seeds in a milacre plot (diameter of 7 feet 6 inches) and multiply by 1,000 to determine the number of seeds per acre.

Iowa State University Forestry Handbook – May 2000
Planting Methods

- Containerized Stock
  - Shovel
  - Auger
Planting Methods

- Bare Root Seedlings
  - Shovel
  - Planting bar
  - Tree planting machine
TREES PLANTED IN AN UNSATISFACTORY MANNER

1. 'L' ROOTS
   Hole Shallow
   Roots Drying Likely Due To Depression Left

2. 'U' or 'J' ROOTS
   Hole Shallow
   Root Ends Often Exposed to Air

3. JAMMED ROOTS
   Hole Too Narrow And Shallow

4. COMPACTED ROOTS
   Hole Too Narrow

5. TOO SHALLOW
   Roots Exposed
   Hole Too Shallow

6. TOO DEEP
   Needles Buried
   Hole O.K.
   Tree Position Poor

7. INADEQUATE TAMPLING
   Roots Drying
   Likely Due To Depression Left

8. PLANTED IN ROTTEN WOOD
   Roots Not In Damp Mineral Soil

9. PLANTED ON MOUND
   Roots Apt To Dry Out

10. NOT VERTICAL
    Tree Not Planted Vertical To The Horizontal Plane
    Do Not Exceed 10º Tolerance From Perpendicular

11. AIR POCKET
    Improper Tamping

12. A SATISFACTORY PLANTED TREE

Source: USFS
Post Planting

- Weather
Post Planting

- Tree shelters
  - Great for protecting seedlings
  - Increase survival, protect from deer browse and rodent damage
  - Increase cost of planting by 33% or more

- Proper installation important
Post Planting

- Tree shelters
  - Proper installation important
Post Planting Maintenance

- Just as important as site preparation and proper seedling storage and handling
Post Planting Maintenance

- Continue to treat grasses for at least 3 to 4 years
- Prevent establishment of invasive species
- Remove overstocked areas of volunteer trees
- Shelter maintenance
- Re-planting if needed
ADVICE FROM A TREE:
STAND TALL AND PROUD.
GO OUT ON A LIMB. REMEMBER
YOUR ROOTS. DRINK PLENTY OF
WATER. BE CONTENT WITH
YOUR NATURAL BEAUTY AND
ENJOY THE VIEW.