## INTRODUCTION

This job sheet describes the necessary techniques to establish woody plants for conservation purposes.

This document does not completely cover the facilitating practices often used in conjunction with tree/shrub establishment, such as site preparation and follow-up weed control, that are also necessary to ensure plant survival. For these additional practices, refer to Wisconsin NRCS Conservation Practice Standard (WI NRCS CPS), *Tree/Shrub Site Preparation (490), Herbaceous Weed Control (315), Mulching (484)*, and/or other applicable conservation practice standards and associated job sheets.

## PURPOSE

This practice can be used to establish woody plants for:

- Forest products such as timber, pulpwood, etc.
- Wildlife habitat
- Long-term erosion control and improvement of water quality
- Treating waste
- Storing carbon in biomass
- Reducing energy use
- Developing renewable energy systems
- Improving or restoring natural diversity
- Enhancing aesthetics
- Reducing air pollution
- Uptake of soil and water-born chemical and nutrients

## COVER CROPS

Cover crops or permanent sod strips may be needed between tree/shrub rows on sandy or highly erosive sites in order to prevent erosion and damage to seedlings by sandblasting. Cover crops are also used to minimize the risk of more aggressive or invasive vegetation (e.g., Canada thistle) establishing.

Ideally, cover crops should be allowed one growing season prior to planting the trees. This will provide flexibility in case the cover crop doesn't establish adequately, due to unfavorable weather conditions, for instance. If cover crops are needed, use WI NRCS CPS, *Cover Crop (340)*.

## SITE PREPARATION

Site preparation prior to tree/shrub planting is typically necessary on any site with existing vegetation to reduce competition and assure tree survival. Site preparation likely is not needed on bare or very sparsely vegetated sites – recently tilled, following an annual crop (e.g. annual grains, soybeans), moss, sparse Junegrass, etc. Refer to WI NRCS CPS, *Tree/Shrub Site Preparation (490)* and job sheet for more information.

## CARE OF SEEDLINGS

Proper care of seedlings prior to and during the planting process is critical to ensuring a successful planting. Seedlings that have had roots dried, frozen, or subjected to mold or high temperature should be assumed dead and not suitable for planting.

Seedlings should be packed and shipped in wet moss or other similar medium, kept cool (ideal temperature between 33 and 37 degrees F) and moist through the planting process. Make plans for cold storage in case planting is delayed, if possible. Exposure to direct sun and wind can kill a seedling in less than 30 seconds.

Plant seedlings as soon as possible after received, keeping roots moist throughout the planting process.

If seedlings can't be planted right away, store them in a cool, moist, shaded location up to 7 days. Do not stack bundles of trees in layers of more than two deep to allow adequate air circulation and prevent heating.

If planting is delayed for longer than seven days after receipt and they can not be kept in cold storage, heel in the seedlings in a shaded area and keep them moist. To heel-in seedlings: Dig a trench in the soil, place the seedling in the trench and cover the roots with soil, wetting the soil and roots during the process. Refer to Figure 2. Transplant heeled in seedlings and resume normal tree planting as soon as suitable conditions exist.

Do not immerse roots in water or wash soil off of seedling roots. Mist seedlings to keep them moist.

Water absorbent/retention dip may help conserve moisture on seedling roots when planting in dry weather.

## PLANTING REQUIREMENTS

### Planting Dates

Plant bare-root stock, seedling plugs, live cuttings, containerized stock or balled and burlapped stock during the dormant season in the Spring after the ground thaws until June 1 as soil moisture and local weather conditions permit or in the Fall, after October 1 until the ground freezes when soil moisture is adequate.

Do not plant seedlings (bare-root or plugs) in the Fall on soils subject to frost-heave action (clays, clay loam, silty clay loams, silts, silt loams, and loams).

### Planting Seedlings

The planting trench or hole must be deep and wide enough to permit roots to spread out and down without J-rooting or L-rooting. If the roots are too long for the planting equipment, minimal pruning of small end roots may be needed. Do not prune back into the main root system or more than 25% of the total root length (excluding long individual fibrous roots), or to less than 8 inches. Pack soil around each plant firmly to eliminate air pockets after planting.

Plant trees/shrubs vertically with the root collars equal to or up to one inch below the soil surface to ensure adequate coverage of the roots with soil.

### Planting Cuttings

Plant cuttings within 2 days of collection or shipping arrival in the spring before June 1. Plant, with buds pointing up, in firm ground with 1" of cutting exposed above ground.

### Planting Containerized Trees

Dig a hole slightly larger than the container diameter. Gently remove plants from containers before placing in the ground and firmly pack soil around roots to eliminate air pockets. Before planting, loosen any spiraling or compacted roots. Water should be applied generously.

### Planting Balled and Burlapped Trees

When handling stock, never lift a tree at the stem or trunk. Handle stock at the root ball. Dig a hole 1 1/2 times as wide as the root ball and about the same depth as the root ball. Remove any rope, wire, or plastic twine from the tree. Pull back burlap around trunk and fold down into the hole. Carefully place the tree in the hole and firmly pack soil around roots to eliminate air pockets. Water should be applied generously.

### Other Planting Information

Use equipment and plant on the contour or across the slope, as possible to minimize erosion potential.

Use of a professional tree planting contractor has been shown to significantly increase the chances for successful tree establishment.

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If damage from deer, rabbits or other herbivores is anticipated, use tree shelters or repellents to protect seedlings.

## MAINTENANCE

### Weed Control

Maintain a 36" diameter weed-free area in all directions from planted seedlings or cuttings until average tree/shrub height is taller than the surrounding weeds. This will typically take 3 to 5 years. Use WI NRCS CPS, *Mulching (484)* for organic or inorganic mulch, including fabric weed barriers. Use WI NRCS CPS, *Herbaceous Weed*

*Control (315)* for chemical or mechanical (tillage) weed control.

If tillage is used for weed control, care must be taken not to damage plant stems. Keep tillage depths shallow to avoid root damage.

**Note**: Mowing is not considered a weed control practices in field plantings, as it tends to stimulate root growth of grasses. It can be used between tree rows, however, to improve access, and reduce cover for potentially damaging herbivores.

**Mulch and Fabric Weed Barriers**

**Note**: organic or inorganic mulch, including fabric weed barriers, should be specified as WI NRCS CPS, *Mulching (484)*. However, some additional guidance is provided here.

Mulch is organic or inorganic material that is spread around the individual seedling to help retain soil moisture, moderate soil temperature, and prevent weed growth. Apply mulch in a 3' diameter circle around each seedling, 2 to 3" deep, and pulled back from the plant stem slightly. Straw or other similar mulch generally should be avoided as it can encourage mice and other small herbivores that may damage the seedlings.

Freshly chipped wood mulch should be aged for a few months to minimize the risk of heat damage to the seedlings (chips heat up significantly during the early stages of decay), and nitrogen deficiency problems (decaying organic matter can deplete the soil of nitrogen).

Fabric weed barriers are porous, yet opaque material that is installed over a tree or shrub seedling. They permit water to seep through to the seedling, but prevent weed growth. They are installed as 3' x 3' squares over individual plants, or as long rolls that can be rolled out over rows of trees.

If weed barriers or mulch will be used for follow-up weed control, site preparation may not be required. However, in sites with aggressive difficult-to-kill weeds (e.g., reed canary grass), mechanical or chemical site preparation should be used prior to planting and installation of the weed barriers or mulch.

**Other Maintenance Information**

Supplemental planting is recommended if survival drops below 80% of the minimum allowed stocking level (see "Spacing Requirements" above).

Protect trees and shrubs from fire, insects, disease, and animals until established. Refer to WI NRCS CPS, *Firebreak (398)* or other applicable standards as needed.

Pruning may be required to remove damaged, diseased or unwanted limbs to improve health and quality. Refer to WI NRCS CPS, *Tree/Shrub Pruning (660)*.

**Figure 1**

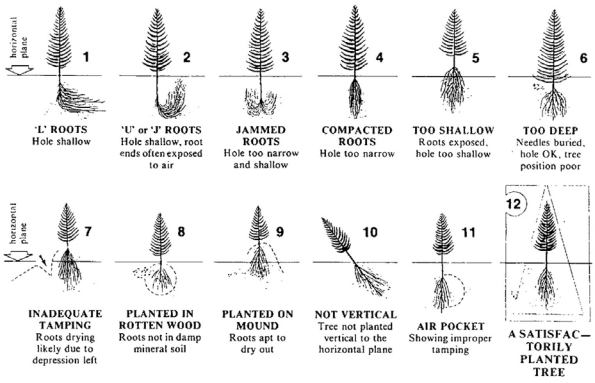
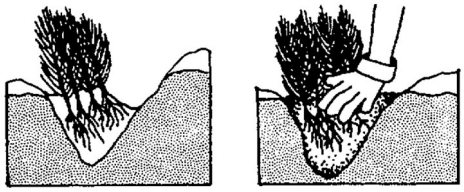



**Figure 2**



One method of long-term tree storage is the "heeling-in" technique. Roots must be packed tightly in soil and kept moist, and the heel-in trench must be shaded and protected from the wind.

## GENERAL INFORMATION

Client Name*: _____ Tract No.: _____ Field No.: _____

Site Specifications: _____ Acres To Be Planted*: _____

Soil Map Unit(s): _____Cons. Tree/Shrub Suit. Group: _____

*Map of site* - attach a sketch, map, or aerial photo indicating the location of area to be treated with FSI.*

**PURPOSES*** (check all that apply). Establish Woody Plants For...

- ☐ Forest products (such as timber, pulpwood, etc.)
- ☐ Wildlife habitat
- ☐ Treating waste
- ☐ Storing carbon in biomass
- ☐ Reducing energy use
- ☐ Long-term erosion control and improvement of water quality
- ☐ Developing renewable energy systems
- ☐ Improving or restoring natural diversity
- ☐ Enhancing aesthetics
- ☐ Reducing air pollution
- ☐ Uptake of soil and water-born chemicals and nutrients

**SITE PREPARATION** (for information only - include site preparation in plan as separate conservation practice: Tree/Shrub Preparation (490))

Initial Site Preparation Method*: _____ Date*: _____

Additional Information:_____

## TREE/SHRUB ESTABLISHMENT

Planting Method*: _____ Planting Date*: _____

Storage Requirements (if any): _____

Average Spacing Between Rows*: _____ Average In-Row Spacing*: _____

Average Stems Per Acre*:_____ Average Seedling Size/Type: _____

***Number of Trees/Acre at Various Spacings:***

| Spacing | Stems Per Acre | Spacing | Stems Per Acre | Spacing | Stems Per Acre |
|---|---|---|---|---|---|
| 5 x 5 | 1742 | 8 x 10 | 544 | 15 x 15 | 194 |
| 6 x 6 | 1210 | 9 x 9 | 538 | 16 x 16 | 170 |
| 6 x 8 | 907 | 9 x 10 | 484 | 18 x 18 | 134 |
| 6 x 10 | 726 | 10 x 10 | 436 | 20 x 20 | 109 |
| 7 x 10 | 622 | 10 x 12 | 363 | 30 x 30 | 48 |
| 7 x 7 | 889 | 12 x 12 | 302 | 40 x 40 | 27 |
| 8 x 8 | 681 | 14 x 14 | 222 | | |
| To calculate stems/acre for other spacings: 43,560 divided by (row spacing in feet x stem spacing in feet). | | | | | |

**required for practice certification*

**SPECIES COMPOSITION**

| Species/Cultivars*: | Form | Kind of Stock[1] | Total Stems Planted | Total Stems Contracted | Total Stems "As Installed" |
|---|---|---|---|---|---|
| | ☐ Tree ☐ Shrub | | | | |
| | ☐ Tree ☐ Shrub | | | | |
| | ☐ Tree ☐ Shrub | | | | |
| | ☐ Tree ☐ Shrub | | | | |
| | ☐ Tree ☐ Shrub | | | | |
| | ☐ Tree ☐ Shrub | | | | |
| | ☐ Tree ☐ Shrub | | | | |
| Total number of trees/shrubs needed for planting: | | | | | |

[1]Bareroot, container, balled and burlapped, etc. Include size, caliper, height, and age as applicable.

**POST-PLATING WEED CONTROL**

Method/Practice Used*:_____ Date(s) Planned*:_____

Additional Information (if any):_____

**REQUIRED DOCUMENTATION AND VERIFICATION**

☐ Practice amount applied is field verified by*: _____ on: _____ (date)

Before payment is made, the following information is required to be in the case file:

☐ Photographs of the established practice must include*:

- Statement "Photo was taken in the field by (enter name)"*
- Date photo was taken in the field*
- Statement of what the photo represents if it needs clarification*

☐ Field verification is documented and a certified planner verified "as installed" this practice meets NRCS standards and specifications.*

**Practice Certification (NRCS USE ONLY)**

I certify that the practice as installed is complete and meets the applicable Wisconsin NRCS Conservation Practice Standard and all applicable practice specifications. Any changes to the original practice design have been approved and are documented on the original practice design "as installed."

Certified Planner (print) (sign) Date

**required for practice certification*