



Michigan Technical Note
USDA-Natural Resources Conservation Service

FORESTRY #30

Subject: EVALUATION OF TREE AND SHRUB ESTABLISHMENT PRACTICES

Date: December, 2011

Introduction:

Many factors can affect the success of a tree and shrub establishment project including weather, planting technique, planting stock quality, site-species suitability, herbivory, and weed competition. While some of these factors can be addressed through careful planning and utilization of supporting conservation practices, the effects of several of these factors simply can't be known in advance. A post-planting evaluation of the stand is necessary to determine whether the planting survival level is adequate to meet the landowner's objectives and address the resource concerns for which the conservation practice was installed.

The evaluation is an important step in the conservation planning process. For tree and shrub establishment, it will help you determine the need for replanting; additional weed control; protection from deer, rabbits or other herbivores; or management of insect or disease problems.



Evaluations of tree/shrub plantings can help identify problems, such as broken support stakes, so they can be corrected in a timely fashion.

Additionally, for clients enrolled in financial assistance programs, it may be necessary to conduct one or more planting evaluations to certify the practice as complete, and ensure compliance with the program contract.

This procedure can be used to evaluate any tree and shrub planting practice, e.g., Tree/Shrub Establishment (612), Riparian Forest Buffer (391), Windbreak/Shelterbelt Establishment (390), etc.

Procedure:

Evaluation Methods

There are two methods described in this document for evaluating a planting of trees/shrubs – circular plots and linear plots (row assessment). Circular plots are appropriate for most field plantings, but are not appropriate for narrow linear plantings, e.g. one- or two-row windbreaks or hedgerows. Linear plot assessments can be used to evaluate any plantings where trees were installed with straight, uniform rows, including linear plantings like windbreaks and hedgerows.

Circular Plots

This method is appropriate for all field plantings types, including random spacing layouts and direct seeding plantings. It can also be used for wider linear plantings, e.g., windbreaks with several rows.

Select a route through the planting area that will best represent the variation of soils, topography, etc. A diagonal transect through the plantation or two diagonals forming an “X” is recommended. Select a random starting spot (e.g., pace 100’ into the plantation from the edge), and push a stake into the ground to represent the plot center. A soil probe, tile probe, or anything similar that will remain upright can be used. Attach a cord or rope that is 11.8 feet (11’, 9½”) long to the stake. This will be the radius of your plot which will be 1/100th of an acre in size.



Count and inspect all live trees within the plot and record the information in the attached evaluation form. If desirable natural tree and shrub regeneration (those species that helps

meet the objectives of the planting and addresses the identified resource concerns) is present in the plot, include those plants as well. Count every other tree or shrub that fall directly on the edge of the plot. When data collection is complete for the first plot, pace 100 feet along the transect line, then repeat the process until at least the required number of plots has been assessed. The distance between plots may need to be increased or decreased, depending on the size of the planting and number of plots required.

In order to obtain a reliable survival estimate, conduct the evaluation on at least five plots for plantations up to five acres in size. For those larger than five acres, evaluate one plot per acre for the first ten acres, and one additional plot for each additional five acres. For sites with highly variable soils, hydrology, etc., consider increasing the number of plots by 50% or more.

Linear Plots

This method can be used for plantings that were installed with uniform rows with evenly spaced trees and shrubs. It is the recommended method for windbreaks, hedgerows, and other similar linear plantings.

To use this method, simply assess 10 consecutive trees/shrubs in a row (based on the original planned/planted design); this will be one plot. Count the number of live trees and record the number on the evaluation form. After 10 plants have been inspected within that row, move over one or more rows, and repeat the procedure until the required number of plots has been assessed. For windbreaks or other similar linear plantings, be sure to adequately inspect each row. For field plantings, be sure to assess several areas throughout the planting that adequately represent the variability in site conditions.

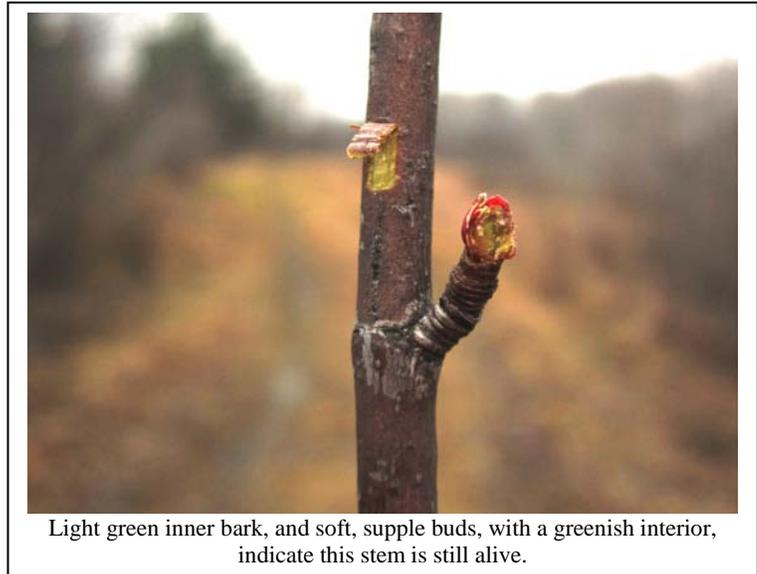
In order to obtain a reliable survival estimate, conduct the evaluation on at least three plots for plantations up to five acres in size. For those larger than five acres, evaluate one plot per two acres for the first ten acres, and one additional plot for each additional ten acres. For sites with highly variable soils, hydrology, etc., consider increasing the number of plots by 50% or more. Since windbreaks are designed with very specific density and layout criteria to function correctly, double the number of plots assessed from those listed here, to increase the confidence level of the data collected.

Timing and Plant Inspection

Generally it is advised to assess survival 4 to 5 months after planting, and again after the third year. However, more regular inspections may be required by program rules. For plantings that included weed fabric mats, shelters or flags, it is generally easy to locate the trees and shrubs, even if the surrounding vegetation is tall and thick. Where these measures were not used, though, strategic scheduling of the evaluation can be beneficial. For evergreen plantations, it may be easier to see small trees in the late fall or winter, when the brown ground cover or snow provide more contrast to their green foliage.

For plantings of deciduous trees and shrubs, growing season (leaf-on) evaluations may facilitate better tree and shrub identification. Depending on the species planted and the surrounding cover, fall evaluations can be considered also to take advantage of contrasting foliage color to make it easier to locate the trees and shrubs.

If deciduous trees/shrubs are evaluated during dormancy, confirm survival with presence of soft, current-year buds, often with a greenish interior (inspect a lateral bud low on the plant), by scraping a very small patch of bark to reveal green inner bark layer, or by assessing the “suppleness” of the twig. Dead stems will generally be dry and brittle, and crack easily. **Be very careful not to damage the terminal (end) bud of the leader (central upright stem).** Do not destructively inspect buds or scrape bark on more trees than is needed to develop a general “feel” for which trees are alive.



Be sure to inspect the whole plant to determine survival. Many species, in the first year or two after planting, will experience dieback of the main stem, but will send up new shoots from the roots or root collar. Be sure to check the tree or shrub closely near the ground for the presence of new live shoots.

Other Information

In addition to tree survival, it is strongly recommended to also record concerns with planting technique (too shallow, too deep, lean, etc.), herbivore damage, grass and forb species present and their density, insect or disease concerns, and any other factors that may affect the likelihood of plantation success. These observations can be recorded on the attached data sheet as well.

References:

Herman, R., D. Schmoker, B. Sloan, and T. Ward. 2002. Illinois Direct Seeding Handbook: A Reforestation Guide. Assoc. of IL SWCDs, USDA-NRCS, IL Dept. of Natural Resources, & IL Environmental Protection Agency.
<http://www.il.nrcs.usda.gov/technical/forestry/dshndbk.html>

Klien, L., J. Cummings-Carlson and A.J. Martin. Lake States Woodlands Plantation Establishment Series: Maintenance. G3482. University of Wisconsin Extension. Madison, WI.

<http://basineducation.uwex.edu/woodland/OWW/Pubs/UWEX/G3482.pdf>

Kucera, M., and J. Harder. 2002. Guide for Evaluation of Survival for Conservation Tree and Shrub Plantings. Nebraska Forestry Technical Note, No. 63. USDA Natural Resources Conservation Service. Lincoln, NE.

Wisconsin Department of Natural Resources. 2007. Plantation Maintenance. Wisconsin DNR. Madison, WI.
<http://dnr.wi.gov/forestry/Nursery/GeneralInfo/maintenance.htm>

Tree and Shrub Planting Evaluation

USDA-NRCS

Note: Reproduce this sheet as needed. Conduct a separate inventory for different cover types, conservation practices or land units. Use one sheet per land unit. Refer to Forestry Technical Note #30 for more information on evaluation technique.

Client:		Total acres in unit:		County:		Evaluation date:	
Tract #:	Field #:	Planned trees/ac. (a):		Planned spacing (ft.):	___X___	Evaluation by:	
Conservation practice:	<input type="checkbox"/> Tree/Shrub Establishment (612); <input type="checkbox"/> Windbreak/Shelterbelt Establishment (380); <input type="checkbox"/> Riparian Forest Buffer (391); <input type="checkbox"/> Windbreak/Shelterbelt Renovation; <input type="checkbox"/> Other (specify): _____						

Assessment Method Used (check one):

Circular Plots (1/100th ac.; radius 11.8 ft. (11', 9½"))

Linear (Row) Plots (10 consecutive trees assessed/plot)

Minimum number of circular plots needed:	
≤ 5 ac.	5 plots
6 to 10 ac.	1 plot per ac.
> 10 ac.	10 plots + 1 plot/additional 5 ac.

Minimum number of linear plots needed*:	
≤ 5 ac.	3 plots
6 to 10 ac.	1 plot per 2 ac.
> 10 ac.	5 plots + 1 plot/additional 10 ac.

*double the number of plots assessed for windbreaks

Important! Be sure to inspect several areas/rows in the plantation to ensure the sample is representative of the site.

Plot Number	# of Live Trees	Additional Field Notes (species observed, deer/rodent damage, weed competition, O&M needs, etc. Include plot number(s) if note does not apply to the whole planting unit):
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

Totals # plots (b) Total # of live trees (c)

Circular Plot Summary:

$$\boxed{} \div \boxed{} \times 100 = \boxed{} \div \boxed{} = \boxed{} \%$$

Total # of live trees (c) Total # of plots (b) **Remaining Trees/Ac.** Original # Trees/Ac. (a) **Survival Rate**

Linear Row Plot Summary:

$$\boxed{} \div \boxed{} \times 10 = \boxed{} \% \times \boxed{} \div 100 = \boxed{}$$

Total # of live trees (c) Total # of plots (b) **Survival Rate** Original # Trees/Ac. (a) **Remaining Trees/Ac.**