



# CHAPTER 7

## ILLINOIS STANDARDS AND SPECIFICATIONS FOR DIRECT SEEDING

---

◆ Introduction	7-2
◆ NRCS Illinois Woodland Direct Seeding Standard	7-2
◆ References	7-6



# INTRODUCTION

USDA-NRCS conservation practice standards are reviewed periodically, and updated when needed. To obtain the current version of this standard, contact the nearest USDA-NRCS office or log on to the NRCS-IL webpage at <http://www.il.nrcs.usda.gov/fotg/index.html> and click on Section IV, Index of Conservation Practice Standards, Woodland Direct Seeding.

## NATURAL RESOURCES CONSERVATION SERVICE CONSERVATION PRACTICE STANDARD

MAY 2000

### WOODLAND DIRECT SEEDING \*

(Acre)  
652

#### DEFINITION

Planting tree seed by hand or by mechanical means.

#### PURPOSES

This practice may be applied as part of a conservation system to support one or more of the following purposes:

- Reduce water pollution through uptake of soil and water borne chemicals and nutrients
- Provide erosion control
- Provide wildlife habitat
- Protect a watershed
- Establish woody plants for forest products
- Energy conservation
- Beautify an area
- Sequester atmospheric carbon to reduce greenhouse gases and reverse global warming

#### CONDITIONS WHERE PRACTICE APPLIES

Any areas where woody plants are suited, except under existing forest cover or any other sites determined to have an unacceptable risk of seed predation. On these sites see Tree/Shrub Establishment, 612.

#### GENERAL CRITERIA

##### General criteria applicable to all purposes:

Species will be adapted to soil-site conditions.

Species will be suitable for the planned purpose.

Seeding rates will be adequate to accomplish the planned purpose. Seeding dates and care in handling and planting will ensure that planted seed will have an acceptable rate of survival.

Only viable, high quality, and adapted planting stock or seed will be used.

Site preparation shall be sufficient for establishment and growth of selected species.

# NRCS CONSERVATION PRACTICE STANDARD: WOODLAND DIRECT SEEDING

Timing and use of equipment will be appropriate for the site and soil conditions.

The planting will be protected from adverse impacts such as livestock damage or fire.

## ADDITIONAL CRITERIA

### Criteria to reduce water pollution

Use species that are native to the region.

If in a riparian area use species adapted to local flooding depth, duration and frequency.

### Criteria to Provide Erosion Control

Use non-competitive cover crops between planted rows where soil erosion is anticipated, see Conservation Cover, 327.

Seed will be drilled or row planted on the contour or across the slope. Competing vegetation will be controlled with an herbicide rather than tillage.

### Criteria to provide wildlife habitat

Use several native species to accomplish the intended purpose.

Select species that best meet wildlife needs.

## CONSIDERATIONS

The seed sources should be within 200 miles north or south of the planting site.

Consideration will be given to plant materials that have been selected and tested in tree improvement programs, or that display superior qualities.

All seed should be collected locally, or purchased from nurseries or other sources that are known to be using locally adapted seed.

Where multiple species are available to accomplish the establishment objectives, consideration should be given to selecting the species which best meet wildlife needs.

Tree arrangement and spacing should allow for access lanes.

Residual chemical carryover should be considered prior to planting.

Increase the seeding rate as much as possible above the minimum with low cost or locally available woody seeds, which serve as a woody cover crop or nurse crop. Woody plants are usually less competitive than grasses or forbs and are the best companion crops for trees. Potential nurse crop species include the light seeded tree species listed under “Species to Use.” Other potential trees and shrubs to use include redbud, sumac, dogwood, paw paw, chokecherry, and plum. Limit the use of fast growing species such as ash, silver maple, sycamore, black cherry and walnut in plantations that include oak to avoid overtopping and suppressing the slower growing oaks.

Consider using tube tree shelters to mark rows in row plantings. Use as many tree shelters as feasible, especially if rabbit or deer damage is likely. Place the shelters over the seedlings as soon as they appear and secure with a decay resistant stake.

Seeding by hand is usually not feasible for areas larger than approximately 5 acres. Many kinds of existing machinery can be adapted to plant tree seed. Much more efficient, precise and economical equipment has recently been developed, however, that will sow more seed at a faster rate, allowing up to 20 acres to be planted per day with a small crew.

A snap trap survey of rodent populations shortly before seeding the site will allow an opportunity to manage damaging populations before they eat or damage tree seed.

Small, light seed, such as ash, is cheap and can be viewed as a woody cover crop. Use larger, more expensive seed, such as walnut and bur oak, more sparingly to keep costs down.

Test soils and/or consult soil survey report before planting to determine whether soil fertility, pH, or species mix need to be adjusted. Some species, such as pin oak (pH < 6.8) and black walnut (high fertility), have very specific requirements.

# NRCS CONSERVATION PRACTICE STANDARD: WOODLAND DIRECT SEEDING

## PLANS AND SPECIFICATIONS

Specifications for applying this practice shall be prepared for each site and recorded using approved specification sheets, job sheets, narrative statements in the conservation plan or other acceptable documentation.

### Site Preparation

Planting sites will be prepared by destroying competing vegetation by either herbicide, or cultivation or both. If soil erosion potential exists, strips of existing vegetation will remain undisturbed of minimum width and minimum number to reduce soil erosion (see Contour Buffer Strips, 332, for guidance). On clean tilled sites with soil erosion potential that are row planted a cover crop of non-competitive grasses or legumes will be sown, (see Conservation Cover, 327, for recommendations for tree/shrub plantings or temporary cover). If a cover crop is needed in a row planting, strip cultivation or herbicide spray will be used with a minimum strip width of 4 feet to create a seedbed for direct seeding.

### Species to Use

For species selection refer to the appropriate section of the FOTG, Section II, Forestland Interpretations or Windbreak Interpretations or the standard for the practice being planned. The following species have been successfully established using direct seeding:

#### Heavy seeded species

Black walnut  
Oak  
Hickory  
Pecan  
Persimmon  
Kentucky coffeetree

#### Light seeded species

ash  
maple  
basswood  
sycamore  
sweetgum  
hackberry/sugarberry  
black cherry  
tuliptree  
bald cypress  
water tupelo

## Seed Inspection, Care, and Storage

Only undamaged, viable, mature seed will be used. Inspect by species at least 10 randomly selected seed per bushel. Crack or cut open seed and to be sure all seed is filled, moist, normal colored and not destroyed by insects. For more information on how to inspect seed see [Seeds of Woody Plants of the United States](#) or [Seed Biology and Technology of Quercus](#) (for oaks) or the [Illinois Direct Seeding Handbook](#). Acorns may have up to one insect hole and ¼ of the nut damaged by insects and still be viable. If any non-viable seed is found the seeding rate will be increased by the percentage of non-viable seed.

If possible, seed should be planted immediately after collection. If planting is delayed more than a few days seed will be placed in porous bags, such as onion bags, and in cold storage, no more than 50 degrees and preferably 35-40 degrees. All light seeded species, as well as persimmon and Kentucky coffeetree, will be kept dry; most heavy seeded species will be kept moist but not wet. Do not allow to mold. Acorns will be rehydrated by soaking in cold water for not less than 4 and not more than 24 hours as soon as possible after collection or delivery and not allowed to dry out. Do not allow seed to heat up, avoid storing in large quantities unless well ventilated and refrigerated. Never leave tree seed in the sun. For further information by species see references cited in previous paragraph.

If seed will be stored for more than a few weeks transfer to sealed plastic bags: 1.75 mil for white oak; 4 mil for all other species. Store at 35-40 degrees. Inspect bags periodically and if no condensation is visible on the inside of bags rehydrate by soaking. Inspect seed, as described in the previous section, when removing from storage before planting. Acorns in the white oak group should be planted as soon as possible in fall, do not try to store more than 6 months. Other species can be stored up to 3 years.

Seed may be planted whenever soil is unfrozen and moisture is adequate. Planting in July, August or early September, however, may result in lower survival due to high soil temperatures and potential for rapid loss of soil moisture. If sprouting of seed begins seed can still be successfully planted but risk of dehydration is increased.

# NRCS CONSERVATION PRACTICE STANDARD: WOODLAND DIRECT SEEDING

## Seeding Rate

Plant at least 3,000 seed per acre of heavy seeded species if row planting; 4,800 if broadcast seeding. If there is no source of light seeded species within 500 feet of any portion of the planting site that portion will receive an additional 1,000 seed per acre of either heavy or light seeded species. To overcome predation double the seeding rate for the first 100 feet beyond a forest edge.

## Seeding Methods

Seed may be planted mechanically or by hand, in rows or broadcast. Depth of planting for heavy seeded species will be approximately 2 times the seed diameter, or 2 to 5 inches deep depending upon species. Plant all species at 2 inches or more if seed predation and/or low soil moisture are anticipated. Light seeded species will be sown on the surface of the soil. Seed that is broadcast will be disked in and cultipacked or rolled. The following chart shows row spacing and seed spacing combinations that will result in 3000 seed per acre:

6' row spacing	= 2.4'/seed
7' row spacing	= 2.0'/seed
8' row spacing	= 1.8'/seed
9' row spacing	= 1.6'/seed
10' row spacing	= 1.5'/seed
11' row spacing	= 1.3'/seed
12' row spacing	= 1.2'/seed
13' row spacing	= 1.1'/seed
14' row spacing	= 1.0'/seed
15' row spacing	= 1.0'/seed
16' row spacing	= 0.9'/seed
17' row spacing	= 0.9'/seed
18' row spacing	= 0.8'/seed

## OPERATION AND MAINTENANCE

Competing vegetation will be controlled in at least a 2 foot radius until the woody plants are established. The establishment period will be at least 3 years and will be extended if site conditions warrant.

Replanting will be required when survival is less than 1,000 desirable woody stems per acre at the end of 3 growing seasons. Replant to 1,000 seedlings per acre.

Trees and shrubs will be protected against fire, insects, disease, and animals until established.

Damaging pests will be monitored and controlled, specifically insects, diseases, rodents and herbivores, including deer and beaver.



# REFERENCES

---

**Seeds of Woody Plants in the United States.** 1974. Agricultural Handbook No. 450. USDA-Forest Service. 883 pp. Available on the Web at: <http://wpsm.net/>

**OR**

**Seeds of Woody Plants in North America.** 1992. Young, J.A. and C.G. Young. Dioscorides Press. 407 pp.

**Silvics of North America,** Vol. 1, Conifers and Vol. 2, Hardwoods. 1990. Agricultural Handbook 654. USDA Forest Service. Vol. 1, 675 pp. Vol. 2, 877 pp. Available on the Web at: [http://www.na.fs.fed.us/spfo/pubs/silvics\\_manual/table\\_of\\_contents.htm](http://www.na.fs.fed.us/spfo/pubs/silvics_manual/table_of_contents.htm).

**Growing Illinois Trees From Seed.** 1983. Circular 1219. C.E.S., College of Agriculture, University of Illinois, Urbana-Champaign. 32 pp.

**Seed Collection Manual.** Circa 1980. Illinois Department of Natural Resources, Division of Forestry Resources. 23 pp.

**Direct Seeding Hardwoods on the Cache River Joint Venture.** 1997. Maginel, D. and M.D. Hutchison. The Nature Conservancy, Ullin, IL. 3 pp.

**Oak Regeneration: Serious Problems, Practical Solutions.** 1993. GTR-SE-84, USDA-Forest Service, SE For. Exp. Sta., Asheville, NC. 319 pp.

**Guide to Regeneration of Bottomland Hardwoods.** 1992. GTR-SE-76. USDA-Forest Service, SE For. Exp. Sta., Asheville, NC. 35 pp.

**Seed Biology and Technology of Quercus.** 1987. GTR-SO-66. USDA-Forest Service, So. For. Exp. Sta., New Orleans, LA. 21 pp.

**Regeneration of Oaks by Direct Seeding.** Johnson, R.L. and R.M. Krinard, USDA-Forest Service, So. For. Exp. Sta., New Orleans, LA. In: Proceedings, Third Symposium of Southeastern Hardwoods. 1985. pp 56-65.

**NOTE:** *Copies of all of the above are available for up to a 2-week loan from the NRCS State Agroforester. Some references may also be available from IDNR District Foresters, the IDNR Forest Management Staff Forester, and the State Cooperative Extension Forester.*