

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**TREE/SHRUB SITE PREPARATION**

(Ac.)

**CODE 490**

**DEFINITION**

Treatment of areas to improve site conditions for establishing trees and/or shrubs.

**PURPOSE**

- Encourage natural regeneration of desirable woody plants.
- Permit artificial establishment of woody plants.

**CONDITIONS WHERE PRACTICE APPLIES**

On all lands needing treatment to establish trees and/or shrubs.

**CRITERIA**

**General Criteria Applicable to All Purposes**

The method, intensity, and timing of site preparation will match limitations of the site, equipment, and requirements for establishing the desired woody species. Use Table 2 as a guide in determining appropriate site preparation methods.

An appropriate site preparation method (mechanical, chemical, and/or burning) will be chosen to achieve the intended purpose and to protect desirable vegetation, site, and soil conditions. Other complementary practices and measures will be used as necessary to control erosion, runoff, compaction and displacement to acceptable levels.

Erosion and/or runoff will be controlled. Soil compaction and displacement will be minimized.

Maintain necessary filter strips and/or riparian forest buffers. Follow criteria in conservation practice standards FILTER STRIP (Practice

Code - 393) and RIPARIAN FOREST BUFFERS (Practice Code - 391).

Remaining slash and debris shall not create habitat for or harbor harmful levels of pests, or hinder needed equipment operations, or create an undue fire hazard.

Measures, including the use of equipment, will be implemented to control or protect against locally invasive and noxious species that may arise from site preparation activities. If pesticides are used, refer to conservation practice standard PEST MANAGEMENT (Practice Code - 595).

All chemicals will be applied in accordance with label guidelines. Dispose of chemical containers in accordance with label direction and adhere to federal, state, and local regulations.

Comply with applicable federal, state, and local laws and regulations during installation, operation, and maintenance of the conservation practice.

Livestock will be fenced out to prevent damage to site preparation areas and woody plants.

**Additional Criteria to Encourage Natural Regeneration of Desirable Woody Plants**

Existing desirable tree species must be present with the potential for successful natural regeneration and seed production. Refer to conservation practice standard TREE/SHRUB ESTABLISHMENT (Practice Code - 612).

**CONSIDERATIONS**

The site preparation method(s) selected should be cost-effective and protect cultural resources, wildlife habitat, threatened and endangered

species, water resources, and identified unique areas on the site.

Visual quality objectives should be considered when selecting site preparation methods. Anticipate possible off-site effects and modify site preparation design accordingly.

Consider personnel safety issues during site preparation activities.

If a plow pan or compacted soils exist, use subsoiling or ripping techniques to break-up the subsoil and promote healthy plant root systems.

If chemical site preparation is used to control vegetation, the potential for surface and/or ground water contamination exists.

When preparing sites located in cropland fields, consider the effect carry-over herbicide residue will have on planted tree species.

Particulates, smoke, and other air pollutants generated by site preparation may have on-site and off-site effects on air quality.

Impacts on wildlife species, habitat and aesthetics should be considered when selecting site preparation methods.

For complex sites, consult a professional forester for assistance.

## PLANS AND SPECIFICATIONS

Plans will address method of site preparation, species, and protection required during establishment of desirable woody plants.

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

### Cropland / Grassland

Areas with residue cover less than 50% may not require site preparation, depending on equipment that will be used for tree/shrub planting. Areas with residue cover greater than 50% will require site preparation, see Table 2.

If site preparation is needed, use one or more of the following methods.

**Mechanical:** Expose mineral soil. Limit tillage activities to no more than 2 months prior to planting or seeding. Till earlier if flooding is a possibility. Fall tillage is permissible for early spring planting. Use contour strip tilling on slopes greater than 3 percent. Planting strip widths should be greater than 3 feet with inter-widths of 5 feet or greater.

**Chemical:** Mark planting rows with durable markers and apply appropriate chemicals (see References) in 4-foot bands over projected planting rows. If slopes exceed 3 percent, apply treatment on contour. Adhere to all application setbacks directed by chemical label for use in proximity to water bodies and other environmentally sensitive areas. Use low volatile formations. Some chemicals need extended time to work successfully. Consider applying chemicals in the fall or early spring prior to tree planting or direct seeding. Some sod-forming grasses may need to be mowed or tilled, allowed to regrow, and then treated with appropriate chemical to achieve a good kill.

**Prescribed Burning:** Refer to conservation practice standard PRESCRIBED BURNING (Practice Code - 338). Illinois Job Sheet 338-JS Prescribed Burning Plan will be used for documentation if developed by trained NRCS employees. Other trained professionals may use Illinois Job Sheet 338-JS or another plan format that contains the same information. Prescribed Burning Specifications must adhere to all applicable NRCS policies in the General Manual (190 GM Part 413 Prescribed Burning) and Illinois supplements to the General Manual (190 - General Manual, Amend. IL-1) as well as all applicable state and local laws, ordinances, and regulations. To control competing vegetation, refer to Fire Effects Information System database, <http://www.fs.fed.us/database/feis/>. Enter the name of the plant species to be controlled to determine best time to burn.

If either a temporary or permanent cover is needed or desired after site preparation, use Table 1 to select species, allowable mixture percentage, and minimum seeding rates needed to control potential erosion or weed competition between planting zones.

**Table 1. Vegetative Cover**

| Species                                                                                                                                                                                                                                         | % of mixture by weight (range allowed) | Seeding Rate (lbs PLS/Acre) [Pure Stand] |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------------------|
| <b>PERMANENT COVER</b>                                                                                                                                                                                                                          |                                        |                                          |
| Kentucky bluegrass                                                                                                                                                                                                                              | 0-100                                  | 1 lbs                                    |
| Redtop                                                                                                                                                                                                                                          | 0-100                                  | 1 lbs                                    |
| Timothy                                                                                                                                                                                                                                         | 0-100                                  | 2 lbs                                    |
| Orchardgrass                                                                                                                                                                                                                                    | 0-100                                  | 3.2 lbs                                  |
| Virginia wild rye                                                                                                                                                                                                                               | 0-100                                  | 15 lbs                                   |
| Ladino clover                                                                                                                                                                                                                                   | 0-50                                   | 2 lbs                                    |
| Alsike clover                                                                                                                                                                                                                                   | 0-50                                   | 2.5 lbs                                  |
| Annual lespedeza                                                                                                                                                                                                                                | 0-50                                   | 7.5 lbs                                  |
| <b>TEMPORARY COVER</b>                                                                                                                                                                                                                          |                                        |                                          |
| Wheat                                                                                                                                                                                                                                           | 100                                    | 20 lbs                                   |
| Rye                                                                                                                                                                                                                                             | 100                                    | 15 lbs                                   |
| Oats                                                                                                                                                                                                                                            | 100                                    | 15 lbs                                   |
| <p><i>Note: Seeding rates are minimums designed to establish cover with limited competition to trees. Increased seeding rates may be used to accommodate specific site conditions and objectives when designed by the resource planner.</i></p> |                                        |                                          |

For establishment methods, seeding dates, and fertilization (optional) with a temporary or permanent cover crop, follow criteria in conservation practice standard CONSERVATION COVER (Practice Code - 327).

### Forestland

#### Reforestation

Harvest any merchantable material, then use one or more of the following site preparation methods:

**Mechanical:** Pile debris in windrows or in a manner that does not impede growth of desired species. Remove remaining cover to expose mineral soil. On slopes greater than 3 percent, operate equipment on the contour. On land that is gullied, some additional grading may be necessary.

**Chemical:** Mark planting rows with durable markers and apply appropriate chemicals (see References) in 4-foot bands over projected planting rows. If slopes exceed 3 percent, apply on contour. Adhere to all application setbacks directed by the chemical label for use in proximity to water bodies and other environmentally sensitive areas. Use low volatile formations. Some chemicals need extended time to work successfully. Consider applying chemicals in the fall or early spring prior to tree planting or direct seeding.

**Prescribed Burning:** Refer to conservation practice standard PRESCRIBED BURNING (Practice Code - 338). Illinois Job Sheet 338-JS Prescribed Burning Plan will be used for documentation if developed by trained NRCS employees. Other trained professionals may use Illinois Job Sheet 338-JS or another plan format that contains the same information. Prescribed Burning Specifications must adhere to all applicable NRCS policies in the General Manual (190 GM Part 413 Prescribed Burning) and Illinois Supplements to the General Manual (190 - General Manual, Amend. IL-1) as well as all applicable state and local laws, ordinances, and regulations. To reduce surface leaf litter, burn after leaf fall in late November or early December. To control competing vegetation, refer to Fire Effects Information System database, <http://www.fs.fed.us/database/feis/>. Enter the name of the plant species to be controlled to determine best time to burn.

#### Underplanting

Control woody plants less than 2 inches Diameter Breast Height (DBH) and herbaceous competitors by method(s) identified in Table 2.

Reduce competition from undesirable woody plants greater than 2 inches DBH that directly interfere with the planted tree(s) ability to capture secondary light from the overstory canopy.

Reduce overstory to achieve 40-70% stocking through harvest or thinning of undesirable trees, resulting in a well spaced fairly uniform overstory canopy.

Conduct burning only under controlled, predetermined conditions as outlined in Illinois Job Sheet 338-JS or other approved burn plan format. Refer to conservation practice standard

PREScribed BURNING (Practice Code - 338). To reduce surface litter, burn after leaf fall in late November or early December. To control competing vegetation, burn in late spring.

The remaining overstory may be removed during the dormant season after 3-5 years or when planted trees are fully established.

*To increase survival and reduce animal browsing of underplanted trees, consider installing 4-5 foot tube tree shelters on all container stock or on at least 50 well-dispersed most vigorous seedlings per acre.*

### **Natural Regeneration**

To encourage natural regeneration establishment and development of desirable woody plants, utilize the same principals for overstory stocking and removal of competition as outlined in ***Underplanting***.

If adequate regeneration exists or will be supplemented by stump sprouting, create regeneration harvest openings greater than .2 acres in size. Up to 20 square feet of basal area per acre can be retained in crop trees within the openings to supplement mast/seed production without interfering with regeneration.

### **OPERATION AND MAINTENANCE**

Repair/maintain erosion control measures as necessary to ensure proper function.

Control locally invasive and noxious plants to a level where they do not compete with tree establishment. If pesticides are used, refer to conservation practice standard PEST MANAGEMENT (Practice Code - 595).

Access by vehicles or equipment during or after site preparation (i.e. before adequate tree and shrub establishment occurs) shall be controlled to minimize erosion, compaction and other site impacts. Refer to conservation practice standard ACCESS CONTROL (Practice Code - 472).

### **REFERENCES**

A Guide to Bottomland Hardwood Restoration. Allen, J.A., Keeland, B.D., Stanturf, J.A., Clewell, A.F., and Kennedy, H.E., 2001. USGS

Information and Technical Report. USGS/BRD/ITR-2000-0011, US Forest Service General Technical Report SRS-40, 132p. [http://www.srs.fs.usda.gov/pubs/gtr/gtr\\_srs040.pdf](http://www.srs.fs.usda.gov/pubs/gtr/gtr_srs040.pdf)

A Reference Manual for Herbicide Use in Forest and Conservation Tree Planting and Timber Stand Improvement Projects in Illinois. Illinois Stewardship Advisory Comm. & University of Illinois, 1998. [http://web.extension.uiuc.edu/forestry/publications/pdf/tree\\_planting/IL\\_HerbicideRefMan.pdf](http://web.extension.uiuc.edu/forestry/publications/pdf/tree_planting/IL_HerbicideRefMan.pdf)

Chemical Weed Control in Tree Plantings. MF-656, Kansas Forest Service-Kansas State University, 2001. <http://www.ksre.ksu.edu/library/forst2/mf656.pdf>

Forestry Handbook, Second Edition: Society of American Foresters. Ronald Press. 1984

The Role of Fire in Oak Regeneration. Van Lear, D.H. and Watt, J.M. in Oak Regeneration: Serious Problems, Practical Recommendations, US Forest Service General Technical Report SE-84, 1993. [http://www.srs.fs.usda.gov/pubs/gtr/gtr\\_se084.pdf](http://www.srs.fs.usda.gov/pubs/gtr/gtr_se084.pdf)

Forestry and Water Quality: Pollution Control Practices. Pope, P.E., Purdue University. pub. FNR-88. 1993. <http://www.ces.purdue.edu/extmedia/FNR/FNR-88.pdf>

Oak Regeneration: Serious Problems, Practical Recommendations. Loftis, D., McGee, C. Syposium Proceedings 1992. US Forest Service General Technical Report SE-84, 319 pp

Proposed Administrative Rule 1536.70. Illinois Department of Natural Resources.

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**Table 2. Site preparation guidelines.**

Site preparation methods noted for each category are suggested options based on cover and type of establishment method.

(NOTE: Specific site conditions may not allow the use of indicated site preparation options. Make appropriate adjustments based on field conditions, observations, and landowner objectives.)

| <u>SITE TYPE</u> | <u>ESTABLISHMENT METHODS</u>       |                      |                    |
|------------------|------------------------------------|----------------------|--------------------|
| Cover            | Direct Seeding                     | Natural Regeneration | Seedling/Container |
| Cropland         | <u>SITE PREPARATION OPTIONS **</u> |                      |                    |
| <50 % Cover      | C-N                                | C-N                  | C-N                |
| >50% Cover       | C-M-MC                             | C-M-MC               | C-M-MC             |
| Grassland        | C-M-CB-MC                          | C-M-CB-MC            | C-M-CB-MC          |
| Forestland       | C-M-MC-B-MB-CMB-H                  | C-M-MC-B-MB-CMB-H    | C-M-MC-B-MB-CMB-H  |

\* *Direct Seeding in underplanting situations is often difficult due to residual stocking and is not recommended.*

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|     |   |                                                          |
|-----|---|----------------------------------------------------------|
| M   | - | Mechanical                                               |
| C   | - | Chemical                                                 |
| B   | - | Prescribed burning                                       |
| N   | - | Not necessary                                            |
| MB  | - | Mechanical and prescribed burning                        |
| MC  | - | Mechanical and chemical                                  |
| CB  | - | Chemical and prescribed burning                          |
| CMB | - | Chemical, mechanical and prescribed burning              |
| H   | - | Harvest cut, to increase light penetration to understory |