

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

TREE/SHRUB ESTABLISHMENT (ACRE)

CODE 612

MONTANA TECHNICAL GUIDE

SECTION IV

DEFINITION

To establish woody plants by planting or seeding

See the Field Office Technical Guide (FOTG), Section II, Conservation Tree/Shrub Suitability Groups (CTSG) for a general listing of conservation species suited to the soils and environmental factors at the site.

PURPOSES

- To establish woody plants for forest products
- Provide erosion control and for energy conservation
- To reduce air pollution and sequester carbon dioxide
- To reduce water pollution by the uptake of soil and water borne chemicals and nutrients
- To landscape and beautify an area
- Protect a watershed
- Provide wildlife habitat

Species will be suitable for the planned purpose.

See the Woodland Management and Productivity table of the Soil Survey Manual for which tree species are found on particular forested soils and which trees to plant.

Common species for timber production are Ponderosa pine, Douglas-fir, Western larch, Lodgepole pine, and Engelmann spruce.

Common species for Christmas tree plantations are White spruce, Colorado blue spruce, Austrian pine, Scotch pine, Douglas-fir, Grand fir, and Concolor fir.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies on any areas where woody plants are suited.

Shrubs adapted to particular range sites are listed in the ecological range site descriptions located in FOTG, Section II-E-8.

Trees and shrubs suited for riparian areas are listed in the FOTG, Section IV, Practice Standards, 391–Riparian Forest Buffer.

CRITERIA

General Criteria Applicable To All Purposes Named Above

Species Selection

Species will be adapted to soil-site conditions.

Contact your local nursery, community forester, or Extension agent for species suitable for landscaping and beautifying an area.

Spacing

Planting or seeding rates will be adequate to accomplish the planned purpose.

NOTE: This type of font (AaBbCcDdEe 123..) indicates NRCS National Standards.
This type of font (AaBbCcDdEe 123..) indicates Montana Supplement.

The recommended direct seeding rates for reforestation purposes are as follows:

| | POUNDS PLS1/ACRE |
|------------------|------------------|
| Douglas-fir | 1/2 – 1-1/2 |
| Englemann spruce | 1/2 – 1 |
| Lodgepole pine | 1/2 – 1 |
| Ponderosa pine | 2 – 4 |
| Western larch | 1/2 – 3/4 |

1 PLS = Pure Live Seed

Success of direct seeding depends upon the following factors:

- site preparation
- soil moisture
- rodent population
- timing
- seed scarification
- predators
- aspect
- overcoming seed dormancy
- plant competition
- species requirements

Direct seeding should be done in the spring or fall depending upon species.

- Spring = Englemann spruce, Western larch
- Fall = Lodgepole pine, Ponderosa pine, Douglas fir

Direct tree seeding has had limited success and is generally not recommended due to the high cost per surviving seedling.

Seeding rates for some shrubs can be found in:

- FOTG, Section IV, Practice Standards, 512–Pasture and Hayland Planting and 550–Range Planting.
- Plant Materials Technical Note MT-31: *Restoration of Woody Plants within Native Range Communities.*

Initial planting densities for trees and shrubs will depend on their potential height at 20 years of age. Heights may be estimated based on the performance of the individual species—or comparable species—in nearby areas on similar sites. Planting density guidelines are:

| PLANT TYPES | HEIGHT (FEET) | PLANT-TO-PLANT SPACING (FEET) | NO. PLANTS PER ACRE |
|---------------|---------------|-------------------------------|---------------------|
| Shrubs | <10 | 3–6 | 4,840–1,210 |
| Shrubs /Trees | 10–25 | 6–10 | 1,210–436 |
| Trees | >25 | 10–15 | 436–194 |

On harsh sites, use the lower planting density to accommodate the limited supply of moisture and nutrients.

When establishing a windbreak/shelterbelt, refer to FOTG, Section IV, Practice Standards 380–Windbreak/Shelterbelt Establishment for between row spacing guidelines.

Site Preparation

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

The planting area must be free of living vegetation and perennial weeds before planting.

One of the following methods will qualify for proper site preparation:

Tillable sites

1. One year of summer fallow for cropped and idle land with no grass sod. Two years of summer fallow for sod and alfalfa.
2. A combination of cultivation and chemical weed control can be employed to destroy competitive vegetation. Sod should be tilled and not just chemically sprayed.
3. Any land leveling or smoothing needed to facilitate irrigation must be done prior to planting. The irrigation system should be designed to provide water control independent of the adjoining fields.

Non-tillable sites

1. Where cultivation is not feasible as with wet lands, steep slopes, erosive soils, or other areas, the vegetation will be scalped or killed on a 3-foot wide strip or spot on which the trees will be planted.

Sites with undesirable brush will need an initial treatment that physically or chemically removes and kills the brush species to facilitate planting or seeding of desired stock to prevent encroachment of the brush. Chemicals will be applied according to label.

Planting sites for reforestation purposes must be prepared according to the FOTG, Section IV, Practice Standards 490–Forest Site Preparation.

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

Origin, Handling, Storage, and Size for Woody Planting Stock

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

All planting stock and seed should be purchased from nurseries that are known to **use** locally adapted seed, seedlings or cuttings. Priority will be given to plant materials that have been selected and tested in tree improvement programs. All plant materials should comply with the minimum standards established by the American Nurseryman Standards Institute.

Planting stock must be of known origin and adapted to the site. Named varieties are recommended and should be used when they are available. Utilize local nurseries for planting stock.

Planting stock will be stored in a cool, moist environment (34-38 degrees F; 75-90% RH). Keep stock tops dry and free of mold and roots moist and cool. Do not store seedlings in bucket of water during planting or storage.

Keep roots of bareroot stock moist during planting operations by placing in partially aerated water-soil slurry, peat moss, super-absorbent (e.g., polyacrylamide) slurry or equivalent material (bentonite). Roots and rooting medium of container stock shall be kept moist at all times by periodic watering.

Planting Stock Grade Specifications:

| SPECIES | CALIPER 1 INCH ABOVE ROOT COLLAR (INCHES) | | HEIGHT RANGE (INCHES) | AGE (YEARS) |
|-----------|---|--|-----------------------|-------------|
| | | | | |
| Broadleaf | 3/16- 3/8 | | 12- 24 | 1-3 |
| Evergreen | 1/4- 1/2 | | 6- 12 | 2- 4 |

Planting

Planting dates, and care in handling and planting of the seed or seedlings will ensure that planted materials have an acceptable rate of survival.

Stock shall not be planted when the soil is frozen. Plant into dry soil only if there is a way to irrigate or water woody plant materials afterwards. Plant only when air temperatures are above freezing.

Do not plant on hot, windy days to avoid excessive drying. The seedling roots should not be exposed to the air for more than 30 seconds. In mixed plantings of conifer and deciduous seedlings, plant bare root

conifers first for they are more susceptible to their roots drying out.

Planting shall be done in early spring or late fall with dormant seedlings. Trees and shrubs may be planted by hand or with a planting machine. The buds should not have broken dormancy and started to swell so that bud scales are separated. On sloping sites, plant on the contour or as nearly on the contour as possible.

Plant seedlings in a vertical position with root collars at or about inch below the soil surface. Pack soil around the seedling to eliminate air pockets. Make the hole or trench deep and wide enough to avoid bending and compacting roots.

Regeneration

Adequate seed or advanced reproduction needs to be present or provided for when using natural regeneration to establish a stand.

Existing regeneration needs to be protected from logging damage by careful tree felling and skidding.

Natural regeneration is successful with most forest tree species except Ponderosa pine and Western larch. Residual overstory trees of these species must be observed for adequate cone crops.

The acceptability and timing of coppice regeneration shall be based on species, age, and diameter.

Protection

The planting will be protected from adverse impacts such as livestock damage, **wildlife damage**, fire, or excessive wind and sun exposure (desiccation or environmental stress).

Protect plantings from livestock with fence. Protect plantings from wildlife damage with nets, tubes, baits, traps, repellents, and/or fencing.

On hot, dry south and west aspects, protect conifers with shingles or burlap shades for the first two growing seasons. To protect conifers from winter desiccation, place shingles or burlap shades on the sides the prevailing winds are coming from. Use natural shade behind stumps, downed logs, or dead brush whenever possible.

Additional Criteria to Provide Wildlife Habitat

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

Select appropriate plant species for the needs of wildlife species you are trying to attract. To enhance the food value of plantings, include fruit and berry producing shrubs. To enhance wildlife cover, select trees and shrubs that are dense or evergreen.

The greater the plant species diversity the better the wildlife values. See FOTG, Section IV, Practice Standards 645–Upland Wildlife Management for more guidance.

Utilize for browsing wildlife only after tree/shrub will out compete browsing.

Additional Criteria to Improve Aesthetics

Plans for landscape and beautification plantings should consider foliage color, color and season of flowering, form, and mature plant height. Include conifers and other colorful species in the planting.

Plantings along farmstead entrance lanes should have the nearest row of woody plants at least 100 feet from centerline of the lane.

Adequate space should be left for cultivation at mature growth stage.

CONSIDERATIONS

When underplanting, trees should be planted sufficiently in advance of overstory removal to ensure full establishment. Plantings should not be made if the overstory will be removed in less than ten years.

Prescribed burning may be required for natural regeneration of serotinous cone species and for site preparation for other species. Refer to the FOTG, Section IV, Practice Standards 338–Prescribed Burning for more information.

Residual chemical carryover should be considered prior to planting. Obtain the history of pesticides applied at the site to be planted and what limitations they may impose. Select plant species or varieties tolerant to herbicides used in the area. Consider pesticide drift from adjoining cropland.

Plants that may be alternate hosts to undesirable pests should be avoided. Species diversity should be considered to avoid loss of function due to species specific pests. Avoid planting forest tree species if the site has known insect or disease infestations of that species.

Tree arrangement and spacing should allow for access lanes, structures, and other improvements.

Additional Considerations for Mulches, Fabric, and Mats

Moisture conservation or supplemental watering shall be provided for plant establishment and growth where natural precipitation is too low for the selected species.

Geo-textile fabric, in rolls or mats and other appropriate organic mulch materials, may be used for weed control and moisture conservation for new plantings on all sites.

Acceptable mulches, fabric, or mat materials must allow for water infiltration and air movement. Fabric mats will be a minimum of three feet by three feet in size and properly secured. Rodent damage may occur if they are not properly secured. Manufactured fabrics and tree mats must have a serviceable life span of at least three years.

When organic mulches are used, the material shall be placed a minimum of four inches deep and in at least a three feet wide diameter around the seedling. Organic mulches should be kept at least six inches away from the main stem of trees and shrubs to minimize possible rodent damage.

Additional Considerations for Trickle Irrigation

Supplemental water may be provided as needed to improve establishment, health, and vigor of the woody plantings.

Practice Standard 441–Irrigation System, Trickle has been developed for detailed information regarding this practice.

Established plantings should receive sufficient water to fill the soil profile to a depth of six feet where soils permit. Infrequent deep irrigation will help control weeds and provide deep rooting for future dryland survival.

General irrigation should cease around August 15th to permit trees to harden off before frost. On light sandy or gravelly soils the shut off date can be later. But after trees/shrubs have harden off, a late fall

supplemental application of irrigation water, just before soil freezing is very beneficial to trees if the soil is very dry. This is especially true for evergreens.

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.

Plans and specifications should include information on but not limited to:

- adapted tree species for the purposes outlined
- spacing
- planting methods
- cultural practices and maintenance requirements

Separate specifications can be prepared for these types of plantings:

- interplanting
- underplanting
- planting in open areas

OPERATION AND MAINTENANCE

The following actions shall be carried out to insure that this practice functions as intended throughout its expected life. These actions include normal repetitive activities in the application and use of the practice (operation), and repair and upkeep of the practice (maintenance):

- Replanting of dead trees or shrubs will be required when survival is inadequate.
- Competing vegetation will be controlled until the woody plants are established. **In forest plantings, this is addressed during site preparation or at time of planting.**
- **In non-forest plantings, regular weed control is needed to maintain the establishment, health, and vigor of the plantings. Weed control is needed for the**

first 3 to 5 years of establishment. Cultivate no deeper than three inches and no closer than two feet from the base of the plant. This shall be done frequently enough to keep the planting reasonably free from weeds. The optimum time to perform this activity is several times throughout the growing season. In areas of low precipitation, continued weed control is needed throughout the life of the practice to maintain the health and vigor of the planting.

- **Use caution in the application of chemical weed sprays in the vicinity of woody plantings. Strict adherence to label recommendations is essential to avoid damage to plantings.**
- **Mulches, fabrics, and tree mats will reduce the amount of maintenance needed to keep the planting growing and to control weeds.**
- Damaging pests will be monitored and controlled.
- **Maintaining the planting in a vigorous growing condition will aid in control of damaging pests. Early detection and application of control measures can often prevent extensive damage.**
- Periodic applications of nutrients may be needed to maintain plant vigor.
- Trees and shrubs will be protected from fire, insects, disease, and animals until established.
- **Protect plantings from fire by clean cultivation or the use of vegetative fire breaks.**
- **Control animal and rodent damage by using fencing, repellents, clean tillage, traps, poisoning or hunting. Hunting needs to be done within seasonal requirements of the Montana Department of Fish, Wildlife and Parks (DFW&P). Contact DFW&P for more information and assistance on controlling big game species.**
- Supplemental watering may be desirable to ensure adequate survival.

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

TREE/SHRUB ESTABLISHMENT (ACRE)

CODE 612

MONTANA CONSERVATION PRACTICE SPECIFICATION / JOB SHEET

DEFINITION: To establish woody plants by planting or seeding.

SCOPE: This specification provides direction in establishing woody plants for forest products, erosion control, reducing air and water pollution, protecting a watershed, and wildlife habitat.

ESTABLISHMENT RECOMMENDATIONS: This practice applies to any area where woody plants are suited.

Species Selection

Care should be taken to select species that are adapted to the soil-site conditions. Select species that will be suitable for the planned purpose(s).

Spacing

Planting or seeding rates will be adequate to accomplish the planned purpose(s). Planting density specifications are:

| PLANT TYPES | HEIGHT (FEET) | PLANT-TO-PLANT SPACING (FEET) | NO. PLANTS PER ACRE |
|---------------|---------------|-------------------------------|---------------------|
| Shrubs | <10 | 3–6 | 4,840–1,210 |
| Shrubs /Trees | 10–25 | 6–10 | 1,210–436 |
| Trees | >25 | 10–15 | 436–194 |

Site Preparation

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

Care, Handling, and Size for Woody Planting Stock

Only viable, high quality, and adapted planting stock or seed will be used. All plant materials should comply with the minimum standards established by the American Nurseryman Standards Institute.

Planting

Planting dates and care in planting of the seed or seedlings will ensure that planted materials have an acceptable rate of survival.

Protection

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

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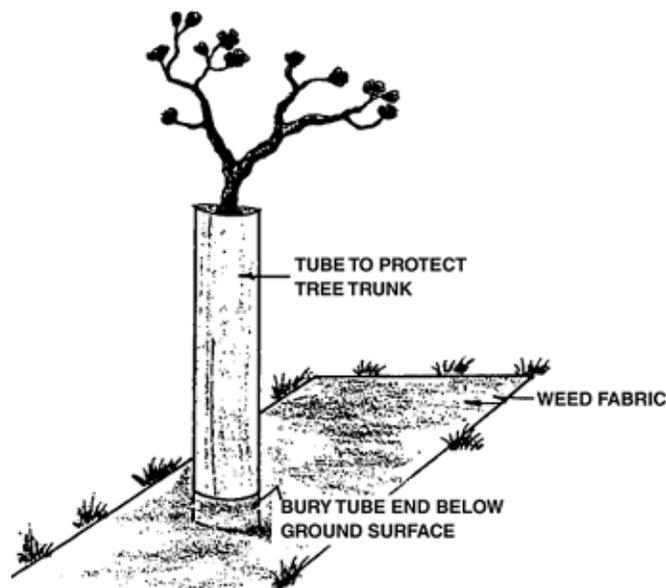
WHEN TO PLANT: Plant when the soil is moist and the air temperature is above freezing. Planting should be done in early spring or late fall with dormant seedlings. Do not plant on hot, windy days. Plant trees when the weather is cool, the humidity is high, and the winds are light.

HANDLING AND STORAGE: Plant seedlings immediately after receiving them. If they cannot be planted, they should be stored in a cool (34–38° F) and a moist (60% R.H.) area. The seedling should be dormant and will not need light. Seedling storage should be limited to a week or less if storage temperatures are higher than 38° F. The seedlings should be left in their shipping package until planting. Upon receiving the seedlings, open the packages and check to see that the roots are moist. Dampen if necessary and reseal the package.

PLANTING: Areas that have no seed source should be reforested by planting. Care should be taken to select species that are adapted to the soil-site conditions. To allow seedlings to become established, competing vegetation should be controlled by scalping, cultivation, chemical control, and/or the use of fabric barrier. Remove or kill all competing vegetation for a 3-foot wide strip or spot on which the seedlings will be planted. Utilize local nurseries for planting stock.

PROTECTION: Grazing and browsing in planted areas can cause damage to the seedlings. Protect the plants by reducing animal stocking levels, fencing, mesh nets, and tubes.

The following diagram illustrates the use of a solid tube for rodent protection and a fabric mat used for weed control and moisture conservation.



MAINTENANCE: Replanting will be required when survival is inadequate. Regular weed control is needed to maintain the establishment, health, and vigor of the plantings. Weed control is needed for the first 3 to 5 years of establishment. Supplemental watering may be desirable to ensure adequate survival.

TREE / SHRUB ESTABLISHMENT—Specification Sheet

LANDOWNER **FIELD NUMBER**

PURPOSE (CHECK ALL THAT APPLY)

- | | |
|--|---|
| <input type="checkbox"/> Reforestation | <input type="checkbox"/> Streambank Stabilization |
| <input type="checkbox"/> Erosion Control—Windbreak/Shelterbelt | <input type="checkbox"/> Beautification |
| <input type="checkbox"/> Reduce Air Pollution/Sequester Carbon Dioxide | <input type="checkbox"/> Wildlife Habitat |
| <input type="checkbox"/> Reduce Water Pollution—Uptake Nutrients | |

SOIL TYPE

Map Unit/Series _____

Ratings: Seedling Mortality _____; Plant Competition _____;

Conservation Tree/Shrub Suitability Group _____

WOODY PLANT MATERIALS

| SPECIES | KIND OF STOCK ¹ | SPACING ² | PLANTS/ACRE | ACRES | TOTAL | PLANTING DATE |
|---------|----------------------------|----------------------|-------------|-------|-------|---------------|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

¹ BAreroot, COntainer, Cutting

² Average Spacing Between Plants

PLANTING LAYOUT—Job Sketch

PLANTING PROCEDURE—Planting Hoe

Figures 1 through 8 illustrate the correct planting procedures using a planting hoe.



FIGURE 1. DRIVE PLANTING TOOL FIRMLY.

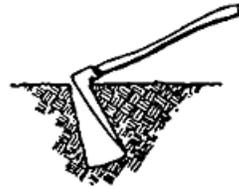


FIGURE 2. LIFT UP ON HANDLE TO WIDEN HOLE.



FIGURE 3. PULL BACK ON HANDLE.



FIGURE 4. PLANT TREES UPRIGHT IN HOLE WITH ROOTS UNTANGLED AND NOT TURNED UP.



FIGURE 5. PLANT THE TREE AS DEEP AS IT WAS IN THE NURSERY, NEVER SHALLOWER. DO NOT BURY GREEN FOLIAGE.

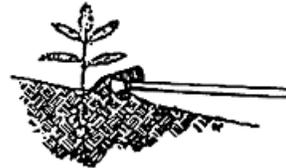


FIGURE 6. PUSH SOIL BACK INTO PLANTING HOLE WITH BLADE OF PLANTING TOOL.



FIGURE 7. FIRM THE SOIL AROUND THE TREE WITH YOUR HEEL SO THAT IT CANNOT BE UPROOTED BY PULLING ON NEEDLES.



FIGURE 8. BE SURE TO ELIMINATE AIR POCKETS.

ADDITIONAL SPECIFICATIONS AND NOTES—Site Preparation, Browse Protection, etc.

APPROVALS:

NRCS Conservationist

Job Class

Date

Producer

Date