

NATURAL RESOURCES CONSERVATION SERVICE

TREE / SHRUB ESTABLISHMENT (ACRE)

CODE 612

MONTANA CONSERVATION PRACTICE SPECIFICATION

DEFINITION: Establishing woody plants by planting seedlings or cuttings, direct seeding, or natural regeneration.

SCOPE: This specification provides direction in establishing woody plants for forest products, wildlife habitat, erosion control, improving water quality, increase carbon storage in biomass, renewable energy production, and enhancing aesthetics.

ESTABLISHMENT RECOMMENDATIONS: This practice applies to any area where woody plants can be grown.

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).

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.

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 and Specifications, 391–Riparian Forest Buffer.

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.

Spacing.

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:

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

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

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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 = Engelmann 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.

The recommended direct seeding rate for re-forestation purposes are as follows:

	POUNDS PLS ¹ /ACRE	
Douglas-fir	1/2	- 1-1/2
Engelmann spruce	1/2	- 1
Lodgepole pine	1/2	- 1
Ponderosa pine	2	- 4
Western larch	1/2	- 3/4

¹ PLS = Pure Live Seed

Seeding rates for some shrubs can be found in:

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

Site Preparation.

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

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.

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 Stock Grade Specifications.

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

Plant seedlings immediately after receiving them. If they cannot be planted, they should be stored in a cool, moist environment (34-38° 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. 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.

Planting dates and care in 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.

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.

Do not plant on hot, windy days to avoid excessive drying. Plant trees when the weather is cool, the humidity is high, and the winds are light. 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.

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.

Areas that have no seed source should be reforested by planting. 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.

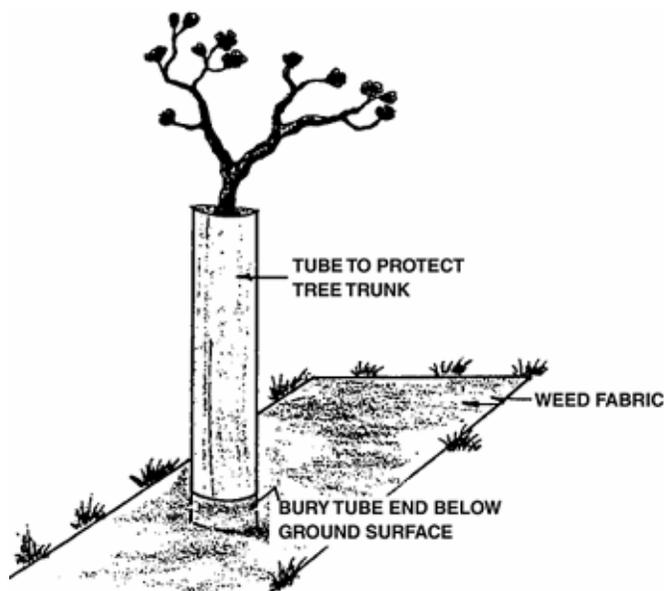
The planting will be protected from adverse impacts such as livestock damage, wildlife damage, or fire.

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

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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.

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



Regeneration.

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.

Aesthetics.

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

Mulches, Fabric, and Mats.

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.

Trickle Irrigation.

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.

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Maintenance.

In non-forest plantings, controlling competing vegetation is needed to maintain the establishment, health, and vigor of the plantings. Control the competing vegetation for the first three to five 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 plant competition. The optimum time to perform this activity is several times throughout the growing season. In areas of low precipitation, continued control of competing vegetation is needed throughout the life of the practice to maintain the health and vigor of the planting. Supplemental watering may be desirable to ensure adequate survival.

Replanting will be required when survival is inadequate.

Woven fabric shall be periodically inspected to ensure tree girdling is not occurring.

Survival Percentages.

For a successful tree or shrub planting, it is required that 75% of all trees or shrubs planted survive after "leaf out" during spring or summer of the second year.