

TREE/SHRUB ESTABLISHMENT SPECIFICATION SHEET

Client: _____



Photo courtesy of NRCS

Tree/Shrub Establishment

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

Purposes

- Establish Woody Plants for Forest Products
- Wildlife Habitat
- Long Term Erosion Control and Improvement of Water Quality
- Treat Waste
- Improve or Restore Natural Diversity
- Store Carbon in Biomass
- Energy Conservation
- Enhance Aesthetics

Where Used

- On any area where woody plants can be grown.

General Requirements

On forestland, Oregon's Forest Practices Act, requires the landowner to obtain a permit for planting and associated activities. The landowner shall obtain all necessary permits prior to commencing practice installation.

Planting dates, and care in handling and planting of the seed, cuttings or seedlings will ensure that planted material have an acceptable rate of survival. Plant trees and/or shrubs, when dormant, and the soil is not frozen (see Table 1). Plant high elevation areas shortly after snow melt. Plant on cloudy, high humidity, calm days.

Only viable, high quality and adapted planting stock or seed will be used. Rooted seedling stock shall be a "Plug" (one season in a container) or a 2+0 bareroot seedling. The first number indicates number of seasons in a nursery bed, and the second number indicates seasons in a transplant (outside) bed. Cuttings and whips shall be a minimum of 12 inches long, have a minimum small end diameter of ¼ inches for shrubs and 3/8 inches for trees, and contain at least 3 lateral buds. Buds shall be firm and show no evidence of new growth.

Where frost heaving occurs, plant bareroot stock only.

Where moisture is limiting, summer heat is intense, or plant competition is severe, plant seedlings with well-developed root systems, such as Plug +1 or 2+1. A 1:1 shoot to root ratio is desirable.

Where moisture is not limiting, but plant competition and/or browsing problems are significant, plant tall, well developed seedlings, such as 1+1 or 2+1.

Shrub plantings shall be either containerized or bare root stock. Container plantings shall not be larger than 2 gallons. Bareroot stock shall not be larger than 24 inches in height, unless extenuating environmental circumstances call for taller plants. Shoot to root ratio shall not exceed 1.5:1.

Where disease is a concern, limit planting stock to species that are resistant or immune to disease. For, sites infected with Laminated root rot (*Phellinus weirii*), which is very common in western Oregon, plant species listed below:

Resistant Species

- Incense cedar, Ponderosa pine, Western red cedar

Immune Species

- Bigleaf maple, Red alder,
- Pacific madrone, Tanoak,
- Oregon ash, Poplar, Cottonwood

Site preparation shall be sufficient for the site. See practice 490 Tree/Shrub Site Preparation for specifications.

Timing and use of planting equipment will be appropriate for the site and soil conditions. A tree planting machine is efficient on flatter slopes. Use on slopes less than 10 percent. Hand plant any site.

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Planting Dates for All Plantings

Table 1. **General** planting dates by MLRA and elevation.

MLRA	Elev. Range	Start Date	End Date
A1	0- 3700	12/1	4/1
A2	0- 499	12/1	3/1
A2	500- 1700	12/15	3/15
A3	650- 1999	12/15	3/15
A3	2000- 2999	3/15	5/31
A3	3000- 3999	4/1	6/1
A3	5000- 6000	4/15	6/15
A4	0- 2999	12/1	4/15
A5	2000- 2999	11/15	4/15
A5	3000- 3999	3/15	5/15
A5	4000- 5000	4/1	6/15
B6	950- 1999	3/15	5/15
B6	2000- 2999	3/15	6/1
B6	3000- 3999	4/1	6/15
B6	4000- 4999	4/15	6/15
B6	5000- 7000	5/1	6/15
B7	800- 1600	3/15	5/1
B8	800- 3400	3/15	5/15
B9	1600- 2999	4/1	6/15
B9	3000- 5000	4/15	6/15
B10	2200- 3999	4/1	5/15
B10	4000- 6000	4/15	6/1
B11	2100- 3000	3/15	5/1
D21	4000- 6000	4/1	6/1
D23	4400- 5999	4/1	5/1
D23	6000- 8000	4/15	5/15
D24	3900- 5999	4/1	5/1
D25	4500- 5999	4/15	5/15
E43	1300- 2999	3/15	5/15
E43	3000- 4999	3/15	6/1
E43	5000- 6999	4/1	6/1
E43	7000- 9600	4/15	6/15

Planting for Forest Products

Planting or seeding rates will be adequate to accomplish the planned purpose. Below are recommended planting rates, trees per acre (for timber production), based on site productivity.

MLRA 1, 2, 3, 4, 5 SPECIES	SITE CLASS		
	I, II	III	IV, V
Douglas Fir	436	360	302
Grand/Noble Fir	436	360	302
Western Hemlock	436	360	302
Sitka Spruce	436	360	302
Ponderosa/Sugar Pine	302	258	194
Western Red Cedar	436	360	302

MLRA 6, 8, 9, 10, 21, 23, 24, 25, 43

SPECIES	SITE CLASS		
	I, II	III	IV, V
Douglas fir	302	258	222
Ponderosa pine	258	194	150
Lodgepole pine	436	302	222
Western Larch	302	258	222
White/Grand fir	302	258	222
W. white pine	302	258	222

Trees per Acre	Spacing (ft)
436	10 x 10
360	10 x 12
302	12 x 12
258	12 x 14 or 13 x 13
222	14 x 14
194	15 x 15
150	17 x 17

Species will be adapted to site conditions and suitable for the planned purpose.

For Christmas tree production, plant no closer than 4x4 or farther than 8x8. Exact spacing should be based on cultivation or spraying equipment.

Seedling Protection for All Plantings

Seedlings shall be protected from any agent that will inhibit growth or cause mortality. These are competing vegetation, browsing animals, excess heat and drought.

Competing Vegetation

Competing vegetation will be kept away from planted seedling. See Forest Stand Improvement (666) specification for detailed information.

Mulch may be used to control some types of vegetation. Paper, geo-textile, plastic, rock, etc. may be used. See Mulching (484) specification for additional detail.

Browsing Animals

Protection of seedlings from browsing animals can be accomplished by one of the following:

- Fencing (see Fencing (382) specification)
- Whole tree nets of 6-15 mil photodegradable polypropylene mesh.
- Whole tree protectors of 50 mil photodegradable polypropylene mesh tubes, photodegradable polypropylene solid tree tubes, or of spun polyester (Reemay) sleeves, 2-5 inches in diameter, and 2-3 feet in length.
- Budcaps shall be of spun polyester (Reemay) sheets or weatherproof paper cut into 4 by 5-inch rectangular pieces.

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- Terminal bud protectors of 50 mil photodegradable polypropylene mesh tubes, or of spun polyester (Reemay) sleeves, 1-3 inches in diameter, cut to length of enclose the leader and leave 4-8 inches above the end of the leader to allow for growth.

Protective devices shall be secured:

- Fold budcaps lengthwise and staple around the terminal leader and bud, forming a protective cylinder.
- Staple leader tubes to small branchlets along the leader to prevent coming off during high winds.
- Secure net tubes with pins of 9-gauge wire, ≥ 12 inches long, hooked through the mesh and pressed into the ground.
- Support sleeves and tubes with a 3-4-foot stake, wood or bamboo, driven into the soil next to the seedling and secured to the stake by ties.

Maintenance of Protective Devices:

- Inspect and replace, repair, remove, or adjust devices.
- Budcaps and sleeves may need adjustment (upward) to protect trees until beyond grazing or browsing.
- Nets and tubes may require physical removal (generally on north slopes) to prevent girdling.

Chemical repellants may be used. See Forestry Tech Note 23. Repellants must be applied correctly or damage to seedlings may occur. Most will need reapplication; inspect for reapplication needs.

Physical removal of animal pests by trapping and/or hunting is feasible. Follow State and local hunting and trapping regulations.

Protection from Excessive Heat

Where excessive heat causes mortality (generally south facing slopes), apply shade cards or collars to newly planted seedlings. Shade cards may be made of heavy weatherproof cardboard, wood, styrofoam, etc. Cards shall be 8" x 12", collars shall be 3 inches in diameter and 4 inches high. Attach cards to wire or wood stake to hold in place. Place 3 inches from seedling. Place on the south side of the seedling with an east-west orientation. Place shade card as close to the ground as possible. Inspect at least annually until successful seedling establishment.

Protection from Drought

If soil moisture is very limited and irrigation water is available apply water at a rate of 1 gallon per tree soon after planting. Recommended rates are 1 gallon per week the first growing season, two gallons per week

the second growing season and 3 gallons per week the third growing season. See Irrigation system and irrigation water management.

Discontinue watering in the late summer to allow trees and shrubs to harden off. In late fall, if soil moisture is depleted, a deep watering is recommended to prevent winter desiccation damage.

Planting for Wildlife Habitat

Establish multiple plant species for wildlife habitat species diversity. Plant species desirable to targeted wildlife. The area shall be comprised of trees and shrubs. If trees are present plant adapted shrubs. If shrubs are present plant adapted trees. Establish plants in a non-linear planting regime. Plant native species, when feasible. Nonnative species are acceptable if they do not spread.

Planting for Storing Carbon in Biomass

Plant tree species that sequester high quantities of carbon. Plant at rates that fully stock the stand. Base planting rates on the soil site index for the species being planted, or amount of carbon to be sequestered.

Plans and Specifications

Specifications shall be prepared for each site and purpose and recorded using approved specification sheets, such as Tree/Shrub Establishment (612) or other acceptable documentation.

Operation and Maintenance

The area of treatment will be periodically inspected and protected from adverse impacts from insects, disease, livestock, competing vegetation, wildlife and fire damage.

Trees/shrubs shall be replanted to maintain adequate stocking to accomplish the intended purpose. Removal, incorporation, bio- or photo-degradation of tree protective devices and associated materials shall be consistent with the intended purpose and site conditions.

Operation of equipment near and on the site shall not compromise the intended purpose of the tree planting.

Properly collect and dispose of artificial materials after intended use.

Competing vegetation will not impede seedling growth. See Forest Stand Improvement (666) specification for additional details.

TREE/SHRUB ESTABLISHMENT SPECIFICATION SHEET

Client		Farm/Tract	
Location		County/SWCD	
Planner		Date	
Project Size		Topo Map	
Planting Stock Type		Predominate Soil Type and Seedling Mortality Rating	

DESIGN APPROVAL:

Practice Code No.	PRACTICE	LEAD DISCIPLINE	CONTROLLING FACTOR	UNITS	JOB CLASS				
					I	II	III	IV	V
612	Tree/Shrub Establishment	ESD-For	Complexity of establishing plant material; site sensitivity	Type of planting stock; potential seedling mortality rating from Soil Survey.	Container stock; potential seedling mortality low	Bare-root stock or cuttings; potential seedling mortality moderate	Direct seeding or natural regeneration; any seedling mortality rating	All	All
This practice is classified as Job Class (check one):									

Design Approved By: /s/ _____ Date: _____

Job Title: _____

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Practice Purpose (Check all that apply.)										
Forest Products				Wildlife Habitat						
Improve Water Quality				Treat Waste						
Long Term Erosion Control				Carbon Sequestration						
Energy Conservation				Enhance Aesthetics						
Tree Species										
Tree Species		Seed Zone or Elevation*			Tree Spacing			Number of Seedlings to Order		
Minimum Seedling Size:					Container Size:					
*Select seedlings from the listed seed zone and elevation or a geographic area of similar climate within an elevation of 500 feet higher or lower and within 100 miles north to 100 miles south of the planting site. Stock for introduced species must be from a proven, adapted source.										
Shrub Species			Shrub Spacing				Number of Seedlings to Order			
Minimum Seedling Size:							Container Size:			
Planting Dates:							Seeding Protection Needed		Yes	No
TYPE:	Whole Tree Protectors		Whole Tree Nets		Terminal Bud Protectors			Bud Caps		
	Fencing		Other (Describe)							
Moisture Conservation Needed			Yes		No					

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Competing Vegetation Control		Hand		Mechanical		Chemical*		Mulch
		Other (Describe):						

Species to Control:

*WIN-PST will be used to evaluate potential human and water resource concerns (attach report). A WIN-PST hazard rating of Intermediate or higher requires mitigation. Required mitigation shall consist of:

Additional Information:

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SEEDLING INSPECTION: While at the nursery or before accepting delivered seedlings, check that seedlings match the seed zone and elevation specified on the order. This information should be printed on the container. Open several packages at random. While protecting exposed seedlings from drying, check for the following signs of damage:

- Dry roots
- White tip roots
- Swollen or burst buds
- Presence of mold on needles or stems
- Presence of sour odors
- Physical damage to seedlings
- Seedlings frozen in a solid block of ice
- Ripped or crushed bags or boxes exposed to circulating air

Remove a few seedlings from each opened package and strip areas of bark along the roots and stem with a fingernail or knife edge to reveal the woody tissues. The cambium layer of the stem must be green and moist with a light-colored sapwood beneath. Moist and consistently light-colored woody tissue should be found along the stripped root.

DO NOT ACCEPT DAMAGED SEEDLINGS: The seedlings must be alive, dormant, and disease free. Immediately contact the nursery staff for further instructions.

TEMPORARY STORAGE INSTRUCTIONS: Bareroot seedlings and cuttings may be stored for up to 7 to 10 days at temperatures from 36 to 45 degrees F. If snow is available, storage can be provided by constructing a cavity for the packaged seedlings (on a north facing slope or under shade if possible). If planting must be delayed or cold storage is not available, unpack bareroot seedlings and "heel in":

1. Dig a V-shaped trench in a moist, shady place;
2. Break bundles and spread seedlings out evenly, 3 or 4 thick, in an upright position to a depth equal to the root collar;
3. Fill in with loose soil, and water;
4. Complete filling in soil and pack firmly.

Unrooted cuttings and whips can be soaked in cold water (lower 1/3 to 1/2 is sufficient) for 48 hours prior to planting to enhance root formation.

SITE PREPARATION: Clear the planting area to mineral soil. Size of clearing must be large on sites with dense grass or herbaceous cover. Follow more specific instructions on the Forestland Site Preparation (490) specification worksheet.

CARE AT PLANTING TIME: Keep seedlings roots moist at all times after removal from shipping packages or heel-in trench. At the field site store seedlings in the shade or under a reflective space blanket. Do not use canvas to protect seedlings from solar heating. Use suitable container (bucket, bag, or planting tray) for carrying the trees during the planting operation. Keep wet material around roots to prevent their damage through exposure. Never carry a handful of trees exposed to the sun and wind. Take one tree at a time from the container and plant it immediately. Trim excessively long roots with a sharp hatchet, machete, shears, or scissors. Do not tear or rip roots. Containerized stock roots shall be kept moist at all times.

TIMING OF PLANTING: Avoid planting on hot, windy days. Planting site must be free of snow and the soil frost-free. Do not carry more seedlings than can be planted in one hour (warm, windy, dry day) to two hours (calm, humid day). Utilize debris and stumps to provide shade for newly planted seedlings wherever possible.

TREE/SHRUB ESTABLISHMENT SPECIFICATION SHEET**PLANTING METHODS:**

Bareroot Seedlings – Open a hole or slit deeper than the root size to be planted to accommodate the root system with all roots pointing down (no "J" or "L" shaped roots). Plant seedlings slightly deeper than they grew in the nursery (indicated by a change in bark characteristics) with roots naturally positioned. Do not twist or bunch roots. In slit planting, push the tree down to the bottom of the slit, then with a shaking motion, raise it gently back to the correct level. While holding the tree in an upright position, at the correct depth, bring loose, moist soil in around the root system. Do not let dry soil or surface litter fall into the hole. When the slit or hole is filled, pack the moist soil down firmly. No roots should be exposed or foliage covered.

Plugs – Plugs are easily planted due to their shape. Plugs are grown in cylindrical containers. Larger size plugs, i.e. 20 cubic inches, have larger root systems and grow quickly. Open a hole and place plug in hole at the same depth as grown in the container. Place moist soil around the plug and pack. Firm up soil completely around plugs to remove any air pockets.

Un-rooted Cuttings – For un-rooted cuttings and whips open a hole or slit deep enough to allow cuttings to be inserted so at least half to two-thirds of the cutting length is below ground. Insert cutting vertically with buds pointing up, insuring that one to three buds remain above ground. Firm the soil around the cutting so good contact with the soil is obtained.

Containerized – Containerized plants are best planted in the spring, summer and fall. Dig a hole at least 50 percent wider than the container. Plant the root ball top at or just below natural ground level. Root-bound plants should have the root system slit and flared out over a mound of soil in the planting hole. Cut off any long roots before planting. Refill hole with soil and pack well to remove air-pockets. If available, water plant. Prune off diseased or damaged branches, suckers, etc.

An optional, slow release fertilizer can be placed in the bottom of the planting whole. Make sure that initially there is no contact between the fertilizer and seedling roots.

MOISTURE CONSERVATION: Control competing vegetation for at least two years, using one of the following methods.

Hand or Mechanical – Use a hoe, shovel, brush cutter or chainsaw to control all competing vegetation in the immediate area (4-foot minimum diameter) of the seedling. Repeat as necessary until trees are free to grow.

Chemical – Apply herbicides according to label directions. The herbicide selected must be formulated and registered for use on forestland. Consult a local weed specialist for rates, timing and restrictions. Repeat as often as needed to control competing vegetation. An area 3 foot in diameter shall be treated.

Mulch – Spread mulch material (paper, plastic, geotextile, etc.) around the base of seedling for a minimum of 1.5 radius around the seedling. See Mulching (484) specification and complete job sheet if using mulch.

SEEDLING PROTECTION - Where browsing pests damage seedlings, seedlings will be protected. Protection techniques will be commensurate with the pest causing damage. Acceptable methods include fencing, tree tubes, bud caps, repellants, whole tree protectors

Operation and Maintenance:**Associated Practices:**

Conservation Cover (327)

Herbaceous Weed Treatment (315)

Upland Wildlife Habitat Management (644)

Natural Resources Conservation Service, Oregon

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CLIENT’S ACKNOWLEDGEMENT STATEMENT:

The client acknowledges that:

- a. They have received a copy of the specification and understand the contents and requirements.
- b. It shall be the responsibility of the client to obtain all necessary permits and/or rights, and to comply with all ordinances and laws (Oregon Forest Practices Act) pertaining to the application of this practice.

Accepted By: /s/ _____ Date: _____

CERTIFICATION:

The client has provided one or more of the required certification documentation options (acceptable forms of documentation are listed below), it has been reviewed, meets the specifications, and will be placed in the case file, and/or the site has been inspected, documented, and meets the specification.

	Receipts from Contractor
	Map(s) – Including Field Numbers, Fields Treated, and Acres Treated
	Photo Monitoring
	Post Treatment Inventory:
Brief Description (Types of equipment and date of application.)	

I have completed a review of the information provided by the client and certify this practice with field verification has been applied according to this specification

Certified By: /s/ _____ Date: _____

Job Title: _____

FIELD LEVEL CERTIFICATION			
Land Unit/CIN:	Acres Completed:	Date:	Certifier:

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