

Project #001 - Small Tree-Topping
Project #002 - Down Wood Creation

End Result: Improve stand structure and species diversity in even-aged monoculture plantations of Douglas-fir. The end result will create old growth habitat for the marbeled murrelet and spotted owl, and other old growth dependent species.

Measure of accomplishment: Trees topped and trees felled
Quantity: 774 for Project #001, 258 for Project #002

Project Specifications

Subdivision Numbers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Total
Subdivision Acres	15	9	12	4	40	4	7	18	11	11	4	23	19	6	14	6	29	13	26	271
Project #001- number of trees to top	45	27	36	12	120	9	21	51	33	33	12	66	60	9	42	15	81	33	69	774
Project #002- number of trees to fall	15	9	12	4	40	3	7	17	11	11	4	22	20	3	14	5	27	11	23	258

- 1) Trees selected for treatment will consist only of plantation trees, and will be distributed following the criteria described below in the identified subdivisions.
- 2) All trees selected will be live Douglas-fir or hemlock trees. Hemlock will not be cut where this species is less than 50% of the specific treatment area. Trees selected will be sound: shall not have forked or broken tops, crooked boles, large scars, or other detrimental structural characteristics.
- 3) **Distribution shall be clumped or grouped. Groups and clumps shall be at least 100' from a stream or open road and at least 75' uphill and 50' downhill from any other road.**
 - a) Mingle topped trees and down wood (Tree Falling) in large clumps, but combined opening size should not exceed ½ acre; for example 120' wide and 200' long.
 - b) Clump is defined as an area containing 10 or more treated trees that are within 50' of another treated tree of the same clump. Clumped trees should be a combination of felled or topped trees. Total affected area when mingling treatments shall not exceed ½ acre; Minimum size of a clump should be 10 treated trees; such as 5 felled and 5 topped. Distance between clumps with more than 10 treated trees shall be 400-800 feet.
 - c) Group is defined as 2 to 9 treated trees that are within 50' of another treated tree of the same group. Distance between groups shall be 200-400 feet.
 - d) Location of treatment areas should be along secondary ridges and gentler slopes where possible. Locate clumps first around any big leaf maple trees - if present, second around large alder (> 8" dbh) - if present, and third around one or two "dominant" live conifer trees.

Chainsaw topping: intent is to create snags and live topped trees in equal proportion, but a ten percent tolerance is acceptable; e.g., 40% snags and 60% live topped or vice versa. (Other methods of tree topping are not permitted, such as blasting tops out.)

- 4) **Chainsaw topping: Snag trees.** Intent is to create a dead tree/snag.
 - a) **Snag trees will have two to four live limbs over five feet in length and will be at least 35' tall.**
 - b) Remove limbs shorter than 5 feet and any other live limbs below treatment, except for the 2-4 required. Trees with epicormic branching should be topped live trees.

- c) The sawed surface will have 4 grooves, each at least 4 inches deep. Grooves will be created in a tic-tac-toe grid formation.
- 5) **Chainsaw topping: Live trees.** The intent is to promote development of a stove-pipe cavity in a live tree. Topping to the specified standards will provide good conditions for fungi that cause heart-rot, and retaining adequate amount of live limbs below topping site should keep the tree alive and allow upper most limbs to grow vertically and eventually provide cover over the developing cavity.
- a) Live trees will be in the largest size class available.
 - b) Live trees shall retain at least 15 live limbs that are at least five feet in length. Retain all epicormic branches and shorter live limbs.
 - c) Live tree diameter (outside bark) at topping height shall be greater than 6 inches.
 - d) Live trees will have a minimum of 1-foot of bole area above the last whorl of green limbs. This will facilitate rot development above last live whorl of branches.
 - e) Trees meeting these specifications (a, b, c and d) for Live trees will be dominant trees with full crowns (30-50% crown ratio).
- 6) **Tree felling**
- a) At least 70% of felled trees shall be felled side-hill (within fifty degrees of horizontal). Over-lap felled trees where possible.
 - b) Minimum outside bark diameter at breast height (dbh) of felled trees will be 10".
- 7) **Marking treated trees**
- a) **Topping: Contractor will paint topped trees** with a band of orange paint at dbh level and orange tree number above dbh level and wrap orange and white striped flagging around the trees. "Wildlife Tree" signs will be placed at dbh. Nails shall not be completely nailed into the tree to allow for continued diameter growth on all live trees.
 - b) **Tree felling:** Contractor will establish an untreated tree as the clump identification tree by wrapping orange and white striped flagging around trees and painting two bands of orange paint around a tree and painting the clump or group number on the tree; e.g., C1 or G1.
- 8) **The Contractor will furnish** paint, flagging, aluminum nails. **Government will furnish** "Wildlife Tree" signs.
- 9) **Contractor will map** location of each clump/group with GPS. GPS location of individual trees is not required. Coordinates are NAD 83, UTMs. Contractor must provide an electronic and written file of coordinates. Electronic transfer can be accomplished by one of three methods. All of these methods shall include coordinates and corresponding name, number, and clump/group number for each clump/group.
- i. **Preferred method:** Provide the government with a GDB file with locations of clumps/groups from Mapsource.
 - ii. Contractor brings in their GPS and has coordinates with corresponding data downloaded directly to the government computer.
 - iii. Contractor submits a CD with a spreadsheet containing X column and Y column coordinates, and a column identifying corresponding data.
- 10) Contractor will label a Reference Tree at each treated subdivision that is live and easily visible from a main, drivable road. Mark with a band of orange paint and "R" painted above the band. Two pieces of orange and white striped flagging shall be tied on a branch or around the bole and shall extend a minimum of two feet, with point of tie facing the road. The contractor shall record the project name, project area number, bearing and approximate distance to the treated tree closest to the road, and the treated tree number on the flagging with a permanent marker. If the reference tree is over 200 feet from the closest treated tree, flag the route to the tree with orange and white striped flagging.
- 11) The Contractor is REQUIRED to submit a weekly plan of work at least two days before implementing each weekly plan. This plan shall be submitted to the project Contract Administrator (CA).

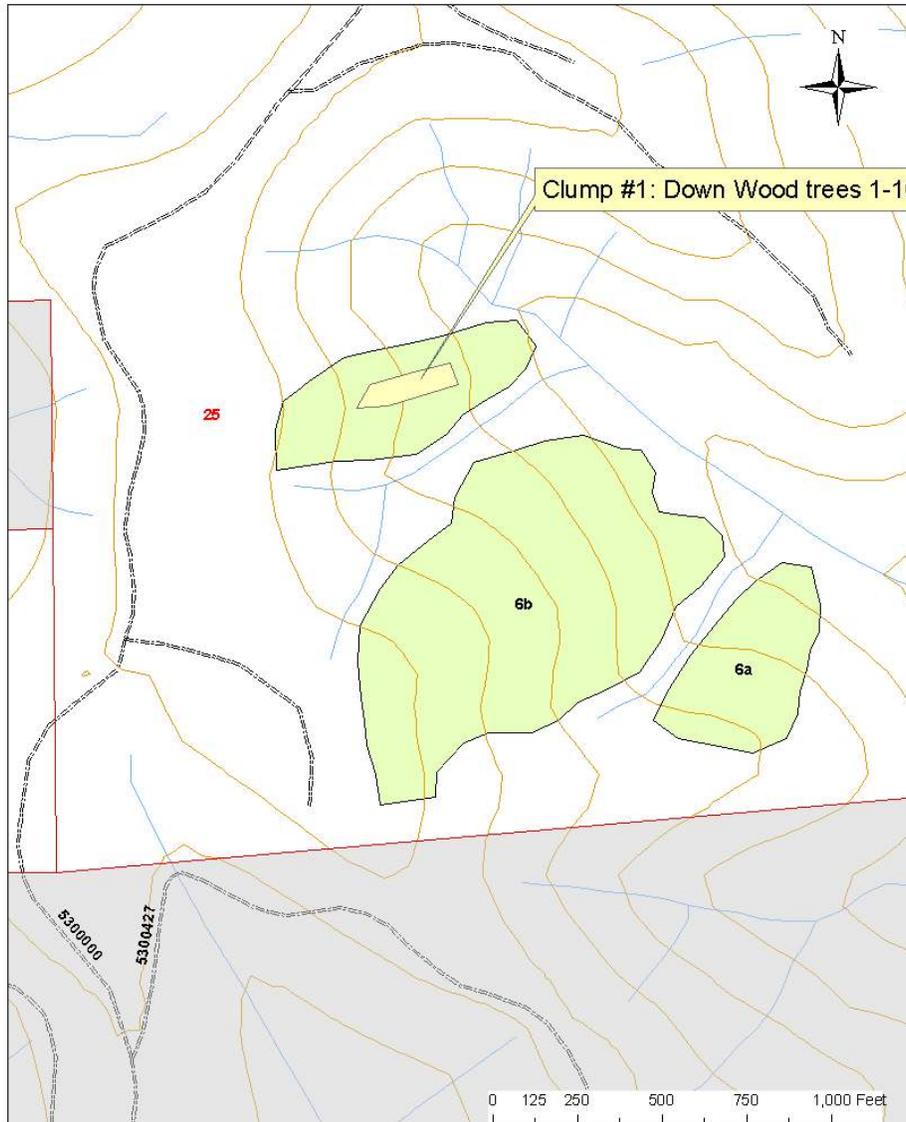
The Contractor is REQUIRED to inform the project contract administrator within 7 days of when a subdivision has been accomplished and provide a completed tree register form with signature and a map showing accurate location of clumps or groups of treated trees and their corresponding tree-numbers. See attached example of completed map and tree register form.

When: Work can occur any time of year, with the following requirements, unless otherwise agreed:

- After yarding is completed and accepted for the subdivision.
- In wind-prone areas of harvested subdivisions (as identified by Forest Service), allow at least 1 year after harvest to complete the felling and topping.
- **For operating restrictions, use restrictions described in K-G.3.1.5# PROJECT OPERATION SCHEDULE** Note: Use of handtools have the same seasonal and timing restrictions as power tools.

Inspection details: contractor will provide inspection reports as detailed in their Quality Control Plan.

Earley School Unit Example - Unit 6



Project #003 - Scalp, Gap Plant, and Tree Protection, Upland Areas
Project #004 - Scalp, Underplant, and Tree Protection, Upland Areas

End Result: Increase species diversity in even-aged monoculture plantations by planting other tree species that typically make-up old growth habitat.

Project # 003. Scalp, Gap Plant, and Tree Protection, Upland Areas -

Measure of Accomplishment: Number of seedlings/trees planted and protected.

Quantity: 375 seedlings/trees. Plant and protect 375 seedlings on approximately 3 acres (averages approximately 125 seedlings/acre).

Table 1

Subdivision Number	2	12	13	17
Subdivision Acres	9	23	19	29
Project #003 - number of 1/2 acre gaps created	1	2	2	1
Project #003 - number of seedlings to plant in created gaps	62	125	125	63

The creation of holes that average 1/2 acre in size is specified in the contract. The location of the gaps is shown on the Contract Area Map. The Contractor will adhere to the technical specifications below while planting the created holes with an average of 63 seedlings planted within each created 1/2 acre gap. This equates to an average spacing of 19' x 19'.

Project # 004. Scalp, Underplant, and Tree Protection, Upland Areas -

Measure of Accomplishment: Number of seedlings/trees underplanted and protected.

Quantity: 3,675 seedlings/trees. Plant and protect 3,675 seedlings on approximately 49 acres. (averages approximately 75 seedlings/acre).

Table 2

Subdivision Number	2	3	4	6	10	15	16	19
Subdivision Acres	9	12	4	4	11	14	6	26
Project #004 - Planting Acres	7	3	3	3	7	6	2	18
Project #004 - number of seedlings to underplant in thinning subdivision	525	225	225	225	525	450	150	1350

It is expected that many small openings will be created following commercial thinning activities. It is in these small openings that underplanting activities will occur. **The Contractor should expect to cover the majority of the thinning subdivision acres (86 acres) to find 49 acres of acceptable planting spots as defined in the technical specifications presented below. Plant at an average spacing of 24' x 24'.**

TECHNICAL SPECIFICATIONS FOR PROJECTS #003 & #004

SECTION 1 - GENERAL

1. DESCRIPTION OF PROJECT:

The Contractor shall provide any and all labor, training, and equipment necessary to perform the mobilization, site preparation, tree planting, and tree protection as described in the following sections. The Forest Service shall provide the tree seedlings, all tree protection devices, and self-inspection materials as specified in Section 3

2. ACCESSIBILITY:

Work areas may be reached by Forest roads that are accessible using a standard two-wheel drive pickup during normal operating seasons, unless otherwise indicated on Contract Area Maps. Vehicles shall not operate off system roads without prior written approval of the Contract Administrator (CA) or Contract Inspector (CI). Inaccessibility due to snow, fallen trees, slides or washouts on roads may or may not be permitted at the option of the Government. If road access is blocked, the Government may: (1) provide an alternate access route, or (2) substitute similar stewardship project. Roads shown on subdivision maps indicate access to subdivisions and are not to suggest the roads are open within the subdivisions or for any further travel. No vehicle shall by-pass any officially blocked road (barrier, locked gates, posted signs, rocks/log/dirt, etc.) without approval of the CA or CI.

SECTION 2 - DEFINITIONS

Planting hole - An area that is at least **15 feet** from a live residual tree of any species. Planting holes will typically be found inside thinned subdivisions within skyline corridors approved by the CA or CI as designated corridors, below landing areas, and in Phellinus infection centers.

Hole - An opening in the subdivision canopy generally between 1/2 and 1 acre in size absent of, or sparsely stocked with conifers. The holes are either deliberately created within a thinned subdivision or created as a consequence of harvest operations.

Plantable Spot - An area from which vegetation, ash, duff, and debris has been or can be removed, and a tree seedling can be planted as specified elsewhere herein.

Unplantable Spot - An area within the specified spacing limits in which it is not possible to plant a seedling according to specifications.

Satisfactorily Planted Seedling - A seedling planted in full accordance with all planting specifications set forth in this contract.

Unsatisfactorily Planted Seedling - A planted seedling which fails to meet one or more of the specifications for a CA or CI as designated satisfactorily planted seedling.

Wasted Seedlings - Seedlings which are lost, damaged, destroyed, or handled contrary to the specifications for care of seedlings. Planted seedlings in excess of the maximum number of seedlings creditable as specified elsewhere herein are also considered to be wasted seedlings.

Cotyledon Scar - Lowest point on stem from which branches will grow. Marked by a distinct ring in the bark on most species of tree seedlings.

Root Length - Root length will be measured from the longest root tip and the cotyledon scar.

Replanting - Any planting work done in a stewardship project, either voluntarily by the Contractor or as directed by the CA or CI as designated, after the Contractor has given the planting inspection cards to the Government.

Mineral Soil - Where soil content is less than 70 percent coarse rock fragments greater than 2mm in size.

Microsite Planting - The planting of tree seedlings in plantable spots most favorable to seedling survival and growth. Examples of favorable microsite features that provide protection from sun, wind, animals, and other damaging agents are logs, and stumps.

Prepared Sites - An area from which logging slash and competing vegetation has been removed to allow a seedling to be planted in full accordance with all specifications set forth in this contract.

Scalp - The removal of all vegetation which exposes at least 70% mineral soil.

Tree Height - Tree height will be measured from the ground to the tip of the seedling.

Suitable Tree - A tree of good form and vigor which shows no physical damage and which conforms to the size, characteristics, and species specified on the Planting Data Sheets.

SECTION 3 - GOVERNMENT FURNISHED PROPERTY

GOV'T FURNISHED DATA PROPERTY AND SERVICES	QUANTITY	WHERE, WHEN AND HOW TO BE FURNISHED TO CONTRACTOR
1-0, 1-1 and 2-0 Seedlings	Project 003 & 004 - 4,050	Brought to site by Government
Tree Tubes and Bamboo	Project 003 & 004 - 4,050 tubes and 8,100 bamboo stakes.	Brought to site by Government.
Inspection Book Planting Inspection Sheet, R6-2470-113 Animal or Shade Inspection Sheet, R6-FS-2400-114 Woods Thin STWD Mandatory Stewardship Project Specs.	CA or CI as designated satisfactory to complete the project. One Set	Furnished at Pre-work meeting Furnished at Pre-work meeting
Contract Area Maps	One Set	Furnished at Pre-work meeting
Government Quality Assurance Plan	One Set	Furnished at Pre-work meeting

SEEDLING HANDLING EQUIPMENT

A. PLANTING BAGS

Planting bags shall be a light color, shall not retain heat, shall have a minimum depth of 15 inches and shall be free of defects or contaminants.

B. CARE OF SEEDLINGS

The Contractor shall adhere to the following specifications for care and protection of tree seedlings:

1. Seedlings shall be protected at all times from drying, heating, smothering, freezing, crushing, drowning, abrasion, rapid temperature fluctuations, or contact with injurious substances.
2. Seedlings stored in boxes, bags, or bundles shall not be exposed to direct sunlight. Punctured or torn bags or boxes shall be promptly resealed. Containers of seedlings shall be opened only in full shade. Bundles, bags, or boxes shall be separated to provide free air movement.
3. Seedlings shall not be removed from shipping containers until needed for preparation for planting.
4. Seedlings shall be planted without further root or top pruning or culling. If pruning or culling is necessary, or if mold, dry roots, evidence of injury, or drying is seen, the condition shall immediately be reported to the CA or INS as designated.
5. Frozen seedlings shall not be handled until completely thawed. They shall be thawed in full shade.
6. Seedlings removed from cold storage facilities shall not be allowed to stand or lay in water or snow or be covered with snow.

7. Seedlings in planting bags shall have only their tops exposed. Burlap-wrapped trees shall have the wrappings loosened slightly.
8. Seedlings shall not be removed from a planting bag until immediately before planting in a prepared planting hole.
9. Seedlings shall be gently removed, one at a time, to prevent stripping or other injury, and quickly and gently inserted into the planting hole.
10. Seedlings carried in planting bags shall not exceed the amount that can be carried or removed without injury, or which can be planted before critical heating or drying occur. Seedlings placed in planting bags shall be planted out and not returned to storage. Trees in planting bags shall be planted out before extended breaks, such as lunch.
11. The Contractor shall not touch the roots of the seedlings.
12. The Contractor shall not dig and replant seedlings other than those located on inspection plots or spot checks of below ground planting quality.
13. Unplanted seedlings shall be returned to the Government at the end of each working day.

C. PLANTING WEATHER GUIDELINES

The Contractor shall plant only under the following weather conditions (see attached Weather Guidelines for Lifting and Planting, Appendix C):

1. Air Temperature between 30-65 degrees F
2. Wind Velocity less than 20 mph
3. Relative Humidity greater than or equal to 20%
4. Wet bulb depression (Dry bulb reading minus wet bulb) less than 8 degrees Fahrenheit
5. Soil temperature greater than or equal to 40 degrees Fahrenheit

D. PREPARATION OF SEEDLINGS

The Contractor shall provide water and a container at least 15 inches wide and 15 inches deep for dipping roots of bareroot seedlings. Water and container shall be kept free of contaminants and used only for dipping. Roots shall be dipped in water to wet them prior to placing seedlings in planting bags. Seedlings shall remain in the water for at least 3 seconds but not longer than 30 seconds.

E. SPACING AND SPOT SELECTION

A. Seedlings Spacing Requirements:

1. Seedlings are to be planted only in planting holes. A planting hole is defined as any opening where a seedling can be planted at least 15 feet or more away from a residual tree of any species.
2. Seedlings shall be planted to the boundary of all planting areas and around the perimeter of unplantable areas in spots distributed at intervals prescribed. For individual seedlings, the specified average spacing may be varied no more than 25 percent in any direction to find a suitable planting spot. The specified underplanting spacing shall be 19' X 19' for Project 2 and 24' x 24' for Project 3 unless favorable conditions exist where Microsite planting would be most favorable.
3. Where microsite planting sites are available as many as four seedlings can be "clump" planted at 8 foot spacing. In no case shall a planted seedling be closer than 15 feet to a residual tree.

4. Prepared sites shall extend to the boundary of all planting areas and around the perimeter of all unplanted areas.

B. Planting Spot Selection:

1. Brush patches containing planting spots shall be planted even though this may require spreading stems aside or working around the stems.
2. Whenever possible, within the 25 percent variance in average spacing, planting spots shall be prepared where stumps, logs, dead brush, and terrain features provide partial protection from the sun, wind, animals, loose debris, and other agents detrimental to seedlings.

C. Microsite Planting:

1. Only western red cedar and western Hemlock shall be planted in the microsite locations. Microsites are the shade side of stumps, logs, brush and where designated by the CA or CI as Designated. At each microsite location up to 3 to 4 seedlings can be planted a minimum of 8 feet apart depending on the size of the microsite.
2. Seedlings shall be spaced a minimum of 15 feet away from existing healthy residual trees.

F. PLANTING SPOT PREPARATION

Prior to digging the planting hole, the Contractor shall clear or "scalp" the planting spot of all limbs, logs, snow, bark, rotten wood, rocks and other loose debris and shall scalp ash, duff, sod, crowns of living plants, and roots to moist mineral soil. The scalp shall be a minimum of 24" x 24". Site preparation and scalping dimensions are further described in Section 4. If slash prohibits the specific diameter of scalp, a smaller scalp will be acceptable.

G. PREPARING THE PLANTING HOLE

A. Planting holes shall be located near the center of the prepared planting spot and shall be between perpendicular to the ground surface and true vertical.

B. For Handtools: An open planting hole, broken out as shown the attached Exhibit 1, and deep and wide enough to fully accommodate the roots of the seedlings to be planted is required when hand planting tools are used. The planting hole shall be broken out on four sides, with the back of the planting hole being broken out after the seedling is suspended in the center of the planting hole.

H. SEEDLING PLACEMENT

The 1-0 and 2-0 Bare Root Seedlings - The bareroot seedling shall be suspended near the center of the planting hole with roots in a near natural arrangement at a depth such that, after filling, firming, and leveling, the soil comes to a point at or above the cotyledon scar of the tree. No portion of the roots shall be exposed. Roots shall not be doubled up, twisted, spiraled, or bunched. The root system shall be aligned with the axis of the planting hole with all roots extending downward. See Exhibit 1.

- It is permissible to cover the lowest whorl of branches with uncompacted soil.

I. FILLING AND FIRING

Moist mineral soil shall be filled in and firmed around seedling roots. Dry soil, ash, organic matter, rock and other foreign material shall be kept out of planting holes. Soil shall be filled in and firmed progressively so no loose soil or air pockets remain and the seedling is as firmly planted as soil conditions will allow. The Contractor shall not wedge the sides of the planting hole. Firming the soil around the roots shall be accomplished in a manner that assures the seedling and its root system is not damaged.

After the soil is firmed around the roots, it shall be smoothed out to the level of the surrounding mineral soil surface. After planting, the seedling stem shall be erect and free to grow. The seedling shall not be weighted down with mud or debris. See exhibit 2.

J. MIXTURE OF PLANTING STOCK

A mixture of planting stock will be used in each subdivision. The Contractor shall plant these mixtures or stages in locations as required by the CA or CI as designated.

SECTION 4. PERFORMANCE WORK STATEMENT TASKS AND CRITICAL SUBTASKS

The Contractor shall be responsible for all tasks concerning the handling, planting, and protection of the seedling. The Contractor shall perform the work to the Quality/Performance Requirements.

Planting

- Preparing seedlings for planting
- Spacing
- Planting spot preparation
- Scalping
- Seedling Placement

1. Plant in planting hole only. A planting hole is an area that is at least 15 feet from a live residual tree of any species.
2. For Projects 3 & 4 prepare a planting spot by creating 24 x 24 inch scalps. All vegetation will be removed from the scalps exposing mineral soil.
3. Government supplied seedlings will be a combination of 1-0, 1-1 or 2-0 Western Red Cedar, Sitka Spruce, Western Hemlock, Douglas-fir, Big Leaf Maple and Red Alder.
4. Trees will be dipped in water before being places in planting bags. Contractor will provide water and buckets for dipping trees prior to planting.
5. Trees will be left in their shipping containers or planting bags until they are ready to plant.
6. Roots should only be exposed when dipping in water and when they are going into the ground.

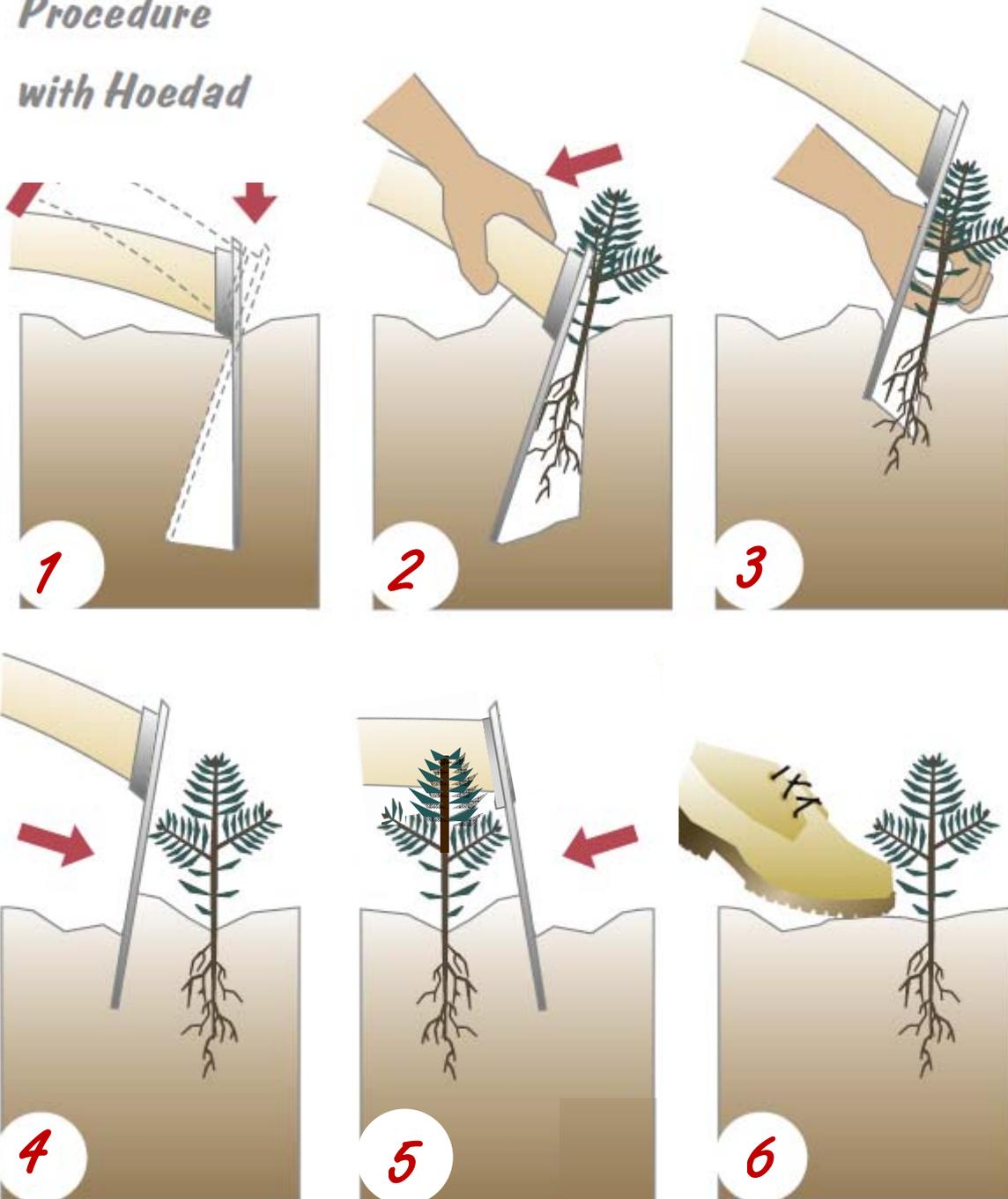
Tree Protection

-Tubing

1. Tube all trees except spruce. Tubes and stakes are provided by the Government. Tubes will be supported by two 4 foot bamboo woven through the tubes 4 times (see exhibit 2).
2. The bamboo's large end will be in the ground at least 12 inches. The tree top will be vertical and not bunched in the tube. The bottom of the tube will be flush with the ground.
3. If a seedling is too large to tube, tubing will not be required.
4. The Contractor is required to haul all tubes and bamboo to the planting sites.

ATTACHMENT 2 - PLANTING/TUBING/SCALPING DIAGRAMS
Exhibit 1

*Planting
Procedure
with Hoedad*



ATTACHMENT 2 - PLANTING/TUBING/SCALPING DIAGRAMS
Exhibit 1

Satisfactory and Unsatisfactory Plantings

<p>SATISFACTORY</p> 	<p>SATISFACTORY</p> 	<p>Unsatisfactory</p>  <p>Too deep. Needles buried.</p>
<p>Unsatisfactory</p>  <p>Improper orientation. Not planted into the slope or near vertical.</p>	<p>Unsatisfactory</p>  <p>"L" roots. Shallow hole.</p>	<p>Unsatisfactory</p>  <p>"J" roots. Shallow hole. Roots often exposed.</p>
<p>Unsatisfactory</p>  <p>Jammed roots. Hole too narrow and shallow.</p>	<p>Unsatisfactory</p>  <p>Hole too shallow. Roots exposed.</p>	<p>Unsatisfactory</p>  <p>Air pocket because of improper tamping.</p>
<p>Unsatisfactory</p>  <p>Planted in rotten wood. Roots not in mineral soil.</p>	<p>Unsatisfactory</p>  <p>"U"- or "J"-shaped tap root.</p>	<p>Unsatisfactory</p>  <p>Compacted roots. Hole too narrow.</p>

Exhibit 2

TUBING INSTALLATION WITH BAMBOO

TOP VIEW

SIDE VIEW

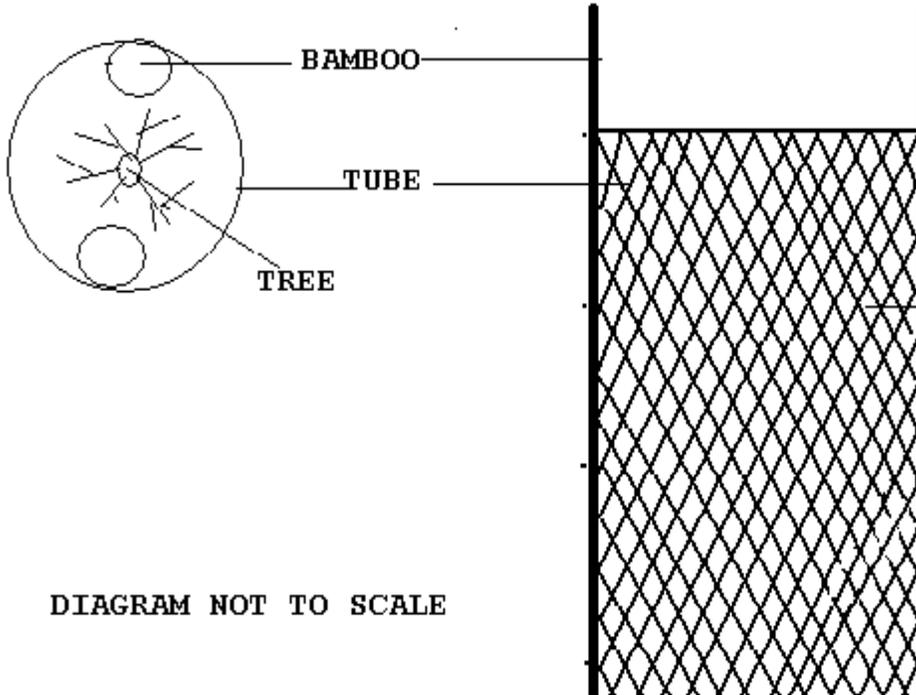


DIAGRAM NOT TO SCALE

Exhibit 2

TUBING INSTALLATION SHOWING WEAVE POINTS

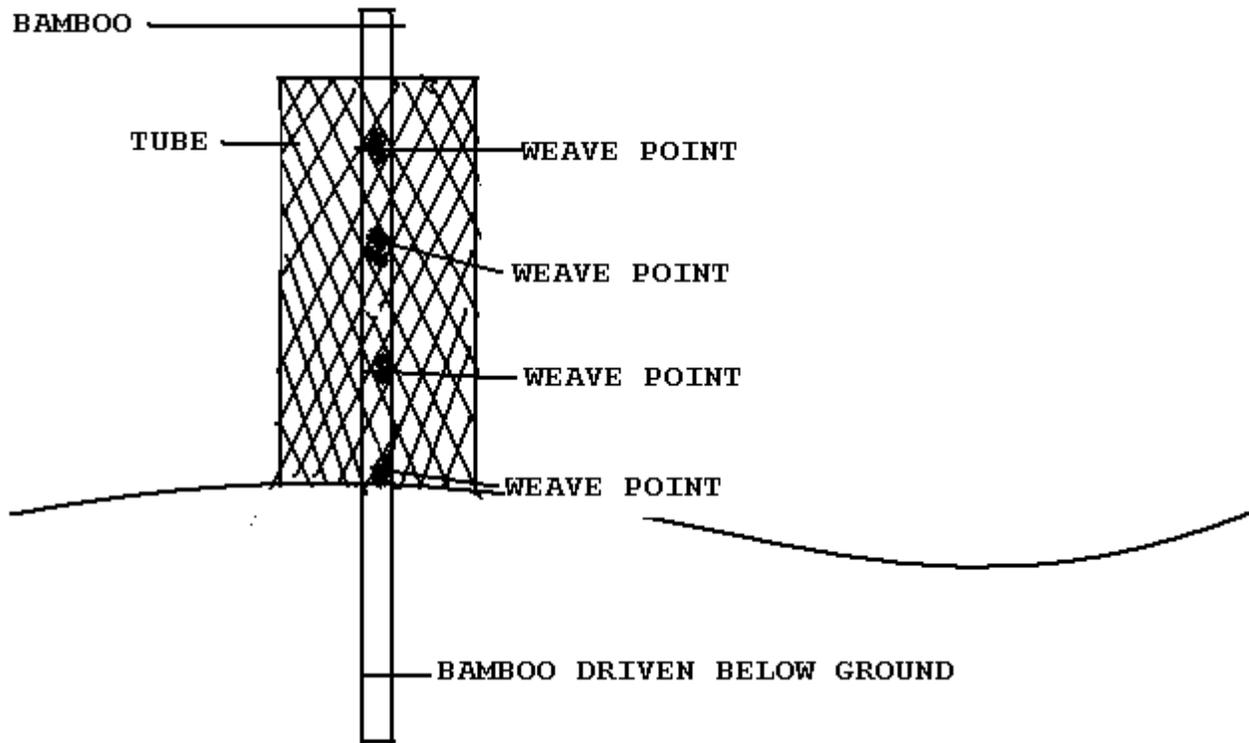


DIAGRAM NOT TO SCALE

SECTION 5 - CONTRACTOR INSPECTION

1. CONTRACTOR INSPECTION PROCEDURES

The Contractor shall provide and maintain an inspection system acceptable to the Government covering the projects under this contract. Complete records of all inspection work performed by the Contractor shall be maintained and made available to the Government during contract performance and for as long afterwards as the contract requires.

The Contractor shall inspect the work of their crews in any fashion chosen so long as the inspection procedure is thorough enough to ensure compliance with all of the planting specifications described herein. When the Contractor, through inspections and possible re-inspections is satisfied that the crew's planting work is in compliance with the contract specifications, the Contractor shall then request that the Government representatives perform an inspection.