

## Mechanical Site Preparation

**PURPOSE:** Mechanical site preparation for tree planting is the removal or reduction of competing vegetation and debris to facilitate the establishment of a desirable stand of trees. Mechanical site preparation is one broad category of site preparation in which large heavy machinery such as tractors, bulldozers, skidders, etc. with certain implements attached, are used to prepare an area for tree planting. General descriptions of individual examples of mechanical site preparation follow. See individual detailed descriptions for more information on each practice.

**MOWING OR BUSH-HOGGING:** Mowing may be used as site preparation on pastures and/or light, semi-open fields prior to planting, by machine or hand. It is often used in conjunction with herbicides and sub-soiling. Any type of rotary cutting device equivalent to a Bush-Hog can be used. Bush-hogging should not be performed from April 1 through July if quail and turkey management is desired objective.

**SUBSOILING:** Subsoiling is used primarily as a method of mechanical site preparation for heavy soils on cutover and openland sites that have a compacted layer at or below the surface inhibiting root growth and development. Subsoiling increases aeration and water-holding capacity of compacted soils and breaks up root restricting hardpans and traffic pans. It is highly recommended prior to planting trees on hayfields, pasture or cropland. A farm tractor or dozer on cutover sites, pulling a subsoil shank, performs subsoiling. The subsoiling shank must be a minimum length of 18 inches in order to rip the soil to a depth of 15 inches. The recommended time frame for subsoiling is during the months of July through October when the soil is generally dry and crumbly. Adequate rainfall (4-6 inches) must follow this operation to settle the rip back in before the planting operation is conducted. Distance between subsoil rows should coincide with the planting spacing. All forestry practices are to be performed in such a manner as to maintain soil productivity, limit erosion, and protect water quality. Therefore, subsoil rows must follow the contour of the site.

**BEDDING:** Bedding is used to improve drainage on wet soils, to help with weed control and to make planting easier. Bedding both disks and mounds the topsoil and nutrient-rich organic matter in long, continuous strips. The bedding plows have several scalloped disks that cut the soil and throw it into the center of the bed. A compaction roller then firms the bed into place. A crawler tractor usually pulls the bedding plow, although faster rubber-tired skidders are sometimes used. The beds should be elevated enough to allow planting of seedlings above standing water and should be oriented to channel excess water away from the planting site. Bedding should be done fairly close to planting season; otherwise, the beds may lose shape and slump, particularly on wetter sites. However, this practice should be applied at least six weeks prior to planting to allow for the freshly bedded soil to settle. Sites that are subject to flooding need to have the beds arranged to allow the water to rise and fall without having to cross the beds. Bedding should be avoided on sites that may be subject to drought due to an increase in water loss around the seedling roots. Since bedding requires an area sufficiently free of debris and vegetation to allow forming the beds, it is usually combined with other mechanical treatments.



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**DRUM CHOPPING:** This technique is applicable on most any site ranging from light to heavy vegetative/debris cover that would prohibit or hamper hand planting. Limitations include sites with debris or residual timber six inches or larger in diameter, excessive slope, extreme wetness, and large rock or other debris incapable of being chopped. Chopping is accomplished by the use of a heavy track vehicle pulling one or two large metal cylinders (drums) with longitudinal cutting blades that chop or flatten vegetation to facilitate hand planting. Drum chopping should be performed on the contour to prevent erosion. In many cases drum chopping increases hardwood competition, therefore it should be used in conjunction with herbicide application.



**SHEAR, RAKE, and PILE:** Shear, rake, and pile is a method of mechanical site preparation that is used to rid the site of debris after a final harvest. This method is used when there is a large amount of debris or standing stems present on the site. A combination of shearing and piling can be accomplished by using a dozer with a V-cutting blade to shear off remaining debris at the ground level. After shearing, a bulldozer with a root rake or brush rake attachment in place of a straight blade, pushes or rakes all debris into piles or windrows. Once piled, the debris can then be burned. Windrows should follow the contour of the site and on slopes exceeding 7 percent, parallel windrows should be located no more than 150 feet apart with openings of at least 20 feet for every 150 feet of windrow. Windrows should be no wider than 30 feet at the base. Care should be taken to move as little topsoil as possible.



**THREE-IN-ONE COMBINATION PLOW:** The 3-in-1-combination plow is primarily used on cutover or clearcut tracts that contain large amounts of logging slash or small undesirable stems. This method of site preparation is extremely beneficial in low-lying areas or in areas that remain dry during most of the year. The four rotating disks located directly behind the subsoiler (ripping blade) cultivate a planting bed 12 inches above the normal ground level promoting root development. This method of site preparation is performed June through November and the bed should be allowed to settle at least three months. It is critical that three-in-one plowing be performed on the contour of the site to prevent erosion. This method will require a release treatment of herbicide in the first or second year after tree planting.



**SCALPING:** Scalping is used to remove the top layer of sod that may hinder proper tree planting seedling survival and plantation establishment due to competition and white grub type beetle attacks. Scalping is performed in conjunction with subsoiling on openland. Scalping removes the sod created by grasses such as fescue and bermudagrass and is highly recommended when converting openland to longleaf pine.



**DISKING:** Disking is used to reduce hardwood competition, break up compacted soils and incorporate organic material into the soil promoting better growth and survival. This practice is usually conducted on sites with light amounts of debris and residual stems less than 2 inches in diameter. Burning prior to this practice on sites with heavier debris may facilitate the use of this site preparation method.

**SHEAR ONLY:** Shear only is a method of site preparation used on cutover sites when there is a light amount of residual debris remaining from the harvest operation. Site with heavier amounts of debris will likely need to be pushed into windrows or piles to facilitate planting. Shear only can be used on slopes with higher erosion potential but must be conducted along the contour of the land to be effective. This practice is usually performed in conjunction with an application of herbicides to control competing sprouts. Shearing should be performed on anticipated planting row centers.



**RAKE ONLY:** Rake only is a method of mechanical site preparation used to pile or windrow debris after an intensive final harvest. This operation serves to facilitate planting operations and/or improve access for other more intensive site preparation equipment. This method can only be used if there is not a large number of stumps or standing stems present on site. If too many stumps or standing materials exist, shearing and piling, mulching or some other site preparation method would need to be used. Raking helps to reduce the amount of large roots near the soil surface minimizing residual sprouting thus reducing competition with planted pines. Regardless of the planting method used, ridding the site of debris will help facilitate a better planting job. Quite often sites that have been raked might also be wildland machine planted resulting in more uniform spacing and better survival. Care should be taken to disturb as little soil as possible during this procedure. As with any mechanical site preparation, this operation should be conducted so that windrows are pushed up along the contour of the land to help prevent soil erosion.



**SPOT TILLAGE:** Spot tillage creates a favorable micro site for tree establishment and growth by tilling the soil and nearby organic matter to a depth of 24-36 inches. The affected spot is usually close to around 3-4feet in diameter. This method has minimal impact on the surrounding area and may be best suited for urban forest situations, horticultural applications or in areas with steep slopes and other obstructions. Spot Tillage is ideal for establishing trees on steep terrain (slopes less than 20%) as work can be done either up or down a slope. Erosion is minimized because harvest debris is left on the site as mulch and there is less site disturbance.



**MULCHING:** Mulching is a relatively new method of mechanical site prep that can also be used to improve an existing stand of timber. This technique is applicable on most any site ranging from light to heavy vegetative/debris cover. Limitations include sites with excessive slope, extreme wetness, and large rock or other debris incapable of being mulched. This operation is extremely beneficial to the landowner, the site, and existing or newly planted trees in several ways. Mulching carries much less liability than burning and can be conducted throughout the year while prescribed burning is limited to days with favorable burning conditions. The mulched material increases the moisture retained in the soil, distributes the nutrient rich organic matter evenly across the site, decreases soil temperatures, and reduces erosion by aiding in soil stabilization.

