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MIDSTORY REDUCTION TREATMENTS WITH A WOODGATOR® T-5

Silvicultural Systems: thinning *August 2001*

INTRODUCTION: Many stands in the Southern U.S. have developed an increased amount of non-commercial midstory and understory components. Managers may not be able to prescribe burn these stands, due to smoke management concerns or risk of fire climbing into the crowns of the overstory trees. A variety of machines have been designed to mulch, shred, or chop standing vegetation to clear rights-of-way, prepare fire breaks, clean real estate tracts, and site prepare planting sites. These machines also can be used for mid-story reduction treatments as a substitute for prescribed fire.

Fig. 1: The Woodgator® mulches vegetation for stand improvement and reduction of wildfire risk.

With the range of machine and cutter head designs available, it is important to have information on the capabilities and limitations of these machine types. Using this information, managers can better match machines to specific applications and site conditions. In February 1999, two machines were demonstrated on the Croatan National Forest near Havelock, North Carolina: the rubber-tired front-mounted Woodgator® T-5 and the boom-mounted Shinn Cutting System, SC-1. (The Shinn SC-1 was highlighted in FRA Technical Release 99-R-29.)

Terra Services Inc. of Simonton, Texas owns the Woodgator® used in the demonstration. While this demonstration was implemented on National Forest land, this type of operation has application on private lands. Woodgator® machines have been used to clear land for the seismic industries and to clear salvage residues from National Forest lands in Texas. This machine can be used to create and maintain permanent fire lines, perform pre-commercial row thinning, or create fuel breaks.

GENERAL FEATURES: The machine is a modified Ford 9030 Versatile tractor with a modified Royer cutting head. The addition of skid plates, an underbelly plate, a back bumper, and an operator cage are some of the modifications made to the tractor. Forestry tires (18.4-26) were added for woods operation.

The cutting head is attached directly to the front of the machine. Mulching is achieved with a series of 38 stirrup-flails mounted on a rotating drum. As the drum spins, centrifugal force keeps the knives extended away from the drum for cutting. As the knives connect with vegetation, vegetation is severed and mulched. A bar attached to the front of the cutting head assists with pushing over stems while severing them at the base. The cutting head can be raised or lowered as needed.

During the demonstration on the Croatan National Forest, the machine mulched the material to an acceptable level with two passes. One pass may be adequate for most applications. All trees 5 inches in dbh and less were prescribed for removal, and the Woodgator® T-5 was able to handle all material.

APPLICATION: The demonstration entailed clearing understory and midstory vegetation in two areas in North Carolina. A shopping center, a four-lane highway, and the Cherry Point Marine Base surrounded one area. The other area was directly adjacent to an apartment complex, with apartments within 20 feet of the forest boundary.

	Stand 1 (Shopping Center Area)	Stand 2 (Apt. Area)
Trees per Acre	285	54.7
Basal Area (ft2)	117.7	68.0
Average DBH (inches)	8.7	15.5
Production (Acres/PMH)	0.65	1.29

The stands had been regenerated naturally. The shopping center area stand contained 69-year-old longleaf pines. The apartment area stand contained 69-year-old pond pines. The average production rate over all production plots was approximately 0.97 acres/productive machine hour (PMH). Production rates in stands planted in rows may be higher. During the demonstration on the Croatan National Forest, the machine mulched the material to an acceptable level with two passes. All trees 5 inches in dbh and smaller were prescribed for removal, and the Woodgator® T-5 was able to handle all material. One pass may be adequate for most applications, where aesthetics and mulched material size are not important. One-pass treatments will have higher machine production rates, also.

SPECIFICATIONS AND COSTS: Assuming new equipment, the machine cost was estimated at $62/scheduled machine hour, including the operator's wage. Estimating a utilization rate of 65%, the cost per acre for both stands was approximately $98/acre. This cost does not allow for overhead, profit, or support. Higher costs may be realized due to ground conditions or regional location. Actual utilization rates may be higher. Fuel use was estimated based on horsepower of the machine.

The Woodgator® T-5 has a 116-horsepower engine. The Sundstrand 9400 series hydraulic pump provides 5,000 psi, with a hydraulic flow rate of 50 gallons per minute to the head. The drum cuts a swath of up to 5.2 feet wide. Individual teeth can be replaced as they break or wear. A new T-5 costs approximately $170,000[1].

Terra Services Inc. offers two larger versions of the Woodgator® and low ground pressure units, including the Tracgator®. The larger machines offer 177-225-horsepower engines, with cutting swaths of 7.5-8 feet. In applications where larger trees, downed logs, or log decks are to be mulched, these higher horsepower models may more appropriate choices. The low-ground-pressure units are tracked machines for wet site applications. Terra's cutting heads can also be boom-mounted on other prime movers.

Further information concerning this cutting system, or other mechanical treatments, may be obtained from the authors.

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[1] Price subject to change without notice.