

# Site Disturbance and Social Impacts of Animal Logging and Conventional Logging in Appalachia

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**Abstract** - Due to the public's perception of conventional logging, animal logging is making a comeback in southwestern Virginia. Animal logging offers less soil disturbance and has higher post harvest aesthetics than conventional logging. This is primarily due to the fact that animal loggers perform singletree selection harvesting while conventional loggers perform commercial clearcuts. However, animal loggers can economically harvest timber using singletree selection and inflict less damage to the residual stand.

## Introduction

There is much controversy today dealing with post harvest disturbance. This has led to an increase in public criticism and newer regulations in the forest industry that govern how and where harvests are performed. A majority of the public's criticism is due to urban sprawl. People want to relocate from metropolitan areas to quieter, more aesthetic areas. Many of these people are not aware of the scientific aspects of forest harvesting and rely solely on aesthetics to drive their thought process. Granted, a clearcut on a hardwood stand is not a beautiful sight, but can be beneficial to the environment if performed properly.

Animal logging is making a comeback in some regions of the country due to public demands on aesthetics. In Virginia, aesthetics ranks higher than income in forests owned by non-industrial private landowners (Sullivan 2002). Most practicing horse loggers perform a type of singletree selection harvests. The Healing Harvest Foundation practices the "worst first" tree removal by taking out only 30 percent of the dying, diseased, and over mature trees in a stand (Rutledge 2002). Landowners desire to see a forest of large, "old growth" trees on their woodlots and this is aided through singletree selection.

Another factor that is making animal logging an option for non-industrial private landowners is that 86% of forested land in Virginia lies in tracts of less than 50 acres (Becker 2001). Decreasing tract size increases logging costs of conventional loggers due to the set up and transportation costs. It costs a conventional logger anywhere from \$500 to \$2000

dollars in moving costs and lost productivity during a move (Visser 2002). Animal logging requires only minimal equipment usually including chainsaws, the animals, and a self-loading truck. Animal loggers can efficiently log tracts containing 20 MBF of timber and still profit from the job. The major advantage of skidding with horses is due to the minimum impact inflicted upon the harvest site. When using a logging arch, the deep disturbance (< 5cm) found is only as wide as the width of the log being skidded. Only light leaf litter disturbance occurs where the animal hooves contact. Since logs are cut into tree length sections, only areas that contact the felled bole receive disturbance. This is due to the fact that trees are skidded out in tree length sections and not in tree length form. The upper branches and canopy remain intact on the forest floor.

Landings on animal logging jobs are less disturbed and are more aesthetically pleasing than conventional logging jobs. This is mainly attributed to the low production of animal loggers. There is less of a need to construct a one-half to one-acre landing when a crew is only producing 1.5 MBF per day. Also, less landing area is needed for the animals to turn around. Higher aesthetics are also achieved by the lack of slash on the deck area. Many landowners detest a deck area because many loggers leave the area with huge piles of slash causing the area to be useless for many years. Another advantage of less landing area is the area of severe compaction is reduced. An animal can compact the soil just as bad as a skidder on active areas such as landings. This is due to the high number of pounds per square inch (PSI) exerted by the animal's hooves. Due to the weight of logs and equipment, severe compaction is inevitable on

harvested areas. However, the use of animal extraction limits these areas on a logging job.

One drawback of decreased slash on landings is the higher risk of erosion. Slash slows the velocity of water before it hits the forest floor thus reducing the impact of every raindrop. Slash also creates crude silt fences that slow the velocity of flowing water across a site and traps sediment particles that can lead to increased stream turbidity. However, erosion can be easily avoided on decks not containing slash by seeding in decks with grass seed.

## **The Study**

There were two sample sites for this study. Each site represented a typical harvest for the logging system. The animal logging site was located in Copper Hill, VA. Jason Rutledge performed the harvest during October 2002 using singletree selection. Equipment used on this harvest included a chainsaw, a mechanical log arch pulled by draft horses, and a truck mounted loader. The harvest area was approximately five acres in size. Slopes on this site ranged from 15 – 30%.

The conventional harvest was performed by Bill Best on Virginia Tech's Fishburn Forest located near Prices Fork in Montgomery County, VA. Mr. Best performed a silvicultural clearcut using all mechanized equipment. Mr. Best's equipment spread was slightly non-typical for the Appalachian region since all mechanized equipment was used. Equipment consisted of a tracked shear, grapple skidder, cable skidder, stroke delimeter and one trailer mounted loader. However, overall site disturbance would compare with a typical manual ground crew using chainsaws and cable skidders.

Since no actual comparisons existed comparing soil disturbance on animal logging and conventional logging using the point sample method, I conducted my own research. The point sample method is effective in giving the researcher an accurate measurement of soil disturbance of an area while being simple to perform. The point sample method involved traversing over the harvested site and recording the disturbance of a point every meter. At each point, the forester assesses the point and records a disturbance category. The disturbance categories range from disturbance category 1 which is no disturbance to category 11 that represents non-soil disturbances. Each category is explained in detail on chart 1 on page 4.

Precautions were taken to keep data accurate. All traverse lines were run perpendicular to skid trails to avoid excessive sampling. Excessive sampling of the skid trails would cause the data to show higher amounts of deep disturbance on the entire sampling site when these conditions may only exist on the skid trails. Also, the segments closest to the landings on both sites were sampled. This captured the highest disturbance areas and kept both sampling areas equivalent in respect to sample location. Slopes on this harvest site were between 15 and 30%.

## **Results**

The non-disturbance category had the largest difference. Fifty six percent of the animal logged site was undisturbed while only 20% of the conventionally harvested site had no disturbance. Both sites had almost equal amounts of light disturbance. Only 1% of the horse logged site contained deep disturbance and this was in the category of less than 5 cm deep. The conventionally logged site had 11% of deep disturbance. Almost 8% of this was in the category of less than 5 cm deep. The conventionally logged site had over 5% of slash over the site while 27% of the horse logged site was covered in slash. This can be attributed to the fact that the horse logger was performing singletree selection and the conventional logger was performing a silvicultural clearcut.

## **Discussion**

Chart 1 on page 4 illustrates the reduced soil disturbance caused by animal logging. Reduced soil disturbance is mostly due to the fact that the majority of animal loggers in this area harvest using singletree selection methods. Most conventional crews harvest using commercial clearcuts or silvicultural clearcuts when harvesting. There is more passes made back and forth a harvest area during a clearcutting operation than a singletree selection harvest. Furthermore, extracting tree length logs rather than cut to length material causes more ground disturbance.

The high percentage of slash on the conventionally site is largely attributed to the use of a stroke delimeter. The stroke delimeter is able to delimb the trees where they were felled. This allows for slash

to be distributed uniformly on the site. Also, the use of a grapple skidder allows for the accumulated slash on the deck to be distributed back on the harvested area.

Most crews in Appalachia do not have this equipment spread but are able to have comparable amounts of slash on the site. This is possible since the timber cutter bucks and limbs the trees where they are felled. However, crews that skid tree length timber with a cable skidder leave less considerable amounts of slash onsite. This is due to the fact that all the trees are delimbed at the deck. The loader operator puts all the slash into piles on the deck after delimiting. The loader operator does this since slash cannot be skidded back onto the site with a cable skidder and still is productive.

Conventional loggers are physically able to extract timber using singletree selection and cause minimal soil disturbance. However, it would be extremely difficult economically to perform this type of harvest. This is due to the fact that in singletree selection, accurate directional felling trees is absolutely necessary. This harvesting system would cause felling to be the limiting factor on productivity and economics. Labor costs prevent the economics of this system to be feasible. Experience saw operators are becoming increasingly difficult to locate and expect decent pay (\$12/hour minimum).

There will always be demand for conventional logging in Appalachia. Mills will always need the volume of timber that conventional logging operations are capable of supplying. Landowners who have larger tracts and want the maximum

amount of revenue on their timberlands will demand conventional loggers.

Animal logging will gain in popularity over the coming years. This is due to the social demands of high aesthetics and minimal disturbance. Also, decreasing tract size will make some tracts uneconomical to harvest for many conventional crews. Animal logging will be another option for forest landowners who want to manage their timberland.

## References

- Becker, Charles W. 2001. Virginia Forests: Our Common Wealth. Virginia Department of Forestry, 24pp.  
<http://home.att.net/~grindstone/le/logsys/horse/horse.html>. Horse Logging: A Method of Pleasing Your Adversaries.
- Rummer, Robert B., Toms, Christopher W., Wilhoit, John H. 1996. Animal Logging in the Southern United States. Presentation at annual ASAE meeting.
- Rutledge, Jason. 2002. Environmentally Sensitive Harvesting Guest Lecturer. Virginia Polytechnic Institute and State University. Blacksburg, VA.
- Sullivan, Jay. 2002. Forest Resource Management Class Lecture. Virginia Polytechnic Institute and State University. Blacksburg, VA.
- Visser, J.M. (Rien). 2002. Environmentally Sensitive Harvesting Class Lecture. Virginia Polytechnic Institute and State University. Blacksburg, VA.
- Willis, Jim. 2000. Forestry Focus: Of Cow and Trees. Virginia Cooperative Extension Service. [www.cnr.vt.edu/forestupdate](http://www.cnr.vt.edu/forestupdate).

**Chart 1. Illustrates soil disturbance categories between both study sites.**

