

Logging



Hauling Logs from Woodland Properties

The efficiency of your woodland harvesting process depends on the efficiency of your loading and hauling activities. With proper planning and good contract supervision, you can help loading and hauling proceed smoothly.

This publication covers landing organization, road conditions for hauling, equipment for loading, and hauling costs. It also describes special concerns for woodland owners.

For several reasons, you need to think about hauling as a separate but interrelated part of timber harvesting. First, if you do your own cutting and skidding, you may need to contract hauling services. Even if you contract the entire harvest job to a logger, most logging contractors subcontract all or part of the hauling.

Second, loading and hauling can be expensive, and inefficient landing arrangements or poor roads may substantially reduce your returns.

Third, if you load and haul timber from "cold decks" (logs placed in piles for hauling after the yarding operation is complete), the logging contractor may move on to another job and leave you to supervise the loading and hauling.

The principal objective of hauling is to transport the logs to market in a timely and efficient fashion. You must carefully organize landings and log decks, roads must be adequate, and you should know requirements for loading equipment. These all influence the cost and efficiency of loading and hauling.

Landing and log decks

Your first step in planning is to determine whether the logs will be cold-decked or loaded and hauled out as soon as they are yarded into the landing (hot loading). A relatively large harvest operation capable of producing more than six loads per day is needed for hot loading. Otherwise, the loader will be idle for part of the day.

Most commonly, logs from woodland properties are loaded and hauled from cold decks.

Arrangement

Landings must be large enough to accommodate the decks and still allow room for the loader to maneuver. If you use a single landing, its surface should allow the truck and loader access to the logs.

You need rocked landings for winter hauling; compacted dirt is adequate in summer. The landing

grade should not be greater than 8 percent.

Sometimes timber is decked continuously along a road or on a series of landings along a road. Make sure that you have at least a full load at each spaced-out landing. There should be enough long logs (greater than 32 feet) to cover the bunk and stakes (called *bunk logs* and *wing logs*) of the log truck so a load can be assembled. Finally, prepare a truck turnaround near the landing.

Log decks

Build decks to facilitate loading (see figure 1). The list below offers some guidelines:

- Deck logs with ends closest to the loader even.
- Make sure all logs are bucked a maximum length of 48 feet plus trim.
- Deck logs so they can be reached from the loader position—a maximum 12 to 15 feet away for self-loaders.
- Do not mix brush, tops, limbs, or cull logs in the deck.
- Deck long, limber logs with butts toward the loader (see figure 2); otherwise, they will break during loading.

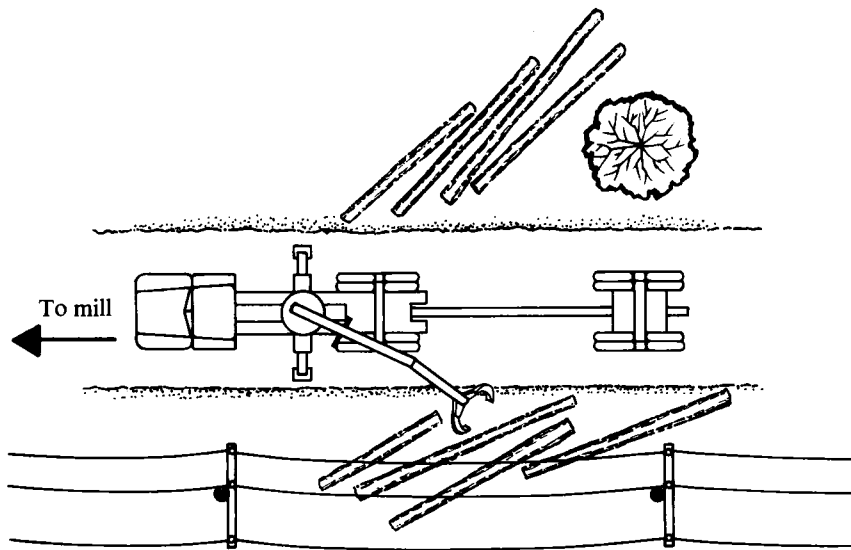


Figure 1.—Common problems of log decks are uneven ends, mixed lengths, obstacles, unseparated bunk and wing logs, and piles of logs in awkward angles for loading.

- Alternate butts and tops in the deck to help build a better load.
- Buck big logs within the capacity of the loader and align the butts toward the loader.
- If the ground slopes, deck on the uphill side; loader reach is limited below road level.
- Do not deck near obstacles like standing trees and overhead wires; they could hamper the swing (or turn) of the loader.

If you must deck logs beyond the reach of the loader, have a skidding machine available to push logs within reach. Logs headed for different destinations should be decked separately so they can be used to “top off” a load (see figure 3).

Woodland roads

Before loading or hauling, make sure your road is adequate for heavy traffic. Truckers may refuse to haul your wood if they anticipate getting stuck or damaging their vehicles.

Surface conditions

For winter hauling, roads should be rocked. For summer hauling on a dirt road, a few loads of rock on soft spots or steep pitches are helpful.

Keep truckers informed of road conditions. Let them know if logs can be hauled after a rain shower or if the road needs a few days to dry out.

Clearances

Trucks need at least 14 feet of overhead clearance and 10 feet of width (to clear mirrors). Buildings, fences, and power lines may be especially troublesome on woodland properties.

Curves and tailsweep

Trucks hauling poles and long logs need adequate room to negotiate curves (see figure 4). While woodland roads are likely to have curves, they are not a problem if truck speed is slow. However, if you expect truck speed to be 15 miles per

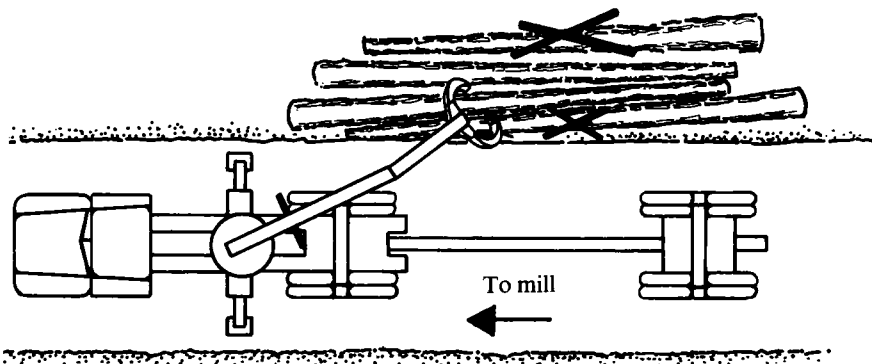


Figure 2.—Deck long, limber logs with butts toward the loader.

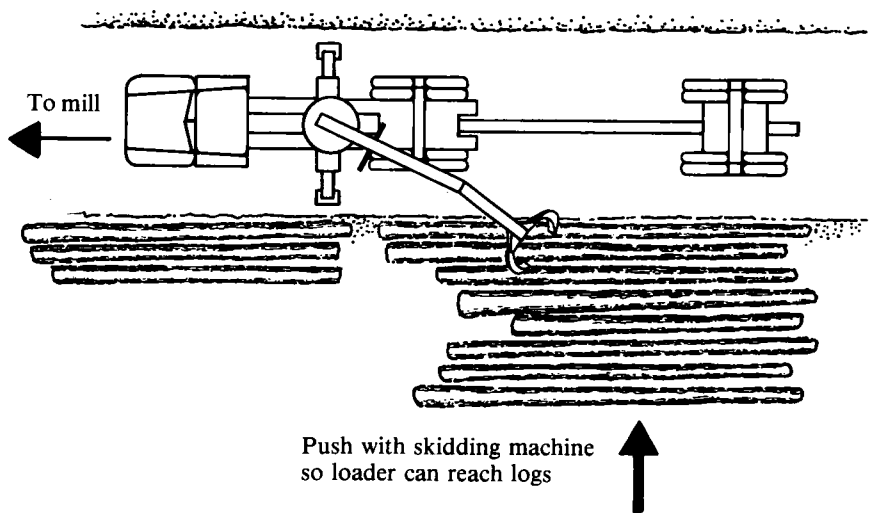


Figure 3.—Good deck arrangement for loading.

hour or greater, curves can add greatly to hauling time.

Intersections

Make sure intersections with main and public roads measure less than 90° (see figure 5). Approval of the Oregon Department of Transportation district engineer is required for roads that intersect public highways.

You need a permit to load logs from a public highway (check with your county engineer or the state district engineer). You must place signs warning "Watch out for log trucks" within 300 feet of either side of the intersection.

Grades and vertical curves

If you have steep road grades, check with the logger or trucker to be sure that a loaded log truck can pull itself up the grades. Where two different grades meet, use a vertical curve to smooth out abrupt grade changes (see figure 6). Make sure the truck will not be in a bind from limited vertical movement.

Weight limits

Check with the county engineer to determine if log hauling is permitted on public roads leading to your property. Arrange for permits if necessary. If you are unsure about the sturdiness of bridges on your property, have an engineer check them.

Loading equipment

A variety of equipment is available for loading logs. The most efficient selection will depend on timber size and volume, the machine's materials-handling capability, its landing-to-landing mobility, and (of course) its operating cost.

The basic types of loaders are front-end loaders, heel boom loaders, and self-loading log trucks. Front-end loaders and heel boom loaders may be mounted on tracked or rubber-tired carriers. Heel boom loaders may be further classified as cable or hydraulic loaders depending on their operating mechanisms.

All loader types are adequate for most woodland loading jobs (see table 1 for a comparison of loaders).

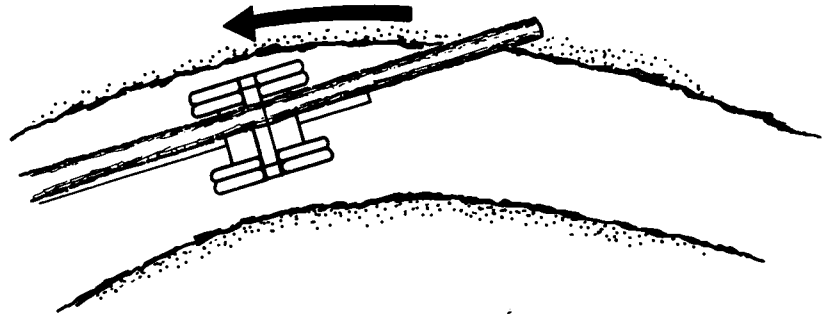
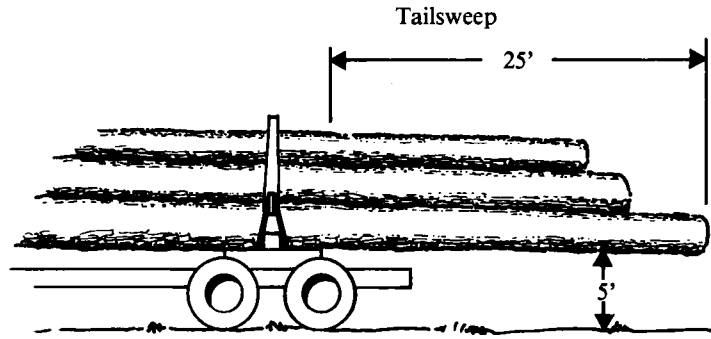


Figure 4.—Poles and long logs need room to negotiate curves and accommodate tailsweep.

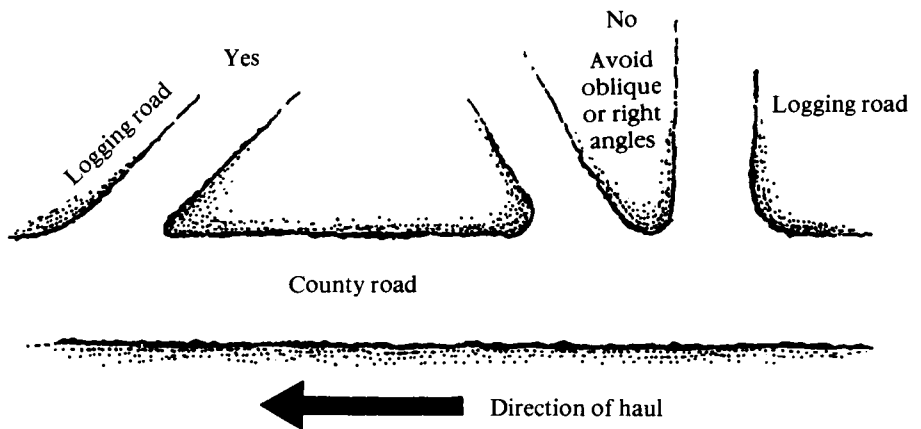


Figure 5.—Proper and improper road intersections.

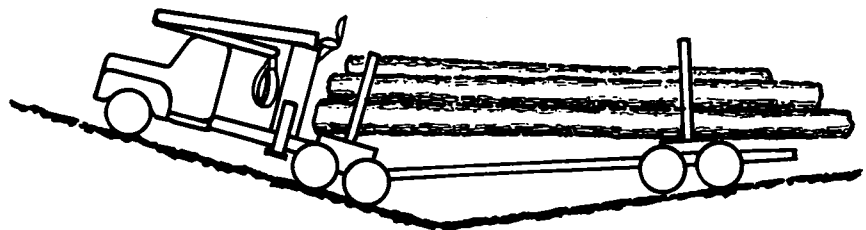


Figure 6.—Steep grades and abrupt grade changes can put a truck in a bind, limiting its vertical movement.

Table 1.—Loader comparison

Criteria	Front-end		Cable		Hydraulic		Self-loaders
	Tracked	Rubber	Tracked	Rubber	Tracked	Rubber	
Materials handling capacity: timber size	Medium logs; long logs create problems	Medium logs; long logs create problems	Medium to very large logs	Medium to very large logs	Small to large logs	Small to large logs	Small to medium logs
Landing-to-landing mobility	Adequate	Excellent	Poor	Excellent	Poor	Excellent	Excellent
Landing space needed	Medium, difficult to load in the road	Large, difficult to load in the road	Small	Small	Small	Small	Small
Operating cost	Low	Low	Moderate to very high	Moderate to very high	Moderate	Variable	Buried in hauling cost
Operating training requirements	Moderate	Moderate	High	High	Moderate	Moderate	Low
Maintenance requirements	Moderate	High (because of flat tires)	Moderate	High	Moderate	High	Low
Special advantages and limitations	Good traction; versatile, (e.g., buckets, debris handling)	May be traction limited; can carry logs to 500'; versatile, (e.g., buckets, debris handling)	Moves slowly	Mobile on highway; can load on pavement	Moves slowly	Mobile on highway; can load on pavement	Can pick up small scattered volumes; reduces load volume by 20% or so
Requirements for moving machine to property	Lowboy move required	Depending on distance, may not require lowboy move	Lowboy move required	Depending on distance, may not require lowboy move	Lowboy move required	Depending on distance, may not require lowboy move	No problems

However, to select the appropriate loader for your situation, you must consider the overall price per unit volume loaded. (Loading and hauling costs usually are lumped together as a single cost or bid figure.)

Operating limits of loaders

Match the size of the loading machine to your timber and landing arrangement. A machine's ability to reach and lift from the loading position is limited.

Front-end loaders can only lift certain loads vertically before they reach their tipping point (the load causes the rear of the machine to lift off the ground).

Heel boom loaders can lift different loads depending on machine size, the load's distance from the machine center, counterbalance weight, and whether they are lifting over the end of the machine or the side.

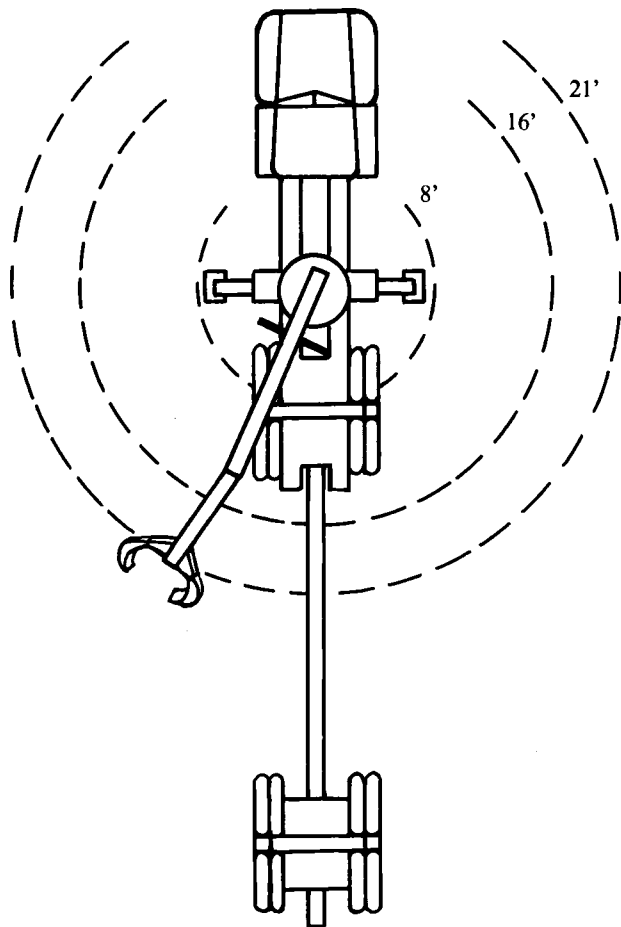
Depending on their size, loaders on self-loading log trucks have both weight and distance limits (see figure 7). Remember, the larger the loader on a self-loader, the less payload the truck can haul. Self-loaders also have constraints on the landing and deck arrangement because they must operate from the road.

Decision: Self-loaders or separate loaders

There are cost tradeoffs in selecting self-loading trucks over a separate loader and conventional trucks. Whether you intend to cold deck logs on your property, or haul them as soon as they are yarded, the loader operation must match the capacity of the yarding or skidding.

Clearly, the *availability* of self-loading log trucks or separate loaders will help determine which type of loader you use. During peak demands, it may be difficult to obtain self-loading trucks.

The decision analysis is usually limited to comparing moderately



Lift capacity of self-loaders

Distance from center of load (feet)	Average size loader (pounds)	Large capacity loader (pounds)
8	12,500	21,000
16	6,200	10,500
21	4,500	7,750

Figure 7.—Self-loaders have different lifting capacities depending on machine size and distance from loader.

new equipment; however, some landowners and loggers maintain a depreciated loader for small jobs when high machine utilization is not required.

Self-loaders carry about 15 to 20 percent less volume than a conventional log truck. Their high initial cost increases the hourly operating rate from 10 to 25 percent over conventional trucks. When you consider the reduced payload and high costs, the cost per unit volume loaded and hauled may be more than 20 percent higher than a separate loading and hauling operation, especially for long hauls.

Self-loaders are most efficient for picking up small volumes or scattered volumes when you cannot justify bringing in a separate loader. Short hauls are better than long hauls because the operator spends less time carrying the dead weight of the loader.

Some operators use the loader on a self-loader to first load a conventional truck and then themselves. If

scheduling can be arranged, this combination adds to loader utilization.

A small loader on a rubber-tired carrier does not need a lowboy to move it to the site. To use the loader effectively, you need to keep two or more trucks hauling enough volume from the property.

Operating cost of the loader is about $\frac{2}{3}$ that of a self-loader. The combined loading and hauling cost can be less than that of a self-loader if sufficient trucks and log volumes are available to keep the loader utilized. Longer hauls add to truck efficiency.

Larger, more efficient loaders may, on occasion, be used on woodland properties. They usually require move-in time or a lowboy move but can be justified if sufficient volume and truck trips are available to offset the high operating and move-in cost. It would be unusual to move a large loader to an area for less than 4 to 5 days of loading.

Cost influences

Most bids for loading and hauling services are based on knowing the fixed and variable costs of the hauling activity. Divide these costs (including profit and risk) by the amount of volume that can be hauled during the day.

For example, if loading and hauling costs run \$400 and two trips per day are possible with an average 4,000 board foot (4 MBF) per haul, the cost is \$400 divided by 8 MBF, or \$50 per MBF. If three trips per day are possible, the cost is \$400 divided by 12 MBF, or \$33.33 per MBF.

These figures are hypothetical and are not meant to suggest actual rates. Rates depend on market conditions, contractor requirements, and factors associated with each loading and hauling operation. These include:

- *Haul distance* (this translates into number of trips);
- *Loading time* (loading efficiency and deck arrangement);

- *Delays* (may be from road conditions, scaling requirements, poor directions, etc.);
- *Type of logs* (species, diameters, and lengths—small logs contain less board foot volume than large logs, yet may be equivalent in weight and take more time to load);
- *Type of truck* (a statewide survey found average volumes hauled to be 4,560 board feet for conventional trucks, 3,730 board feet for self-loaders, and 5,294 board feet for short loggers—truck and trailer loads). (These numbers do not necessarily indicate truck capacity.)

Payment by weight

Many contractors bid hauling (and even logging) by weight. Loads are scaled on a sample basis to estimate volumes, but costs are on a per-ton basis. This is most equitable for hauling because it removes the variation in volume from different log sizes and reduces the scaling delays in small logs.

Weight limits are set for highway hauling. Conventional trucks can carry about 26 tons. Dividing the cost per day by the number of tons hauled per day gives a consistent hauling price. Sample scaling provides volume measurement as needed.

Make sure the hauler knows how and when payment will be made, how much the payment will be, and who is responsible for payment.

Special concerns

You may have some of the following special concerns about log hauling.

Locating log haulers

The Oregon State University Extension forestry agent serving your county can help you locate a contractor. You also can call the Oregon Forest Products Transportation Association (Salem, Oregon) to obtain a list of haulers in your area. In addition, your log purchaser may be able to suggest a contractor or provide you with one, and fellow woodland owners may have a name to suggest.

If sufficient values are involved, get competitive bids and use a written contract or letter of agreement. Do not order truckers for less than a day's work or for partial loads. Give good directions and, if necessary, meet them for the first trip onto your property.

Load accountability

Register your log brand and make sure your logs are branded. Make out a load ticket in duplicate for each load, showing your name, the trucker, destination, date, and number of logs. Keep one load ticket and send one with the trucker for the scaler. Oregon law requires anyone transporting forest products to have this information.

You will receive a scale or weight ticket for each load plus your original load ticket from the log purchaser.

Traffic control

Always control traffic when logs are being hauled on your property. Be sure the haulers have adequate vehicle liability insurance; woodland owners are particularly vulnerable to traffic accident claims.

Locked gates

Tell log haulers which gates to leave open or closed. Provide truckers with access to locked gates and don't lock the gates until all the trucks are gone for the day.

Summary

To efficiently plan and organize a hauling operation from your woodland property, you must attend to details and make key decisions.

Organize landing arrangements and log decks to help the loading rather than hinder it. Make sure your roads are adequate for heavy traffic; permits may be required. Decide which loading and hauling equipment you will need for your operation and be prepared to make financial and other arrangements with truckers hauling logs from your property.

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Extension's forestry program improves Oregonians' knowledge of forest resources and their options for expanding benefits from these resources. This educational program assists forest owners, managers, processors, and users in understanding small woodland production and management and use of all forest lands. Priority subjects are reforestation, growth, management, harvesting, processing and use of wood, protection of soil and water, and other multiple uses and values.

This publication was prepared by John J. Garland, Extension timber harvesting specialist, Oregon State University. It is one of a series of publications being developed as an Extension Woodland Workbook. Your county Extension forestry agent has additional information.

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