



# Planning Woodland Roads

Woodland roads are the foundation for long term development of your property. Roads are not the byproduct of a harvesting operation; you should plan them in advance. Woodland owners should coordinate with other land management plans to provide access for harvest (including salvage operations), regeneration, site preparation, stand management (thinnings), fire protection, and general access for hunting, firewood gathering, and other uses. Planning for roads can yield large gains.

Because woodland roads involve large sums of money and can have significant environmental consequences, you should develop specific objectives for road development. The most common need for roads occurs immediately before harvest activities, but consider other elements.

Will the road be *capitalized* (depreciated annually or amortized over timber volumes removed), or will it be *expensed* (annual taxable income reduced by expenses occurring within the year) during timber harvesting?

Are road costs hidden as part of the timber contract? Can you tie the harvest of large timber to road construction while the larger equipment is available on the property? What contract provisions will you need for roads? How should soil and water resources be protected? Planning for woodland roads addresses such questions in advance.

This publication, one of several on woodland roads, covers planning; others will cover road design, construction, and maintenance. The planning information included here is: seeking help with roads, timing of road development, steps in road-building, information needed for planning, rock surfacing, contracting, financial considerations, and planning for soil and water protection.

Finally, some suggestions are provided to help you critically review roads on other woodlands and relate your observations to roads planned for your own property.

## Seeking help

Before embarking on a woodland road project, determine whether you need technical help. It is available from a variety of sources. Some general help is provided without charge; however, the price for detailed advice can be recovered easily by savings in road construction or by avoiding environmental problems.

Table 1 identifies some of the conditions that often call for technical decisions during planning of woodland roads. Some of these are related to the property itself; others are associated with the scale of operation and your own skills. No decision table can absolutely determine when technical help is needed; each woodland road is unique for the terrain it crosses.

Some woodland roads are easy to locate and construct, while others could be financial and environmental disasters. Some technical review and prior approval may be required because roads are covered under the Oregon Forest Practices Act; permits are required before operations.

When reviewing table 1, circle the conditions that normally require technical assistance on your land. If you circle two or more of the conditions, seek technical assistance as indicated. If you circle only one condition, evaluate whether you can acquire sufficient skills to handle the condition.

Because road development is an infrequent activity and roads themselves are financial and environmental risks, you should obtain technical assistance to reduce these risks.

## Road development on the property

Woodland owners typically must decide how much road to build. Should you build roads as needed, or should you develop the property at one time? Several considerations bear on the decision.

Building short stretches of road as needed makes sense to some landowners. Roadbuilding can be a do-it-yourself activity requiring much less money. You could build the easy roads and contract more difficult stretches. There is less maintenance required when roads are sequentially developed.

Table 1.—*Decision table for technical assistance*

Conditions	Woodland owner can handle	Technical assistance needed	Source for assistance
Slope on hillside where road to be built	Less than 40%	Greater than 40%	Forester, engineer, road contractor
Stream crossings	Class II streams,* culverts less than 48"	Class I streams,* greater than 48" culverts, bridges, etc.	State forest practices forester, engineer, forester
Terrain	Stable and/or nonerosive	Unstable and erosive (slumps, slides, bare soils, silty soils)	State forest practices forester, engineer, forester, road contractor
Soil depth and rock outcrops	Deep soils—no blasting	Shallow soils, rock blasting	Engineer, road contractor
Soil moisture	Well-drained	Wet spots, swamps	State forest practices forester, engineer, forester, road contractor
Scale of operation & finances	Short roads less than ½ mile, less than \$5,000, low-intensity use	Long roads greater than ½ mile, greater than \$5,000, high-intensity use	Forester, engineer, accountant, lawyer
Road crossing other ownerships	Written agreement exists	Agreement to be negotiated	Lawyer, engineer
Owner skills & equipment available	Has equipment or rents it; knows how to operate it	Lacks both	Road contractor

\* You can determine stream classes by visiting State Forestry Department offices with a legal property description in hand.

Building all your roads at one time provides immediate access to the entire property. You can take advantage of harvesting to meet particular markets, provide fire protection to the whole property, and carry out land management operations, as well as enjoy recreation on your property.

Some woodland owners can tie the harvest of large timber on their property to road development. Harvesting the large timber requires equipment of sufficient size to be useful for roadbuilding as well. The harvest of large timber also helps generate the money needed for road construction.

## Steps in roadbuilding

Steps for building most woodland roads include:

1. *Reconnaissance.* Scout the property to assure that road location meets management needs. Find "control points" (locations where the road must be built, such as landing areas, or locations to avoid, such as rock outcrops or wet areas).
2. *Design.* Develop the specifications for the road. Determine grades, widths, curves, cut and fill information. If you use a contract, develop plans and details for it.
3. *Layout.* Provides design guidelines to those doing the construction. Ribbons and stakes generally identify the right-of-way, road centerline, and the location for cuts and fills.

4. *Right-of-way logging and building a pioneer road.* Remove timber and deck it where it can be hauled away after the road is built. A pioneer road (narrow with little excavation) is needed for logging and should be located to help the later steps.

5. *Clearing and grubbing.* Remove stumps and other organic debris from the roadway. While you can cut some stumps low and leave them, you should remove most of them to avoid holes as they rot out. Also, they are obstacles to excavation. Do not add brush and other debris to fill areas.

6. *Excavation to grade.* Cut the earth down to grade; build fills in compacted layers up to grade.

7. *Installing drainage features.* Cross streams with culverts, bridges, or other structures. Consider road cross-drains. How does water get into the cross-drain? How is it dissipated across the road?

8. *Surfacing.* Dirt roads need to have surfaces smooth enough for traffic and surfaces that will handle rainfall effectively. Build gravel roads by spreading the gravel and then reshaping the road surface for drainage purposes.

A typical schedule of roadbuilding activity spans 18 months to 2 years. Table 2 outlines the roadbuilding events and their timing.

## Planning information

A variety of information sources are available to help woodland owners plan their woodland roads. A primary consideration is the legal assurance that the road is on the woodland property. If your property has been surveyed, the boundary markers may be evident. If you are uncertain of property boundaries, check your property descriptions, consult your county surveyor for survey information, and perhaps consider a property line survey if necessary.

Table 2. *Schedule of roadbuilding*

Year 1				Year 2			
Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
RECON							
DESIGN							
LAYOUT EXCAVATION							
DRAINAGE*							
ORDER CULVERTS							
MAINTENANCE							
SURFACING*							
MAINTENANCE							

\* If you can schedule some log hauling after the road is built and before surfacing, the road will benefit from the compaction. The road will especially benefit by overwintering before surfacing.

Roads that connect with existing roads off the property, or roads that may cross a neighbor's property, need to have a right-of-way or road use agreement prepared. Legal advice can save problems from later misunderstandings of verbal agreements.

Maps or aerial photos can be especially helpful to road planning. Check with adjacent owners and government agencies, such as the Oregon Department of Forestry, U.S. Soil Conservation Service, U.S. Bureau of Land Management, and U.S. Forest Service for the availability of maps and photos covering the property. At a minimum, maintain a detailed drawing of your property showing the roads.

The Soil Conservation Service (SCS) can be especially helpful. The SCS often has soils maps or photos covering the property that yield good information on roadbuilding problems that you may encounter.

Once road planning is advanced far enough to set a tentative location, consult the forest practices forester (FPF) of the Oregon Department of Forestry. You must obtain permits before roadbuilding, and the FPF can describe what measures will be needed to protect soil and water resources.

If the road location and likely construction problems are difficult, the FPF may visit the property to discuss the road and reach an agreement with you on a plan he or she must approve before road construction proceeds.

You may need consulting advice and services from a forester, engineer, or road contractor for some woodland roads. The quality of service provided and fees charged may be variable; seek references and even solicit bids for the job if significant values are involved.

By learning how to use some basic measuring tools, you can develop information to help in road planning and check on the progress of roads during construction. The OSU Extension Service through its county-based forestry agents can help you with your educational needs and refer you to a variety of Extension publications related to roads and woodland management.

### Surfacing woodland roads

For many woodland owners, a well-maintained dirt road is sufficient for their property. However, a rock road can provide all-weather access to the property and improve hauling and road maintenance. Specific techniques are covered in the Extension publication *Rocking Woodland Roads* (see "Suggested readings," below) but several planning related issues are raised here.

Surfacing woodland roads may double the cost of the road. Typically, the rock is applied in two layers or courses. The *base course* is larger rock to support the load on the road; depth of the base course is 6" to 18" as needed. The running surface or *topping course* is a 2" to 4" layer of smaller rock.

You must decide how much of the road to surface, or simply whether you will use rock to maintain or improve spots on an otherwise dirt road. The cost of surfacing depends on the length of road, the depth and width of rock you need, and whether the rock is available nearby or must be hauled to your property.

If rock is available on the property, you have a great advantage over those who must haul it from a distant source. Some rock on woodland properties can simply be dug out of the hillside and spread on the road. Other rock sources on woodland properties may require development of a rock pit.

While numerous regulations and permits are required for rock pits, the value of the rock may be significant. Most owners need technical assistance for this development.

The financial and tax treatment of the surfacing is likely to be a consideration. You may expense the cost of rock used for maintenance and for *temporary* roads against the year's income.

You may treat rock used for *permanent* roads differently from a tax standpoint (see discussion below). Rock that you encounter as excavation for the road and that you spread adjacent to the excavation site is considered part of the road construction costs.

## Contracting considerations

If the value (or construction cost) of your woodland road is sufficient, consider a written contract for road construction. A contract details for the contractor how the road should be built, and it protects your interests as landowner. Logging road construction contracts contain many design specifications; they often provide the contractor with a grade and ground profile of the road centerline. You may need technical assistance from a forester or engineer, as well as an attorney, to prepare a road construction contract.

Because road construction is often tied directly to timber harvesting, the timber contract (sale or service) may contain the roadbuilding provisions. While the logging contractor may be capable of building some roads that meet logging and woodland management objectives, the ordinary timber contract may not be adequate to meet your objectives for road construction unless you modify it.

*The purpose of contract specifications is to translate the road design information to the contractor.* Specifications cover road widths, lengths, etc., and prices, as well as responsibilities. Contract specifications control the roadbuilder's performance during the contract period.

If you need further control of roadbuilding, either to protect your interests or because construction is difficult or environmentally sensitive, use construction stakes to convey information to roadbuilders.

Stakes and ribbons mark the limits for the contractor's activity between clearing lines (right-of-way) and tell the contractor where to cut and fill. If the contractor follows the construction staking information, the road will be built to your design specifications.

Under some circumstances, it is well worth the extra engineering expense to develop a detailed road construction contract and then provide construction staking to support the contract.

If a contract (verbal or written) covers road construction, you or someone you designate must oversee the roadbuilding. Even though you may use a detailed written contract, the contract supervisor has to be at the construction site frequently to assure performance. Times and activities especially critical for contract supervision include:

- the start of excavation,
- during installation of stream crossings (culverts, bridges, etc.),
- during final grading, and
- before the large excavation equipment is moved from the site.

Other times and activities depend on circumstances; however, it is important for landowners to be available for any necessary design and construction changes as the road is being built.

## Financial considerations

Because woodland roads may cost from \$8,000 to \$100,000 per mile, you will need to address several financial and tax concerns during planning. The most immediate question may be where the money is coming from to build woodland roads. If road construction is tied to timber harvest, you have the option of lumping timber harvesting and roadbuilding costs together or separating them and itemizing costs in more detail.

There are several advantages to knowing what woodland roads cost as opposed to burying their cost in a timber harvest operation. First, you can clearly see the impact of road construction on timber harvest returns. Second, when you know the value of the road, the importance of maintenance becomes more obvious for asset protection. Finally, you can document the cost of the road for tax purposes.

As of this writing, the Internal Revenue Service (IRS) treatment of woodland roads is unclear. Resolving the tax treatment may require tax court decisions and IRS revisions. Prudent landowners who are involved with permanent roads should review their circumstances with a certified public accountant (C.P.A.).

At issue is whether woodland roads are classed as *temporary* or *permanent*. The uncertainty is caused by a tax shift to the Accelerated Cost Recovery System (ACRS) and away from a tax accounting system based on an asset's useful life.

Costs associated with *temporary* roads used for timber harvest within a short period (normally 1 year) are expensed against the year's income. However, if the road serves the property for longer than 1 year of harvesting or accesses the property for additional harvest units, then you may consider it a *permanent* road.

Other road items that you may expense include maintenance, reconstruction, landing construction, and surfacing rock used for maintenance. Skidroads are not considered permanent roads even though they may be used later in woodland management.

Advice from a C.P.A. is warranted because you may be asked this question: "Did you build the road to harvest the timber, or did you harvest the timber just to build the road?" The relative amounts of revenues versus expenses help answer this question.

*Permanent* roads access the property more than for current harvest needs and are classed for tax purposes as capital assets. Capital assets are further placed in certain *asset classes* under the ACRS approach, and only a portion of the cost each year may offset annual income.

The number of years that you must apportion the road cost against revenues is uncertain until the IRS rules are clarified. Your C.P.A. should address these issues at tax time.

Another concern is the amount of resources you allocate to initial road construction versus annual maintenance problems. By not allocating enough interest and resources to get the road built properly, you may

face annual maintenance problems beyond your capability. Once the contractor removes the roadbuilding machinery from your property, you may not have skills or equipment to handle severe maintenance problems, such as road failures or culvert problems.

## Planning for environmental protection

Roads are the source of most problems with soil and water protection—both on your woodland property itself and on downstream adjacent properties. Adequate road planning assures that road drainage, stream crossings, and placement of excess excavation will not create problems during and after road construction. Publications and other sources of information are available to help landowners in planning for environmental protection (see “Suggested readings”).

## Critically reviewing roads on other properties

Woodland owners typically have time to study and deliberate their decisions on woodland roads. Therefore, you can critically review roads built on other properties and collect information and experience to help with your roads. Simply by driving roads on other properties and using a mental checklist, you can gain valuable insights from the successes and failures of others.

A primary point on the checklist is to relate the road to the owner's use requirements. Government and large industry roads may be built to higher standards than you would need for your woodland properties. However, there are useful points on these roads that do relate to woodland-owner roads. The checklist below is not a complete list of criteria, but it should help you to critically review other owners' roads.

- Check the width and road surface. Is it a crowned road, an inslope or outslope road? Would water quickly drain off the surface? Is the road rocked? How much rock?
- If you were a log truck driver, how would you evaluate the grades? Too steep?
- Check the horizontal curves; could a load of poles get around the curves?
- How do the cutslopes and fillslopes look? Are they holding up?
- Check the road intersections at the highway and with other roads. Any safety or traffic problems?
- Check the culverts, bridges, and stream crossings, as well as the road drainage features. Are they adequate for storm conditions?
- Review the maintenance on the older roads. Are ditches and culverts plugged?
- Look for erosion-control measures, such as grass seeding, culvert outfalls, etc. Are they effective in halting erosion?
- Look at road failures and piece together information on what might have caused the failure. Look for evidence that water wasn't properly drained.

## Conclusion

Planning for woodland roads means that woodland owners must give careful thought to their property development and roadbuilding objectives. You need to carefully assess whether you can handle the roadbuilding yourself or must contract for it. A variety of planning information is available to you, especially in planning for soil and water protection. Major planning decisions involve financial concerns and rock surfacing. Finally, you can develop your roadbuilding knowledge by critically reviewing roads on other properties.

## Suggested readings

(Order OSU Extension Service and PNW publications from the Bulletin Mailing Office, OSU, Corvallis 97331; enclose the amounts indicated.)

Adams, Paul W., *Maintenance of Woodland Roads*, Oregon State University Extension Service Circular 1139 (Corvallis, 1983, in press).

Adams, Paul W., *Soil Compaction on Woodland Properties*, Oregon State University Extension Service Circular 1109 (Corvallis, 1983). Single copy 50¢ plus 25¢ postage.

Berglund, Erwin R., *Seeding to Control Erosion Along Forest Roads*, Oregon State University Extension Service Circular 885 (Corvallis, reprinted 1978). Single copy 75¢ plus 25¢ postage.

Berglund, Erwin R., and Marvin Rowley, *Rocking Woodland Roads*, Oregon State University Extension Circular 859 (Corvallis, 1975). Single copy 25¢ plus 25¢ postage.

*Field Guide to the Oregon Forest Practice Rules*, Oregon State Department of Forestry (Salem, issued annually). Order from Oregon Department of Forestry, Salem 97310.

Garland, John J., *Designing Woodland Roads*, Oregon State University Extension Service Circular 1137 (Corvallis, 1983). Single copy \$1.75 plus 25¢ postage.

Garland, John J., *Road Construction on Woodland Properties*, Oregon State University Extension Service Circular 1135 (Corvallis, 1983). Single copy 75¢ plus 25¢ postage.

Side, Roy C., *Impacts of Forest Practices on Surface Erosion*, Pacific Northwest Extension publication PNW 195 (Oregon State University, Corvallis, 1980). Single copy 50¢ plus 25¢ postage.

Side, Roy C., *Slope Stability on Forest Land*, Pacific Northwest Extension publication PNW 209 (Oregon State University, Corvallis, 1980). Single copy no charge; 25¢ postage.

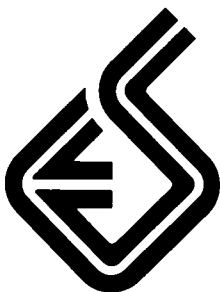
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**This publication** was prepared by John J. Garland, Extension timber harvesting specialist, Oregon State University.

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