DOING A TIMBER HARVEST

OREGON STATE UNIVERSITY EXTENSION SERVICE

Choosing the right logging contractor

FOR YOUR FAMILY FOREST

Choosing a logging contractor for a harvest operation is an important decision. How do you go about selecting the right person for your property and your particular project? Some of the decision-making is tailored to your situation as landowner, and there are some key questions about their ability to handle your specific issues that you should ask the contractors who might provide these important services.

The questions below are not the only questions you could ask, and should not replace trusted relationships or "gut feelings." They are meant to help you think through what to ask and what the contractors' responses mean.

Questions to ask potential logging contractors

WHAT ARE YOUR QUALIFICATIONS?

Logging mistakes can be irreversible. Make sure you find a logging contractor who is appropriate for the type of work you need to get done.

In Oregon, look for a qualified logging professional. A qualified logger participates in continuing education programs and keeps abreast of current forest and business regulations governing harvest operations in the state. Visit www.oregonloggers.org/Opl_directory.aspx for a list of qualified logging professionals.

WHAT SERVICES DO YOU PROVIDE?

Some loggers only conduct regeneration harvests, while others work on both thinning and regeneration harvests. As the landowner, you need to know whether a contractor can address other project needs, such as log sales, harvest plans, road construction/maintenance, slash treatment, erosion control, reforestation, permitting and harvest taxes.

HOW WILL I BE CHARGED FOR YOUR SERVICES?

There can be several different answers to this question. What is important is that you know upfront whether you will be charged on a percentage or dollar-per-unit basis. Landowner and contractor must agree on what services are included in agreed prices.

WHAT IS INCLUDED IN THE LOGGING PRICE?

It is very important that you know and understand exactly what services will be delivered and when, and whether these services are included in the agreed price. You and the contractor will need to agree on who is responsible (both financially and operationally) for any road improvements, installation of culverts, slash disposal, etc. Be sure you specifically agree that the price includes log trucking.

DO YOU DO ALL THE WORK YOURSELF, OR IS SOME OF IT SUBCONTRACTED?

It is normal for a logger to subcontract aspects of the harvest project. Be sure you know if this is planned, and that you understand how the logger will manage subcontractors. It is also important that you know who is in charge if you are out on the logging project and need to talk to someone.

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DO YOU HAVE THE APPROPRIATE INSURANCE COVERAGE?

If something were to go wrong during the logging operation, you want both you and the contractor to be protected financially. Loggers should have sufficient insurance coverage for property damage and liability (including woods broadform liability, vehicle liability and workers' compensation). Ask to see certificates of coverage before you sign a contract.

DO YOU USE A STANDARD WRITTEN CONTRACT?

Some people may operate without a written contract when there is an experienced relationship between contractor and landowner. However, it is best to have a written contract that specifies the responsibilities of both parties in the transaction. The contract is legally binding and protects both parties from painful misunderstandings and costly disputes.

IF I'M THINNING, HOW WILL YOU DETERMINE CUT-TREES AND PROTECT LEAVE-TREES?

Both parties must agree in advance to how cut-trees will be determined and leave-trees protected. In thinning operations, some incidental damage to leave-trees may occur. A logger should be able to discuss methods to minimize damage to the leave-trees. Establish a specific measurement — for example, "residual damage to trees will not surpass 5 percent." Stipulate in the contract any fines that will be charged if and when damage exceeds that level.

Establish realistic expectations

The landowner and logger should have frank discussions and clear agreements about the expectations of logging project results. Family forest owners may have unrealistic expectations that conflict with the realities of logging capabilities. Logging small tracts is more expensive, time-consuming and difficult than larger commercial logging projects. Because managing a logging project is so complex, a family forest owner may want to seek special assistance from either:

- a logging contractor whose experience is tailored to small projects; or
- a forestry consultant who can plan and facilitate all contracted arrangements

Where to look for a logger

The list of individuals and firms who can handle your family forest logging needs is constantly changing. However, places where you can look to find a list of potential loggers include:

- Ask other landowners who they work with and trust.
  - Oregon Small Woodlands Association: www.oswa.org
  - Oregon Tree Farm System: www.otfs.org/
- Ask a forester.
  - Society of American Foresters: www.safnet.org
  - Association of Consulting Foresters: www.acf-foresters.org/
  - Oregon Department of Forestry: www.oregon.gov/ODF/Working/Pages/FindAForester.aspx
  - Oregon State University Extension Service: extensionweb.forestry.oregonstate.edu/directory
- Ask log buyers at local timber mills.
  - OSU Forest Industries Directory: www.orforestdirectory.com/
  - Associated Oregon Loggers – directory of qualified logging contractors: www.oregonloggers.org/Opl_Directory.aspx

Helpful resources

See these publications for more information about harvesting operations for your family forest:

- Contracts for Woodland Owners (EC 1192): https://catalog.extension.oregonstate.edu/ec1192
- Small-Scale Harvesting for Woodland Owners (EM 9129): https://catalog.extension.oregonstate.edu/em9129
- Timber Harvesting Options for Woodland Owners (EC 1582): https://catalog.extension.oregonstate.edu/ec1582
- Oregon Forest Resources Institute: http://knowyourforest.org

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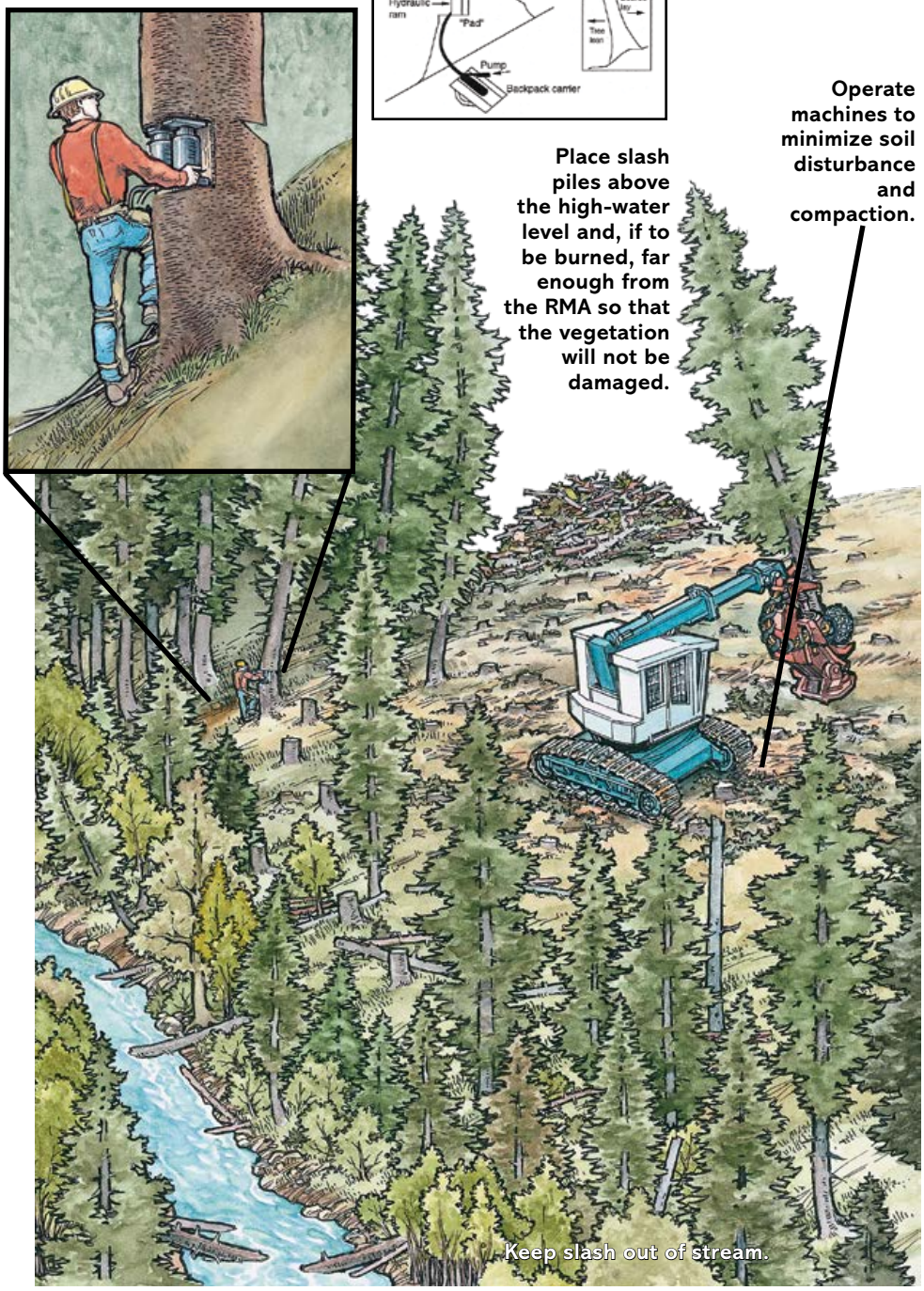
What should you know when felling, bucking and limbing trees near water?

What are these requirements intended to protect?

- stream channels and banks
- water quality, by keeping slash out of streams
- soils in RMAs, and vegetation that is left in the RMA

Hydraulic jacks help prevent RMA damage and reduce log breakage.



How can tree felling, bucking and limbing cause damage?

These harvesting activities can:

- gouge or break down stream banks
- damage or bury remaining vegetation
- leave slash in the channel or within the high water level
- cause trees to roll, crushing and breaking remaining vegetation
- disturb soil and damage vegetation with mechanical felling equipment

What are the felling, bucking and limbing requirements?

Fell, buck and limb trees to minimize disturbance to channels, soils and retained vegetation in RMAs, streams, lakes and all wetlands greater than one-quarter acre.

When possible, fell trees away from RMAs, streams, lakes and significant wetlands, except trees felled for stream improvement projects that have been planned and reviewed. Note: Because hardwoods often lean toward streams, are shorter and have broader crowns, safety and feasibility concerns may not allow for directional felling. Consult with the Stewardship Forester before falling trees towards the RMA.

Buck and yard hardwood trees to minimize damage to beds, banks and retained vegetation. When it can consistently protect bed and banks,

yard hardwoods away from water before limbing.

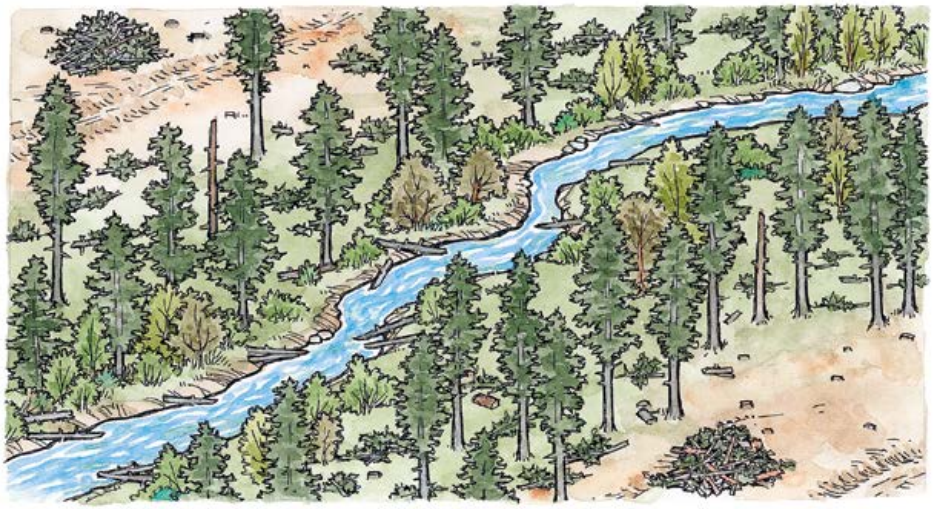
On steep slopes use jacking, line pulling, high stumps, whole-tree yarding or stage-cutting to prevent damage to vegetation retained in RMAs, soils, streams, lakes and significant wetlands.

Minimize slash accumulations in channels, significant wetlands and lakes, including during felling, bucking, limbing or yarding.

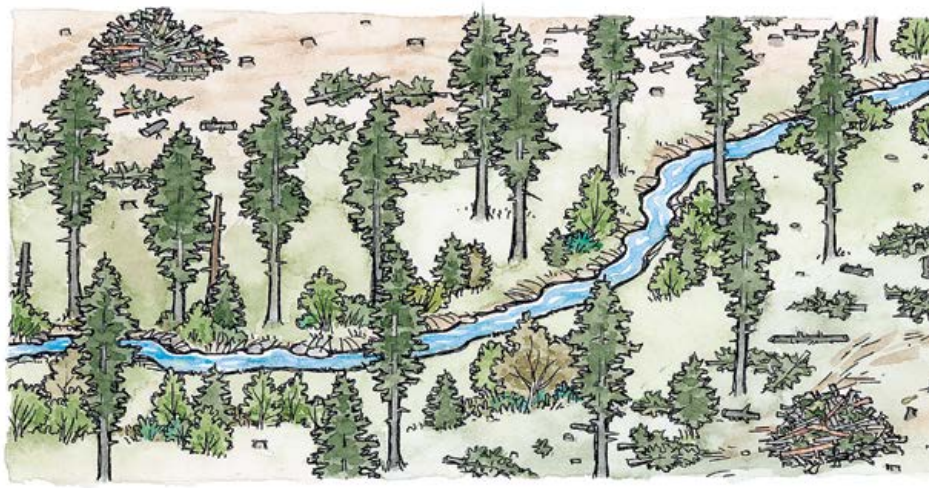
Remove slash within 24 hours from Type F, Type SSBT and Type D streams, lakes and significant wetlands. Don't allow slash to accumulate in Type N streams, lakes or wetlands in quantities that threaten water quality or increase potential for mass debris movement.

Place slash removed from streams, lakes or wetlands above high-water levels and away from streambanks, wetlands and side channels.

HOW MUCH AND WHAT SIZE SLASH SHOULD BE REMOVED?



Type F and SSBT streams: **Leave slash too big for hand removal. It becomes large woody debris. This requires a written plan approved by ODF. Plans need to show a benefit of slash, or that removing it would create greater damage.**



Type D streams: **All slash should be removed from below the high-water level.**

Type N streams: Banks and streambed should be generally free of slash.

What should you know when ground yarding near water and using temporary crossings?

After trees are cut, limbed and bucked into logs, they are moved (yarded) by skidders, tractors or shovels on a skid trail to a landing, where they are loaded onto trucks. Both skid-trail construction and temporary stream crossings may be needed to yard logs cut in the RMA or to yard logs to a landing across the stream. These activities have the potential to disturb RMA soils and vegetation, reducing their ability to limit sedimentation and protect water quality.

What yarding activities can disturb RMAs, wetlands and lakes?

- construction, use and removal of temporary stream crossings
- skid trails that generate muddy runoff that can move into waters of the state

Both of these activities are subject to requirements described in this section.

What are these requirements intended to protect?

- Fish passage on Type F and SSBT streams
- channels and banks
- vegetation left in the RMA
- RMA soils that control runoff and keep sediment out of waters

Maintain RMA vegetation and minimize disturbance to beds and banks of streams, lakes and all wetlands of more than one-quarter acre.

What should be avoided when planning temporary stream crossings?

When improperly built, temporary stream crossings are a threat to streams, lakes, wetlands and fish passage.

WHY?

- Fish may not be able to migrate upstream or downstream on Type F and SSBT streams.
- High water can erode fill materials and wash out crossing structures, creating sediment.
- Crossings must be planned to affect as little of the channel, banks and riparian area as possible.

Minimize the number of temporary stream crossings.

WHAT THIS MEANS:

- Install crossings only where necessary to access across streams.
- Crossings are not allowed simply to straighten skid roads.
- Use existing, permanent roads as much as possible.
- Locate skid trails outside the RMA are used as much as possible.
- A maximum of one crossing per harvest unit is desirable.

Additional temporary crossings can be used when:

- the alternative involves crossing a landslide
- the alternative is skid trails on slopes greater than 60 percent
- the alternative is to cross a property line and the adjoining landowner is unwilling to have skid trails on that property
- the only alternative is a skid trail parallel to and within 100 feet of the stream
- the only alternative is a permanent crossing

When is a temporary crossing structure needed?

- when there is streamflow at the time of harvest
- if streamflow will occur during harvest
- if streambanks are wet or fragile

Is logging equipment allowed in stream channels?

Tractors, skidders, feller-bunchers and any other equipment being used for logging is subject to the following restriction:

Do not operate ground equipment within any stream channel, except as required for temporary stream crossings.

WHAT THIS MEANS:

The only time logging equipment is allowed in a stream is for construction of a temporary stream crossing structure, or when crossing a dry stream with a stable bed and banks.

Is anything else not allowed?

Straightening or shortening any stream channel is not permitted.

What are acceptable temporary crossing structures?

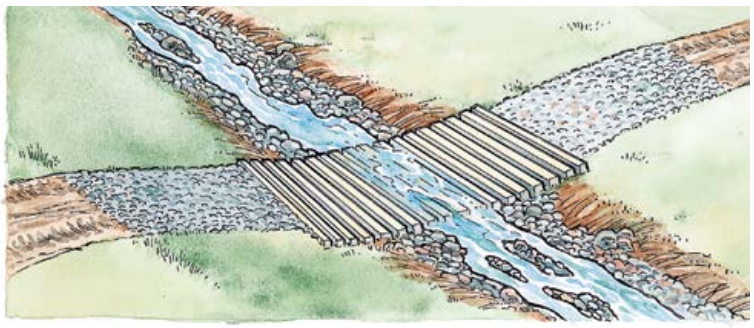
The choice of temporary crossing structure depends on stream size, time of year, whether fish are present and the volume of timber moved via the crossing.

The illustrations show several temporary stream crossings. The improved mat ford and natural bottom ford are for log truck use only. Yarding across these two temporary crossings would result in sediment or wood debris entering the stream.

The other three temporary crossings are for both yarding and truck use.

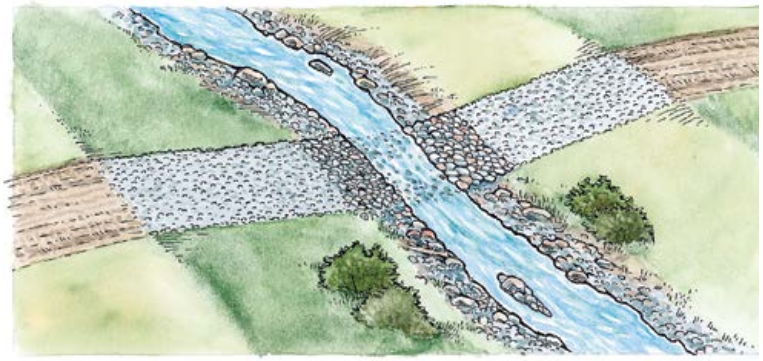
Always remove temporary crossings at the completion of yarding (see page 60).

Examples of temporary crossings



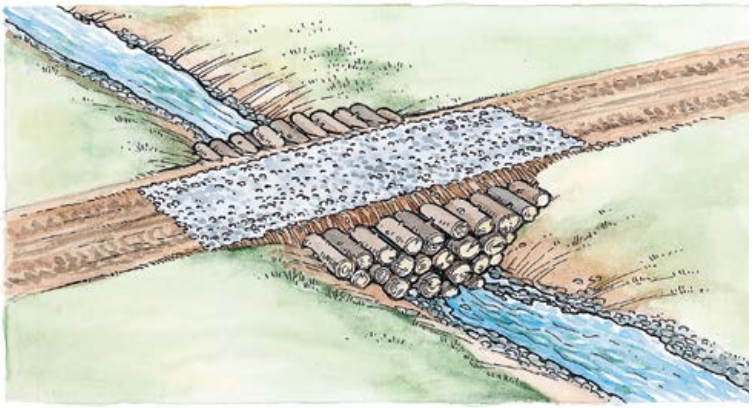
IMPROVED MAT FORD

This is for log truck use only and constructed with concrete or wood planks fastened together.



NATURAL BOTTOM FORDS

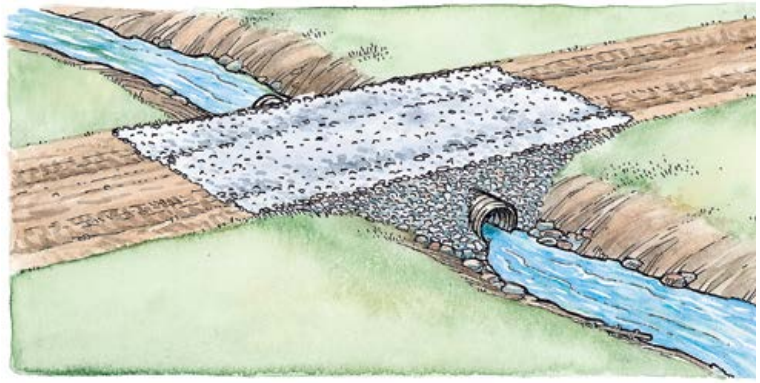
This is for log truck use only. Use this only where bed and banks are gravel, cobbles or bedrock. Approaches must be gravel, cobbles or bedrock. Any bare soil in the approach must be rocked.



LOG CROSSING

Fill over logs should be rock. Keep fill back from ends of logs. Use only for Type N streams with very low flows.

CULVERT AND



ROCK FILL

Temporary stream crossing with culvert and rock fill. Maximum fill is 8 feet. Larger fill requires a written plan (see Page 55). Culvert size must accommodate stream flow during period of use.

BRIDGE

Temporary short bridges provide the greatest stream protection. Use portion of rail car or reinforced concrete. Constructed abutments may not be needed. Wood timbers on the ground some distance back from the bank may suffice.

How do you know if the temporary structure will handle the stream flow?

Use temporary stream crossing structures like a log crossing, culvert or ford capable of passing stream flows likely to occur during use.

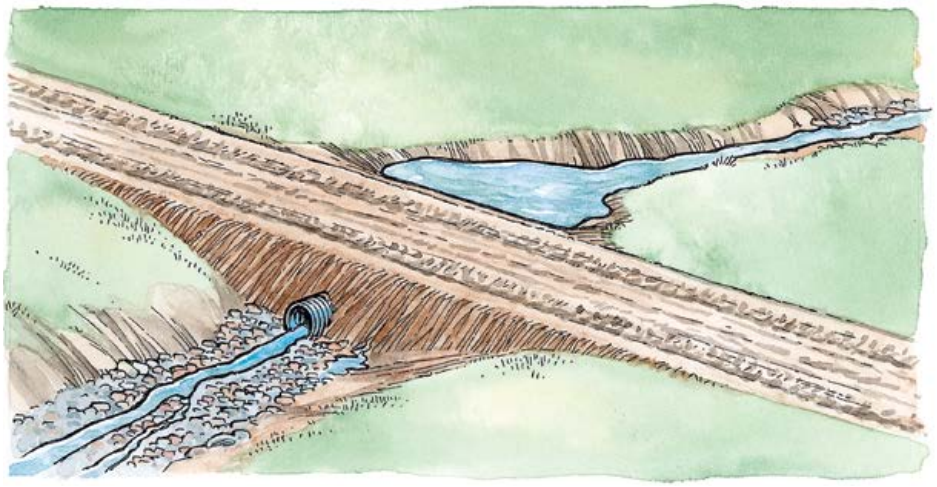
Be sure your temporary stream crossing:

- is able to pass the highest flow reasonably expected during the life of the structure – this is a storm flow that is higher than normal seasonal flow
- is able to pass flows without ponding water behind the fill or saturating the fill soil

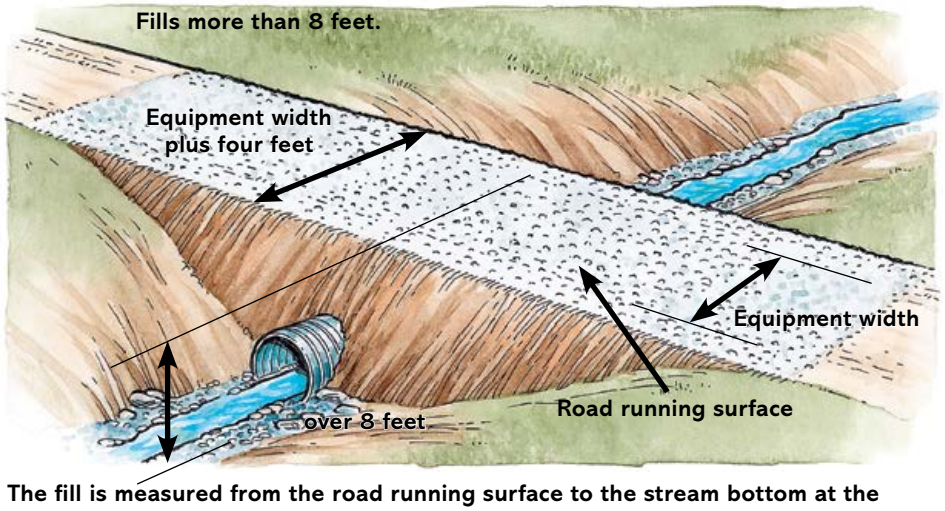
Where should temporary crossings be located?

- Choose a single channel that is narrow and not deeply incised.
- Avoid multiple, braided or side channels.
- Avoid eroded areas or streambanks with exposed soils.
- Banks should be less than 5 feet high. Bridges are better where banks are higher.
- Look for rock, cobble or gravel rather than clays, decomposed granite soils or sand.
- Avoid very wet or weak soils.
- Avoid slide areas, gullies or active erosion areas.
- Approach the crossing at right angles and get up, out and away from the stream as quickly as possible.

Choose temporary locations that minimize cuts, fills or other bank disturbance. Provide cross-drainage on nearby roads and skid trails to prevent runoff and sediment delivery to the stream.



This temporary stream crossing culvert is too small. The stream is ponding behind the culvert and seeping through the fill. The culvert could fail, sending fill soil downstream.



The fill is measured from the road running surface to the stream bottom at the downstream side. Fills more than 8 feet must be designed in accordance with road construction-stream crossing fill rules, except that passage of a 50-year flow is not required for temporary crossings.

When is a written plan required for temporary stream crossings?

A written plan is required when crossing Type F and Type SSBT streams (even if dry).

What is necessary when constructing temporary structures in live streams?

- Keep equipment out of the water.
- Temporary water diversions are OK if done during low flows and if fish are not affected. This means you can either pump stream water around the construction site or use a temporary trench. Be sure to minimize sediment entering water.
- It is recommended that temporary crossing fill be rock rather than soil. This makes it easier to remove after the operation is complete.
- Protect streambed and banks from damage.

Temporary structures must withstand erosion by the stream and minimize sedimentation.

When and how should temporary crossing structures be removed?

Remove temporary stream crossing structures after completion of the operation or prior to seasonal runoff, whichever comes first. Place fill material where it cannot enter the water.

Soil and slash left below the high water level may be carried into the stream if not placed in a stable location.

Rule of thumb: Any material that might make its way into the stream should be removed.

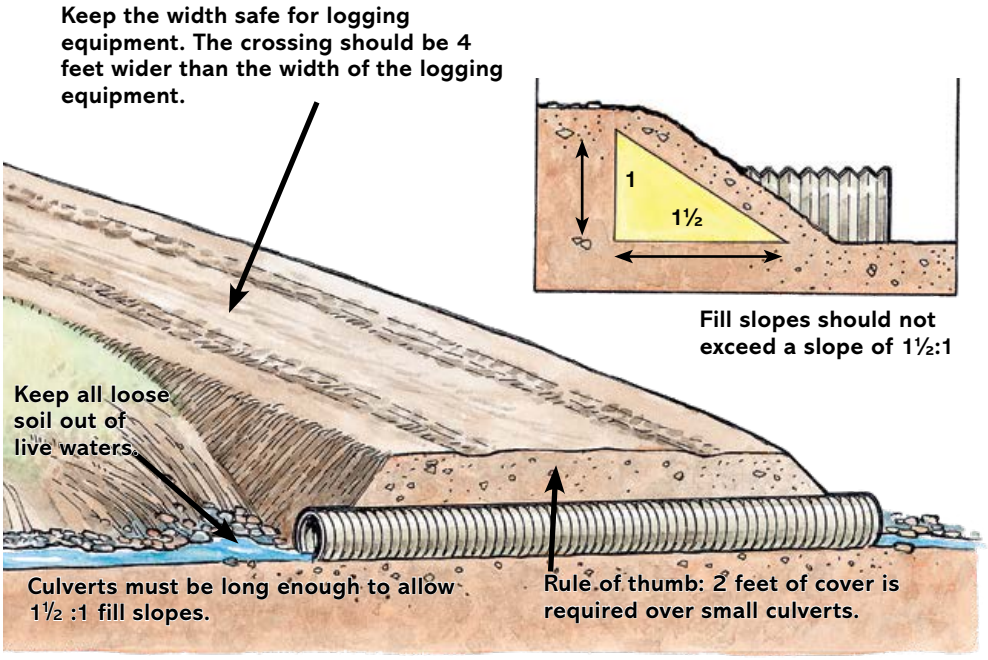
What is necessary when constructing temporary crossings in dry streams?

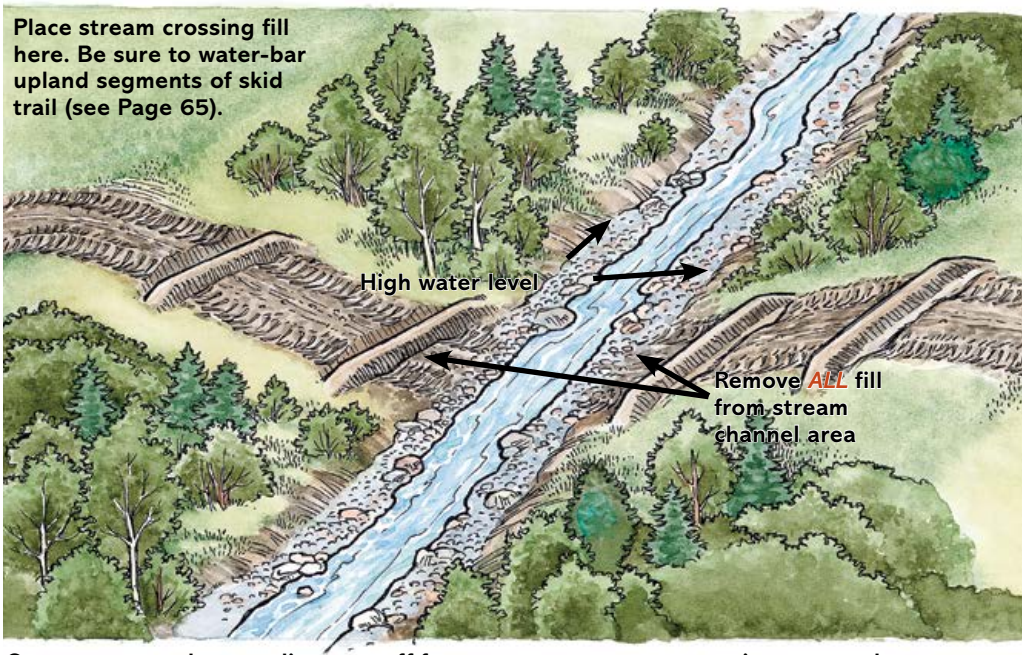
When the channel is dry and will remain dry during the operation, crossing structures may not be necessary.

Locate crossings where bed and banks are clean gravel, cobbles or bedrock. If wetlands or any other wet soils are present, use temporary structures.

A written plan is required to when heavy equipment crosses Type F, SSBT, and D streams, even when dry.

No temporary crossing is required as long as disturbance is no greater than what would occur if structures were constructed.





Construct water bars to divert runoff from temporary stream crossing approaches. Construct as soon as crossing use has ended and before rainy or runoff season.

How do you decommission a temporary crossing in a dry stream?

Remove soil that enters the stream during yarding after the operation or before stream flow, whichever comes first. Place material where it will not enter water.

Construct water bars, dips or other water diversions on stream crossing approaches after the operation or prior to rainy-season runoff, whichever comes first.

What about skid trails in RMAs?

Skid trails are routes used by vehicles to transport felled trees to collection sites (landings). For the purpose of the forest practice requirements skid trails are also defined as:

- any area where equipment constructs a trail by excavating and filling
- any area used by equipment where visible ruts are formed

Machine activity within 100 feet of streams, lakes and other wetlands greater than one-quarter acre must minimize the risk of sediment entering waters and prevent stream channel changes.

Locate, construct and maintain skid trails in RMAs acording to harvesting rules.

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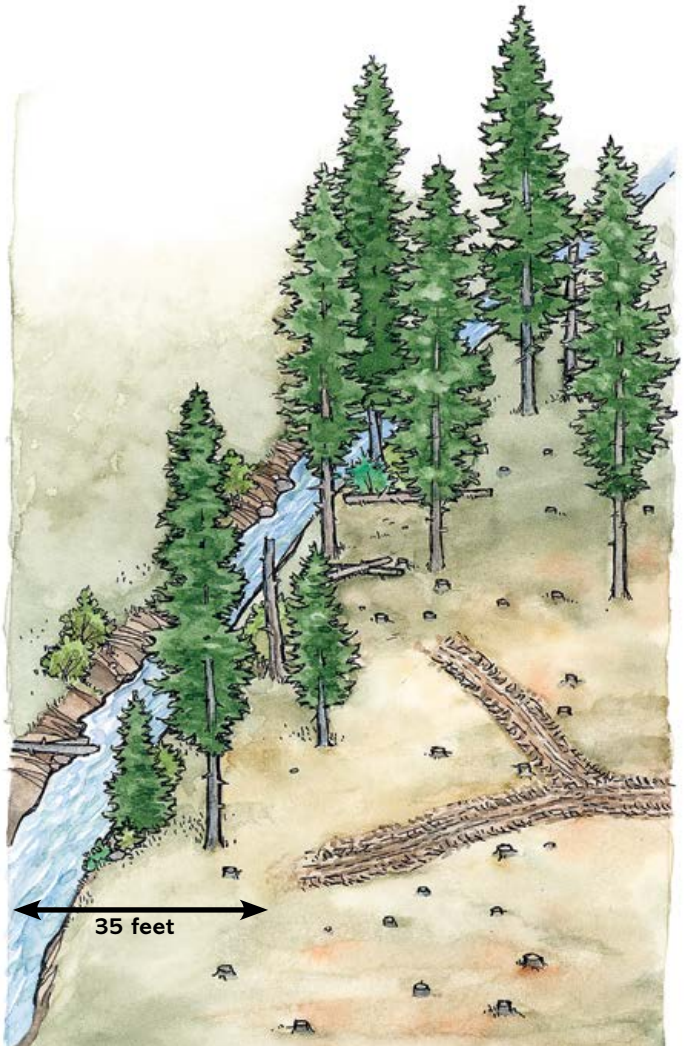
What is not allowed?

Using a stream channel for a skid trail or driving up and down stream channels is not permitted. Restrictions also apply when the stream channel is dry and to Type N streams located in the operation unit.

For Type F, SSBT and D streams in steep, narrow canyons, the distance from the high water level to the steep canyon slope is generally less than 35 feet. This means an alternative logging system (cable or helicopter) must be used.

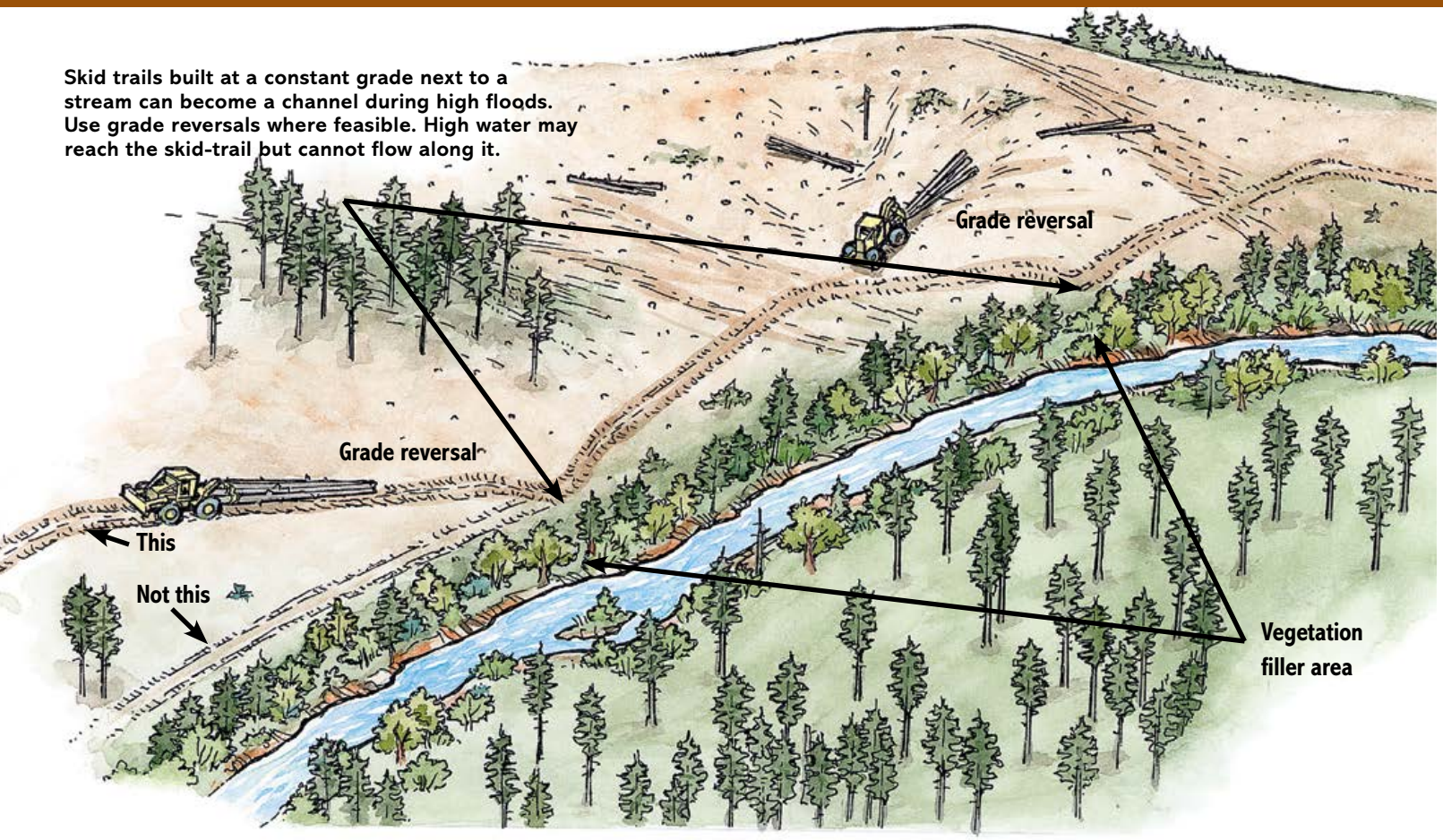
How far must skid trails be kept from Type F, SSBT or D streams.?

Minimize exposed soil from skid trails in RMAs. Except for stream crossings, do not locate skid trails within 35 feet of Type F, SSBT or D streams. Be sure an adequate vegetation filter exists between skid trails and water so sediment can be filtered from skid trail runoff water.



A minimum of 35 feet of slope distance is required between skid trails and the high water level of Type F, SSBT and D streams. Only stream crossings are allowed closer to streams. Approaches to stream crossings must be designed to get skid trails out of this 35-foot portion of the RMA as quickly as possible.

For Type F, SSBT and D streams in steep, narrow canyons, the distance from the high water level to the steep canyon slope is generally less than 35 feet. This means an alternative logging system (cable or helicopter) must be used.



How far must skid trails be kept from Type N streams and wetlands?

Table 3-1 gives guidelines for minimum adequate setback distances for all Type N streams and wetlands. Distances are measured from the closest area of disturbed soil to the high water level.

Table 3-1 Minimum Skid Trail Setback Distances for Type N Streams and Wetlands

Soil	Slope in Percent		
	0 to 35%	35 to 50%	50 to 65%
Normal	20 feet	35 feet	100 feet
Erodible	35 feet	100 feet	Likely rule Violation

How do you construct skid trails to avoid stream diversion during high flows?

Locate and construct skid trails so that when high flows occur water from the stream will not flow onto the skid trail.

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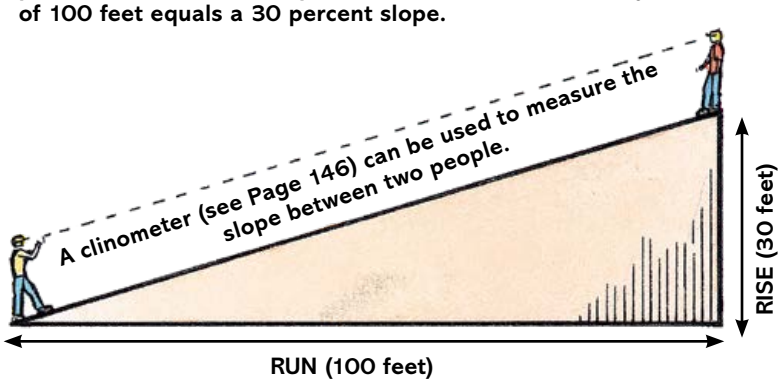
Skid trails constructed in a floodplain run the risk of diverting waters from the stream. These skid trails can become temporary streams that cause serious erosion.

Avoid the possibility of a channel diversion by trying to keep skid trails well above the stream high water level.

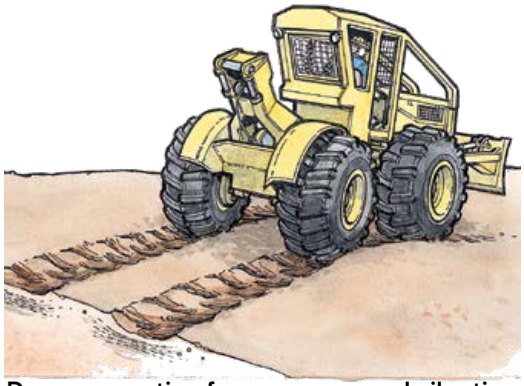
Skid trails below the high water level must have frequent grade reversals or large rolling dips. Grade reversals are essential when skid trails are parallel to channels (see illustration).

How to measure slope in percent: RISE divided by RUN = percent SLOPE. For example: a rise of 30 feet divided by a run of 100 feet equals a 30 percent slope.



What should you know when ground yarding outside RMAs?

- Generally, skid trails should follow slope contours rather than go up and down the slope.
- The potential for erosion increases with the steepness of the slope for ground yarding.
- Skid trail construction on steep slopes often requires cutting and sidecasting.
- Sidecasting removes productive soils, replacing them with less productive subsoils.



Deep compaction from pressure and vibration from heavy equipment can decrease tree growth, and increase runoff and erosion on slopes.

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Avoid ground skidding on unstable, wet or easily compacted soils and on steep slopes unless it can be done without damaging soil productivity through soil disturbance, compaction or erosion.

Locate skid trails where sidecasting is kept to a minimum.

WHAT THIS MEANS:

If more than 20 percent of the harvest unit has major soil displacement, deep compaction or extensive erosion, the operation is considered damaging and not in compliance.

Major soil displacement is the lateral movement of soil, often producing ruts that can change natural drainage and increase erosion.

WHAT THIS MEANS:

There is a risk of sidecast material sliding and causing problems well below the skid trail. Minimize soil disturbance by fitting skid trails to the topography, and avoid buildup of sidecast.

Skid trail sidecast should not cover productive soil for a significant percentage of the unit. It is likely to cause landslides and remove soil from the slope. Any combination of slope covered by sidecast, slides from sidecast and excavated skid trails should not exceed more than 20 percent of the ground in any 5-acre portion of the unit.

Operators should plan to pull back sidecast and place it in the skid trail after the harvest and before the rainy season.

Rule of thumb: A sidecast depth of 3 feet or more is considered excessive on slopes of 50 to 65 percent. Two feet or more is excessive on slopes greater than 65 percent. Note: Know your soil type – some are more prone to failure when placed on steep slopes.

Both the logs and the yarding vehicle can cause excessive soil disturbance, especially on slopes.

What locations are not stable for skid trails?

- actively moving landslides
- high landslide hazard locations (see page 52)
- all slopes steeper than 70 percent
- slopes on non-cohesive soils (sands, decomposed granite soils, and ash), greater than 60 percent
- areas impacted by intense wildfire (reduce these slope guidelines by 10 percent)

Avoid excavating skid trails on slumps or slides. Locate skid trails on stable areas. Minimize the risk of material entering waters of the state.

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Slumps and slides are evidence of less stable soils. Constructing skid trails on these features or other potentially unstable locations can change drainage and steepen or load the slope. These can increase the chance of soil movement and resource damage from erosion and sedimentation.

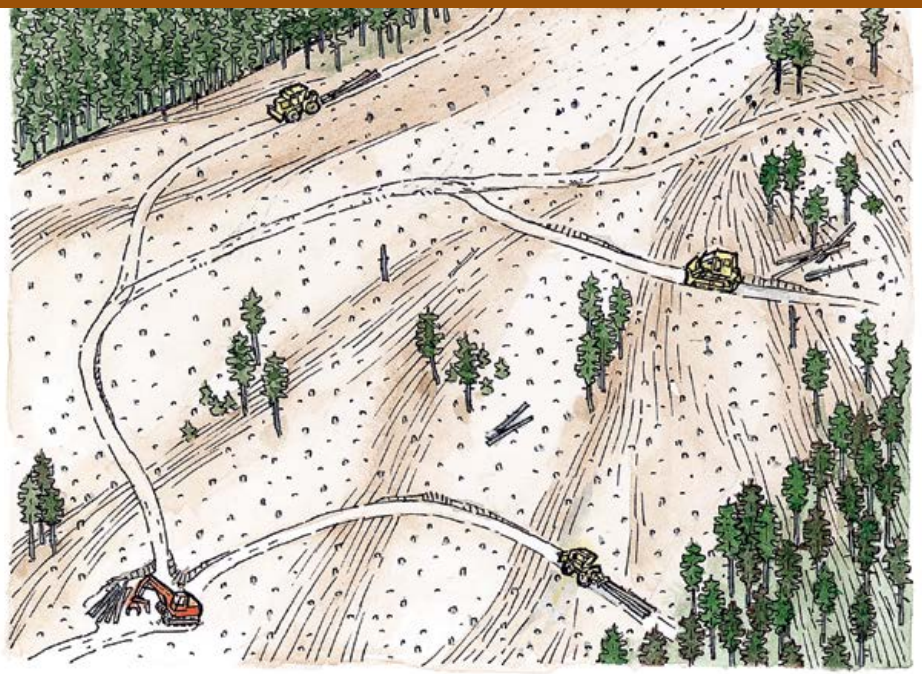
WHAT THIS MEANS:

Landowners and operators need to recognize both stable and unstable locations for skid trails. Also, carefully consider drainage and potential impacts to nearby streams and other waters, whether or not a soil failure might occur.

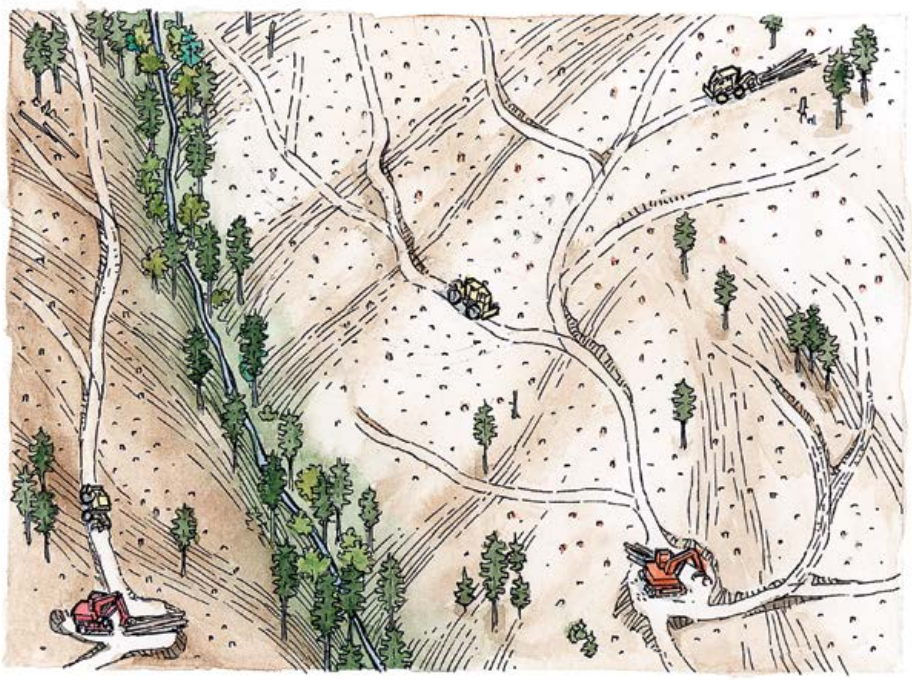
Are there any tips on skid trail layout?

Advance planning can minimize the impact of skid trails on soil and the amount of ground occupied by skid trails. Preplanned skid trails can become permanent parts of your logging unit. They can be used for other management activities and future harvests.

There are two common patterns for preplanned skid trails: branching and parallel (see illustrations).



On gentle slopes, the branching skid trail pattern has one or more main trails from which other trails branch off to provide access to the area.



On steeper slopes, the parallel skid trail pattern attempts to parallel the natural contours of the land.

Shovel logging is a unique yarding method in which a tracked vehicle travels and accumulates logs throughout the cutover area, using few or no constructed skid trails. Similarly, **logging with feller-bunchers or grapple skidders** requires traffic throughout the harvest unit. See pages 151-153 for further information about these systems.

With such harvest systems, care must still be taken to limit soil disturbance and compaction, and to control drainage (see next section) where there is any excavation, filling or rutting in traffic areas.

How is drainage from skid trails controlled?

Construct dips, grade reversals or other effective water diversions in skid trails as necessary to minimize soil displacement and to ensure runoff water is filtered before it enters water.

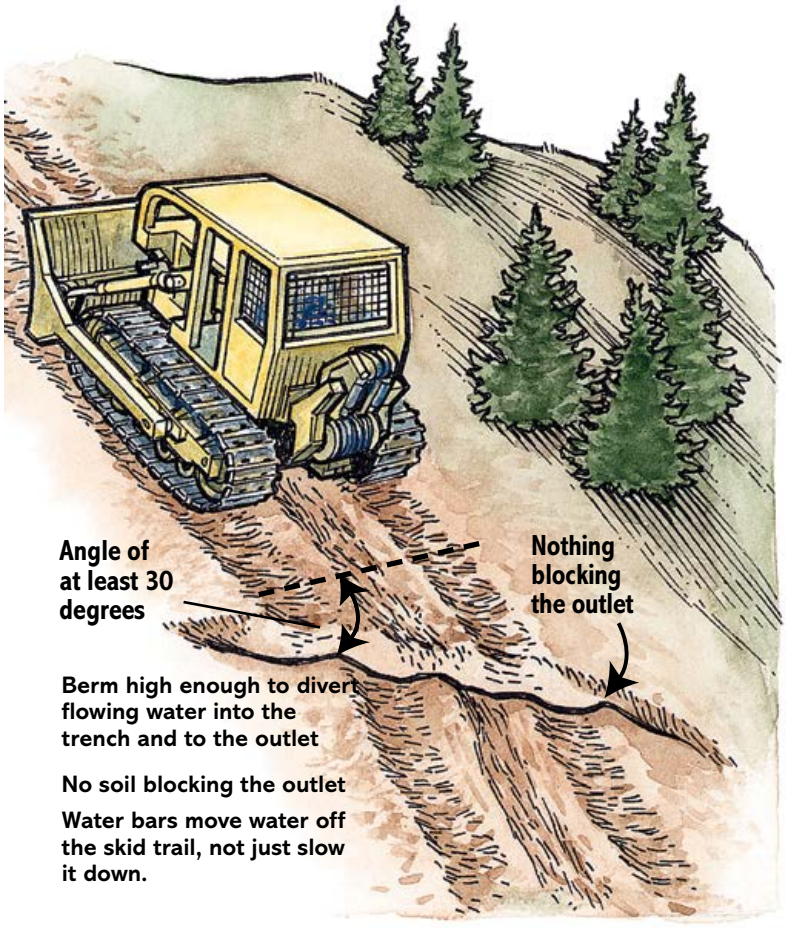
- For drainage dips, see page 113.
- For grade reversals, see page 62.

Drain skid trails by water barring or other effective means immediately following completion of the operation and at all times during the operation when runoff is likely.

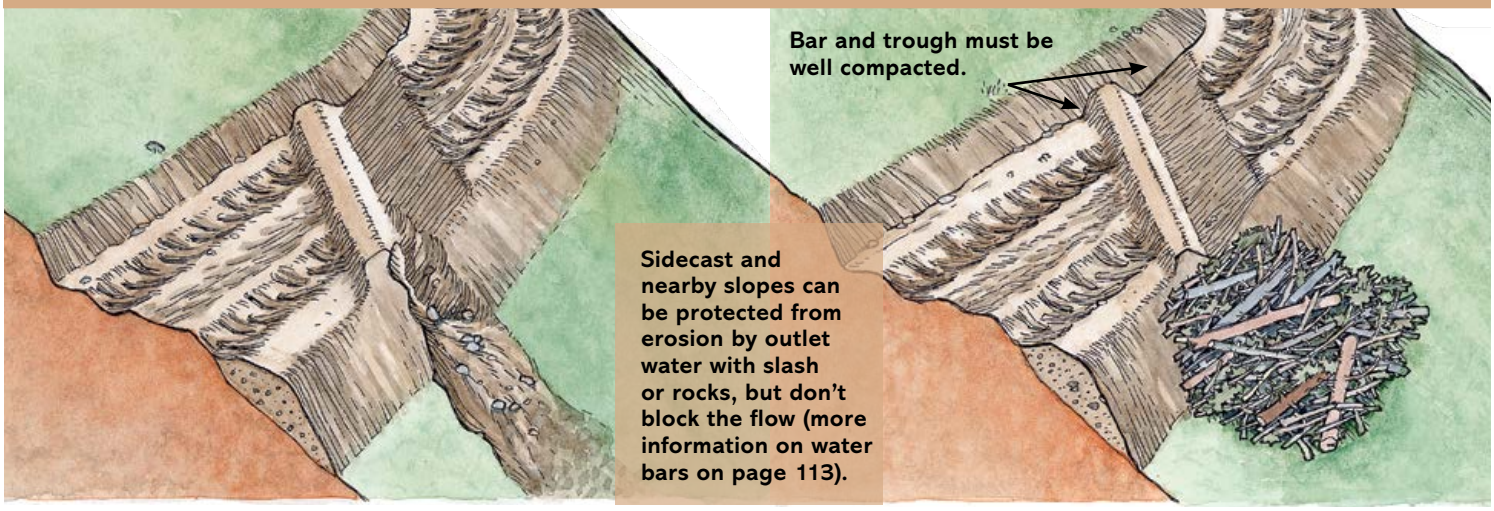
Skid trails with too few grade changes can concentrate water and erode the slope.

Operators are required to keep material eroded from skid trails from entering waters of the state.

Stabilization must be permanent. Water bars must be able to handle or prevent erosion from all potential uses and storm events. This effort must take into account unauthorized recreational traffic.



TIPS ON SKID TRAIL WATER BARS



How do you determine water bar spacing?

Table 3-2 is a guide to minimum water bar spacing on skid trails. Narrower spacing, especially on steep slopes, can significantly reduce the erosive power of runoff and provide extra protection.

Table 3-2 Minimum Water Bar Spacing On Skid Trails

Slope of Skid Road	Soil Description	
Percent (see Appendix)	Sensitive soils (silts, granitics)	Normal forest soil (loam, gravel, cobble)
5 to 15	150 feet	300 feet
15 to 35	100 feet	200 feet
35 to 50	50 feet	100 feet
Over 50	25 feet	50 feet

What other concerns are there for ground skidding on steep slopes or those likely to erode?

Ground skidding on these locations can cause soil damage and allows sediment to enter streams, so there are some unique requirements to protect streams during skidding activities on such slopes.

What slopes or soils have these requirements?

Slopes of more than 60 percent have unique requirements for ground skidding. Note that ground skidding is never allowed in high landslide hazard locations, which typically have more than 70 to 80 percent slopes (see page 52).

The requirements also apply to slopes of more than 40 percent with decomposed granite soils, which are more likely to erode even when less than 60 percent. These soils are most common in areas of southwest Oregon. They have been identified and mapped on county soil surveys.

What are the requirements for steep-slope skidding?

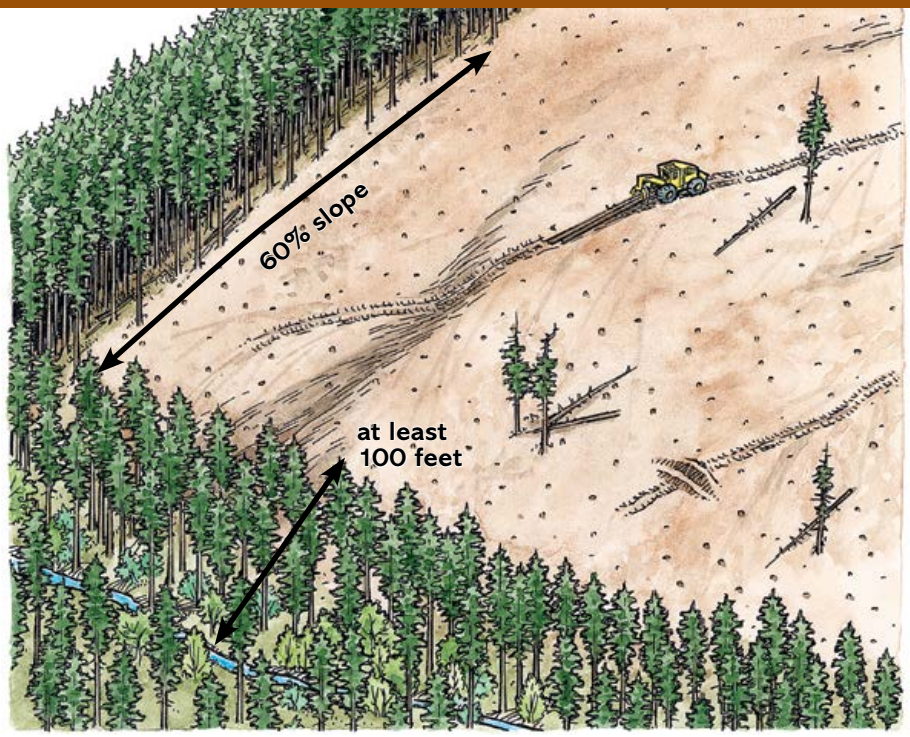
Since ground skidding on steep or slopes likely to erode has a high potential for delivering sediment to streams, it must be done carefully. Here are the requirements:

- Do not construct skid trails straight up and down the slope, because water can flow back onto the skid trail even if water bars are installed.
- Skid at an angle to the slope (see illustration above right).
- Keep skid trails at least 100 feet from stream channels.
- Plan spacing and location of trails carefully – no more than 10 percent of the steep slope area should be disturbed.

How do you build steep-slope skid trail cross ditches?

While similar to water bars, steep slope skid trail cross ditches should be deeper (see photo sequence at right).

For other information sources, see the Appendix, pages 197-198.



Steep slope skidding is allowed. However, skid trails must be at an angle to the slope. Never use skid trails up and down steep slopes.

Begin construction of the skid trail cross ditch at the far edge of the skid trail.

Cut an extra-deep cross ditch at an angle greater than perpendicular to the skid trail, and be sure the ditch is open so water can drain out.

The finished skid trail cross ditch should be deep. This is more than a water bar.

What should you know when cable logging near water?

Cable yarding across streams, wetlands or lakes is a good harvesting choice if it results in less road construction and if the logs can be suspended above the RMA and through narrow, widely spaced corridors. Written plans that are reviewed by ODF are needed for cable yarding across Type F, SSBT or Type D streams, any large or medium Type N streams, and lakes or significant wetlands.

WHAT THIS MEANS:

The written plan should describe cable corridor spacing, corridor width and how vegetation will be protected when operations move from one corridor to another.

Minimize the yarding of logs across streams, lakes, significant wetlands and other wetlands greater than one-quarter acre when harvesting can be done using existing roads or other practical alternatives. fpa

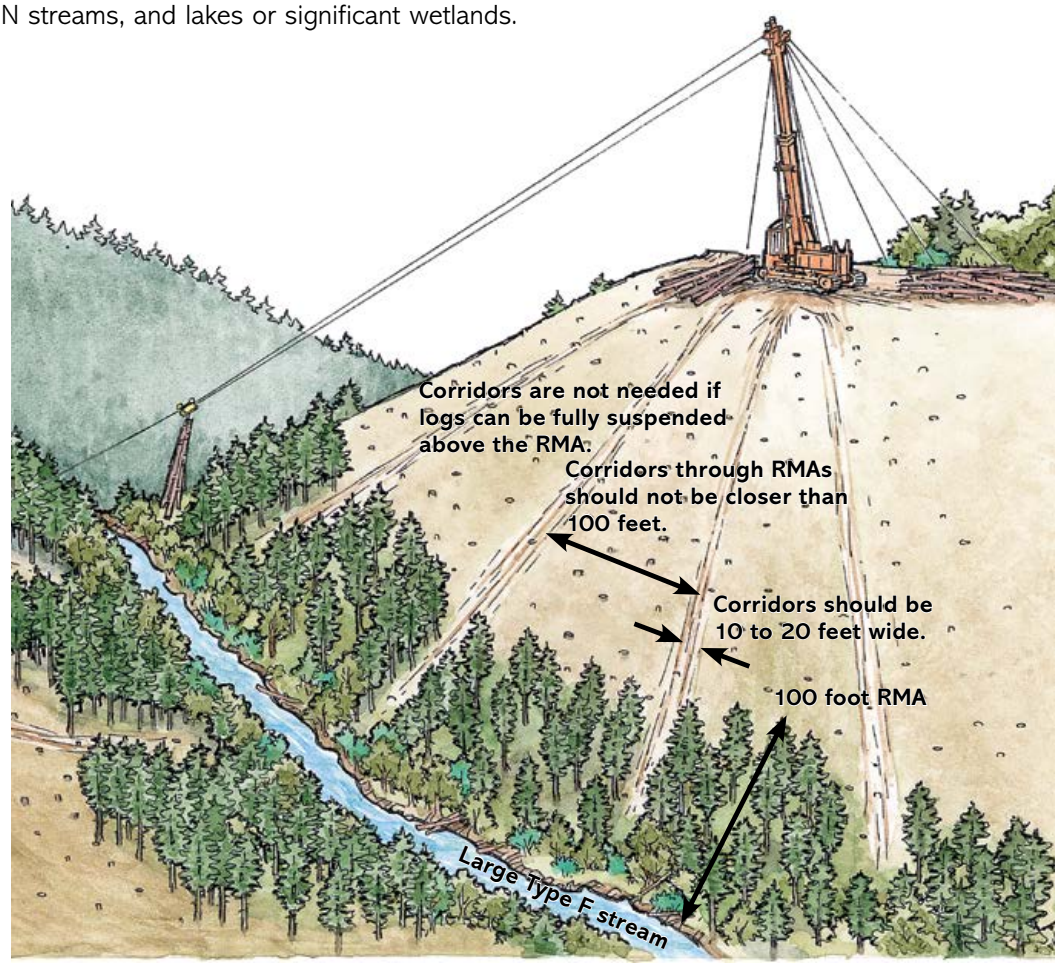
Maintain RMA vegetation and minimize disturbance to beds and banks of streams, lakes, all wetlands more than one-quarter acre and retained vegetation.

What cable logging activities can disturb RMAs, wetlands and lakes?

- cutting trees for cable corridors that are too wide and too close together
- swaying cables in the corridors that damage adjacent trees – minimize cable sway during yarding and when raising and lowering lines
- swinging logs that damage trees adjacent to the corridors
- swinging lines to the next corridor, rather than pulling them out and re-stringing

What are these requirements intended to protect?

- stream channels and banks
- water in the channel
- vegetation left in the RMA
- soils in the RMA



Use yarding corridors through retained streamside trees as long as the number and widths are minimized. Trees outside the corridor must be left with adequate crowns to provide original canopy cover. fpa

How much suspension is needed?

When yarding is necessary across Type F, Type SSBT or Type D streams, any large or medium Type N streams, lakes or significant wetlands, swing the yarded material free of the ground in the aquatic areas and riparian areas. fpa

When yarding across small Type N streams or other wetlands greater than one-quarter acre, minimize disturbance to stream channel or wetland and retained streamside vegetation. At least the leading end of logs must be raised off the ground.

Avoid dragging logs with the lead edge on the ground, and never drag logs:

- down a stream channel
- across a channel
- through wetlands

What are the requirements for log landings?

Logs are yarded from where trees are felled in the harvest unit to openings located near roads in the forest called "landings." There the logs are stored and eventually loaded onto trucks for delivery to a mill or other location. Because landings are built on cleared ground that is often compacted, they are potential sources of runoff and erosion. Sometimes they have a tendency to expand in size (explained below). Keeping them small, drained and well located is what these requirements are all about.

Minimize the size of landings to that necessary for safe operation. fpa

What is the problem with oversize landings?

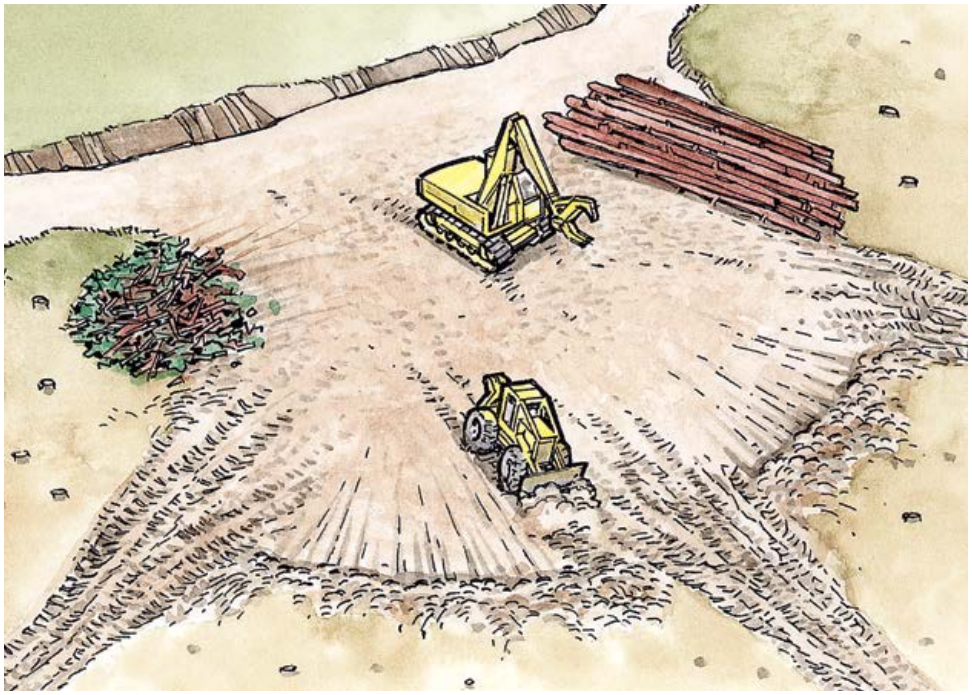
- They are bare, compacted surfaces where runoff can accumulate and erode soil.
- Sediment from landings can move to waters of the state.
- Oversize landings take forestland out of production.

Generally, landings more than one-quarter acre (about 100 feet by 100 feet) are larger than necessary. In many situations, smaller landings will meet safety and operational needs, but sizes and shapes will vary with the logging system and other needs.

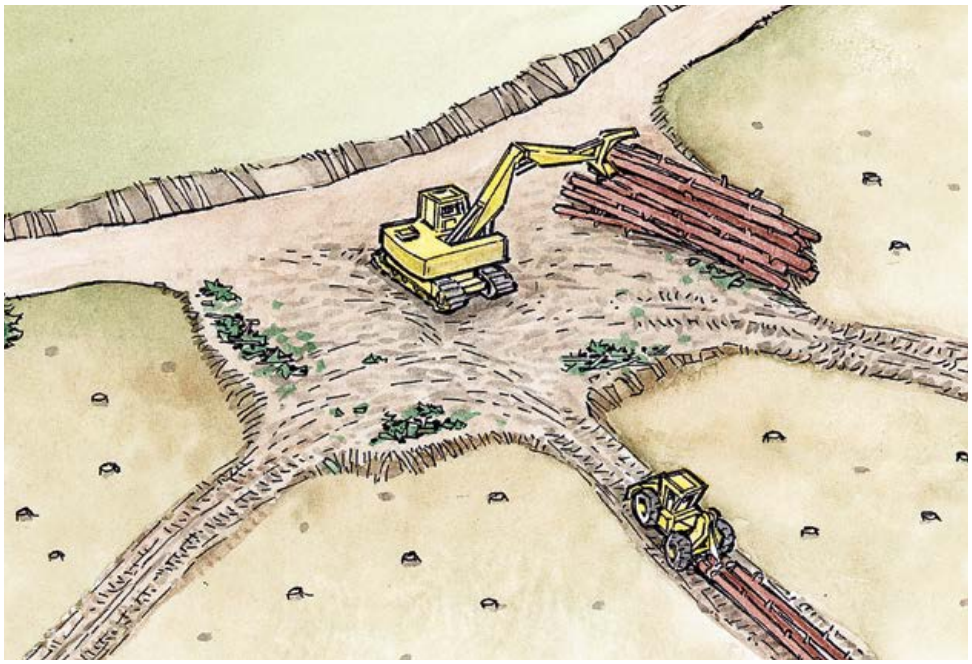
Landings must provide enough space for the skidding, yarding, loading and trucking equipment, as well as the logs that are expected to accumulate prior to loading and hauling. Different systems and equipment, along with the slope of the land and density of trees in the area, influence the number and size of landings needed.

Whole-tree harvest systems, whether ground-based or cable, require larger landings. This is due to the different equipment and space needed to remove and pile tops and limbs and to cut and load logs for transport.

Helicopters require large landings, but usually fewer are needed. Mobile cable yarding machines can operate on narrow sections of road, with little more than a turnout required if truck loading is frequent. Tower yarders may require that a separate "yarder pad" be constructed on a spur road above the main road where logs are landed and then loaded onto trucks.



Tractor yarding requires moderate-size landings that sometimes grow larger than needed. When several skid trails enter a landing and equipment, logs and debris converge, there is a tendency is to "cut the corners" of trails or actively expand the landing. Instead, have trails converge before they reach the landing, and also pile debris where it does not impede traffic yet can be burned, chipped or otherwise utilized later.



Locate landings on stable areas that minimize the risk of material entering water.

WHAT THIS MEANS:

If any part of a landing is on a slope steep enough to pose a risk of fill or sidecast entering waters of the state, it is a violation.

Similarly, It is a violation when landing fill or excavation occurs in such a way that an old landslide (often appearing as a slump) may be reactivated. Landing fill also must not be placed in a high landslide hazard location.

Avoid landings in RMAs. If there is no alternative, you must submit a written plan for review by ODF.

WHAT THIS MEANS:

This requirement is intended to keep landings out of RMAs. It applies even when a portion of a landing may be located in a RMA. And even if the landing is outside the RMA, a nearby location may be a poor choice because of the chance of sediment entering waters of the state.

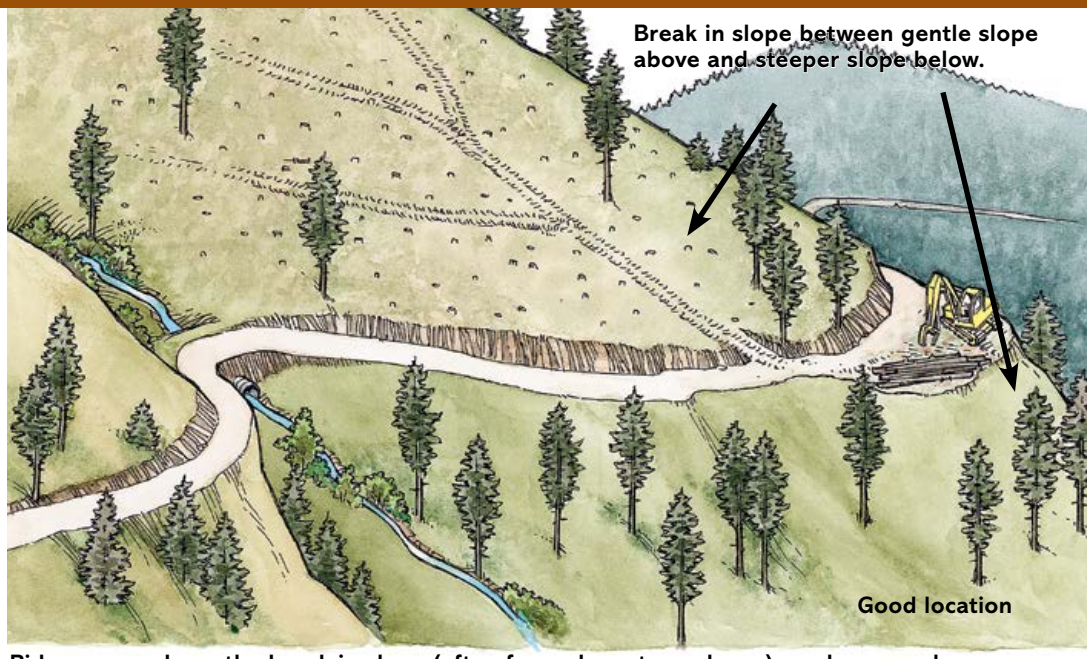
Do not incorporate slash, logs or other large quantities of organic material into landing fills.

WHAT THIS MEANS:

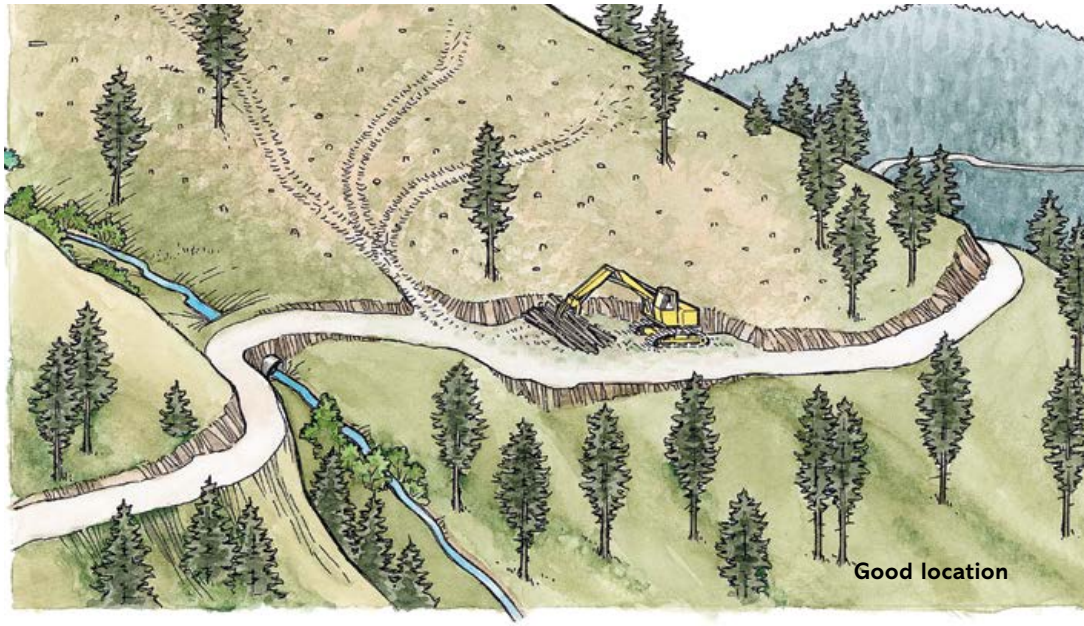
This is intended to prevent a landing fill failure from entering water. When this material decomposes, landing fills can slide downslope. Buried slash may also become a fire hazard.

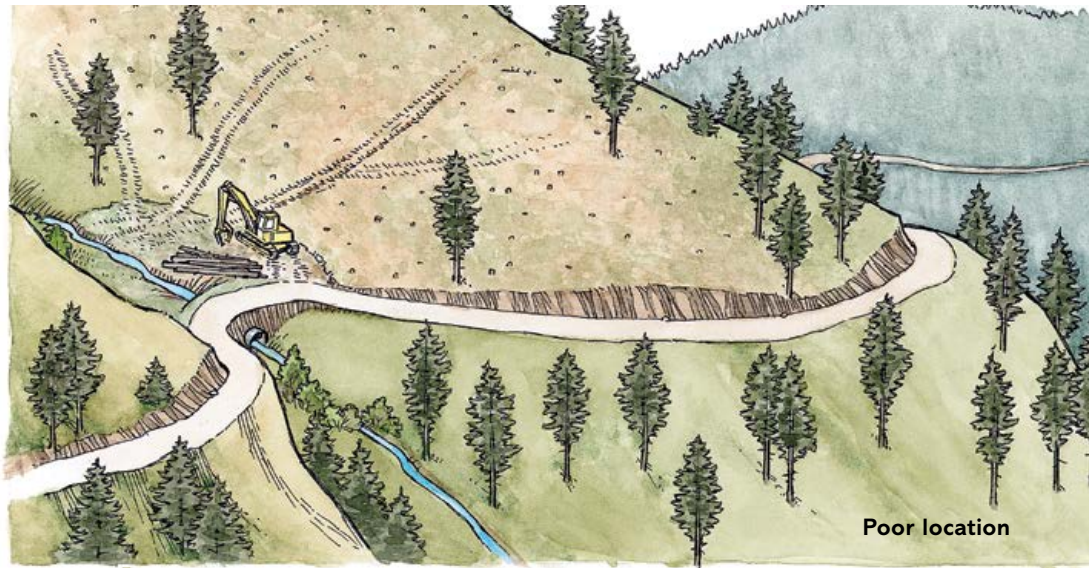
Organic material in landing fills should generally be avoided, but is most serious on slopes of more than 50 percent and when landings are within 100 feet of a water body.

If a landing is constructed such that material can enter waters of the state, it may be in violation.



Ridge noses above the break in slope (often formed on steep slopes) can be a good location for landings.





Put excess material from landing construction in stable locations well above the high water level. End-hauling to a stable location may be necessary.

WHAT THIS MEANS:

This is intended to prevent damage to water quality and aquatic habitat from material used in landing construction.

Excess soil, rock and debris must be placed in stable locations, and never below major-storm flow levels.

This requirement may make it necessary to end-haul this material.

Not allowed:

- building a log landing in a stream channel
- skidding logs into a stream channel,
- dropping logs into a stream channel while cable harvesting

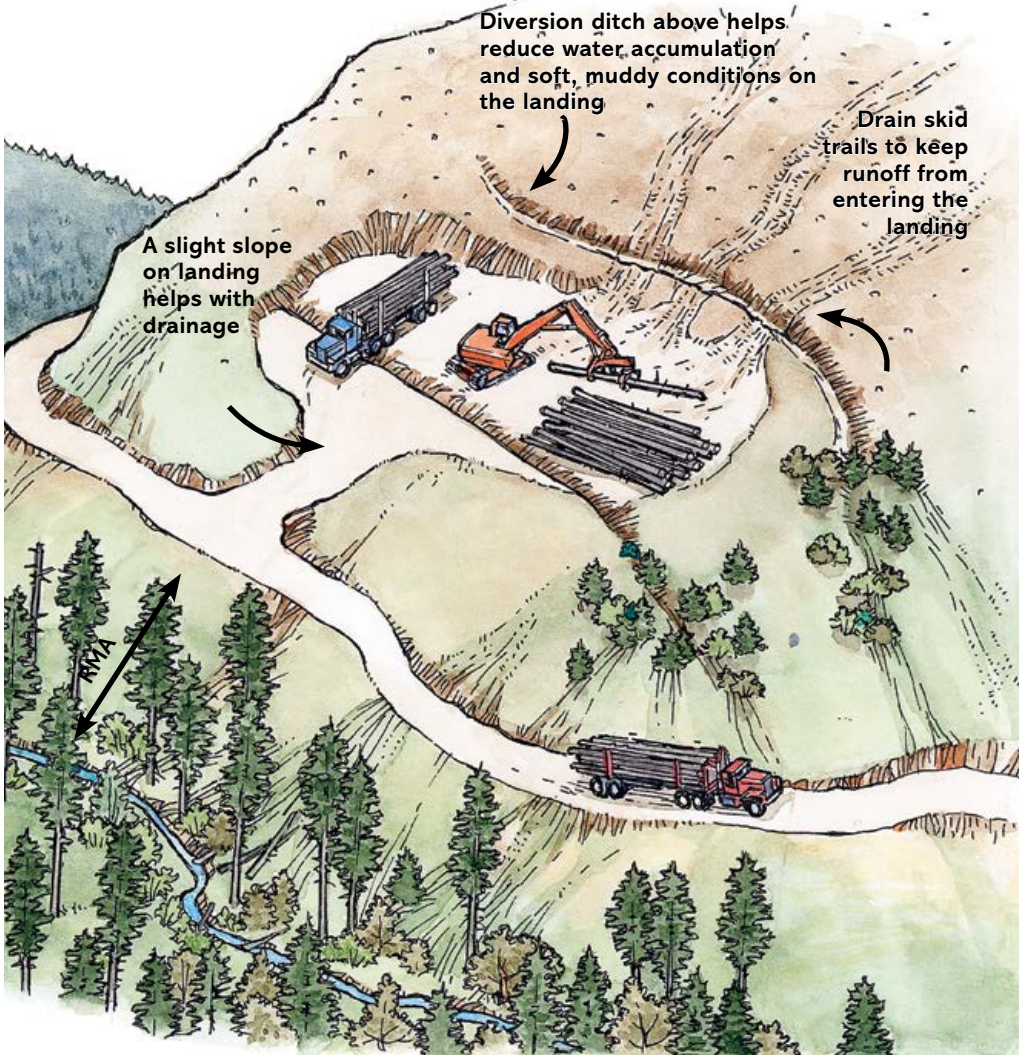
Establish effective drainage on landings during and after use.

WHAT THIS MEANS:

This requirement is intended to minimize sediment entering water.

It is especially important to control drainage from landings constructed above high-hazard sites.

A landing not sloped for effective drainage may be in violation.



Landing drainage structures include culverts, ditches and water bars.

Remove excess material from landings and place it in stable locations.

What should you know about slash treatment and site preparation?

What are slash, slash treatment and site preparation?

When a harvest is finished, some tree tops, limbs and defective wood often are left on the site. This material is called slash, and some of it may require treatment to make the site ready for successful reforestation (site preparation), to reduce wildfire hazards, or both. Piling, burning and chipping are examples of slash treatments. Sometimes slash treatment and site preparation are done together, or it may be a two-step process.

Some questions you need to answer:

- Will the slash create an additional wildfire hazard?
- It's important to anticipate the slash your harvest is likely to generate, and how it will affect the wildfire hazard that currently exists with dead and dying trees, needles and branches on the forest floor, etc. If the harvest is not expected to raise wildfire hazard above your forest's natural wildfire hazard, then slash treatment is less of a concern. ODF can help you determine whether or not the harvest will raise the natural wildfire hazard.
- Will the slash interfere with reforestation?
- If you're planning a Type 1 or Type 3 harvest, reforestation will be required. Your harvest site will likely need some slash treatment, because those harvest types leave enough slash to make it difficult to find suitable planting spots. Also, if natural regeneration is your plan, there may not be enough bare soil to provide a natural seedbed without some slash treatment.
- Are there concerns about burning due to proximity to communities or major highways?
- Increased air quality standards and visibility considerations can limit the days that burning is allowed, especially near larger communities. Plans for slash treatment and any related site preparation should consider the possibility of significant restrictions on burning.
- Are there opportunities to use or treat slash that avoid burning?
- Onsite burning is the traditional treatment to reduce or eliminate slash, but newer equipment and technologies have provided some alternatives and opportunities. Among these is chipping slash to provide material used for biomass energy production. Proximity to biomass energy facilities and road access for chip vans are important considerations.

Slash, after harvest and before treatment.

Why are slash treatment and site preparation important?

- Wildfire hazard can be reduced.
- It can expose planting spots and make reaching those spots easier.
- It may reduce damage to planted seedlings by rodents that hide in slash.
- It can be used to remove vegetation that will compete with newly planted seedlings.
- Minimize slash in waters of the state, which will reduce the depletion of oxygen levels as it rots. Waters of the state include streams, springs, ponds and wetlands.

What can slash do if it is not treated?

- make wildfire control more difficult
- result in insect and disease problems in the surrounding forest
- result in reforestation gaps
- fall into planting holes and interfere with seedling survival,
- get into waters of the state

Are there ways to reduce slash during the harvest?

Yes. Whole-tree harvesting and cut-to-length harvesting are two methods that can reduce slash on the harvest unit (see the Appendix, pages 152-153). Because whole-tree harvesting generates a lot of slash at the landing as yarded trees are topped and delimbed, there may be an opportunity to chip this material and sell it as fuel for biomass energy. This may avoid a need for further slash treatment.

In cut-to-length harvesting, a mobile processor cuts the tree and then tops and delimbs it in the same area. The machine operator can drop the slash in its travel path, and often crush it enough to reduce the wildfire hazard while leaving openings for later tree planting.

What are other ways to reduce slash accumulation?

- Careful tree felling and bucking can minimize breakage, leaving less slash.
- Broader harvest planning and marketing may allow slash piles or their chips to be sold for biomass energy generation.
- Lop and scatter (on-the-ground chainsaw work), combined with machine crushing, may reduce accumulations of slash.
- It may be possible on some sites to chip slash.

How do you treat slash and prepare the site for planting?

Typically slash is treated either by machine, by burning or by a combination of both.

Two commonly used machines are excavators or bulldozers equipped with brush blades. Excavators have the advantage of making cleaner piles for burning. Of course, ground-based machines should be confined to gentle terrain. While they are effective, both machines can cause excess soil disturbance and water quality problems if not used carefully.

This crawler tractor, equipped with a grapple, picks up whole trees and moves them to a landing or roadside.

After limbs and tops are removed at the landing, the material is piled and either chipped or burned. Whole-tree harvesting brings slash to a central location and efficiently disposes of it, leaving a forest floor ready for replanting.

To reduce wildfire hazard, slash can be crushed, cut or lopped so it lies close to the ground for rapid decay. This is effective for light harvests, but usually is not adequate slash treatment for heavily harvested areas.

Crawler tractors with toothed brush blades are used to pile slash. Never use straight blades; they scrape the soil surface and carry soil into the slash pile. Piles free of soil burn cleaner, reduce soil erosion and protect productive topsoil.

An excavator has the advantage of picking up slash rather than pushing it. It can make taller, more compact piles that burn efficiently, with little soil disturbance.

What problems can occur with slash treatment and site preparation?

- Soils can be exposed to erosion, especially on slopes of greater than 35 percent.
- Soils can be compacted and/or rutted.
- Aggressive slash treatment or whole-tree harvesting may be undesirable on less productive sites where organic matter provides a key source of nutrients and other benefits.

How are slash piles prepared for burning?

- Plan ahead! Oregon's Smoke Management Plan has been highly successful in meeting both air quality and landowner objectives, but it does require understanding and patience by all parties. Landowners must register, notify and pay fees to ODF prior to burning, with fees depending on the burn type (landing pile vs. broadcast) and acreage. Local ODF district staff issue approvals for ignition, with assistance from state meteorologists.
- Cover a portion of the pile with a waterproof barrier. (Note: There are restrictions on the type, area and disposal of coverings – contact ODF for details). This allows for burning during wet periods and reduces the risk of escape. The drier material also burns more completely with less smoke.
- Small, scattered piles can be left for wildlife unless mountain beaver (boomers) or other rodents are a problem.

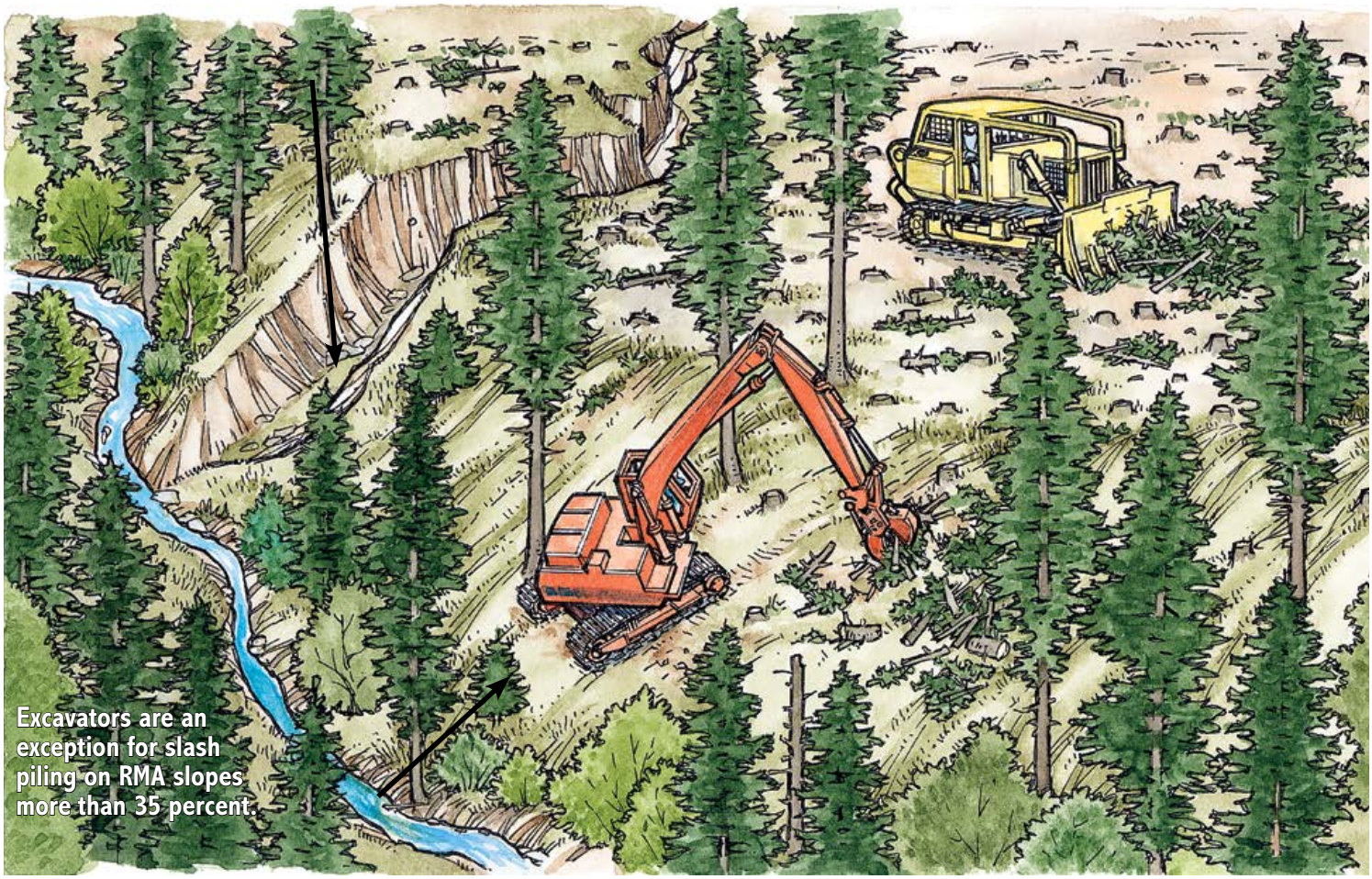
See page 93 for additional tips.

When treating slash, stay clear of wet areas.

The same machine that brings whole trees to the landing may carry slash back and scatter it on the forest floor. This returns nutrients and organic matter to the soil for the next forest. It also protects soil from erosion, especially in skid trails. The fire hazard is minimal because the slash is crushed and close to the ground.

No machine piling is allowed around an eroded gully.

In RMAs, machines on slopes less than 35 percent.



Be sure to have a vegetation filter between machine piling activities and RMAs or waters of the state. This keeps sediment from reaching the stream.

Are there requirements if mechanical site preparation is done near water?

During mechanical site preparation, operators shall not place debris or soil in waters of the state or where it may enter waters of the state.

fpa

When mechanical site preparation is necessary in RMAs or near water, conduct operations in a way that sediment or debris does not enter waters of the state.

When using mechanical site preparation, operators shall provide adequate distance between disturbed soils and waters of the state to filter sediment from runoff water.

Machine piling (see illustration above) is not allowed:

- in RMAs with slopes greater than 35 percent
- on sites with surface or gully erosion
- where subsoil may be exposed or subsoil compaction is likely to occur

An exception: Excavator slash piling in RMAs is allowed on slopes of more than 35 percent, but only during dry periods.

Keep slash out of waters of the state. Slash can deplete oxygen levels as it rots, and in steep reaches it can be a debris torrent hazard.

For other information sources, see the Appendix, pages 197-198.