Forest Practices Technical Guidance

DRAFT

All Water Crossings

Month 2024

Objective

Forest Practices Technical Guidance is advisory guidance, developed by the State Forester through a stakeholder process, to assist landowners and resource professionals to implement the Oregon Forest Practices Act and forest practices rules.

This Technical Guidance addresses the requirements for all water crossings. This guidance is meant to work in conjunction with other Forest Practices Technical Guidance relating to water crossings. Operators should refer to the following guidance that relate to the planned project. This document will be updated with links to these documents as they are finalized.

- Fish Stream Crossings
- Sizing Water Crossings
- Developing a Chemical Spill Prevention and Response Plan
- Road Drainage Systems
- Vacating Forest Roads and Stream Crossings
- Fish Salvage, Worksite Isolation, and Dewatering

Background

In 2022, Senate Bill 1501 directed the Board of Forestry to adopt rules to apply the 2022 Private Forest Accord Report. The Report memorializes the agreements between authors of a conservation coalition and working forest coalition. This was mediated by Governor Brown and sanctioned in 2020 by Senate Bill 1602. They negotiated to modify Oregon's forest practice regulations in support of developing an acceptable habitat conservation plan (HCP). The HCP would provide the means to seek an Incidental Take Permit under Section 10 of the U.S. Endangered Species Act for the covered species identified in the Report.

OAR 629-625-0300 Requires that the Department publish technical guidance for all water crossings.
OAR 629-625-0320 contains the specific rules relating to the design and construction of water crossings.
OAR 629-625-0100 describes the written plan requirements for the crossings.

Terminology

Active channel width (OAR 629-600-0100) means the stream width between the ordinary high-water lines, or at the channel bankfull elevation if the ordinary high-water lines are indeterminate.

Bankfull elevation (OAR 629-600-0100) means the point on a stream bank at which overflow into a floodplain begins.

~~**Bankfull width** of the channel is the point beforewhere the banks begin to overflow into the floodplain. See also "Bankfull elevation" in OAR 629-600-0100.~~
Bankfull width of the channel is the distance between the banks at the Bankfull Elevation.

Channel (OAR 629-600-0100) is a distinct bed or banks scoured by water which serves to confine water and that periodically or continually contains flowing water.

Channel spanning structures are crossing structures that do not have a bottom underneath the streambed and span the bankfull width of the channel.

Cross drain (or relief culvert) –A cross drain is a constructed feature across a road or in a ditch line, as a means of reducing flow within a ditch. Cross drains are not located in stream channels and are considered elements of the road prism. Examples include culverts and water bars.

Earthen materials natural materials which include, but are not limited to dirt, rocks, or soil.

Effective in this guidance means that the purpose of the rule or method described by rule is achieved.

Ford (OAR 629-600-0100) means a type of stream crossing where the vehicle travels on the streambed or other installed structure with the wheels of the vehicle in the water if present.

In-water work means any construction related work or activity that takes place below the high-water mark during flowing conditions and/or when water is present in stream channel.

Minimize means to reduce to the lowest level that is reasonably practicable to achieve.

Ordinary high-water line (OAR 629-600-0100) means the line on the bank or shore to which the high-water ordinarily rises annually in season, as defined in ORS 274.005.

Period of low flow means when a stream has a small, sustained flow level. Streams experience periods of low flow either during dry weather or during cold periods when precipitation is stored as snow and ice.

Stabilize in this guidance means to take measures that prevent or reduce erosion

Stream (OAR 629-600-0100) means a channel, such as a river or creek, which carries flowing surface water during some portion of the year.

(a) For the purposes of the forest practice rules, streams include:
  - (A) The water itself, including any vegetation, aquatic life, or habitats therein;
  - (B) Beds and banks below the high water level which may contain water, whether or not water is actually present;
  - (C) The area between the high water level of connected side channels;
  - (D) Beaver ponds, oxbows, and side channels if they are connected by surface flow to the stream during a portion of the year; and
  - (E) Stream-associated wetlands.

(b) "Streams" do not include:
  - (A) Ephemeral overland flow (such flow does not have a channel); or
  - (B) Road drainage systems or water developments as defined in this rule.

Stream Diversion for the purposes of this guidance stream diversion is when stream flow is diverted out of the stream channel and down the road or ditch in an uncontrolled and unintentional manner.

Surface Waters is used in this guidance to abbreviate the list of water features listed in rule for which water crossing rules are applicable. Including: lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, and canals. The list primarily differs from waters of the state by omitting groundwater and the Pacific Ocean.

Temporary crossings Any water crossing on a haul road not designed for high wet season flows. Water crossings for skid roads are not addressed by this guidance.

Temporary Stream Flow Diversion For the purposes of this guidance temporary stream flow diversion is the intentional rerouting of stream waters during in-stream work. Effectively the same as stream bypass or dewatering.

Water Crossing any structure constructed or placed to allow vehicular access across all typed waters and lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, and canals. Water crossings do not include cross drain culverts, water bars or other ditch relief features.

Waters of the State (OAR 629-600-0100) include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon, and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction.

~~Overview~~

~~When designing the water crossing look at the requirements and guidance for all crossings and for the specific type of crossing planned.~~

Main Content

1. Water Crossing Design

The goal when designing water crossings is to minimize the impacts to the stream during construction and throughout the life of the crossing. Stream crossings can impact water quality by providing opportunities for sediment to enter the stream. The purpose of OAR 629-625-0320 is to minimize these opportunities to impact the stream.

Culverts, bridges, open bottom arch culverts, and fords are all types of water crossings. When evaluating a crossing for replacement landowners are encouraged to consider vacating the crossing if it meets the land management goals. When selecting the crossing type evaluate the stream characteristics. In general, culverts are the most economical choice for smaller streams. For larger streams and streams with large amounts of debris, bridges may be necessary.

a. All water crossings

OAR 629-625-0320 (1) through (3) describes requirements for all stream crossings, this includes all stream types and all crossing types.

Requirements for all types of water crossings

Requirement	Rule #
i. Designed to convey the 100-year peak flow	OAR 629-625-0320(3)(a)
ii. Minimize excavation of side slopes	OAR 629-625-0320(1)(a)
ii. Minimize disturbance of the stream channel, bed, banks, and bank vegetation.	OAR 629-625-0320(1)(e)
iii. Minimize volume of materials in the fill, deep fill, fill armoring	OAR 629-625-0320(1)~~(b)~~
iv. Prevent erosion of the fill and channel	OAR 629-625-0320(1)(c)
v. Minimize hydrologic connectivity	OAR 629-625-0320(1)(d)
vi. Ensure that stream diversion is unlikely.	OAR 629-625-0320(1)(g)

i. Conveying the 100-year peak flow

For details of how to select a crossing size that conveys the statistical 100-year peak flow see Forest Practices Technical Guidance: Water crossing sizing. For culverts the design must convey the flow without water ponding over the top of the culvert. Ponding above the inlet increases the chance of woody debris plugging the culvert. (Furniss et al., 1998). Channel spanning structures such as bridges must have at least 3 feet of clearance between the water level at the 100-year peak flow and the bottom of the structure~~.~~ (See discussion on freeboard in channel spanning structures below.).

ii. Minimizing disturbance to stream channel, bed, banks, and bank vegetation. Minimize excavation of side slopes

Disturbances near the crossing expose readily erodible soils near surface waters. Additionally, alterations to the streambed and banks may impact the natural function and stability of the stream. Operators are required to limit the disturbance to streambeds, stream banks, stream bank vegetation and to minimize excavation of side slopes to only what is needed to install the structure.

Careful planning of equipment access and equipment size can limit the disturbance around the project area. For culverts that are not embedded, limiting the excavation and placing the culvert at the natural stream grade can minimize streambed alteration.

Side slopes are the slopes going away from the stream bank. Side slopes include the flood plain if present and the hill slope near the stream. Excavating these areas exposes erodible soil and potentially destabilizes the slope. Limit excavation of these slopes to only what is needed and avoid unstable slopes when possible.

iii. Minimize volume of materials in the fill

Design stream crossing fills to minimize the potential to fail, move downstream and impact water quality. Minimizing the total fill volume is required for all stream crossings. Methods to minimize fill volume include designing the subgrade as low and narrow as practicable. It is not appropriate to construct stream crossing fills larger than necessary in order to dispose of excess construction materials.

When stream crossing fills are deeper than 15 feet they must be designed to minimize the likelihood of surface erosion, embankment failure, and downstream movement of fill material. Fill depth is measured from the downhill road surface edge straight down to natural ground. It is not possible to directly measure the fill depth post construction, instead it must be calculated assuming a straight line between the uphill and downhill toe of fill. Written plans must detail how the design will achieve the above goals.

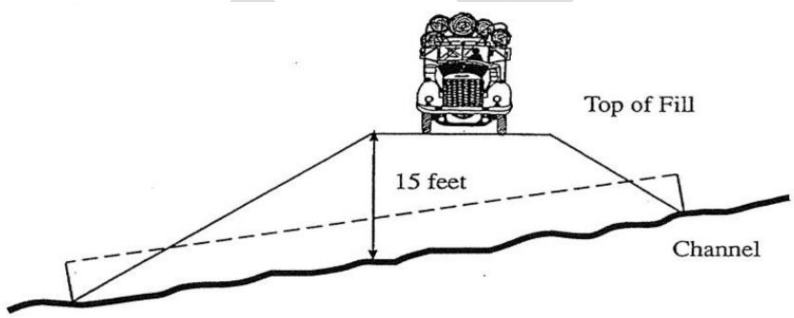

Figure 1. Point where stream crossing fill depth is measured.

When fills greater than 15 feet deep are required, the fill slopes must be armored against erosion. In general, larger rock such as rip rap provides greater resistance to slumping and movement. Smaller rock can protect against surface erosion. A combination can be used.

iv. Prevent erosion of the fill and channel

Fill erosion

Crossing designs that prevent concentrated water from flowing over the fill and do not allow the stream flow to interact with the fill material can prevent the erosion of the fill.

Design strategies to prevent fill erosion:

- Minimizing the road surface water directed towards the fill
- Vegetative stabilization such as grass seed.
- Rock armoring the fill
- Placing culverts at natural stream grade with sufficient length to extend past the fill

- When culverts outlets are not at stream grade using downspouts or other means of preventing stream flow from interacting with the fill.
- Minimizing the fill depth and width to only what is necessary

Channel erosion

Crossings that mimic the natural flow of a stream minimize the potential for channel erosion. Other strategies that dissipate energy at the outlet may also prevent channel erosion.

Design strategies to prevent channel erosion:

- Construct crossings at or as close to natural grade as possible.
- Utilize boulders or other durable non-moveable materials below the outlet to dissipate energy.
- Pay particular attention to culverts that ~~"shotgun"~~have an outlet drop into the stream.
- Utilize roughened materials in culvert to reduce velocity.

v. Minimize hydrologic connectivity

Hydrologic connectivity occurs where road and ditch runoff is delivered to the natural stream channel system. An area of the road prism is considered to be connected when water runoff can reach surface waters without first filtering through the forest floor. Water crossing designs must minimize the amount of connected road prism. Careful planning is needed prior to construction to minimize hydrologic connectivity. Cross drains, ditch reliefs, settling basins etc. may be used as ditch diversions. See Forest Practices Technical Guidance: Road Drainage Systems for more information on minimizing hydrologic connectivity.

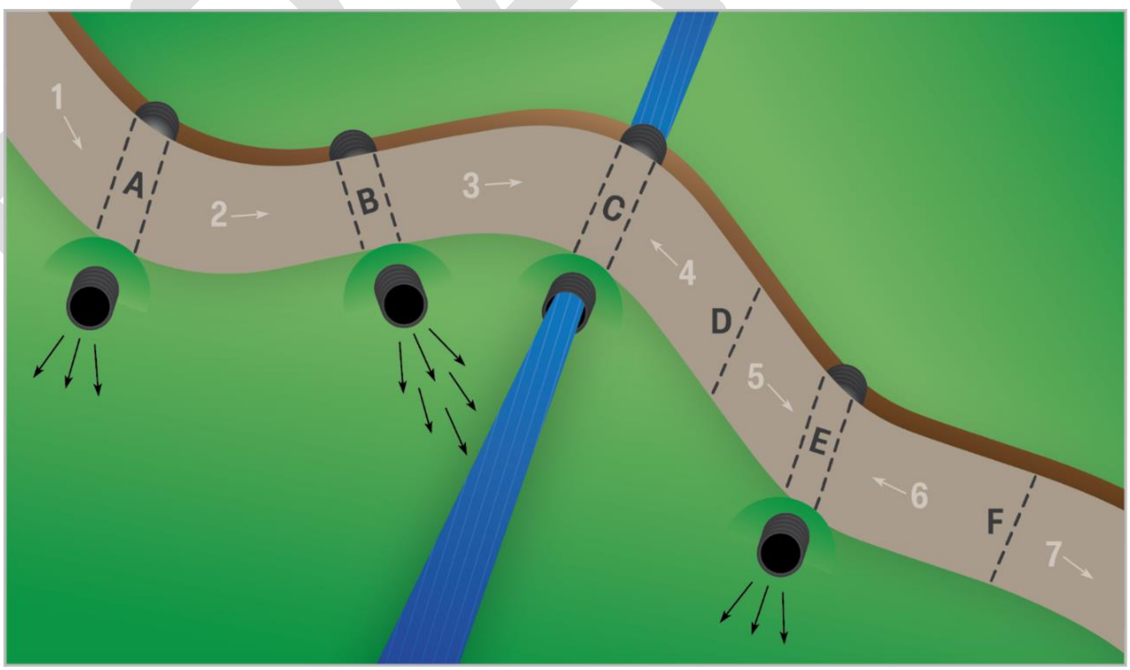

Figure 2. Road Segments (numbered 1-7) and drainage features. Segments 3 and 4 drain directly to the stream. Segment 2 ~~may~~ could deliver some sediment to the stream.

vi. Avoid stream diversion potential

Stream diversion potential is the possibility that when a stream crossing structure is overwhelmed, flow is diverted into the ditch or down the road surface. When an overwhelmed crossing structure will direct water over the road and back into the stream, there is no stream diversion potential. Furniss et al. (1997) notes that "In almost all cases, diversion will create a greater erosional consequence of capacity exceedance than streamflows that breach the fill but remain in the channel".

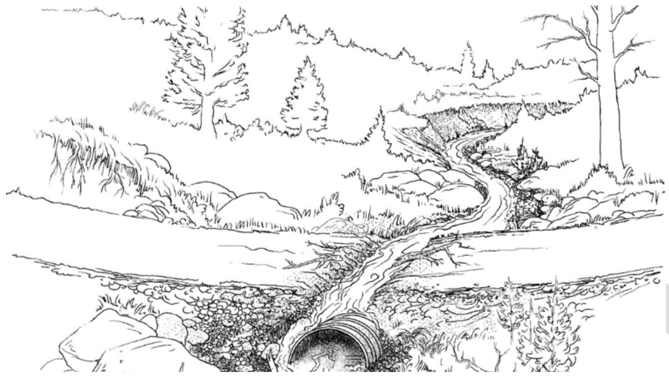

Figure 3. Failed crossing in the bottom of a vertical curve. In this case the crossing does not have diversion potential and waters are routed over the fill and back into the stream.

Figure 4. Failed crossing where the road grade drops past the crossing. This crossing diverted the stream down the road surface and off the road.

Possible consequences of stream diversion include:

- Enlargement of ditchline
- Incision of a new stream channel
- Initiation of a fill failure or steep slope failure
- Diverting into and overwhelming other stream crossings.

Overwhelmed in this context means that the amount of water at a crossing exceeds the capability of the structure. Water may build up to an elevation that allows it to move away from the crossing. Stream crossings may become overwhelmed for a variety of reasons. Debris such as woody material and boulders at the upstream end of the crossing reduce the amount of water that can flow through the crossing. Debris flows may block the structure. The structure may be significantly undersized for the flow during a large storm event.

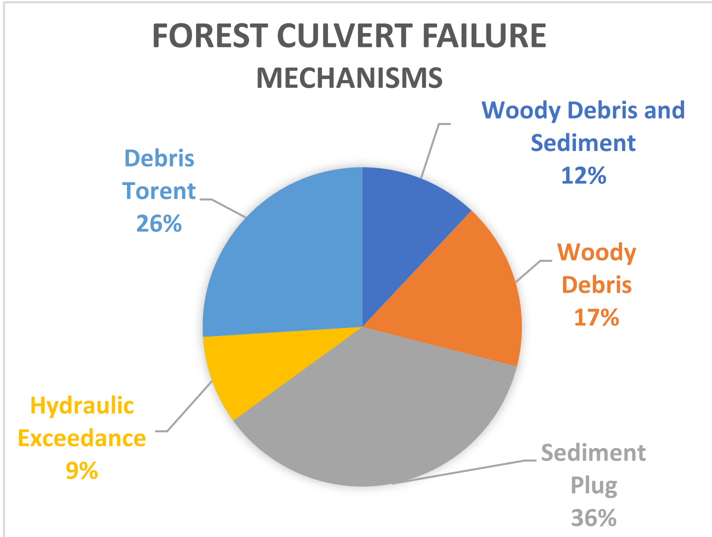

Figure 5 (Furniss et al., 1998)

Stream crossings in the bottom of a vertical curve naturally do not have stream diversion potential. Because the road and ditch slope up away from the crossing, water will flow over the fill if the crossing is overwhelmed. Stream diversion becomes more likely where the road slopes down going away from the crossing.

Methods to minimize stream diversion potential

The best time to plan how to minimize stream diversion potential is during the road and stream crossing design phase. Plan the path that the stream will take if the structure is overwhelmed. The best approach is to slope the road upwards from the crossing in both directions (bottom of a vertical curve). However, it may not be possible to always do so.

In cases where the road slopes down from the structure other strategies may be needed, such as:

1) Rolling dips/critical dips
   Rolling or critical dips are constructed low spots in the road surface that are sloped to carry water to the outside edge of the road. When used for preventing stream diversion the dips should be located downslope and near the crossing. When the dip isn't installed near the crossing it may be necessary to construct a flow path back to the stream channel. Rolling dips on roads with infrequent traffic may be made smaller. Dips on frequently used roads such as mainlines should be made longer. Rolling dips are a good option for minimizing stream diversion on low gradient roads.

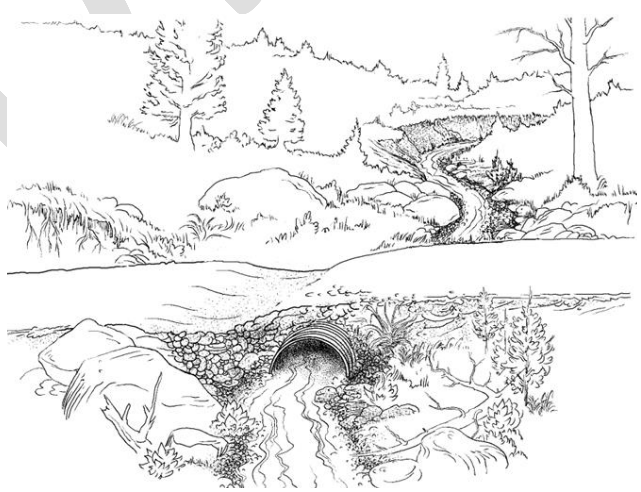

Figure 6 Example of rolling dip

2) Outsloping
Sloping the entire road surface to the outside edge of the road (outsloping) can prevent stream flow from continuing down the roadway. When using this option, it is important to ensure that the point where the water will leave the road edge flows back to the stream channel. ~~Outsloping is also best used on low gradient roads.~~ Safety consideration may limit situations where outsloping may be effectively used. Road grade and surface stability should also be considered.

3) Water- bars
For native surface roads that are only used in the dry months a water bar placed downslope from the crossing is an option. The outlet of the water bar should lead the streamflow back towards the channel, in some cases a constructed path may be necessary. The water bar could be removed when needed during the dry months and replaced when operations are complete. This option may also be used for rocked roads that are inactive. The water bar size should be large enough to handle the expected flow if the structure were to plug.

4) Oversizing the structure
When other options aren't feasible, oversizing the structure to make it less likely to be overwhelmed may be considered. This option is generally more expensive than others. Additional strategies such as inlet beveling and overflow pipes could be considered. When choosing how much to oversize the structure consider how likely it may be for the structure to become plugged by debris from the stream channel or from debris flows. Note OAR 629-625-0320(3)(c) allows the State Forester to require oversizing a structure. Stream flow diversion potential is listed in the rule as a reason to consider doing so.

It is possible for designs that limit stream diversion potential to increase hydrologic connectivity. Consider the outlet area of rolling dips, water bars, and outsloping. When they outlet onto fill it may require armoring of the fill to prevent further erosion. Avoid outlets that lead directly to the stream channel without opportunities to filter sediment when possible.

Maintenance
All measures for preventing stream flow diversion require maintenance. When grading roads ensure that the rolling dips and outsloped sections maintain the intended shape. Water bars need to be periodically assessed for functionality as recreation or forest management activities may reduce their functionality. When using oversized structures, it is best to remove any upstream accumulations of debris.

Requiring larger structures
ODF may require operators to install larger crossings than would otherwise be required for the 100-year peak flow. (OAR 629-625-0320(3)(c) indicates that ODF Salem technical staff will review the need to oversize the structure when requested to do so by the Stewardship Forester.

The Stewardship Foresters may request further review when they suspect that the structure size is inadequate to:

- Avoid delivery of sediment to the water being crossed;
- Avoid stream diversion potential; and
- Provide opportunity for the passage of expected bed load and associated large woody debris during large storms.

To require a larger structure all three of the above conditions must be true. In most cases avoiding delivery of sediment to the waters being crossed will occur when the other two bullets are expected to occur. Stream diversion potential is a concern when an overwhelmed stream crossing can flow away from a channel. For this to occur the following need to be true:

- The road and or ditch slopes away from the crossing.
- No other measures such as those described in the stream diversion section above have been taken or are not feasible.
- The measures that are being used to avoid stream diversion potential are not likely to be effective.

Passage of expected bed load is a concern when the drainage above the crossing has a large amount of slash and debris in it, or when there is a large amount of debris in the stream channel. This condition may also be met if there is high risk of debris flows impacting the structure is noted.

b. Channel spanning structures

Channel spanning structures include bridges and open-bottom structures. Permanent channel spanning structures must span the bankfull width of the stream.

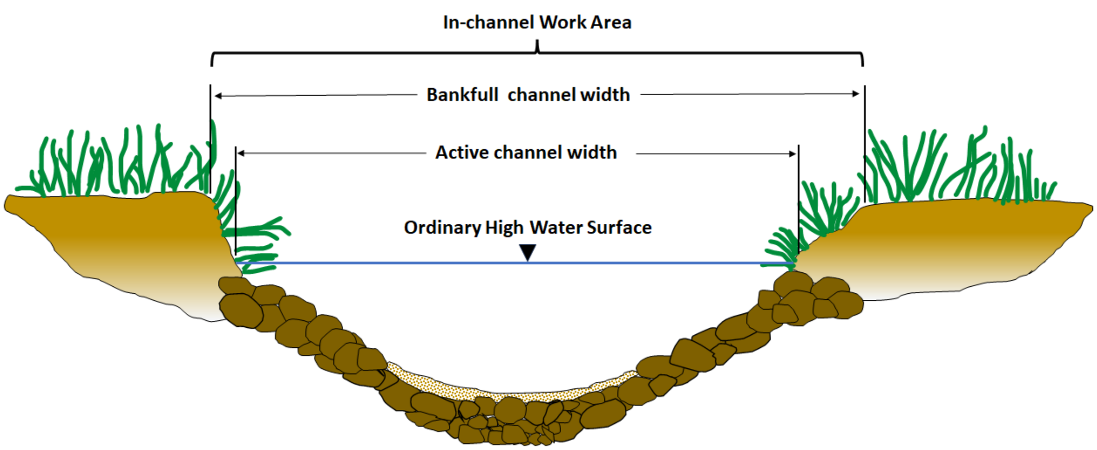

Figure 7. Cross sectional view of a stream channel that illustrates the active channel width, bankfull channel width, and in-channel work area.

Requirements for All Channel Spanning Structures

Requirement	Rule #
i. 3 feet of Freeboard above the 100-year peak flow elevation	OAR 629-625-0320(4)(a)
ii. Anchor one end of log or wood bridges if within 10 feet of 100-year peak flow elevation	OAR 629-625-0320(4)(c)

Requirements for All Channel Spanning Structures

Requirement	Rule #
iii. Use clean materials, geotextiles, and install curbs when earthen materials are used for bridge surfacing	OAR 629-625-0320(4)(d)
iv. Place wood moved from the upstream end of ~~culvert~~ bridges to downstream end	OAR 629-625-0320(4)(e)
v. Bridge structures may not constrict flow to cause any appreciable increase in backwater elevation	OAR 629-625-0320(4)(f)
vi. Bridges must be aligned to cause the least effects on the hydraulics of the watercourse	OAR 629-625-0320(4)(f)
vii. When excavation for and placement of the foundation or superstructure is within the ordinary high-water line the construction site must be separated from the stream	OAR 629-625-0320(4)(g)

i. Freeboard

Freeboard is the distance from the water level at a specified flow to the lower portion of a stream crossing structure. The purpose of freeboard is to allow debris to pass underneath structures. A minimum of t~~T~~hree feet of freeboard above the 100-year peak flow elevation is required for all channel spanning structures. An exception to the 3-foot freeboard requirement can be made when engineering justification shows that a lower clearance is able to pass expected debris and sediment load. The required engineering justification should be provided by someone with ~~a~~ ~~Professional Engineer with~~ appropriate experience designing water crossings. The justification should include specific conditions and measures that justify not providing the required freeboard. Forest practices technical guidance: Water Crossing Sizing for 100-Year Peak Flow describes how to evaluate freeboard.

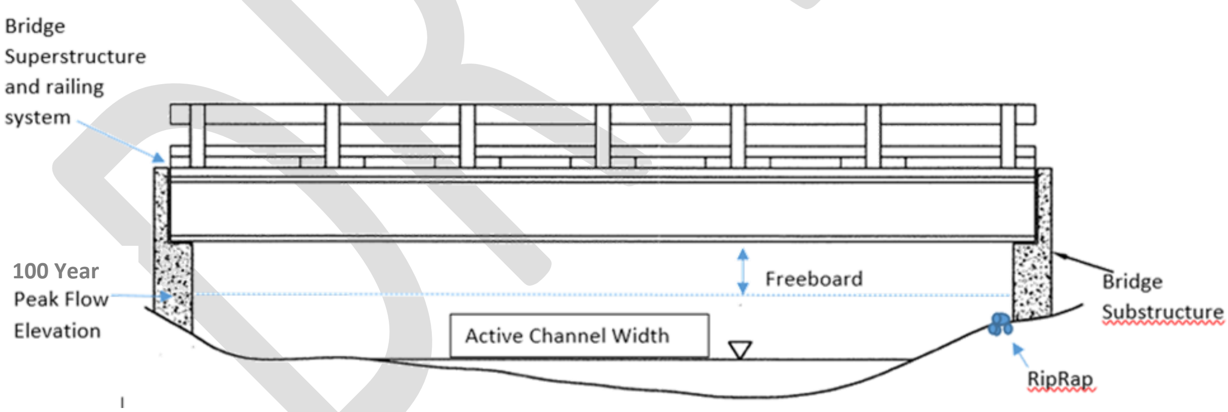

Figure 8. Freeboard illustration.

ii. Anchoring

When a wood structure bridge is placed within 10 vertical feet of the calculated 100-year peak flow at least one end must be anchored firmly. Anchors might include cable ties or other attachments to structure elements not likely to be displaced by very high flows. This rule does not apply to wood decked bridges with concrete or steel structures.

iii. Earthen surfaced bridges

When earthen materials are used for a bridge running surface, operators must take measures to prevent sediment from those materials from entering surface waters. Bridge decks can have holes and other gaps that allow water from the road surface to directly access a stream.

This rule requires the following measures to be taken:

- Use only clean-sorted rock or install a geotextile or equivalent barrier, and
  *Note: Rule language uses gravel, clean-sorted crushed is also acceptable.
- Install curbs tall enough to prevent surfacing materials from falling into the streambed.

For the purposes of this rule the geotextile used should have appropriate filtration or impermeability to prevent sediment from passing through it. It is recommended that the surface rock used be of a high quality that does not break down easily. (See Forest Practices Technical Guidance: Wet Weather Road Use)

iv. Place wood removed from channel downstream

Large wood such as stumps and logs removed from the upstream end of bridges must be placed downstream of the structure. Ensure the wood placement does not block fish passage or increase erosion potential. If there is another structure below that could be impacted by the replaced woody debris, either place the wood below the downstream structure or dispose of the wood with other excess material.

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v. Constricting flow and alignment

Bridge elements such as abutments, piers, piling, sills and approach fills shall not constrict the flow enough to cause an appreciable increase in backwater elevation. Appreciable increase is defined as greater than 0.2 feet calculated at the 100-year peak flow. To determine the increase in backwater, calculate the elevation of the water at the 100-year peak flow for the unobstructed channel and with the design structure, the difference must be less than 0.2 feet. When replacing a culvert with a bridge it may be necessary to use a representative cross section to approximate the natural channel. In most cases backwater elevation will not be changed when the structure spans the bankfull width. Evaluating backwater rise will not be a necessary step in most designs that span the entire bankfull width. Bridges requiring intermediate supports or over streams with wide floodplains may require more careful evaluation. Additionally, when support slopes such as rip rap armor constrict the channel this step should be carefully evaluated.

Flow constriction causes faster water speeds through the crossing. Faster flow increases the forces that move streambed and bank materials. The greater forces move materials that might have otherwise been stable. And small materials are moved more quickly. Bridge structures may not cause a constriction great enough cause channel wide scour.

Notes: Channel spanning structures over Type F and SSBT streams may not constrict the clearly defined channel.

vi. Bridge alignment

Aligning bridge elements to have the least effect on the hydraulics of the watercourse is required. Aligning the elements so that flow crosses as close to a right angle as possible minimizes the possibility of disturbance. Longer features such as abutments minimize disturbance when they are aligned with the flow of the stream. Choosing crossing locations in straight stream segments also helps to minimize scour potential. When it is not possible to align the structure to the stream other stabilization methods may be needed.

vii. Excavation within the ordinary high-water line

Excavation and placement of the foundation and superstructure should be done outside the ordinary high-water line. When it is not possible to do so, the work within the high-water line must be separated from the stream by an approved dike, cofferdam, or similar structure. The structure should prevent loose soil from entering the stream and water from entering the work area. Dry streams or dewatered streams do not need to be isolated, however care should be taken to minimize the impacts to the stream.

c. Permanent Culverts

Requirements for All Water Crossing Culverts

Requirement	Rule #
i. Design and install culverts so they will not cause streambed scouring and bank erosion	OAR 629-625-0320(5)(a)
ii. The culvert, embankment, and fills must have sufficient erosion protection to withstand the 100-year peak flow	OAR 629-625-0320(5)(c)
iii. Place wood moved from the upstream end of culvert to downstream end	OAR 629-625-0320(5)(d)
iv. Revegetate disturbed streambanks with woody material or otherwise stabilize	OAR 629-625-0320(5)(e)
v. Water crossing culverts must be at least 18 inches in diameter	OAR 629-625-0320(5)(f)

i. Streambed scour and bank erosion

Operators must design culverts that do not scour the streambed or erode of the banks near the culvert.

Culverts may speed the flow of water compared to a natural channel. Higher water speeds generally increase the potential to scour a streambed, especially near the outlet. Additionally, during the construction process natural streambed materials near the outlet may be removed making the channel more vulnerable to scour.

The following are some design methods that may be used alone or together to reduce streambed scour potential:

- Placing armor rock at the outlet
- Placing the culvert at the natural stream gradient
- Using boulders as energy dissipators
- Using a larger culvert to reduce water acceleration

Rule does not require that permanent culverts in non-fish streams be placed at the natural stream grade. However, doing so reduces the potential for stream and fill erosion. When culverts are not placed at stream grade operators must ensure that the fill and stream are not eroded. Half round culverts placed to direct stream water to the stream can protect fills. When water volume and velocity is great enough to erode the streambed armoring may be needed.

Streambank erosion is most often caused by stream flow being directed towards the streambanks or by undermining streambanks which causes chunks of the bank to fall into the stream. Aligning the culvert so that the outlet is in line with the stream is the best practice to prevent directly eroding the stream bank. When alignments that direct flow towards the bank cannot be avoided measures must be taken to prevent streambank erosion.

Streams with very steep or unstable soils may erode even when the culvert is aligned with the stream. Scour from the culvert can undermine the banks and cause them to fall into the stream. If this is anticipated, measures to stabilize the bank must be taken.

Measures to stabilize streambanks from streamflow erosion might include:

- Hardening of the streambank to prevent bank erosion should be used.
- Other measures to dissipate energy such as boulder placement.

When applying measures such as streambank hardening it is best to excavate the banks and replace the excavated material with rock to prevent channel narrowing. Also consider the impacts to flows when placing boulders for energy dissipation.

ii. Culvert erosion protection

The culvert and its associated embankments and fills must have sufficient erosion protection to withstand the 100-year peak flow. Erosion protection might include armored overflows and using clean, course fill material. The culvert itself must be designed to convey the 100-year peak flow. In some cases that peak flow may cause extreme erosive forces acting on the fill around the inlet. When culvert fills are constructed of easily erodible material and if it is likely they will encounter turbulent flows, armoring around the inlet and lower portions of the fill can reduce erosion potential. Sometimes the stream channel itself may not convey the 100-year peak flow. In this case the water would leave the channel and potentially impact the fill within the floodplain. Planned armored overflows within the floodplain may help protect the fill within the floodplain. The overflow should be constructed lower than the road grade over the culvert fill to be effective.

iii. Place wood removed from channel downstream

Large wood such as stumps and logs removed from the upstream end of culverts must be placed downstream of the structure. The purpose is to prevent plugging of the culvert while retaining woody debris in the stream system. Ensure the wood placement does not block fish passage or increase erosion potential. If there is another structure below that could be impacted by the replaced woody debris, either place the wood below the downstream structure or dispose of the wood with other excess material. ~~A plan for alternate practice will be needed to alter the requirement.~~

iv. Revegetate streambanks

Operators must revegetate or otherwise stabilize streambanks impacted by construction. When revegetating use grasses, mulching, rock armoring, slash placement, planting of native woody species, or other erosion control techniques as deemed appropriate by the operator for each stream crossing. Native woody plantings must be maintained for 1 year. Maintained means not ~~treated~~ targeted by~~with~~ herbicides and kept free from competing vegetation that over tops the plantings. Grasses may still be used in combination with woody plantings. Other erosion control techniques might include grass seeding and mulching, rock armoring, or slash placement.

v. Culvert minimum size

Culverts used for water crossings must be at least 18 inches in diameter and convey the 100-year peak flow. Operators should consider using larger culverts even for very small streams when there is evidence of debris moving through the stream or if maintenance may be infrequent.

d. Fords

Fords are stream crossings where vehicles drive through the water (when present). In cases where a stream crossing will be used infrequently fords may be a lower impact crossing strategy. Fords should only allow seasonal access as they typically will not be available for use year-round.

Requirements for All Fords

Requirement	Rule #
i. Entry and exit points of a new ford may not be within 100 feet of an existing ford on the same property ownership.	OAR 629-625-0320(7)(a)
ii. Install fords only in a dry streambed or de-water the site.	OAR 629-625-0320(7)(c)
iii. Approaches may not dam the floodplain where substantial overbank flow occurs.	OAR 629-625-0320(7)(d)
iv. Ford must cross as perpendicular to the stream as practicable.	OAR 629-625-0320(7)(d)
v. Minimize the increase in stream velocity through the ford.	OAR 629-625-0320(7)(f)

i. Entry and exit points and minimize stream crossings

OAR 629-625-0200(6) requires operators to minimize the number of stream crossings. Entry and exit points of a new ford may not be within 100 feet of an existing ford on the same property ownership. Note that even if a new ford is over 100 feet from an existing ford it may not be minimizing stream crossings. Stream crossings should only be constructed when existing crossings do not suit the needs for the planned activity.

ii. Dewatering

Fords must be installed in dry streambeds or when the site has been dewatered. See the construction section for more information on dewatering.

iii. Approaches and floodplains

The approaches to the ford may not dam the floodplain where substantial overbank flow occurs. Generally, overbank flow occurs more frequently in areas with wide floodplains and smaller channels. Overbank flow may be substantial when there is evidence of flow such as deposited material and scour in the flood plain. Investigate the history of flooding in the area prior to construction when floodplains are present. It is best to keep the road approaches as near to the natural ground as possible. Temporary fords that will be completely vacated prior to the rainy season may dam the floodplain. If this occurs, minimize the amount of fill within the floodplain.

iv. **Alignment**

Fords must cross the stream as near to perpendicular as possible to limit disturbance and maintenance needs. Topography may limit the ability to cross perpendicular. A different site with lower approaches or a smaller turning radius may allow for a straighter crossing.

v. **Minimize acceleration of water**

Operators must construct fords to minimize the acceleration of water through the ford. Adding rock to the stream channel constricts the flow. Streams react to constriction by raising elevation and/or speeding up. Greater speeds through the ford may cause scour of the ford or the streambed downstream of the ford. Limit the material added to the stream channel to only what is needed to make it drivable. Minimizing acceleration of water becomes especially important when providing for fish passage.

vi. **Ford Best Management Practices**

1. **Rock approaches**

   Rocking approaches can prevent water tracked from the crossing from becoming sediment laden and running back into the stream. Additionally, rocking approaches lessens the material tracked into the stream. The length of road to rock depends on the grade of the road, soil type, and connectivity to the stream. Operators might consider 50 feet in each direction to be a best practice minimum.

2. **Rock in stream channel**

   Use clean rock when constructing the ford. When deformation is noted in the streambed apply more rock or discontinue use. Pay attention to the banks adjacent to the stream; additional rock depth is often needed in this area.

3. **Crossing locations**

   When possible, locate fords in areas with exposed bedrock or large cobbles.

4. **Controlling access**

   When fords are not in use it is good practice to block them. In areas with public access, fords may be used for recreation. Placing boulders, logs, tank-traps, or gating the area can prevent unnecessary impacts.

Figure 9. (left) Road is not adequately rocked and sediment is impacting the stream. (Right) Well rocked approaches with clean open rock.

e. Temporary Crossings

The temporary crossings rules only apply to roads used for log haul. Requirements for skid road crossing are found in OAR 629-630-0800.

If year-round access is not required, temporary crossings can be the most economical and less impactful option. Temporary crossings can take many forms, including culverts and bridges. Any crossing structure that is not designed to accommodate the 100-year peak flow must be a temporary crossing. For the purposes of these rules, temporary crossings are different than fords in that the vehicles wheels do not cross through the stream.

Figure 10. Temporary crossing using a culvert and rock fill.

Requirements for All Temporary Crossings

Requirement	Rule #
i. Design temporary crossings to at least pass the flows expected during use.	OAR 629-625-0320(8)(a)
i. Minimum diameter of 18 inches when culverts are used.	OAR 629-625-0320(8)(a)
ii. Removal of temporary crossings must comply with the standards of the forest road and stream crossing vacation rules.	OAR 629-625-0320(8)(g)

i. Design size

Temporary crossings must be designed to convey the flows expected while the crossing is in place~~.~~ with a minimum diameter of 18 inches.~~.~~ Observations of the crossing site during previous years can indicate how low the stream flow becomes during summer months. In some cases, a low flow channel within the streambed may indicate the width of the summer flow. Temporary crossings should be able to convey the increased flow from a summer storm event. Backing water up behind the crossing should be avoided and is an indication that the crossing may not be able to convey flows from a summer rain event. The minimum culvert size applies even for crossings of dry streams.

ii. Vacating temporary crossings

Temporary crossings must be vacated to the standards described in OAR 629-625-0650. See Forest Practices Technical Guidance: Vacating Forest Roads and Stream Crossings for more information.

iii. Temporary Crossing Best Management Practices

1. Rock approaches

Rocking the approaches to the temporary crossing can lessen the impacts of summer rains to the stream. Operators might consider 50 feet in each direction to be a best practice minimum.

2. Crossing construction

Construct temporary crossing with clean rock. Minimize the amount of material placed in the stream by minimizing the fill height and width to only what is necessary to construct the crossing. Choosing locations with lower banks and flatter approaches helps limit fill height.

f. Other design strategies

Alternative crossing designs are those that do not meet the specific requirements for, permanent channel spanning structures, permanent water crossing culverts, fords, or temporary crossings. Alternate designs may be considered by the department through the plan for alternate practice process. These plans require approval from the department and must show that the proposed design meets or exceeds the required standards. The department may require engineered designs in some cases.

2. Timing of Crossing Construction and Use

Requirements for Timing of Water Crossing Construction and Use

Requirement	Rule #
a. In-water work for water crossing projects must be constructed during the ODFW in-water work period	OAR 629-625-0320(10)(d)(B)
b. In-water work outside of the ODFW in-water work period may be done when specific dates are agreed upon with ODFW consultation.	OAR-629-625-0320(10)(d)(A)(ii)
c. Use fords only during periods of no or low flow.	OAR 629-625-0320(7)(b)
d. Temporary crossings must be installed by and removed by: ○ June 1; September 30 in Western Oregon ○ July 1; October 15 in Eastern Oregon	(OAR 629-625-0320(8)(d)

a. In-Water work

The in-water work periods (IWWP)are specific time periods that were established for individual watersheds to avoid in-water work during the vulnerable life stages of fish including migration, spawning, and rearing. The periods are published in Oregon Guidelines for T~~t~~iming of In-water Work to Protect Fish and Wildlife Resources March 2024. Water crossing projects with in-water work must be completed within the IWWP. In-water work is any soil disturbing activity taking place below the high-water mark of a flowing stream or when water is present. Streams that have had their flow diverted for construction are not considered dry streams. Projects planned when the stream is dry are not required to be done during the IWWP, however all other relevant rules in OAR 629-625-0320 still apply. Projects conducted in streams that are dry still carry a potential to impact streams when flow returns. Operators should prioritize soil stabilization as soon as operations are complete and limit disturbance to bed and banks.

b. Working outside the IWWP

Operators should plan to complete projects with in-water work during the IWWP. Work outside of the established IWWP may be allowed if the operator and ODF, in consultation with ODFW, agree on specific dates. Begin the process by contacting the stewardship forester and discussing plans. A form is included in the appendix of this guidance that may be used to aid in consulting with ODFW. Extensions to work beyond the IWWP are generally given for one or two-week lengths that may be repeated if necessary. Forecast weather will be a key consideration for extensions. Similarly, projects needing to start before the IWWP will consider stream flow, fish migration, and weather conditions. Projects planned on non-fish streams with minimal flows may be considered during periods of low flow when agreed upon by the stewardship forester in consultation with ODFW.

When a stream crossing has failed outside of the IWWP and road reconstruction is of an emergency nature and delay for notification procedures presents a greater potential for resource damage than the operation, the operator may replace the failed crossing structure prior to notification to ODF as allowed by OAR 629-605-0140(2)(f). Operators must report the operation to ODF within 48 hours of starting and be able to demonstrate that an emergency existed. A notification and any required written plans must also be submitted as soon as practicable.

The emergency road repair rule (OAR 629-605-0140(2)(f)) does not exempt any rule requirements other than the requirement to delay operations for waiting periods and notification. It does not specifically remove the requirement to install water crossing inside the IWWP.

Crossings may be reconstructed outside of the IWWP period without seeking a variance when the following are true:

- Delaying reconstruction would cause greater resource damage; or
  - access to an active operation or residences are blocked.
- Other repairs will not adequately stabilize the water crossing until ODF and ODFW can consult on waiving the IWWP or waiting for the IWWP.

All other applicable FPA rules apply to the operation, however there is flexibility in the timing of implementing those rules depending on the nature and timing of the emergency. Early discussion with a stewardship forester is encouraged.

c. Ford timing

Fords may only be used during periods of low or no flow. Periods of low flow vary throughout the state. Low flows typically occur during dry summer months, other times of the year without precipitation for an extended period, and when streams are frozen. When summer rains occur that appreciably raise stream levels, the use of the ford may need to be suspended until stream levels lower.

d. Temporary crossing timing

Temporary crossings in Type N and Type D streams in;

- Western Oregon must be;
  - installed after June 1; and
- removed by September 30.
- Eastern Oregon must be;
  - installed after July 1; and
  - removed by October 15.

These dates can be adjusted when the Department and operator agree on specific dates of removal that have similar levels of resource protection.

Additionally, the IWWP period applies to the installation and removal of these crossings. The dates for installation/removal and IWWP do not often correlate. Operators should plan operations to use the **combined dates which makes the narrowest window**, unless ODF has agreed upon alternative dates.

~~Example: Temporary Crossing Installation and Removal Window~~

	~~June~~	~~July~~	~~August~~	~~September~~	~~October~~
~~FPA - 0320(8)(d)~~	~~June 1 – September 30~~				- -
~~ODFW IWWP~~	-	~~July 1 – October 15~~			-

~~Effective Work Window~~	-	~~July 1 – September 30~~	-	-

3. Crossing Construction

a. Temporary stream diversion/ stream flow bypass/dewatering

Temporary stream diversion, stream flow bypass, and dewatering are all terms for purposeful rerouting of stream waters to provide a dry work area while performing in stream work. This is different than stream diversion discussed elsewhere in this guidance that is a result of crossing failure.

Rerouting water around the construction site may be required in some situations. Stream flow through construction projects may erode disturbed soils before they have been stabilized. The goal is to remove flow through the active project area and return clean water to the stream as soon as possible.

b. Dewatering requirements

Dewatering Requirements

Requirement	Rule #
i. Deposit temporarily turbid water to the forest floor	OAR 629-625-0320(1)(i)
ii. Dewatering for channel spanning structures and culverts	OAR 629-625-0320(1)(j)
iii. Install fords only in dry or dewatered streams	OAR 629-625-0320(7)(c)
iv. Install temporary crossings in dry streams or dewatered streams	OAR 629-625-0320(8)(e)

i. Deposit temporarily turbid water to the forest floor

Clean water from a bypass may be returned to the stream below the work area. Returning the water to the stream is preferred when possible so that stream flows are impacted as little as possible.

If water being routed around the project is sediment laden, then that water must be discharged onto forest floor that can filter the water before reaching waters of the state and above the 100-year flood level when present. Minimum distances from the stream are site specific as soil type and slope can impact the distance needed for sediment to filter before reaching waters of the state. Additionally, the greater the volume of water being rerouted the greater the distance required. When floodplains are present, the discharge point must provide filtering before the water reaches the 100-year flood level. If space is limited, other measures could be used to keep sediment from reaching the stream such as flood plain settling basins (sediment traps).

ii. Dewatering for permanent channel spanning structures and culverts

For permanent crossings in all types of streams the State Forester may require stream diversion to reduce excessive sedimentation or turbidity. The following factors will be considered when determining whether diversion will be required:

- Amount of stream flow during construction
- Project proximity to Type F, Type SSBT, or Hatchery intakes
- Project duration
- Extent of in-water work

When the State Forester believes that the project will cause visible turbidity for more than two hours and that turbidity will likely reach a fish bearing stream then stream bypass will be required.

iii. Install fords only in dry or dewatered streams
Fords must be installed in a dry stream. When water is present during the construction of the ford, flow must be bypassed around the construction site. Note that the requirement is only for construction and that the crossing can be used while the stream is flowing as long as it is during a period of low flow.

iv. Install temporary crossings in dry or dewatered streams
Temporary crossings must be installed in a dry streambed or in isolation of the wetted channel. Isolation means that any excavation or placement of materials is separate from the flowing stream. In general, stream bypass is best when the entire channel is being impacted such as when a clean rock crossing is being constructed. When temporary bridges are being installed it may be easiest to build a barrier between the excavation/placement and the flowing stream.

The State Forester may exempt the requirement to dewater a temporary crossing if the operator shows that avoiding dewatering will reduce siltation or turbidity in the stream. Operators will need to request that the State Forester consider exempting the requirement and describe why the exemption reduces turbidity in the written plan.

c. Pollution control

Pollution Control Requirements

Requirement	Rule #
i. Maintain a spill prevention and response plan on site	OAR 629-625-0320(10)(c)(A)
ii. Uncured concrete or concrete byproducts may not enter waters of the state during construction.	OAR 629-625-0320(10)(c)(B)
iii. Take measures to ensure that the equipment and materials used are free of aquatic invasive species.	OAR 629-625-0320(10)(c)(C)
iv. Do not use wood treated with creosote or pentachlorophenol over the active channel	OAR 629-625-0320(10)(c)(D)
v. Do not allow chemicals or any other toxic or harmful materials to enter waters of the state	OAR 629-625-0320(10)(c)(E)

i. Maintain a spill prevention and response plan on site
Operators must have a spill prevention plan onsite during construction of all water crossings. See forest Practices Technical Guidance: Developing a Chemical Spill Prevention and Response plan.

ii. Uncured concrete may not enter waters of the state
Uncured concrete dissolves in water, changes the pH of the water, and increases alkalinity. Operators may not allow uncured concrete or concrete byproducts to enter waters of the state. Forms used within the stream channel must be sealed to prevent uncured concrete from entering waters of the state.

iii. **Equipment and materials are free of invasive aquatic species**
Operators must ensure that all materials and equipment used for construction, monitoring, and fish salvage are free of aquatic invasive species. Construction equipment may transfer invasive species from one site to another. Cleaning equipment before moving to a new project can reduce the spread of invasive species, especially when the previous project was in an aquatic area. When cleaning equipment at a site make sure that runoff does not reach waters of the state. Fish salvage requirements are discussed further in technical guidance for fish salvage and isolation.

iv. **Do not use creosote or pentachlorophenol in or over the active channel**
Operators may not use creosote or pentachlorophenol treated wood for any crossing structure elements within or over the channel. Note that OAR 629-625-0320 (4)(h) prohibits the use of these preservatives for all channel spanning structures.

v. **Do not allow chemicals or other toxic substances to enter waters of the state**
Operators shall not allow chemicals or any other toxic or harmful materials to enter waters of the state during construction of a water crossing. If it is unclear if a product is harmful read documentation provided with the product and/or consult with ODFW.

d. **Sediment control and stabilization**
Prior to and following construction of water crossings, stabilization and drainage requirements must be completed. The goal of these requirements is to limit sediment transport to streams during the wet weather.

Sediment control and stabilization requirements

Requirement	Rule #
i. Establish effective drainage	OAR 629-625-0320(10)(b)(B)(i)
ii. Seeding and mulching	OAR 629-625-0320(10)(b)(B)(ii) + (iii)
iii. Planting disturbed stream banks with woody species or other erosion control techniques	OAR 629-625-0320(1)(f)

i. **Establish effective drainage**
Operators must establish effective drainage prior to construction or:

- September 30 in Western Oregon
- October 15 in Eastern Oregon
- Other times when the department and operator can agree on specific dates.

Effective road drainage controls runoff waters and directs these waters to locations where they have little or no effect on stream water quality. In addition to routing runoff water by means of cross drains, ditch reliefs etc., sediment capture strategies such as sediment basins and silt fencing can be used to minimize impacts to waters.

The requirement for when effective drainage must be established is dependent on the timing and duration of the project. When projects do not have a reasonable certainty of being completed prior to rains effective drainage must be established prior to and maintained during the project. Effective drainage must be established by the region-specific dates. When other dates provide equivalent protection, they may be used when agreed upon by the operator and state forester.

ii. Seeding and mulching

Stabilize exposed soils in the project stream crossing area using seed, mulch, or a combination of both after construction but no later than:

- September 30 in Western Oregon
- October 15 in Eastern Oregon

Seed and mulch used for stabilization should be invasive free and native. When construction projects go beyond the specified dates, seeding and mulching should be completed in disturbed areas that are unlikely to be further disturbed by construction activities. Additional mulch should also be available to cover the remaining disturbed areas if unexpected wet weather is encountered.

Mulching stabilizes exposed soils by dissipating the energy of raindrops which might otherwise displace and transport soil particles. For mulching to be effective, mulch must be applied thick enough to cover most of the exposed soils. Recommendations are in the 90% cover range. Meaning that if you were to look down at the covered area only 10% of the disturbed soils would be visible.

Applying grass seed to disturbed soil helps fix the soil in place with a root mat. Seeding takes time to become effective but provides longer term stabilization than mulches. Rule requires one or the other be done, however it is recommended that both be done in areas with a high likelihood of delivering sediment to waters.

Seeding and mulching does little to remove sediment from concentrated flows. When sediment is being transported or portions of the roads are being eroded by concentrated flows it is best to redirect the flows to areas where it may not reach waters of the state. Concentrated flows are any areas where water gathers and flows. Ditches are the most common, but concentrated flows can be found anywhere in the road prism. When rerouting flows is not possible, other measures such as settling basins, silt fences, and rock armoring may be appropriate.

iii. Planting stream banks with woody species

Disturbed stream banks must be planted with native woody species~~.~~ or other effective erosion control techniques.~~.~~ Operators may also use other effective means when stabilizing stream banks. Woody species have deeper root systems which help stabilize stream banks during high flows~~.~~ but take time to become effective. Establishing grass can effectively stabilize the top layer quickly. Other effective measures should be considered to stabilize more than the surface layer of the soil.

4. Written plans

All non-fish water crossings require a non-statutory, non-waivable written plan. Type F, SSBT, & D streams require a statutory written plan. The purpose of the written plan is to provide the State Forester the opportunity to comment on whether the planned activity meets the objectives of the rules (OAR 629-605-0170(12)). Additional written plan elements are needed for water crossings that are required to provide fish passage. See OAR 629-625-0100(7).

The intent is that all required elements of a water crossing be addressed for all stream crossings. For written plans with multiple stream crossings the discussion may be grouped together in a manner that makes it clear what applies to each crossing. Examples may include a table or listing the common characteristics together and the individual crossing specific elements separately.

To address the criteria of OAR 629-625-0100(5) it is not required to do exhaustive research and field reconnaissance. Instead, the written plan should describe what was noticed during road location and design. The rule requires an assessment of all the bold items in this section to be included in the written plan. Not all bold items will be known or present at every crossing. Try and be more descriptive than not applicable, examples might be: None noted or not present. In some cases, the absence of an item may be just as notable as the presence, such as noting the absence of a flood plain for example.

Written plans for water crossings on all types of streams must include the following elements:

OAR 629-605-0170(13)	
A map showing protected resources, and operations that may impact those resources **Specific resources that require protection** **The practices that may affect protected resources** **Methods employed for resource protection** **Additional requirements in individual rules**	
OAR 629-625-0100(5)	
Road information	**Transportation needs** **Road location** **Road management objectives** **Land ownership**
Specific resources that may be impacted by water crossing construction or reconstruction Provide a summary of the resources that the project may affect. The effects include those upstream, downstream and at the project site. At a minimum, the written plan must include a discussion of the bold items to the right that are present.	**Aquatic species, habitats, and conditions** List the known aquatic species in the stream reach. Include a brief description of the stream conditions **Floodplain values** Floodplain values include the water, biological, and societal values present in floodplains. Describe the floodplain when present at, above and below the project site. Examples may include the width of the floodplain, the land use of the floodplain, vegetation type, structures, and public roads. **Terrestrial species** Note unique terrestrial species known to be using the stream reach and immediately surrounding area. Examples may include bird species, beavers, turtles, and amphibians. **Water uses that may be impacted by the crossing construction** Note any domestic, municipal, agricultural or other water diversions from the stream and within ½ mile downstream of the project site.
Specific risk factors at the watershed-scale Watershed size to consider.	The watershed description must include the following that apply: **Geologic or geomorphic hazards** Describe known geologic hazards within the watershed that may impact the structure. Examples include debris torrent prone streams, unstable landforms, alluvial fans, or other materials highly prone to erosion.

The intent of this section is to investigate and describe watershed processes away from the project site that could impact the water crossing. When choosing the watershed scale to describe in the written plan, look at the extent of unique features in the watershed that may be influenced by the project or impact the project area. Factors to consider might include: Slide deposition areas Debris flow initiation areas Debris accumulations Large sediment sources	**Event history** Summarize known widespread or localized flooding that has impacted the watershed. Describe any mass earth movements that are evident, such as deep-seated landslides or shallow debris flows. Include recent (10 year) wildfire history within the watershed. **Past and projected land management** Describe the land use within the watershed and any foreseeable changes. Examples of land uses include federal forest, industrial forest, small landowner forestland, agricultural, mixed use, and residential. **Crossing maintenance history** Describe any known information available about stream crossing failures within the watershed. Also include any crossings impacted by erosional events in the watershed that did not fail. **Regional channel stability** Note any evidence of instability of the channel. Is the stream grade or elevation changing? Is stream meandering evident and is it rapid or slowly moving? Are there head cuts present below the site? **Projected watershed conditions over the life of the crossing structure** Detail any known or projected changes to the watershed over time. Land use changes, water diversions and timber harvest are examples of changing watershed conditions.
Specific risk factors at the site scale Site scale is the area effected by the project and immediately around it.	**Channel stability** Note any signs of channel instability. Most importantly, note any evidence that the stream elevation is variable, or that the stream channel has migrated. Signs that may be noted include sediment deposits, both in the stream and in the floodplain, and steep, caving or undercut streambanks. **Potential for blockage by debris** Describe any unstable accumulation of woody material upstream. Woody material along the banks, on gravel bars and otherwise unanchored to the bed or banks are all considered unstable. Note chronic history of removing woody debris at the inlet of existing crossing. **Floodplain constriction** Describe how much of the floodplain will be constricted by the planned projects well as the width of the floodplain. Note: small channels with steep sidehills often have minimal floodplains. **Large elevation changes across infrastructure** This mainly applies to replacement structures. Identify significant differences between the “natural” channel gradient/elevation and the

	inlet/outlet elevations, as well as the crossing gradient. Examples may include outlet drops and raised inlets. **Channel sensitivity to change** Describe if and how the planned project might influence or change channel characteristics over time. **Consequences of site failure to resources** Describe what might be expected if the structure were to be blocked by debris. Is there a possibility for stream diversion? **Potential stream geomorphic changes over the life of the crossing structure** Describe any planned or projected changes that may impact the crossings function over time.
OAR 629-625-0320(1)(b)(B)	
Fills greater than 15 feet deep For fills greater than 15 feet deep the written plan must describe the fill and drainage structure design.	**The written plan must include a design that minimizes:** Surface erosion Embankment failure Downstream movement of fill material
OAR 629-625-0320(8)(h)	
Temporary Crossings For temporary crossings include the date the crossing will be vacated.	If a temporary crossing is constructed in a manner that is compliant with the requirements of a permanent crossing, the crossing does not need to be removed. Operators must submit an amended written plan when a project notified as a temporary crossing is intended to remain in place permanently. **OAR 629-625-0320(10)(b)(A)** As part of the site erosion control plan, the written plan for temporary crossings must contain a description of the measures to be taken to stabilize and hydrologically disconnect the project site after removal.
OAR 629-625-0320(10)(b)(A)	
Erosion Control Plan Written plans for all water crossings must include a site-specific erosion and sediment control plan. An overhead view (e.g. a map) of the project site with drainage routes may be the easiest way to	**Description of the methods being used for erosion and sediment control at the site** Include specific methods to be used both during construction and at the conclusion. **How construction waste materials such as brush and excavated soils will be stored, isolated and disposed of** Describe any temporary placement of waste materials during excavation. Describe the erosion control methods that will be used to prevent runoff from erodible waste materials from entering waters of

communicate the plan to hydrologically disconnect the site. *See Forest Practice Technical Guidance: Road Drainage Networks for more information on hydrologic connection. (not yet updated)	the state. Note: Waste areas not incorporated in the road design must be notified on the Departments Electronic Notification System. **Plan for hydrologically disconnecting the road and ditch line from the crossing being installed** Describe measures to be used to minimize road related runoff from reaching surface waters.~~the.~~ Examples of items that may be noted include: road areas draining towards the crossing, distance to the nearest cross drain, distance from cross drain outlet to waters of the state, and any other measures taken. OAR 629-625-0330(5) requires that when a drainage structure cannot be placed so that delivery of sediment to the stream is effectively limited, then other measures must be taken.
OAR 629-625-0320(10)(d)(A)	
In-Water Work, Worksite Isolation, and Dewatering Written plans must address in-water work, worksite isolation, and dewatering measures to be taken during construction.	**In-Water Work** The plan must describe all work that will occur during and outside of the ODFW IWWP. Examples include fill excavation, streambed preparation, equipment crossings, filling over structure, and streambed material placement. Work outside of the IWWP may occur when the operator and ODF, in consultation with ODFW, agree on alternate dates. **Worksite Isolation** Describe the methods that will be used to isolate the work area from the stream. Isolation is the placement of a temporary barrier used to separate the work area and turbidity from the stream. **Dewatering** Describe what if any method used to dewater the crossing during construction. For example: how long the stream will be dewatered, method of bypass, and where the water will be discharged.

References or Sources of Additional Information

Furniss et al. 1997. Diversion Potential at Road-Stream Crossings, U.S. Forest Service. December 1997.

Furniss, M.J., Ledwith, T.S., Love, M.A., McFadin, B.C., Flanagan, S.A. 1998. Response of Road-Stream Crossings to Large Flood Events in Washington, Oregon, and Northern California. USDA Forest Service Technology and Development Program. 9877 1806 SDTDC.

Private Forest Accord Report, February 2, 2022.

Weaver, W. E., and D. K. Hagens. 2015. Handbook for Forest and Ranch Roads. Mendocino County Resource Conservation District in Cooperation with the California Department of Forestry and Fire Protection and the California State Water Resources Control Board.

US Forest Service Stream Simulation Working Group. "Stream Simulation: An Ecological Approach to Providing Passage for Aquatic Organisms at Road-Stream Crossings" (2008)

Appendix:
REQUEST FOR VARIANCE TO IN-WATER WORK TIMING GUIDELINES

This form is not required, it is intended to facilitate the consultation with ODFW by addressing common questions.

Variance Requested By:

Name_______________________________________ **Telephone**__________________

Company_____________________________________ ___________________________

Address_____________________________________ **Email**______________________

NOAP # and Name ____

Streams(s) you are requesting a variance to work in:_____________________________

Location of Project____

Dates you are requesting to start and complete the project__________________________

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1. **Describe your project and the work you plan to do within the bed or banks of the stream(s) outside the normal in-water work period.**

2. **Describe the conditions at the project site (stream flow, bank stability, etc.)**

3. **Why are you unable to complete the project during this or future in-water work period?**

4. **Are you planning to take any measures to isolate your work from flowing water?**
   If so, describe them.

5. **How will you maintain passage for adult and juvenile fish through the project? (if applicable)**

6. **What precautions do you plan to take to prevent an increase in turbidity in the stream?**

7. **What precautions do you plan to take to prevent pollutants from entering the stream?**

8. **How do you plan to stabilize disturbed areas along the bank?**

Applicant's Signature____ **Date**______________