

Research question(s) package for the research topic: Literature review for eastern Oregon steep slopes

Draft research questions

These questions apply east of the crest of the Cascades¹ in Oregon, and are to be answered via literature reviews:

Question 1a. What are the details (e.g., range, variation, nature) of the characteristics of upslope-initiated shallow rapid landslides? These characteristics may include frequency, magnitude, location, runout, spatial and temporal change in deposits over e.g., decadal timescales.

Question 1b. What are the positive and negative direct and indirect (i.e., habitat) effects of these landslides on species covered in the draft HCP?

Question 1c. Do forest practices alter the details of landslide characteristics and/or their effects on covered species? If so, how?

Landslide effects that may impact covered species or the quality of their habitat include:

- Large wood delivery;
- Fine sediment delivery;
- Coarse sediment delivery;
- The interaction of large wood, fine sediment, coarse sediment, hydrology, and hydraulics, including the evolution of all the deposited material.

Question 2. Do forest practices impact other hillslope processes [aside from upslope-initiated shallow rapid landslides, e.g., debris floods] that may in turn affect species covered in the draft HCP? If so, how?

Research Question Package (OAR 629-603-0200 (3)(a) requirements)

OAR 629-603-0200(3)(a) The AMPC shall succinctly specify preliminary research questions that include the following:

OAR 629-603-0200(3)(a)(A) The **type** of research and monitoring per OAR 629-603-0100(1)(a) or (b)

OAR 629-603-0100(1)(a) Conduct effectiveness monitoring by assessing the degree to which the rules facilitating particular forest conditions and ecological processes achieve the biological goals and objectives. This assessment may include evaluation of cumulative effects.

OAR 629-603-0100(1)(b) Conduct research inquiry and validation monitoring to:

- Determine if additional scientific inquiry is needed to fill knowledge gaps related to biological goals and objectives; and
- Test and improve existing and new models and methodologies used to design and implement forest practice rules intended to meet the biological goals and objectives.

The type of research [per OAR 629-603-0200(3)(a)(A)];

Commented [TF1]: Note: question 1c is the focus of this work, but given there seems to be lack of common understanding on the first 2 questions, it's helpful to keep those explicit at this stage.

Commented [TF2]: Note: lacking AMPC consensus in the discussion, I used PFA Report language of "timber harvest" for question 1c, "forest practices" for question 2.

Commented [FT*O3]: From the PFA Report: "The AMPC will set the scientific agenda, but will play no part in designing actual research projects, carrying out the inquiry, or the IRST's report of findings to the Board and AMPC."

¹ Note: ODF maintains a regulatory GIS layer of the FPA delineation between eastern and western Oregon.

[This research is of type OAR 629-603-0100(1)(a)].

The rule, biological goals and objectives, or other issue being studied [per OAR 629-603-0200(3)(a)(B)];

The issue being studied is outlined in the PFA Report direction, cited below under context of the research question.

Note: there are no HCP-related rules for steep slopes in eastern Oregon. However, for context, the analogous rules in western Oregon are listed in Appendix 1.

The objective of the research [per OAR 629-603-0200(3)(a)(C)];

The objective of this research is to inform deliberations about whether rules or other policies are needed regarding timber harvest and other forest practices on steep slopes in eastern Oregon to protect HCP-covered species.

A brief description of the context of the research question [per OAR 629-603-0200(3)(a)(D)];

The following direction was provided in the PFA Report and provides the foundation for these research questions:

“CHAPTER 3. TIMBER HARVEST ON STEEP SLOPES

3.2 Goals

The goals of the PFA commitments regarding timber harvest on steep slopes is to provide large wood and sediment consistent with maintaining or improving aquatic habitat within large basins over long timeframes. (For the purposes of this Chapter, large basins are those of a size equivalent to those supporting independent populations of Oregon coastal coho salmon. In modeling to support the PFA, these are USGS HUC 4th Field [8-digit] basins). To accomplish this, sediment sources and debris flow runout paths will be identified and a subset of these will be managed during timber harvest activities to retain trees and other vegetation. These actions, together with other HCP commitments, are intended to provide high-quality habitat to support recovery and long-term conservation of the species covered by this HCP on private forestlands.

3.2.1 Objectives

Aligned with the overall goals for timber harvest on steep slopes to provide high-quality habitat that supports the recovery, protection, and long-term conservation of covered species on private forestlands, the Authors establish the following objectives under the PFA:

- a. *Leave trees in Designated Debris Flow Traversal Areas to help create and maintain high-quality habitat in:*
 - 1) *Type F or Type SSBT streams by delivering large wood and regulating sediment storage and transport.*
 - 2) *Type N streams by creating shade and cover for amphibians covered under the HCP.*
- b. *Leave trees in Slope Retention Areas to:*
 - 1) *Reduce timber-harvest-related increases in the frequency and volume of sediment delivered to Type F or Type SSBT streams from mass wasting events.*
 - 2) *Contribute large wood to Type F or Type SSBT streams.*

Commented [TF4]: I don't think this is a cut/dry delineation for this research question. I think at this stage, the intent and questions are (1)(a), but could lead to especially (1)(b)(B).

I think the lit review will certainly point to gaps, but it's likely gaps in processes and results of forest practices on landslide characteristics, which isn't the same as gaps in BGOs [i.e., (1)(b)(A)]

Commented [FT*O5]: BGOs aren't finalized, so can't really link back to them. However, these are likely to be finalized within the next few years, i.e., before the studies on trends are very far along.

Are there other issues to be addressed?

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- c. *Leave trees on a subset of steep (>70%) slopes immediately adjacent to Type F or Type SSBT streams to:*
 - 1) *Stabilize these areas.*
 - 2) *Contribute large wood to Type F or Type SSBT streams.*

3.3.8 Timber Harvest on Steep Slopes in Eastern Oregon

The Private Forest Accord does not prescribe new management measures for landslide initiation zones or debris flow traversal channels in Eastern Oregon. The Authors agree that Eastern Oregon’s unique geologies and climates likely mean that these processes are different in magnitude, frequency, and impact on the covered species, when compared to Western Oregon. Similarly, the impact of timber harvesting on these processes is potentially different in Eastern Oregon. In light of this uncertainty, the Authors agree that the Adaptive Management Program shall, beginning no later than January 1, 2024, examine the scientific literature on the impacts that hillslope processes have on the covered species in Eastern Oregon. The primary focus will be on upslope initiated shallow rapid slides and how timber harvesting may impact these in Eastern Oregon environments. A secondary and more limited focus is whether other hillslope processes that likely affect covered species are changed by forest practices. Findings of the Adaptive Management Program on these topics will be presented to the Board of Forestry. These findings should focus primarily on the importance of shallow rapid landslides in Eastern Oregon to habitat for the covered species and the potential modification of these processes by forest practices or lack thereof. The report on this primary topic may or may not include recommendations as to desirability and relative importance of potential management measures. In addition, the report should convey whether the secondary review of literature on the effect of forest practices on other hillslope processes merits more thorough consideration by the Adaptive Management Program in light of scientific literature on the connection of these processes to covered species. Nothing in this Report should be read to suggest that any additional Eastern Oregon steep slope or other hillslope prescriptions are, or are not, necessary. The timber harvest prescriptions for steep slopes established under Section 3.3.3 of this Chapter for Designated Debris Flow Traversal Areas and under Section 3.3.4 of this Chapter for Designated Sediment Source Areas and Slope Retention Areas do not apply to any private forest ownership class east of the summit of the Cascade Mountains. The timber harvest prescriptions for steep slopes established under Section 3.3.7 Stream Adjacent Failures apply to all private forest ownership classes both west and east of the summit of the Cascade Mountains.”

Other information the AMPC deems necessary for the IRST’s work per section (4) of this rule [per OAR 629-603-0200(3)(a)(E)].

1. *It is essential to maintain the role of the regulatory framework (the FPA) throughout the design and implementation of studies, including the following considerations:*
 - a. *Stratification needs to be relevant to the FPA:*

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- A. *There are two landowner classifications in the FPA: 1) small forestland owners; 2) everyone else.*
- B. *The predominant stream types are N, SSBT, and F.*
- b. *Studies should be tailored to inform model development by including variables such as precipitation, geology or soil type, slope, concavity.*
- 2. *The intention of this monitoring is NOT to compare conditions or rules with the previous rules.*
- 3. *The AMPC wants to know how metrics of interest (e.g., sediment delivery from steep slopes associated with forest practices) compares with those of background, and when thresholds of negative impacts to covered species have been crossed.*
- 4. *Deposits from hillslope processes evolve over time, and it is important to consider how these changes affect (positively and negatively) covered species.*

Appendix 1. Steep slopes rules for western Oregon

This appendix lists the rules from western Oregon that were developed based on the PFA Report, chapter 3. There are currently no analogous rules for eastern Oregon.

For ease of reading, rule text effective November 15, 2022, or earlier is displayed in plain text, rule text effective July 1, 2023 is **bold, green and underlined** and rule text effective January 1, 2024 is **bold, blue and underlined**.

- Rules effective **July 1, 2023** apply to all operations for which a notification is filed under ORS 527.670(6) on or after July 1, 2023, except operations on small forestlands.
- Rules effective **January 1, 2024** apply to all operations for which a notification is filed prior to January 1, 2024, if the operation is not completed on or before December 31, 2023 and all operations for which a notification is filed on or after January 1, 2024.

Division 630 HARVESTING

629-630-0000 Purpose

- (1) **OAR 629-630-0000 through 629-630-0925 shall be known as the harvesting rules.**
- (2) Harvesting of forest tree species is an integral part of forest management by which wood for human use is obtained and by which forests are established and tended.
- (3) Harvesting operations result in a temporary disturbance to the forest environment.
- (4) The purpose of the harvesting rules is to establish standards for forest practices that will maintain the productivity of forestland, minimize soil and debris entering waters of the state, and protect wildlife and fish habitat.
- (5) **The harvesting rules are intended to reduce the potential for sediment delivery to waters of the state from ground disturbance and drainage alterations that may be caused by harvesting.**
- (6) **The purpose of the timber harvesting on steep slopes rules, as identified in OAR 629-630-0900 through 629-630-0925, is to retain trees in designated areas to provide the beneficial elements of landslides while mitigating the potential negative effects of forest management activities on unstable slopes.**
- (7) The harvesting rules shall apply to all forest practices regions unless otherwise indicated.
- (8) **OAR 629-630-0900 through 629-630-0925, do not replace or modify OAR 629-623-0000 through 629-623-0800 Shallow, Rapidly Moving Landslides and Public Safety rules.**

629-630-0150 Ground-Based Harvesting On Steep Or Erosion-Prone Slopes

- (1) Slopes over 60 percent are subject to the requirements of Sections (4) through **(8)** of this rule.
- (2) Slopes over 40 percent where soils consist of decomposed granite-type materials, or other highly erodible materials as determined by the State Forester, are considered erosion-prone and subject to the requirements of Sections (4) through **(8)** of this rule.
- (3) Methods that avoid development of compacted or excavated trails are the preferred alternative for operating on steep or erosion-prone slopes. If the operation will result in

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excavated or compacted skid trails, operators shall apply sections (5) through (8) of this rule.

- (4) If skid trails are located on steep or erosion-prone slopes, operators shall locate them at least 100 feet from any stream channels.
- (5) Operators shall locate skid trails where water can drain off the skid trail and onto undisturbed soils.
- (6) Skid trails shall not be located straight up and down steep or erosion prone slopes for a distance exceeding 100 feet unless effective drainage and sediment filtration can be achieved.
- (7) Operators shall install effective cross ditches on all skid roads located on steep or erosion-prone slopes.
- (8) Operators shall limit the amount of ground with disturbed soils on steep or erosion-prone slopes as described in Sections (2) and (3) of this rule to no more than ten percent of the steep or erosion-prone slopes within the operation area.

629-630-0300 Drainage Systems

- (1) Operators shall construct dips, grade reversals or other effective water diversions in skid trails and fire trails as necessary to minimize soil displacement and to ensure runoff water is filtered before entering waters of the state.
- (2) Operators shall 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.
- (3) Operators shall establish effective drainage on landings during and after use.

629-630-0500 Harvesting On High Landslide Hazard Locations

- (1) Operators and the State Forester shall share responsibility to identify high landslide hazard locations for timber harvesting and road construction to protect natural resources and public safety.
- (2) For operations with potential downslope risk to public safety from shallow, rapidly moving landslides, the shared responsibility includes identifying and evaluating the risk using methods described in OAR 629-623-0100 through 0300. For intermediate and substantial levels of risk, the practices described in OAR 629-623-0400 through 0800 shall also apply. The department shall publish Forest Practices Technical Guidance to explain how to implement this rule.
- (3) Operators shall not construct skid roads on high landslide hazard locations.
- (4) Operators shall not operate ground-based equipment on high landslide hazard locations.
- (5) Operators shall prevent deep or extensive ground disturbance on high landslide hazard locations during log felling and yarding operations.
- (6) Operators concerned about the application of these standards to a specific operation may consult with the State Forester to obtain an evaluation of their harvesting plan and its likelihood of compliance with the standards.

629-630-0600 Felling; Removal of Slash

- (1) Operators shall fell, buck, and limb trees in ways that minimize disturbance to channels, soils and retained vegetation in riparian management areas, streams, lakes and all

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wetlands greater than one-quarter acre, and that minimize slash accumulations in channels, significant wetlands and lakes.

- (2) During felling operations operators shall:
 - (a) Whenever possible, fell all conifer trees away from riparian management areas, streams, lakes and significant wetlands, except for trees felled for stream improvement projects.
 - (b) On steep slopes, use felling practices such as jacking, line pulling, high stumps, whole tree yarding, or stage-cutting as necessary and feasible to prevent damage to vegetation retained in riparian management areas, soils, streams, lakes and significant wetlands.
 - (c) When hardwoods must be felled into or across streams, lakes or significant wetlands, operators shall:
 - (A) Buck and yard the trees to minimize damage to beds, banks and retained vegetation.
 - (B) When it can be done consistently with protecting beds and banks, yard hardwood trees or logs away from the water before limbing.
- (3) Operators shall minimize the effects of slash that may enter waters of the state during felling, bucking, limbing or yarding by:
 - (a) Removing slash from Type F, Type SSBT, Type D streams, large or medium Type Np streams, small Type Np streams within the RH Max, lakes and significant wetlands as an ongoing process (removal within 24 hours of the material entering the stream) during the harvest operation.
 - (b) Not allowing slash to accumulate in Type Ng streams and small Type Np streams upstream of the RH Max, lakes or wetlands in quantities that threaten water quality or increase the potential for mass debris movement.
 - (c) Placing any slash that is removed from streams, lakes, or wetlands above high water levels where it will not enter waters of the state.

629-630-0700 Yarding; Cable Equipment Near Waters of the State

- (1) Operators shall maintain the purposes and functions of vegetation required to be retained in riparian management areas and minimize disturbance to beds and banks of streams, lakes, all wetlands larger than one-quarter acre, and retained vegetation during cable yarding operations.
- (2) Operators shall minimize the yarding of logs across streams, lakes, significant wetlands, and other wetlands greater than one-quarter acre whenever harvesting can be accomplished using existing roads or other practical alternatives.
- (3) Operators may use cable yarding corridors through retained trees if the numbers and widths of yarding corridors are minimized. Operators shall submit a written plan to the State Forester when yarding across any of the waters listed in subsections (a) through (g) of this section:
 - (a) Type F streams;
 - (b) Type SSBT streams;
 - (c) Type D streams;
 - (d) Large or medium Type Np streams;
 - (e) Small Type Np or Type Ns streams located within designated debris flow traversal areas, as described in OAR 629-630-0905;

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- (f) Lakes; or
- (g) Significant wetlands.
- (4) When **u>able** yarding across any of the waters listed in subsections (a) through (f) of this section is necessary, it shall be done by swinging the yarded material free of the ground in the aquatic areas and riparian areas.
 - (a) Type F streams;
 - (b) Type SSBT streams;
 - (c) Type D streams;
 - (d) Large or medium Type Np streams;
 - (e) Lakes; or
 - (f) Significant wetlands.
- (5) Cable yarding across streams classified as **u>Type Ns**, small Type **u>Np, stream-associated wetlands, designated debris flow traversal areas, seeps, and springs**, or other wetlands greater than one-quarter acre shall be done in ways that minimize disturbances to the stream channel or wetland and minimize disturbances of retained streamside vegetation, **u>including one-end log suspension where feasible**.
- (6) **u>Operators shall minimize disturbance from cable yarding near streams to maintain soil function, retain understory vegetation, and protect habitat for fish, amphibians, and other wildlife**.
 - (a) **u>The following equipment limitation zones shall be applied to streams and associated riparian management areas as described in division 643 Water Protection Rules Vegetation Retention Along Streams rules**.
 - (A) **u>An “R-ELZ” means an equipment limitation zone in which disturbance from equipment activity shall be minimized and all trees less than 6 inches DBH and shrub species are retained where possible**.
 - (i) **u>In Western Oregon, the R-ELZ is 35 feet**.
 - (ii) **u>In Eastern Oregon, the R-ELZ is 30 feet**.
 - (B) **u>An “ELZ” means an equipment limitation zone in which disturbance from equipment activity shall be minimized**.
 - (i) **u>In Western Oregon, the ELZ is 35 feet**.
 - (ii) **u>In Eastern Oregon, the ELZ is 30 feet**.
 - (b) **u>Operators shall take corrective action(s) when soil disturbance from cabled logs exceeds 20 percent of the total area within any R-ELZ or ELZ within an operation unit. Corrective action(s) shall be designed to replace the equivalent of lost functions in consultation with the State Forester. Examples include, but are not limited to, water bars, grass seeding, logging slash, mulching, downed log placement in accordance with ORS 527.676(1), with a preference for utilizing on-site materials**.
 - (c) **u>The department shall publish Forest Practices Technical Guidance, developed in consultation with Department of Fish and Wildlife to assist operators with selecting appropriate corrective measures**.

629-630-0800 Yarding; Ground-based Equipment Near Waters of the State

- (1) Operators shall maintain the purposes and functions of vegetation required to be retained in riparian management areas, and minimize disturbances to beds and banks of streams,

lakes, all wetlands larger than one-quarter acre, and retained vegetation during ground-based yarding operations.

- (2) Operators shall not operate ground-based equipment within any stream channel except as allowed in the rules for temporary stream crossings.
- (3) Operators shall minimize the number of stream crossings.
- (4) For crossing streams that have water during the periods of the operations, operators shall:
 - (a) Construct temporary stream crossing structures such as log crossings, culvert installations, or fords that are adequate to pass stream flows that are likely to occur during the periods of use. Structures shall be designed to withstand erosion by the streams and minimize sedimentation.
 - (b) Choose locations for temporary stream crossing structures which minimize cuts and fills or other disturbances to the stream banks.
 - (c) Minimize the volume of material in any fills constructed at a stream crossing. Fills over eight feet deep contain such a large volume of material that they can be a considerable risk to downstream beneficial uses should the material move downstream by water. For any fill for a temporary crossing that is over eight feet deep, operators shall submit to the State Forester a written plan that includes a description of how the fills would be constructed, passage of water, and the length of time the fills would be in the stream.
 - (d) Design temporary structures so that fish movement is not impaired on Type F or Type SSBT streams.
 - (e) Remove all temporary stream crossing structures immediately after completion of operations or prior to seasonal runoff that exceeds the water carrying capacity of the structures, whichever comes first. When removing temporary structures, operators shall place fill material where it will not enter waters of the state.
- (5) For stream crossings where the channels do not contain water during the periods of the operations, operators are not required to construct temporary crossings as long as disturbances are no greater than what would occur if structures were constructed. Soil that enters the channels during the yarding operations must be removed after completion of the operation or prior to stream flow, whichever comes first. When removing such materials from the channels, operators shall place the materials in locations where they will not enter waters of the state.
- (6) Operators shall construct effective sediment barriers such as water bars, dips, or other water diversion on stream crossing approaches after completion of operations, or prior to rainy season runoff, whichever comes first.
- (7) Machine activity near (generally within 100 feet) streams, lakes, and other wetlands greater than one-quarter acre shall be conducted to minimize the risk of sediment entering waters of the state and preventing changes to stream channels. Operators shall only locate, construct, and maintain skid trails in riparian management areas consistent with the harvesting rules.
- (8) Operators shall minimize **ground-based equipment and subsequent disturbance near streams to maintain soil function, retain understory vegetation, and protect habitat for fish, amphibians, and other wildlife.**
 - (a) **The following equipment limitation zones shall be applied to streams and associated riparian management areas as described in division 643 Water Protection Rules Vegetation Retention Along Streams rules:**
 - (A) **An "R-ELZ" means an equipment limitation zone in which disturbance from**

equipment activity shall be minimized and all trees less than 6 inches DBH and shrub species are retained where possible.

(i) In Western Oregon, the R-ELZ is 35 feet.

(ii) In Eastern Oregon, the R-ELZ is 30 feet.

(B) An "ELZ" means an equipment limitation zone in which disturbance from equipment activity shall be minimized.

(i) In Western Oregon, the ELZ is 35 feet.

(ii) In Eastern Oregon, the ELZ is 30 feet.

(b) Operators shall take corrective action(s) when soil disturbance from ground-based equipment exceeds 10 percent of the total area within any R-ELZ or ELZ within an operation unit. Corrective action(s) shall be designed to replace the equivalent of lost functions in consultation with the State Forester. Examples include but are not limited to water bars, grass seeding, logging slash, mulching, downed log placement in accordance with 527.676(1), with a preference for utilizing on-site materials.

(c) The department shall publish Forest Practices Technical Guidance, developed in consultation with Department of Fish and Wildlife, to assist operators with selecting appropriate corrective measures.

(9) Operators shall locate and construct skid trails so that when high stream flow occurs water from the stream will not flow onto the skid trail.

(10) Operators shall minimize the amount of exposed soils due to skid trails within riparian management areas. Except at stream crossings, operators shall not locate skid trails within 35 feet of Type F, Type SSBT or Type D streams. Operators shall provide adequate distances between all skid trails and waters of the state to filter sediment from runoff water.

629-630-0900 Western Oregon Harvests; Slopes Model

(1) For the purpose of OAR 629-630-0905 through 629-630-0925, designated debris flow traversal areas and designated sediment source areas are determined by the slopes model and displayed on department maps and the department's reporting and notification system. The slopes model also identifies which designated sediment source areas contain trigger sources, which help prioritize designated sediment source areas for selection as slope retention areas. Department maps and the department's reporting and notification system display designated sediment source areas and distinguishes those with trigger sources. The slopes model designations can be viewed at the time of submitting a notification of operation to the State Forester.

(2) Definitions in section (1) of this rule are defined in OAR 629-600-0100.

(3) All trees retained, as required for OAR 629-630-0905 through 629-630-0925, that otherwise meet the requirements for leave trees may count toward requirements for wildlife leave trees within harvest type 2 or harvest type 3 units, pursuant to ORS 527.676. Operators are encouraged to leave trees that meet the requirements for wildlife leave trees within harvest type 2 or harvest type 3 units, pursuant to ORS 527.676, immediately adjacent to seeps and springs, as described in OAR 629-655-0000.

629-630-0905 Western Oregon Harvesting; Standard Practice; Designated Debris Flow Traversal Areas

- (1) For Western Oregon, operators shall not harvest timber located in designated debris flow traversal areas.
- (2) Operators shall retain all trees within 25 feet slope distance from either side of the active channel, or center of the draw if no channel is present for areas identified by the slopes model as designated debris flow traversal areas.
- (3) Changes in stream classification for a stream, based on field surveys for fish-use consistent with OAR 629-635-0200, shall not change the department's maps used for notifications of operations that identify designated debris flow traversal areas.
- (4) Operators shall submit a written plan, described in OAR 629-630-0925, for timber harvest units containing designated debris flow traversal areas.
- (5) Cable yarding, which may require cutting, but not removal, of trees, is permitted through designated debris flow traversal areas, but the number, size, and location of yarding corridors shall be designed to minimize impacts to the integrity of designated debris flow traversal areas. The operator shall not remove trees cut for yarding corridors unless these are deemed safety hazards.

629-630-0910 Western Oregon Harvesting; Standard Practice; Designated Sediment Source Areas and Slope Retention Areas

- (1) Slope retention areas encompass field identified headwalls. The department shall publish Forest Practices Technical Guidance to explain how to implement this rule.
- (2) Changes in stream classification for a stream, based on field surveys for fish-use consistent with OAR 629-635-0200, shall not change the department's maps used for notifications of operations that identify designated sediment source areas.
- (3) Landowner representatives shall identify at least 50 percent of the designated sediment source areas as slope retention areas for timber harvesting in Western Oregon as follows:
 - (a) If the number of designated sediment source areas is an odd number, the landowner representative shall round up to the next even number and identify half of the number as slope retention areas.
 - (b) Prioritize designated sediment source areas for selection of slope retention areas as follows:
 - (A) Designated sediment source areas with trigger sources; and
 - (B) Larger designated sediment source areas.
- (4) The landowner representative may adjust the distribution and location of slope retention areas, notwithstanding section (3) of this rule, if the selected slope retention areas:
 - (a) Clearly reduce worker safety, as described in OAR chapter 437, Division 7, Forest Activities; or
 - (b) Cause more resource impact, such as additional road or landing construction, excessive sidehill yarding, or other yarding practices that clearly increase ecological impacts.
- (5) The landowner representative shall have received certified steep slopes training to determine the field delineation of the final boundaries for slope retention areas. The department shall develop and provide certification training opportunities to

landowner representatives when the slopes model has been added to the department's reporting and notification system.

- (6) After clearly marking in the field the boundaries of the slope retention areas, the landowner representative shall submit a written plan, described in OAR 629-630-0925, for timber harvest units containing designated sediment source areas and slope retention areas.
- (7) Operators shall not harvest timber located in the slope retention areas.
- (8) Cable yarding, which may require cutting, but not removal, of trees, is permitted only through slope retention areas that do not contain trigger sources, but the number, size, and location of yarding corridors shall be designed to minimize soil and vegetation disruptions that may increase slope instability. The operator shall not remove trees cut for yarding corridors unless these are deemed safety hazards.
- (9) Operators shall not construct skid roads or operate ground-based equipment in slope retention areas.

629-630-0915 Statewide Harvesting; Standard Practice; Stream Adjacent Failures

- (1) Operators shall extend the riparian management areas, described in OAR 629-643-0100 and OAR 629-643-0120, on all identified stream adjacent failures, as defined in OAR 629-600-0100. The riparian management area shall encompass the perimeter of the stream adjacent failure, defined in OAR 629-600-0100, however, the width of the riparian management area shall only extend to the lesser of:
 - (a) The distance of 170 feet from the edge of a Type F or Type SSBT channel; or
 - (b) The distance to the slope break, defined as 20 percent or greater reduction in slope gradient.
- (2) The landowner representative shall submit a written plan, described in OAR 629-605-0170(13), for timber harvest units where yarding is planned to occur within stream adjacent failures.
- (3) The landowner shall submit a written plan that describes how the number, size, and location of yarding corridors were selected to minimize impacts to the integrity of stream adjacent failures.
- (4) Cable yarding, which may require cutting, but not removal, of trees, is permitted through stream adjacent failures, but the number, size, and location of yarding corridors shall minimize impact to the integrity of the feature. The operator shall not remove trees cut for yarding corridors unless these are deemed safety hazards.
- (5) The operator shall make all riparian management area width measurements using the slope distance and shall measure them from the edge of the active channel or channel migration zone.
- (6) The department shall publish Forest Practices Technical Guidance to assist operators in identifying channel migration zones.

629-630-0920 Small Forestland Owner Minimum Option; Harvesting on Features Identified in the Slopes Model and Stream Adjacent Failures

- (1) Western Oregon, Designated Debris Flow Traversal Areas for harvest type 1, harvest type 2 or harvest type 3 operations. For forestlands in Western Oregon that are managed under the small forestland owner minimum option, operators shall not harvest timber within 50 percent of the length of the designated debris flow

traversal area for each harvest type 1, harvest type 2, or harvest type 3 unit. The State Forester will:

- (a) Assist small forestland owners in determining designated debris flow traversal areas in a planned harvest unit, prioritizing vegetation retention requirements for Type SSBT streams over Type F streams.
- (b) Exempt small forestland owners from the designated debris flow traversal areas requirements for harvest type 4 units.
- (2) Operators shall retain all trees within 25 feet slope distance on either side of the active channel identified in OAR 629-630-0920(1), or center of the draw if no channel is present for areas identified by the slopes model as designated debris flow traversal areas.
- (3) Changes in stream classification for a stream, based on field surveys for fish-use consistent with OAR 629-635-0200, shall not change the department's maps used for notifications of operations that identify designed debris flow traversal areas.
- (4) Operators shall submit a written plan, described in OAR 629-630-0925, for timber harvest units containing designated debris flow traversal areas, except for harvest type 4 units.
- (5) Cable yarding, which may require cutting, but not removal, of trees, is permitted through designated debris flow traversal areas, but the number, size, and location of yarding corridors shall be designed to minimize impacts to the integrity of designated debris flow traversal areas. The operator shall not remove trees cut for yarding corridors unless these are deemed safety hazards.
- (6) Western Oregon, Designated Sediment Source Areas. For forestlands in Western Oregon that are managed under the small forestland owner minimum option, landowners are exempt from the rule requirements for timber harvesting in designated sediment source areas and slope retention areas.
- (7) Statewide, Stream Adjacent Failures. Operators shall extend the riparian management areas, described in OAR 629-643-0100 and OAR 629-643-0120, on all identified stream adjacent failures, as defined in OAR 629-600-0100. The riparian management area shall encompass the perimeter of the stream adjacent failure, defined in OAR 629-600-0100, however, the width of the riparian management area shall only extend to the lesser of:

 - (a) The distance of 30 feet from the outer edge of the small forestland owner minimum option; or
 - (b) The distance to the slope break, defined as 20 percent or greater reduction in slope gradient.
- (8) The landowner representative shall submit a written plan, described in OAR 629-605-0170(13), for timber harvest units where yarding is planned to occur within stream adjacent failures.
- (9) The landowner shall submit a written plan that describes how the number, size, and location of yarding corridors were selected to minimize impacts to the integrity of stream adjacent failures.
- (10) Cable yarding, which may require cutting, but not removal, of trees, is permitted through stream adjacent failures, but the number, size, and location of yarding corridors shall minimize impact to the integrity of the feature. The operator shall not remove trees cut for yarding corridors unless these are deemed safety hazards.

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- (11) The operator shall make all riparian management area width measurements using the slope distance and shall measure them from the edge of the active channel or channel migration zone.
- (12) The department shall publish Forest Practices Technical Guidance to assist operators in identifying channel migration zones.

629-630-0925 Written Plans to Evaluate Harvesting on Features Identified in the Slopes Model

To evaluate timber harvesting on features identified by the slopes model, operators shall submit a written plan that describes how the operation is planned to be conducted in sufficient detail to allow the State Forester to evaluate and comment on the likelihood that the operation will comply with the Forest Practices Act or administrative rules. The written plan shall include at a minimum:

- (1) A unit map including, where applicable:
 - (a) Locations of slopes model designated debris flow traversal areas;
 - (b) Locations of slopes model designated sediment source areas and those selected as slope retention areas; and
 - (c) Identification of approximate yarding corridors relative to (1)(a) and (b).
- (2) Description of the rationale and appropriate documentation for the following that apply:
 - (a) Selection of the 50 percent designated debris flow traversal areas for Western Oregon forestlands that are managed under the small forestland owner minimum option;
 - (b) Selection of slope retention areas, including justification for choosing areas to satisfy the minimum 50 percent designated sediment source area requirement, as described in OAR 629-630-0910(3) and (4);
 - (c) How the number, size, and location of yarding corridors were designed to minimize impacts to the designated debris flow traversal areas; and
 - (d) How the number, size, and location of yarding corridors were designed to minimize soil and vegetation disruptions that may increase slope instability in slope retention areas.
- (3) Additional administrative information related to the operation as required by individual rules or as requested by the State Forester.