

**FPA Guidance for Ground-Based Operations on Steep Slopes:
November 7, 2018**

Introduction

The Department is reviewing how the current Forest Practices Act (FPA) applies to tethered operations on steep slopes to determine if resource protection measures should include amended forest practice rules or improved guidance. This document represents guidance based on the current forest practice harvest rules and guidance, as well as some best management practices being implemented by several forest landowners operating on steep slopes. This document also represents input from representatives of the Northwest and Southwest Regional Forest Practices Committees.

The purpose of this guidance is to provide stewardship foresters and landowners/operators a consistent reference for administering the FPA with tethered-assist technology. This document discusses Plans for Alternate Practice (PFAP), Best Management Practices, and administration of the Division 630 rules applicable to tethered logging.

FPA Rules for Ground-Based Operations on Steep Slopes

Within Division 630, rules for ground-based operations on steep slopes and high landslide hazard locations use terms that are equipment-specific and do not reflect new ground-based technology such as tethered logging. This guidance does not address specific equipment terminology. Rather, it focuses on outcomes that align with the purpose statements of the associated rules: maintaining the productivity of forestland (OAR 629-630-0000 (3)), reducing the potential for soil and debris (OAR 629-630-0000 (3)) entering waters of the state (OAR 629-630-0150) and preventing serious ground disturbances (OAR 629-630-0500 (1)).

1. **Steep or Erosion-Prone Slopes, OAR 629-630-0150.**
 - a. The rule purpose is to reduce the potential for erosion into waters of the state from:
 - i. Slopes over 60%, and
 - ii. Slopes over 40% with soils determined by the State Forester as highly-erodible, such as decomposed granitic-type soils and soils after intense wildland fires.
 - iii. Rule 0150 also applies to high landslide hazard locations (HLHL), where there is an approved Plan for Alternate Practice (PFAP). Note: This application to HLHL is a change from 2009 guidance.
 - b. A PFAP to operate within 100 feet of any stream channel is the only rule modification for rule 0150 that may be approved by the State Forester, if the practices provide “equal or better” resource protection.

2. **High Landslide Hazard Locations, OAR 629-630-0500. Threshold, at least 30 linear slope feet.**
 - a. The rule purpose is to prevent serious ground disturbance and drainage alterations on HLHL slopes that may initiate rapidly moving landslides, regardless of public safety exposure.
 - b. Where there is public safety exposure below HLHL, apply OAR 629-623-0000 through 0800.
 - c. OAR 629-630-0150, also applies if there is an approved PFAP for HLHL.
 - d. HLHL slopes are reviewed and/or field confirmed:
 - i. Slopes in western Oregon over 80% (or 75% in Tye core area).
 - ii. Headwalls or draws in western Oregon over 70% (or 65% in Tye core area).
 - iii. Atypical conditions anywhere in Oregon where the landslide hazard is equivalent to that on the HLHL slope thresholds identified in 2(d)(i) and (ii), as determined by a

geotechnical specialist. The final determination of equivalent hazard is made by the State Forester.

- e. A State Forester-approved PFAP to operate ground-based equipment on HLHL must describe practices to provide “equal or better” resource protection. Identification of HLHL and determination of public safety exposure is a shared responsibility by the operator and ODF. For more information, see Forest Practices Technical Note 2, High Landslide Hazard Locations, Shallow, Rapidly Moving Landslides and Public Safety: Screening and Practices.
- f. If there is public safety exposure, such as homes or public roads, located below the operation, the rules in Division 623 may apply, and consultation with the ODF geotechnical specialist is recommended. If an analysis determines downslope public safety risk is “Intermediate” or “Substantial,” the State Forester will deny approval of a PFAP for those in-unit slopes.
- g. Note: OAR 629-630-0150 for steep or erosion-prone slopes also applies to HLHL slopes.

OAR 629-630-0150 Ground-based Harvesting on Steep or Erosion-Prone Slopes

(1) The purpose of this rule is to reduce the potential for erosion from steep or erosion-prone slopes to enter waters of the state.

(2) Slopes over 60 percent are subject to the requirements of Sections (4) through (9) of this rule.

(3) 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 (9) of this rule.

(4) 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 excavated or compacted skid trails, operators shall apply sections (5) through (9) of this rule.

(5) If skid trails are located on steep or erosion-prone slopes, operators shall locate them at least 100 feet from any stream channels.

(6) Operators shall locate skid trails where water can drain off the skid trail and onto undisturbed soils.

(7) 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.

(8) Operators shall install effective cross ditches on all skid roads located on steep or erosion-prone slopes.

(9) 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.

OAR 629-630-0500 Harvesting On High Landslide Hazard Locations

(1) The purpose of this rule is to prevent timber harvesting-related serious ground disturbance and drainage alterations on all high landslide hazard locations, and to reference additional requirements when there is public safety exposure below the high landslide hazard location.

(2) Operators and the State Forester shall share responsibility to identify high landslide hazard locations and to determine if there is public safety exposure from shallow, rapidly moving landslides using methods described in OAR 629-623-0100 through 0300. If there is public safety exposure, then the practices described in 629-623-0400 through 0800 shall also apply.

(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.

Terminology for Ground-based Operations on Steep Slopes

Calculating 10% disturbance for this rule means calculating the amount of disturbed soils on the total area of steep slopes/erosion prone/HLHL areas within the unit (both cable and ground-based activity areas). Note: Soils, though impacted, that have been stabilized or corrected to protect exposed subsoil and allow sediment-laden waters to infiltrate do not constitute disturbed soils for the purposes of this calculation. Additionally, soils where track berms have been knocked down, slash placed on the impacted soil, and effective drainage and erosion control established do not constitute disturbed soils.

Damage from ground-based operations on steep or erosion-prone slopes/HLHL means an unsatisfactory condition results in: preventable sediment or debris entering waters of the state; disturbance that exceeds 10% on in-unit steep slopes; or adverse ground disturbance, drainage alterations, exposure of subsoil, or deep/extensive ground disturbance that cannot be immediately stabilized or corrected. Adverse ground disturbance includes any areas impacted by ground-based operations in such a way that there is increased risk of soil movement or drainage alteration. This may vary due to location, soil type, or other site specific characteristics.

Disturbed soils mean soils are altered such that water would not likely infiltrate but become channelized or confined, or have the potential to move loosened or exposed soil or debris downslope.

Effective drainage means water bars or other effective methods that direct drainage water off the equipment track and onto “undisturbed soil,” while avoiding drainage to HLHL, headwalls, unstable areas, and wet areas. Effective drainage allows sediment in the drainage water to filter or settle out before the drainage water enters waters of the state. Effective drainage features must be located and spaced as needed to reduce the potential for soil and debris to enter waters of the state.

Headwalls are concave slopes that can concentrate water to increase landslide susceptibility. Headwalls are typically located at the heads of channels or swales.

High landslide hazard location (HLHL) means specific sites with characteristics (steepness, shape, and geology) that make it subject to initiation of shallow, rapidly moving landslides. OAR 629-600-0100(34).

Plan for an Alternate Practice means a document prepared by the landowner, operator, or timber owner, submitted to the State Forester for written approval describing practices different than those prescribed in statute or administrative rule. The plan will describe practices to provide “equal or better” resource protection that, if approved by the State Forester, becomes the new enforcement standard. The PFAP has no required review period or standing for public review (unless there is an associated statutory written plan). *The denial of approval of a Plan for an Alternate Practice may be appealed to the Board of Forestry, ORS 527.700(1).*

Unsatisfactory conditions on steep or erosion-prone slopes means soils impacted by ground-based equipment that exhibit any or all of the following:

- **Excessive soil surface depressions or compaction.** Equipment operates during wet soil conditions or on thin soils, there are excessive equipment passes, or deep ground disturbance from tracks.
 - Which means an **unsatisfactory condition** occurs when deep tracks change water accumulation patterns in soils, or when equipment tracks aren’t likely to effectively drain.
- **Exposed subsoil or excavation.** Equipment tracks churn the layers in the soil profile by directional track turning, track spinning, excessive equipment passes, or deep ground disturbance.
 - Which means an **unsatisfactory condition** occurs when subsoils, which are lighter in color than surface soils, have been mixed with surface soils.
- **Soil puddling.** Operating equipment during wet soil conditions when soils are more easily impacted and displaced.

- Which means an **unsatisfactory condition** occurs when the surface soil layer becomes a slurry caused by the operation.

Water bar means a constructed “ditch out” at an angle to the equipment track that carries surface water runoff away from the track and prevents water channeling in the track.

ODF Administration of the Rules

1. Pre-operation Notification Review:

- a. Notification review for steep or erosion-prone slopes and HLHL, using FERNs, Vantage, or ArcGIS. Verify slopes, public safety exposure, and concerns with a pre-operation inspection.
- b. If an operation has steep or erosion-prone slopes or HLHL, make this **FERNs Formal Comment**.
“The operation has steep or erosion-prone slopes or high landslide hazard locations. No ground-based machinery activity may occur on slopes which are steep or erosion-prone within 100 feet of any stream or on high landslide hazard locations, without a State Forester approved Plan for Alternate Practice.”
- c. Provide the operator or landowner the **PFAP template**.
- d. PFAPs for HLHL areas with “intermediate” or “substantial” downslope public safety risk will not be approved.
- e. Consult the ODF geotechnical specialist if you suspect any downslope public safety exposure, including “low” downslope public safety risk, even if slopes are less than the HLHL slope thresholds. Consult the ODF geotechnical specialist if any structures or public roads are within the Further Review Area (as defined in Forest Practices Technical Note #2). In some cases a PFAP might not be approved when the downslope public safety risk is determined to be “low.”

2. Pre-operation Plan Evaluation:

- a. Evaluate the PFAP, to determine if the PFAP is complete and will provide “equal or better” resource protection. Clarify concerns during a pre-operation site visit with the operator. Review the “Operational Planning Considerations for Operations on Steep Slopes” and “Best Management Practices” below. This list is not exhaustive and other BMPs may be considered.
- b. Consult ODF’s geotechnical specialist, FPA field coordinator, or district staff.
 - i. Send the PFAP to the FPA field coordinator for review. Also, send the PFAP to the ODF geotechnical specialist if HLHL are identified in the review or described in the PFAP.
 - ii. Discuss local slope failures, findings from the pre-operation inspection, operator and landowner experience, operational method, and the adequacy of the PFAP to identify resource concerns and practices to achieve resource protection. Generally, there is a greater risk for soil disturbance on HLHL if tethered cut and tethered yarded, rather than tethered cut and cable yarded.
- c. Provide feedback on the PFAP to the landowner or operator to improve the plan for approval, *ideally within two weeks*. Document verbal conversations in FERNs.

3. Pre-Operation Plan Approval Status:

- a. Approve or deny approval of the PFAP and upload the signed PFAP, based on input from the ODF’s geotechnical specialist and FPA field coordinator.
 - i. If the PFAP is approved, make a **FERNs Formal Comment**:
“Fully implementing this Plan for an Alternate Practice will likely achieve the FPA resource protection standards. The operation will be evaluated on the basis of how

well this approved Plan for an Alternate Practice is implemented and how well required resource protection is achieved.”

- ii. If the PFAP is denied approval, make a **FERNS Formal Comment** and complete a **Certificate of Service** for mail or hand delivery.

“The Plan for an Alternate Practice is denied approval, because it is not likely to achieve FPA resource protection standards.”

4. **Active and Post Operation Inspections:**

- a. Inspect PFAP implementation, to verify operator compliance with the PFAP and look for unsatisfactory conditions as described in the Terminology section above. Review any operational concerns with the FPA field coordinator and district staff. Provide appropriate feedback or directions to the operator and landowner to affirm good work or address mitigation practices.

Operational Planning Considerations for Ground-based Operations on Steep Slopes

- Local erosion-prone soils, e.g. decomposed granitics, volcanic soils and other highly-erodible soils as determined by the State Forester
- Active and recent deep-seated landslides
- Slope instability in vicinity or drainage, e.g. slumps, bare slide surfaces, and pistol-butted trees
- Headwalls of streams or deep moist/wet soils parallel to stream channels
- Wet areas, old slides, and thin-rocky soils
- Non-planar landforms, i.e. slopes broken up by streams or alternating ridges and streams, where blocks or other technology are not planned to operate perpendicular to the contours
- Downslope and drainage features with debris flow potential for public safety risks, e.g. slopes over 60% above houses or public roads. Consult ODF’s geotechnical specialist as needed.
- Proposed season of operation.
- Road prism (cut bank, fill, ditch, surface) potentially disturbed by machinery
- Roads with substantial or unstable sidecast material
- PFAP calls for both tethered cutting and tethered yarding on HLHL.

Operational Best Management Practices for Ground-based Operations on Steep Slopes

1. Handling previously-unidentified areas of concerns discovered during the operation

- The pre-operational meeting will review areas of concern and plans to modify operations to avoid previously-unidentified areas of concern, such as headwalls, unstable slopes, springs, or small wetlands.
- Operations will stop disturbance and stabilize unidentified areas that are unstable or wet.

2. Measures to protect stream channels and waters of the state

- Machines will minimize crossing Type N stream channels. Temporary Type N stream crossings will use logs in the channel to protect the bed and bank and not dam up stream flow, then logs will be immediately removed after use.
- Equipment tracks will be located perpendicular to channels, slashed over, and drained onto undisturbed soils using waterbars or other effective methods, while avoiding drainage to headwalls, unstable soils and wet areas.
- Track berms will be knocked down to restore the ground surface and slash placed on the soil
- Water bars or other effective methods will be utilized to prevent gullies, rills, and sediment delivery to streams and wet areas.
- Machine trails will not be located near culverts, unstable areas or wet areas.
- Maximize track spacing as possible.

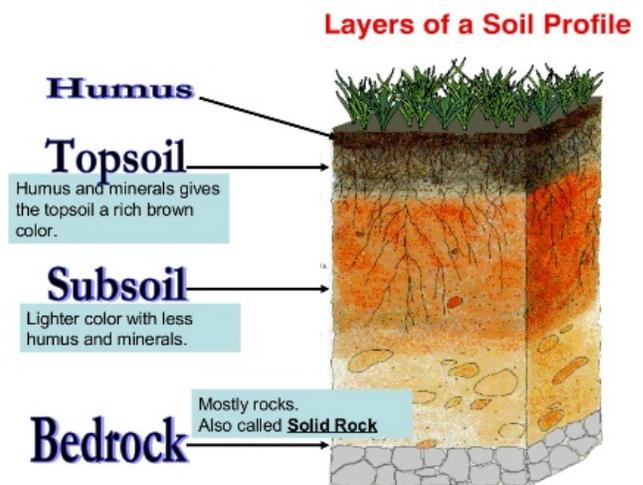
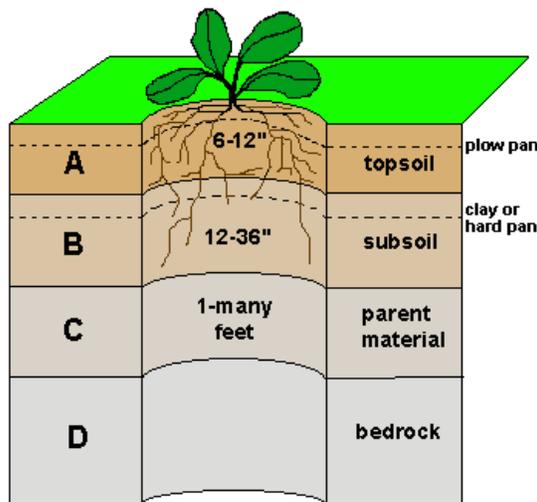
- Machinery passes will be limited, as will directional changes and track spin.
- Maintain constant line tension so the tethered machine does not slip or slide.
- Grass seeding and/or mulching will be done to stabilize unstable, heavily-disturbed soils, especially near streams.

3. Measures to prevent serious ground disturbance and drainage alterations on HLHL

- Equipment will operate in favorable soil moisture conditions and cease during unfavorable conditions that result in subsoil exposure, excessive surface tracks, and likely soil puddling.
- Machinery will not operate in headwalls.
- Machinery passes will be limited, as will directional changes and track spin.

4. Determining when soil disturbance conditions would modify the operation

- Operator will stop operations when soil moisture and soil disturbance become unfavorable, to prevent exposure of the subsoil, likely soil puddling, excessive surface soil depressions, or excessive track depressions that are difficult to drain. Activities shall cease if soil condition turns into a mud-like consistency causing it to be forced out from under machine tracks or wheels, sometimes referred to as “pumping.” The pumping action is not normal track depressions expected in the forest environment under the load of the machinery.



Excessive tethered equipment track depressions that are difficult to effectively drain, 10 to 24 inches deep for over 100 feet.

If a feller-buncher with 28-foot reach maximized its reach and traveled down/up the same track, a 24-inch track will cover 7% and a 36-inch track will cover 10% of every operational acre.

Notes:

- Not every track is considered disturbance. See disturbance definitions above.
- For the same equipment weight, a machine running 24-inch tracks will result in more ground disturbance than the same machine with 36-inch tracks.