



Ministry of
Forests,
Lands and
Natural
Resource
Operations



FFT MECHANICAL SITE PREPARATION STANDARDS

Effective April 1, 2012

These standards apply, in addition to the FFT General Standards (FS 1001), to all mechanical site preparation activities funded by Forests for Tomorrow (FFT).

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ARTICLE 1: DEFINITIONS

1.1 In this document, the following words shall have the following meanings:

“Approved Site Preparation Quality Inspection System” means the inspection system contained in this document **or** another similar system approved in writing by the Ministry Representative;

“Ministry Representative:” means

- (a) a person appointed as a Ministry Representative pursuant to the Recipient Agreement,
- (b) a person who is authorized through an implementation contract to act on behalf of the Ministry Representative for purposes of these Standards, or
- (c) a Ministry employee who is appointed to act as the Ministry Representative for purposes of these Standards.

The person who will be the Ministry Representative for purposes of these Standards must be identified to the Recipient or contractor carrying out mechanical site preparation prior to the commencement of Work.

"No-Treatment Zone" means an area within which no site preparation is to take place;

"Soil Disturbance" means any category of soil disturbance defined in the Soil Disturbance Definition Document contained in Appendix 1, if the soil disturbance was created by the mechanical site preparation contractor on the portion of a Work Area that is equivalent to the net area to be reforested;

The Soil Disturbance Definition Document forms part of these standards.

"Treatment Type" means a particular method of mechanical site preparation to be applied to a Work Area, and may include equipment specifications, treatment objectives and treatment specifications.

ARTICLE 2: SITE PREPARATION STANDARDS

General Requirements

2.1 Before carrying out mechanical site preparation, the Recipient must confirm that a work plan or treatment plan prepared in accordance with section 2.3 is acceptable to

- (a) the District Resource Manager if the site preparation involves knocking down or piling and burning timber that has been killed by wildfire or mountain pine beetle, or

- (b) the Ministry Representative for site preparation treatments not described in paragraph (a).
- 2.2 Despite any requirement that is specified on a per hectare basis (such as the creation of a minimum # of prepared spots per hectare), all standards and requirements must be met throughout the entire Work Area, so that prepared spots are as well distributed as possible.

Work Plans

- 2.3 Unless otherwise specified by the Ministry Representative, where any of the following is not specified in a Treatment Plan, a Work Plan for mechanical site preparation must contain,
- (a) a map of a scale acceptable to the Ministry Representative, showing
 - i) the approximate boundaries and estimated area of each Treatment Unit where a Treatment Type is proposed,
 - ii) the approximate location and estimated area of any No-Treatment Zones within a Treatment Unit, including
 - (1) riparian reserve zones,
 - (2) wildlife tree retention areas, or
 - (3) any other area within the Treatment Unit boundaries where site preparation must not occur (i.e. to protect resource features, wildlife habitat features or for any other reason),
 - iii) the location of any proposed stream crossings to be constructed in accordance with section 55 of the Forest Planning and Practices Regulation;
 - (b) treatment specifics for each Treatment Unit, including
 - i) the maximum limit for Soil Disturbance,
 - ii) the Treatment Type and any specifications on how the treatment should be carried out,
 - iii) treatment objectives, including the target number of prepared spots/ha and the minimum distance between prepared spots,
 - iv) treatment specifications, including the minimum size or characteristics of a prepared spot;
 - (c) any specifications that are necessary for the avoidance of Damage; and
 - (d) for piling and burning treatments the minimum amount of coarse woody debris to be retained per hectare.

Note: Section 51(3)(b) of the Forest Planning and Practices Regulation prohibits mechanical site preparation or broadcast burning in the riparian reserve zone of a stream, wetland or lake.

Practices

- 2.4 Mechanical site preparation must be carried out in accordance with the specifications and any restrictions contained in the Treatment Plan or Work Plan.
- 2.5 If on a Work area the contractor is carrying out both harvesting under an agreement under the Forest Act and mechanical site preparation, the contractor must comply with the maximum limits for Soil Disturbance permitted under section 35 of the Forest Planning and Practices Regulation.
- 2.6 Except in the case of equipment breakdown, machinery must not be fuelled or serviced within 30 metres of a stream, wetland or lake. .

ARTICLE 3: INSPECTION & NOTIFICATION

Quality Inspection – General

- 3.1 Unless otherwise Specified, the methodology given in this Article shall form the basis for the Approved Site Preparation Quality Inspection System.

- 3.2 All Work must be inspected by a person (the "Inspector") who is:
- (a) the Registered Professional Forester (RPF), or operates under the direction of the RPF, who will sign and professionally seal reports for the Work,
 - (b) experienced and competent in conducting inspections of site preparation operations,
 - (c) familiar with the Treatment Plans and Work Plans for the Work Areas, and
 - (d) not engaged in the direct conduct of the site preparation operations.
- 3.3 An Inspector must inspect the Work in accordance with an Approved Site Preparation Quality Inspection System in a timely manner to ensure all Work is performed to the FFT Standards.
- 3.4 Where a visual inspection indicates Soil Disturbance on any area of one (1) hectare or larger is or may be in excess of allowed limits, the Inspector must additionally perform a soil conservation survey using the methodology suggested in the *Soil Conservation Surveys Guidebook* to measure the amount of soil disturbance based on the categories of soil disturbance described in Soil Disturbance Definition Document contained in Appendix 1.
- 3.5 To inspect the quality of mechanical site preparation treatment the Inspector must:
- (a) install plots in a manner that provides systematic or representative coverage over the treated area;
 - (b) mark quality inspection plots in the field and record their location on a survey map such that the Ministry Representative can locate the plots for a period of up to three months after their establishment or until they may be covered for an extended period by snow, whichever is sooner; and
 - (c) record the required information for each plot on a plot card.

Plantability Survey

- 3.6 Where preparing the site for planting is the objective of the Treatment Type, the Inspector must evaluate performance quality by means of a plantability survey and:
- (a) for the purposes of this section, must define a prepared spot as an area which has been mechanically modified by removing slash, dead timber or vegetation, and exposing mineral soil or mineral soil and organic matter in a configuration that will promote seedling survival and growth and as may be further Specified;
 - (b) must install 3.99 m radius plots;
 - (c) must at each plot, measure,
 - i) the total number of satisfactorily prepared spots that are at least the Specified minimum distance apart from each other, and
 - ii) the potential number of prepared spots which could have been prepared given the site conditions, to a maximum per plot based on the Specified target number of prepared spots per hectare;
 - (d) for each area, must determine performance quality by dividing the total number of satisfactorily prepared spots by the total number of potentially preparable spots, and express this number as a percentage; and
 - (e) may declare an area satisfactorily prepared when the average performance quality of all plots in the area is 85% or higher, and there are no contiguous areas of unsatisfactory Work greater than one tenth (1/10) hectare.

Requirement to Notify the Ministry Representative

- 3.7 Further to the notification requirements contained in the *FFT General Standards (FS 1001)* a Recipient must immediately notify the Ministry Representative whenever:
- (a) an inspection reveals unsatisfactory performance on any contiguous area greater than one-tenth (1/10) hectare (or larger minimum area that may be specified by the Ministry Representative), and the nature and extent of the errors are such that performance quality cannot be raised to at least a satisfactory level;

- (b) a limit for Soil Disturbance has been exceeded on a Treatment Unit; or
- (c) site preparation treatment has occurred within a No Treatment Zone, or site preparation machinery has been fueled or serviced in an area prohibited under these standards.

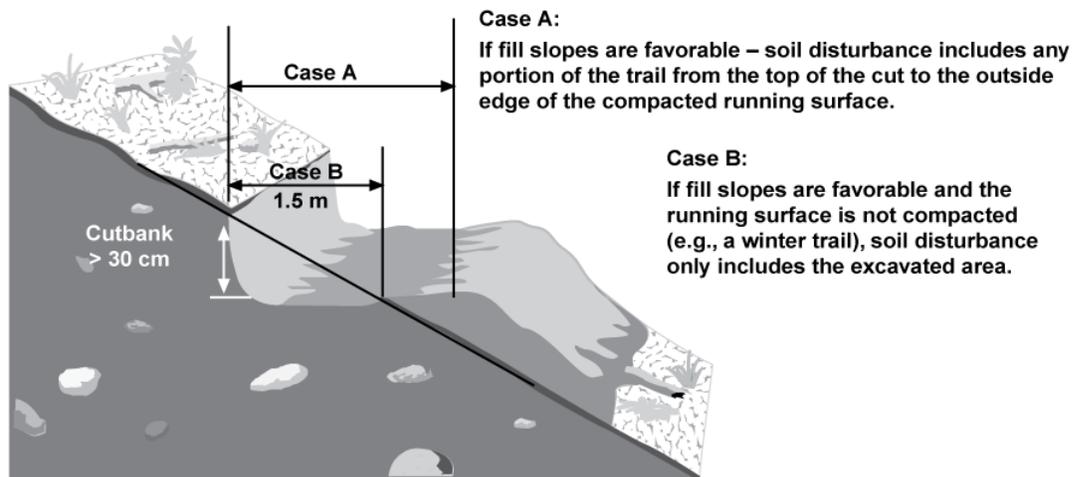
Appendix 1 - SOIL DISTURBANCE DEFINITION DOCUMENT

Under the Forest and Range Practices Act disturbance to the soil must meet minimum size criteria before it is counted as a category detrimental soil disturbance. In this standard each specific category of soil disturbance will be defined and illustrated so the contractor can avoid creating categories of disturbance that will be counted.

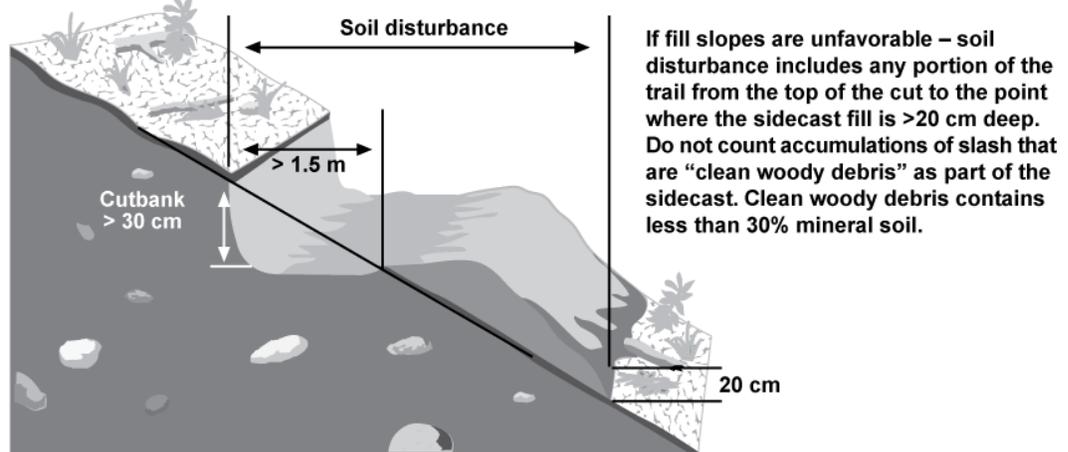
EXCAVATED OR BLADED TRAILS OF A TEMPORARY NATURE

Excavated or bladed trails are constructed trails with an excavated width greater than 1.5 m and a depth of excavation into mineral soil exceeding 30 cm. If the rehabilitation of temporary excavated or bladed trails is not carried out, or if portions are not completely rehabilitated, these structures, or portions thereof, contribute towards counted soil disturbance. If trails are constructed (for fire guards, planter access, etc.) so the depth of excavation into mineral soil is less than 30 cm, they will not meet the legal definition of excavated or bladed trails. Soil disturbance in association with excavated or bladed trails will be assessed in different ways depending on whether the fill slope material is favourable or unfavourable for growing trees (**unfavourable material** = broken rock, rubbly talus/colluvial deposits; dense, unstructured, calcareous or saline soil; intensely burned (red) mineral soil; or steep fill slopes where dry ravel or erosion is likely to preclude reforestation). The following diagrams illustrate these points.

Favorable Fill Slope Material



Unfavorable Fill Slope Material



CORDUROYED TRAILS

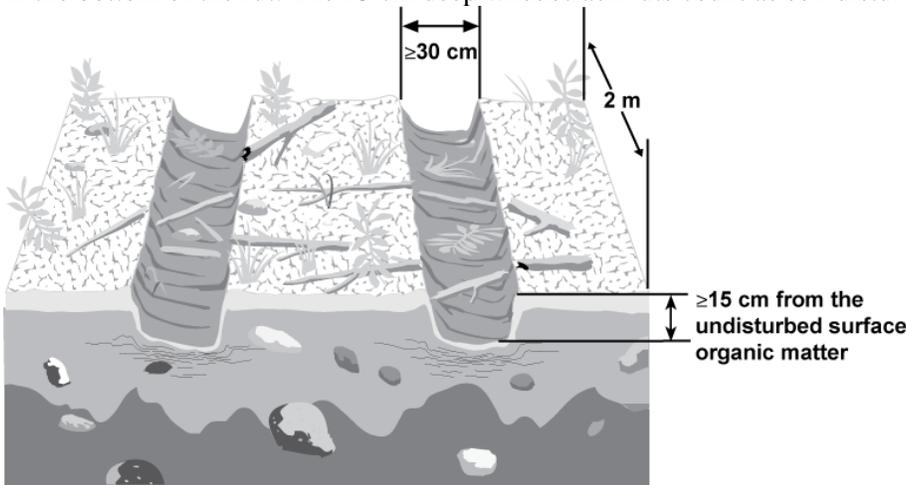
Corduroyed trails are trails where logs and woody debris placed side by side form a surface greater than 2 m in length, capable of supporting equipment traffic. Tree tops and limbs placed in front of equipment to distribute machine load and reduce soil compaction should not be considered a corduroyed trail unless they prevent the establishment of regeneration at close to target stocking. Corduroyed trails legally required rehabilitation under the *Forest Practices Code Act* and are still expected to be rehabilitated at this time.

WHEEL/TRACK RUTS

Wheel/track ruts are impressions in the soil caused by machine traffic. There are two different categories of wheel/track rut disturbance.

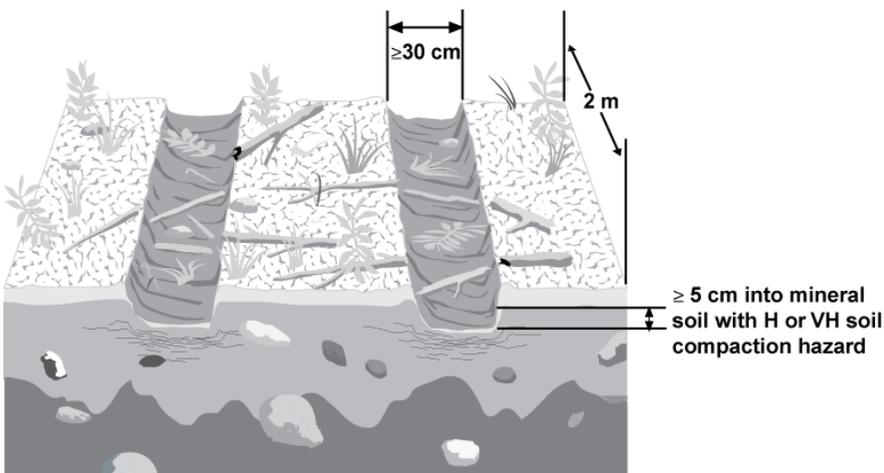
15 cm Deep Wheel/Track Ruts

Fifteen cm deep wheel/track ruts are impressions in the soil that are at least 30 cm wide, 2 m long and have a depth of at least 15 cm at the deepest point in the cross section of the rut over the entire length of 2 m. Depth is measured from the undisturbed surface organic matter to whatever soil material (mineral or organic) is present in the bottom of the rut. The 15 cm deep wheel/track ruts count as soil disturbance on all sites.



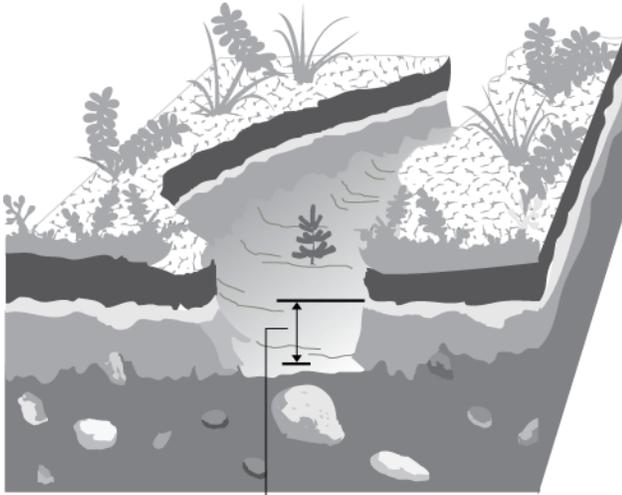
5 cm Deep Wheel/Track Ruts

Five cm deep wheel/track ruts are impressions in the mineral soil that are at least 30 cm wide, 2 m long and have a depth of at least 5 cm at the deepest point in the cross section of the rut over the entire length of 2 m. Depth is measured from the undisturbed mineral soil surface to the mineral soil surface in the bottom of the rut. If forest floor is present in the bottom of the rut, gently brush it aside to expose the underlying mineral soil. The 5 cm deep wheel/track ruts count on sites with a high or very high soil compaction hazard or where the soil compaction hazard has not been documented in a work plan or treatment plan.



DEEP GOUGE

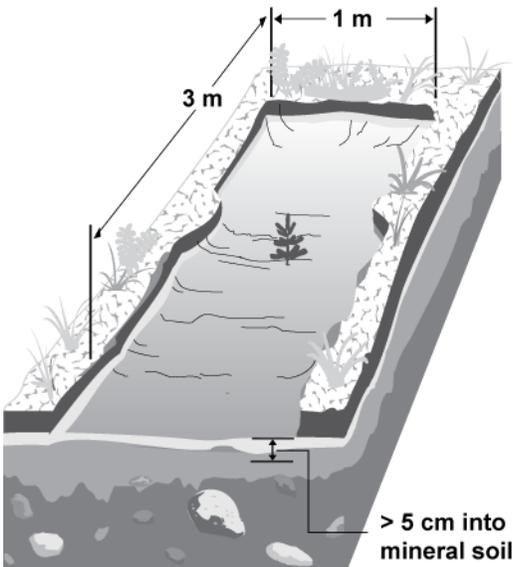
A deep gouge is an excavation into mineral soil that is deeper than 30 cm (measured from the undisturbed mineral soil surface), or to the depth of underlying bedrock. This disturbance counts on all sites.



**> 30 cm into mineral soil
or to bedrock**

LONG GOUGE

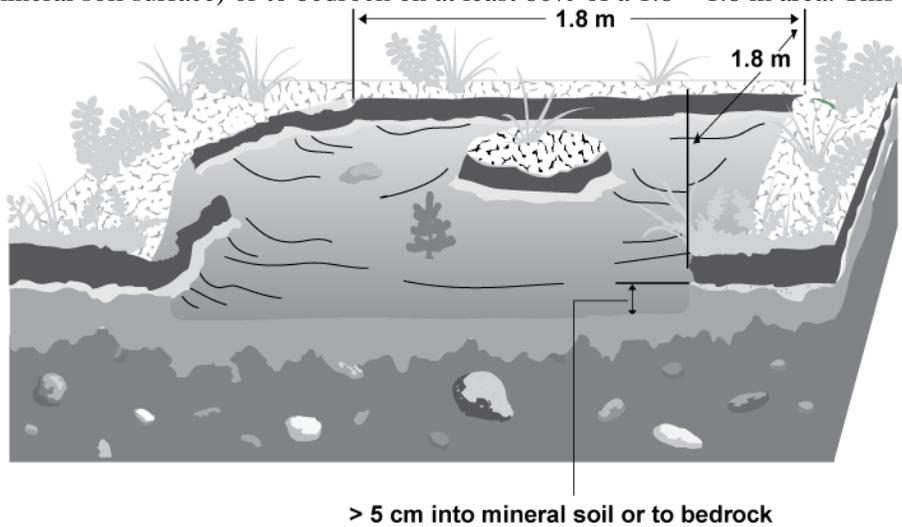
A long gouge is an excavation into mineral soil that is deeper than 5 cm (measured from the undisturbed mineral soil surface), or to bedrock on 100% of a 1.0 × 3.0 m rectangle. This disturbance counts on all sites.



**> 5 cm into
mineral soil**

WIDE GOUGE

A wide gouge is an excavation into mineral soil that is deeper than 5 cm (measured from the undisturbed mineral soil surface) or to bedrock on at least 80% of a 1.8 × 1.8 m area. This disturbance counts on all sites.



VERY WIDE SCALP

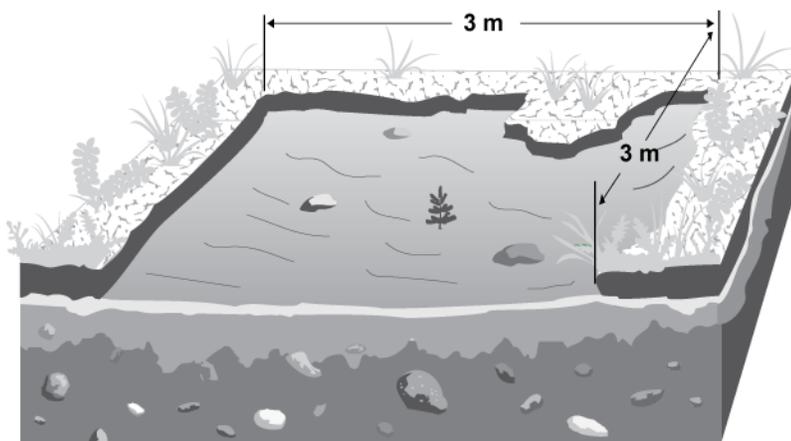
A very wide scalp has forest floor removed on over 80% of a 3.0 × 3.0 m area. This disturbance counts on all sites.

Forest floor **is** removed when there is:

- exposure of underlying mineral soil due to the complete removal of the forest floor
- exposed mineral soil covered by fine woody slash, undecomposed needles or dislodged rotten wood
- exposed mineral soil covered by dislodged forest floor that is less than half the thickness of the adjacent undisturbed forest floor.

Forest floor **is not** removed when there is:

- intact forest floor of any depth typically showing the presence of roots growing into the mineral soil
- mixed forest floor and mineral soil as a result of site preparation mixing treatment that is at least 5 cm thick and is at least half forest floor material
- exposed mineral soil covered by dislodged forest floor that is greater than half the thickness of the adjacent undisturbed forest floor. Dislodged forest floor must be of similar character to the adjacent undisturbed forest floor to be acceptable.

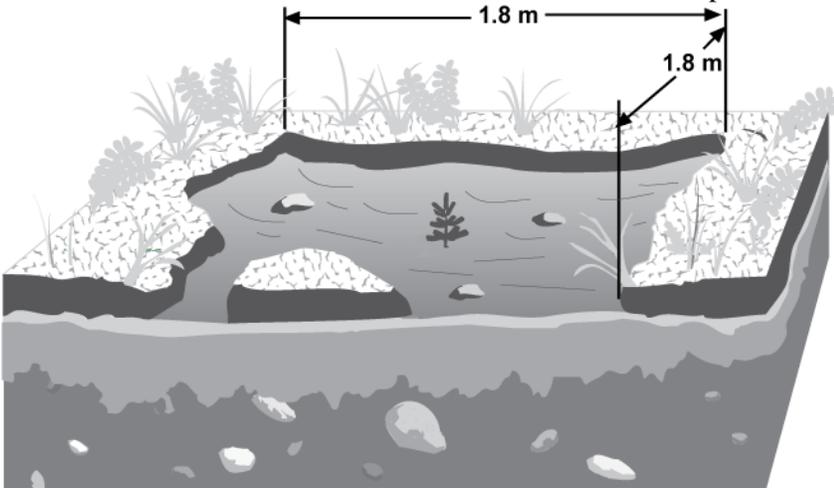


WIDE SCALP

A wide scalp has forest floor removed on over 80% of 1.8×1.8 m area. This disturbance is counted where there is:

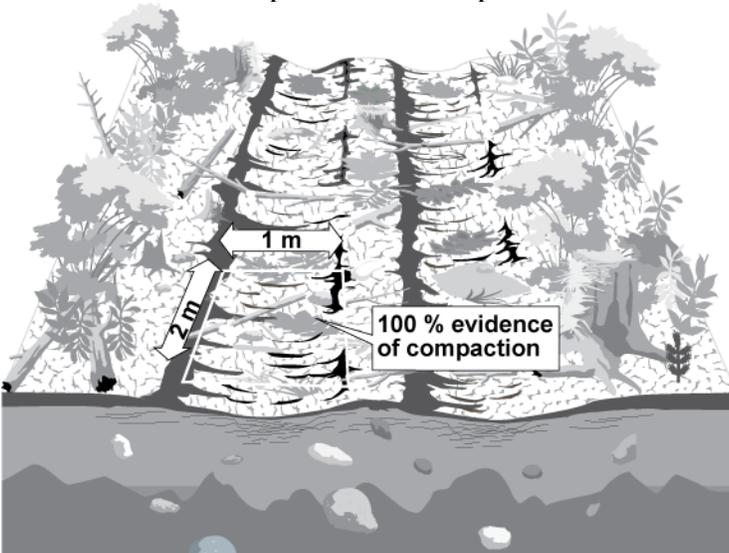
- very high soil displacement hazard
- very high compaction hazard
- very high soil erosion hazard
- moderate or high likelihood of landslides, or

where the soil hazards have not been documented in a work plan or treatment plan



REPEATED MACHINE TRAFFIC

Repeated machine traffic consists of evidence of soil compaction or repeated heavy machine traffic on 100% of a 1.0×2.0 m rectangle. This disturbance counts on all sites except where a low compaction hazard has been documented in a work plan or treatment plan.



EVIDENCE OF COMPACTION

Any of the conditions listed below is considered to be evidence of compaction (compacted mineral soil, puddled mineral soil, compacted deposits of slash and organic debris).

1. Mineral soil compaction is assessed relative to conditions in the adjacent undisturbed soil. Any one of the following attributes defines a compacted condition:
 - *Coarse platy structure*. The excavated soil breaks apart in consolidated plates that are typically 1 cm or greater in thickness.
 - This structure is not evident in the adjacent undisturbed soil.
 - Loss of the normal structure evident in the undisturbed soil.(i.e. a change to massive soil structure)
 - *A noticeable change in density*. If the disturbed and undisturbed soils have the same moisture content, the changes in density may be recognized by any one of the following characteristics:
 - a difference in resistance to shovel penetration
 - a difference in resistance to crushing between the thumb and index fingers of blocks of soil that are 2.5 cm thick.
2. Compacted deposits of forest floor, fine slash and woody debris overlying the mineral soil that cannot be readily excavated with a shovel (e.g., deposits of compacted and cribbed-in slash on winter skid trails that are deeper than 20 cm).

COMPACTED AREAS

A compacted area is an area of soil >100 m² and >5 m wide that has been compacted by equipment travelling over the area. It has the same characteristics and is counted as soil disturbance on the same sites as repeated machine traffic areas. Compacted areas required rehabilitation under the *Forest Practices Code Act* and are still expected to be rehabilitated at this time.

SOMETIMES COUNTED CATEGORIES OF SOIL DISTURBANCE

The following categories of soil disturbance only count on more sensitive sites with moderate, high or very high soil hazards, or where the soil hazards have not been documented in a work plan or treatment plan

They are referred to as *sometimes counted* categories of soil disturbance.

1. 5 cm Deep Wheel/Track Ruts
2. Repeated Machine Traffic
3. Wide Scalp
4. Compacted Area

The work plan or treatment plan should indicate if any of these *sometimes counted* categories of soil disturbance count on specific treatment units. If the plans do not contain this information, the contractor must avoid the creation of any of the *sometimes counted* categories of soil disturbance.

REHABILITATED DISTURBANCES

Soil disturbances that have been rehabilitated in a manner consistent with Forest Planning and Practices Regulation section 35 are not counted as soil disturbance.