Detrimental Soil Disturbance

November 2005
48. Ensuring soil rehabilitation

48. (1) If the district manager determines that the area under an operational plan has sustained damage as a result of a forest practice, the district manager may, by written notice, direct the person responsible for the damage to take measures and to pay costs that are necessary to rehabilitate the area to the satisfaction of the district manager and the person must comply with the notice.

(2) Subsection (1) applies despite any limit for soil disturbance
   (a) specified for an area under a silviculture prescription, or
   (b) prescribed for an area under a site plan prepared under section 21.1.

48.1 Limitations on remedial measures that may be required

48. (1) The district manager must not direct or require a person to take measures under section 45 (4) or 48 (1) if the person establishes that

   (a) the person exercised due diligence to prevent the damage to the area, or
   (b) the person’s actions relevant to damage to the area were the result of an officially induced error.

(2) The Lieutenant Governor in Council may prescribe circumstances in which and conditions on which a person who has taken measures under section 45 (4) or 48 (1) may recover all or part of an amount reasonably incurred for the direct costs of carrying out the measures.

(3) This section does not apply in respect of a direction or requirement to take measures under section 45 (4) or 48 (1) made before the coming into force of this subsection.
Limits on the amount of soil disturbance

31. (1) In this section, “sensitive soils” means soils on an area that through a combination of climate, soil properties, site moisture conditions and site topography have
   (a) in the Interior, a very high soil compaction hazard, soil displacement hazard or soil erosion hazard, and
   (b) on the Coast, a high or very high soil compaction hazard, soil displacement hazard or soil erosion hazard.

   (2) A holder of an agreement under the Forest Act must not cause the soil disturbance or the net area to be reforested within a standards unit to exceed
   (a) the applicable performance standard, or
   (b) if there is no applicable performance standard,
      (i) 5% of the area in the standards unit if the area has sensitive soils, and
      (ii) 10% of the area in the standards unit if the area does not have sensitive soils.

   (3) Despite subsection (2), a holder of an agreement under the Forest Act may exceed the soil disturbance limits under that subsection if
   (a) the harvesting on the area was to remove infected stumps, or
   (b) specific site rehabilitation or site preparation objectives for the area are contained in the forest development plan.

   (4) Despite subsection (2), a holder of an agreement under the Forest Act may temporarily exceed the soil disturbance limits referred to in that subsection if
   (a) the extra disturbance
      (i) is for the construction of temporary access structures or excavated or bladed trails, and
      (ii) does not exceed 5% of the standards unit, and
   (b) the holder rehabilitates the area to the extent necessary to bring the area back into compliance with the specified limits.
Types of Soil Disturbance encountered in Woodlands Operations...

**Dispersed Soil Disturbance – Gouges & Scalps**

- **Always Counted**
  - Deep Gouge
  - Wide Gouge
  - Long Gouge
  - Very Wide Scalp

- **Sometimes Counted**
  - Wide Scalp
  - Continuous Scalp

Depends upon site sensitivity.

**Repeated Machine Traffic**

- Wheel/Track Rut
  - All Sites
  - Very High, High Compaction Hazard Sites

**Dispersed Soil Disturbance – Dispersed Trail**

- Medium or Low Compaction Hazard Sites and Organic Soils

**Excavated or Bladed Trail**

Wheel/Track Rut

Silviculture Practices Branch
B.C. Ministry of Forests
June 95
Unrehabilitated excavated or bladed trails that are not identified as permanent logging trails in a silviculture prescription must be counted as soil disturbance on all sites.
Excavated or Bladed Trail

- Compaction - Moderate
- Displacement - Low
- Soil Erosion - Moderate
- Max Allowable Soil Disturbance Within the NAR - 10%

✔ Not counted once rehabilitated
Compacted areas are areas on which there is evidence of compaction at the survey point and on 100% of a portion that is both greater than 100 m in area and greater than 5 m wide.

Unrehabilitated compacted areas are counted as soil disturbance on all sites except those with low compaction hazard. Where the compaction hazard has not been assessed, compacted areas are always counted as soil disturbance.
Wheel or track ruts 15 cm deep are counted as soil disturbance on all sites.
Wheel or track ruts 5 cm deep are counted as soil disturbance on sites with high or very high soil compaction hazard or where compaction hazard has not been assessed.
Wheel or Track Ruts

- Compaction - Low
- Displacement - Low
- Soil Erosion - Mod-High
- Max Allowable Soil Disturbance Within the NAR - 10%

✓ Track Ruts counted as detrimental Soil Disturbance
Repeated machine traffic must be counted as soil disturbance on all sites except those with low compaction hazard. Where the compaction hazard has not been assessed, repeated machine traffic must be counted as soil disturbance.
Repeated Machine Traffic

- Compaction - Moderate
- Displacement - Low
- Soil Erosion - Moderate
- Max Allowable Soil Disturbance Within the NAR - 10%

✓ Repeated Machine Traffic counted as detrimental Soil Disturbance
Deep Gouge

Deep gouges must be counted as soil disturbance on all sites.
Deep Gouge

- Compaction - High
- Displacement - Low
- Soil Erosion - High
- Max Allowable Soil Disturbance Within the NAR - 10%

- Deep Gouge counted as detrimental Soil Disturbance
Wide gouges are excavations into mineral soil that are a) deeper than 5 cm at the survey point and b) deeper than 5 cm or to bedrock, on at least 80% of an area 1.8 x 1.8 m.

Wide gouges must be counted as soil disturbance on all sites.
*Long gouges* are excavations into mineral soil that are a) deeper than 5 cm at the survey point and b) deeper than 5 cm or to bedrock on 100% of an area 1 x 3 m.

*Long gouges must be counted as soil disturbance on all sites.*
Very wide scalps are areas where the forest floor has been removed at the survey point and from over 80% of an area 3 x 3 m.

Very wide scalps must be counted as soil disturbance on all sites.
Very Wide Scalp

- Compaction - Moderate
- Displacement - Low
- Soil Erosion - Moderate
- Max Allowable Soil Disturbance Within the NAR - 10%

✓ Very Wide Scalp counted as detrimental Soil Disturbance
**Wide Scalp**

*Wide scalps* are areas where the forest floor has been removed at the survey point and from over 80% of an area 1.8 x 1.8 m.

Wide scalps must be counted as soil disturbance on sites with:

- very high soil displacement hazard,
- very high compaction hazard,
- very high soil erosion hazard,
- moderate or high likelihood of landslides, or
- where the hazards for soil compaction, soil displacement, or soil erosion have not been assessed.
Continuous Scalp

They are areas where the forest floor has been removed at the survey point and continuously for a length greater than 5 m. There is no width criterion for this category.

Continuous scalps are counted as soil disturbance on sites with:

- high or very high mass wasting hazard;
- high or very high surface erosion hazard;

- very high soil displacement hazard; and
- moderate or high likelihood of landslides, or where the hazards for soil displacement or surface soil erosion have not been assessed.
Continuous Scalp

- Compaction - High
- Displacement - Low
- Soil Erosion - High
- Max Allowable Soil Disturbance Within the NAR - 10%

✓ Continuous scalp counted as detrimental Soil Disturbance
Requirement for Soil Conservation Surveys

- An assessment should be done in the form of a visual inspection to confirm that the maximum limits in the Site Plan have not been exceeded. *No formal survey measurements need to be done, unless it is apparent that the limits may have been exceeded.*
- For major licensees, soil conservation surveys are not mandatory.
- However, if visual inspections indicate that the operations may be in non-compliance, a formal Transect Survey should be conducted.
How Much Soil Disturbance Are We Allowing For On Our Site Plans

<table>
<thead>
<tr>
<th>F.1 SITE DISTURBANCE</th>
<th>HAZARD RATING</th>
<th>SOIL CHARACTERISTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(if logging methods other than cable or aerial are proposed)</td>
<td>(if temporary access structures are proposed)</td>
</tr>
<tr>
<td>SU(s)</td>
<td>Soil Compaction</td>
<td>Soil Displacement</td>
</tr>
<tr>
<td>1</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>2</td>
<td>Very High</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

SOIL DISTURBANCE LIMITS

<table>
<thead>
<tr>
<th>SU(s)</th>
<th>Maximum Allowable Soil Disturbance Within the Net Area To Reforest (%)</th>
<th>Maximum Extent Soil Disturbance Limits May Be Temporarily Exceeded to Construct Temporary Access Structures (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10.0</td>
<td>3.3</td>
</tr>
<tr>
<td>2</td>
<td>5.0</td>
<td>3.3</td>
</tr>
</tbody>
</table>
Objective ~ to target 3 to 4 obviously disturbed areas within selected Blks and located a POC within each area. Points were assessed at 1-m intervals along four 25 m transects radiating out at Cardinal Bearings from each POC.

<table>
<thead>
<tr>
<th>Results</th>
<th>Disturbance within NAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block A</td>
<td>5.3% (10% Allowed)</td>
</tr>
<tr>
<td>Block B</td>
<td>13.5% (10% Allowed)</td>
</tr>
<tr>
<td>CP 47 - 1</td>
<td>7.0% (10% Allowed - SU 1)</td>
</tr>
<tr>
<td></td>
<td>3.0% (10% Allowed - SU 2)</td>
</tr>
<tr>
<td>CP 304 - 2</td>
<td>14.0% (10% Allowed)</td>
</tr>
<tr>
<td>CP 304 - 4</td>
<td>1.0% (10% Allowed - SU 1)</td>
</tr>
<tr>
<td></td>
<td>1.0% (10% Allowed - SU 2)</td>
</tr>
</tbody>
</table>
Have Our Initial Disturbance Estimates Been Too High When The Entire SU Is Taken Into Account?

- **Objective** ~ To conduct a Formal Transect Survey
- **Procedure** ~ Systematically located a number of grid centers within the block (minimum of 30). Points were then assessed at 1-m intervals along two 30 m transects radiating out from each grid center.
- **Results** ~ 1633 Points assessed within the Transect Survey.
Method ~ to target 3 to 4 obviously disturbed areas within sample areas. Points were assessed 1-m intervals along four 25 m transects at Cardinal Bearings from a starting point.

Results (Est. Disturbance within NAR)

- Sample A: 5.3% (10% Allowed within NAR)
- Sample B: 13.5% (10% Allowed within NAR - SU 1)
- Sample C: 7.0% (10% Allowed within NAR - SU 1) 3.0% (10% Allowed within NAR - SU 2)
- Sample D: 4.0% (10% Allowed within NAR)
- Sample E: 1.0% (10% Allowed within NAR - SU 1) 1.0% (10% Allowed within NAR - SU 2)
Concluding Thoughts On Minimizing Detrimental Soil Disturbance

- On areas within a block that have had obvious soil disturbance, a visual assessment should be completed to decide whether the maximum limits in the Site Plan have been exceeded.

- Where disturbance appears to exceed the limits:
  * target 3 to 4 *obviously disturbed areas* within the block
  * locate a POC within each area. Assess points at 1-m intervals along four 25 m transects radiating out at Cardinal Bearings from each POC to determine the approximate level of disturbance.

- Conduct a Transect Survey of the block, as described within the Soil Conservation Surveys Guidebook, to determine a more accurate level of soil disturbance.

- During Logging: establish designated trails on steeper sloped areas with shallow forest floor layers.
  * Minimizes the occurrence of both Repeated Machine Traffic and/or Very Wide Scalps.

- Establish designated trails and/or winter harvest blocks with sensitive soils.
RESULT: Transect Survey carried out confirms that soil disturbance limits are not generally being exceeded within our harvesting operations.

RECOMMENDATION: Continue to determine/identify the “Maximum Extent Soil Disturbance Limits May Be Temporarily Exceeded To Construct Temporary Access Structures (%%)” by Std Unit.