ECOWOOD
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ON THE AMOUNT OF SENSITIVE LOGGING SITES IN FINLAND

In forest management the sensitivity of a forest site is most often related to the thinning operations. If the trafficability in a clear-cut operation is reasonably good, the sensitivity of the site very seldom becomes a problem. On the other hand, thinning strongly affects the future cutting possibilities in a forest stand. Thus, not only the levels of harvesting costs need to be considered when making decisions on thinning operations. The expected wood production depends on; how evenly the remaining trees in the stand are distributed, the quality of the remaining trees, eventual damage caused to tree trunks and roots, and on ruts caused to the site. The ruts may cause erosion, soil compaction, leaching of nutrients and a lower trafficability. Even aesthetic harm may be caused with a resultant lowering of the recreational value of the stand.

Monitoring the quality of work in thinning, and preventing loss of production value of a stand are important aspects to be considered. On the other hand, there is a higher risk of ruts in a clear-cut area, because larger wood volumes and a greater number of loads will be transported. Rut formation is seldom regarded as a problem, because often some ground preparation will follow. However, without doubt one may claim that in clear-cut operations some soil compaction, erosion risk and leaching of nutrients may exist.

It is not easy to determine the area of sites with a low bearing capacity. One possibility is to review sites where operations have already been completed and assess the eventual damage caused to the ground and to the remaining stand. Because a prerequisite for such an inventory is that the operation has already been completed, one cannot easily extend application of the results to other areas. Another problem is that on all areas there are minor spots where no operation has been possible at all, for instance due to the low bearing capacity of the ground. In Finland such areas belong, in principle, to all peat lands, where the ground is not frozen during the winter. However, the role of peat lands is becoming more and more important from a forestry point of view, because according to current inventories, at least one fifth of tree growth is measured in peat land forests. This indicates that the possibility of using machinery on sites with a low bearing capacity is of great importance.

The situation today

In Finland a systematic follow-up concerning the quality of work in logging is done by Forestry Boards. The aim is to inspect how the Forest Act has been obeyed. About 3 to 5 % of the logging operations related to the forest utilisation pre-notices will be monitored.

A critical value to be measured is the occurrence of rut depths greater than 10 cm. The total length of such ruts in metres is measured from a section of 30 m. A damage is recorded; if one of the two tracks has a rut depth deeper than 10 cm. Actually, the type of rut is assessed using a three-class scale. The mark is considered to be good, if less than 5
% of the tracks have ruts and where those that do exist do not lower the wood production. Remarks are given, if there are more than 5 % of tracks with ruts deeper than 10 cm, but no influence to the stand growth is expected. If the ground damage is so excessive that the tree growth is clearly lowered, then the logging work has been done incorrectly. These marks are only assessed at thinning sites.

A survey based on an overview (a general survey assessment on the quality of work) was carried out in 2000 in Finland at 657 thinning operations. Remarks or incorrectly carried out operations were recorded, as presented in Fig. 1.

Figure 1. Assessment based on the overview of the quality of work

Detailed assessments were carried out at 478 compartments. 46 % of them were first thinning and 54 % later thinning operations. On 73 % of all thinning operations mechanised work methods (harvesters) were used. The share of mechanised operations in first thinning was 64 % and in later thinning 81 %. The length of ruts deeper than 10 cm were measured, to apply an average distance of 30 m (Fig. 2).

Figure 2. The share of ruts deeper than 10 cm on forwarding tracks

Based on the three classes and the amount of ruts caused during the past five years, about 90 % of the thinning operations were done properly. The variation in the percentages was between 85.3 % and 93.1 %.
Table 1. The share of thinned compartments having ruts deeper than 10 cm on less than 5 % of the tracks.

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<td>% of tracks</td>
<td>90.0</td>
<td>93.1</td>
<td>85.3</td>
<td>89.8</td>
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It is possible to measure the sensitivity of forest soils to rut formation. The risk of ruts is much larger during the snow-free season than during the time of frozen ground. In 1997-99 the surveys of the Forestry Centres indicated that the share of ruts deeper than 10 cm in cuttings during the snow-free season were on average 4.3 % and during the season of frozen ground 1 %. These data deal only with thinning operations.

**Especially valuable areas of nature**

In addition to the damage caused to the ground and the remaining stand, more and more attention has been paid to leaving the especially valuable areas of nature untouched. A rough idea on the amount of such areas can be interpreted from the follow-up reports handed to the Central Forestry Board, Tapio concerning the planned wood harvesting operations. In 2000 there were 74 ha of such areas, which correspond to 1.6 % of the area inspected. Thus their share is not very large. Here these areas mean such types of nature, which have been left outside of all wood harvesting or where the cutting is done so that the special features of the nature are maintained. In the year 2000, 99 % of the special topics were left untouched; in 1997-99 their share was 93.5 … 89.8 %. Most of the spots, where the Forest Act was violated, were springs, small-sized rich forest types and rich fens in Southern Finland. This means that more and more of those special types of nature are now being saved. The main reason for this favourable development is that the persons responsible for forest operations today are more highly educated on these considered aspects.

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