THINNING STATUS

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1. INTRODUCTION

At the NFI conference in Portlaoise, on July 11th 2007, the thinning status results generated some discussion, in particular questions were raised regarding the subjectivity of the assessment and its impact on the results. In response to this the Forest Service has amended the original subjective assessment with a more robust assessment using threshold basal area. This information note incorporates these changes to outline the level of thinning present in the national forest estate.

Thinning status and ownership are firstly defined, the basis of the revised assessment is outlined and finally the results are presented.

2. DEFINITION

The definition of thin status and ownership outlined in this section are taken from the NFI Methodology.

2.1 Thin Status

Definition: Describes the thinning status and the frequency of harvesting operations.

Application: Thin status indicates the intensity of forest management by assessing the number of intermediate fellings.

Measurement and Description: The classification of thin status was firstly based on whether the forest was thinned, i.e. some of the trees were cut or harvested to provide growing space for the remaining trees. Where no thinning had taken place an ocular assessment of the growth stage[1] of the forest storey[2] determined the thin status.

For example, if a high forest has been thinned once then the thin status is recorded as 'First thinning'. A similar area could also have been recorded as 'No thinning' if it was at a development stage where it could be thinned but was left unthinned.

[1] Growth stage describes the development of a forest on the basis of tree canopy closure and dbh.

[2] A storey describes the differentiation of the trees into distinct layers. As a plot may cross stand boundaries there may be more than one storey present on the plot, which could be at two different thinning stages.

Where a thinning had occurred, the stocking of the stand and decomposition of stumps was used as an indicative guide to the number of thinnings. The assessment of thin status stage takes place for each storey on the 12.62 m plot.

Attribute **Thin Status**

1. **Juvenile forest**: This is a storey that has not reached the development stage for first thinning.
2. **Respacing/pre-commercial thinning**: The spacing of the storey has been altered prior to the first thin stage. Mainly associated with naturally regenerated stands.
3. **First thinning**: The storey has received a first thinning, generally identified by the presence of extraction racks, and stumps arising from selective thinning may be present. All stumps have the same state of decomposition.
4. **Second thinning**: The storey has received a second thinning, generally identified by the presence of extraction racks and stumps arising from selective thinning. The stumps are grouped into two different stages of decomposition.
5. **Subsequent thinning**: Any thinning post second thinning. Generally the storey is well opened up and the decomposition of the stumps is grouped into a number of different stages.
6. **No thinning**: No thinning has taken place in the storey, but the storey is at a development stage where thinning could have taken place.

2.2 Ownership

Definition: Ownership specifies both land and timber ownership.

Application: Forest ownership type is important as it has the potential to impact on forest management and timber supply.

Measurement and Description: Forest Service and external datasets were used to specify ownership type. Assessment was based on the location of the plot centre.

Attribute **Ownership**

1. **Public**: all state owned forests
2. **Private (grant aid)**: private afforested land which was either in receipt of grant and/or premium since 1980.
3. **Private (other)**: private non grant aided plantations or naturally regenerated forests.

3. THIN STATUS ASSESSMENT

The definition of thinning status outlined above details how thin status was assessed during the NFI fieldwork and was the basis of the results presented on July 11th 2007 at the NFI conference in Portlaoise.

As the assessment was based on a subjective ocular assessment by field-team members and taking on board comments expressed at the conference, the raw data has been amended to remove the subjectivity involved in the field assessment.

The amendments undertaken were based on assessing individual plots that had the thin status of trees classified as 'No thinning'. If a tree was classified as 'No thinning' it meant that the trees belonged to a storey that was at a development stage where thinning was possible but had not been carried out. If the storey was at a development stage where thinning was not possible it was classified as 'Juvenile forest'.

3.1 Revised thin status assessment

The assessment of whether the storey was at a development stage where thinning was possible was made on the basis of species, height, basal area and stocking. For a given species and height a threshold basal area can be calculated[3], which indicates the basal area at which the stand becomes fit for thinning. An example of the process is outlined below:

- **Species**: Sitka spruce
- **Height**: 10 m
- **Stocking**: 2400 stems/ha
- **Basal area (as per plot)**: 35 m^2/ha.
- **Thin threshold basal area**: 33 m^2/ha.

As the threshold basal area is lower than the plot basal area per hectare, then this plot is classified as 'No thinning', as no thinnings have taken place and it is at a development stage where thinning could occur.

It is also important to note that while an area may be at a development stage for a thinning to be undertaken, it may be impractical from an accessibility or financial viewpoint. Stability or incipient windblow concerns are also a significant factor influencing the level of 'No thinning'. Another possibility is that some of these areas may be scheduled for thinning subsequent to the NFI assessment but were not thinned on the date of survey. Any such changes will be captured in future NFI's.

[3] Coillte, 1998. Code of best practice for pre-sale measurement. Module 3 – Methodology for the assessment of Thinning Yield and the establishment of thinning control.

4. REVISED RESULTS

The results are sub-divided into two sections. The first section (4.1) assesses the total stocked forest estate classified by thin status. In the second section (4.2), the 'Juvenile forest' category is removed, with the view to assessing the total stocked forest area that is at a development stage where thinning can occur.

4.1 Total stocked forest estate

The combination of 'No thinning' and 'Juvenile forest' represents the total area of the forest estate which has not been thinned. This accounts for 86% of the total forest estate (Table 1). As greater than 60% of the total stocked forest estate is less than 20 years old, this high figure is not surprising.

Thinning operations have been carried out on 14% of the forest estate, with subsequent thinning accounting for nearly 6% of the total stocked forest estate (Table 1).

Table 1. Total stocked forest estate classified by thin status.

Thin status	Ownership / Area		
	Total		
	1000 ha ($\alpha = 0.05$)		%
no thinning	166.93	(153.53 – 180.34)	26.7
juvenile forest	373.65	(358.86 – 388.43)	59.7
respacing	0.01	(0.00 – 0.02)	0.001
first thinning	25.47	(19.43 – 31.51)	4.1
2nd thinning	11.90	(7.80 – 15.99)	1.9
subsequent thinning	36.57	(29.77 – 43.37)	5.8
temporarily unstocked	11.22	(7.09 – 15.35)	1.8
Total	625.75		100.0

The total stocked forest estate classified by thin status and ownership is presented in Table 2 and Figure 1. As the majority of the Private (grant aid) estate is less than 20 years old, 'Juvenile forest' is the dominant category accounting for 87% of the total.

Table 2. Total stocked forest estate classified by thin status and ownership.

Thin status	Ownership / Area								
	public			private (grant aid)			private (other)		
	1000 ha ($\alpha = 0.05$)		%	1000 ha ($\alpha = 0.05$)		%	1000 ha ($\alpha = 0.05$)		%
no thinning	111.38	(99.73 – 123.02)	31.0	21.38	(15.89 – 26.86)	11.4	34.18	(27.37 – 40.99)	43.0
juvenile forest	181.51	(167.75 – 195.26)	50.5	161.59	(148.29 – 174.88)	86.5	30.55	(24.23 – 36.87)	38.5
respacing	–	–	–	–	–	–	0.01	(0.00 – 0.02)	0.01
first thinning	19.53	(14.21 – 24.85)	5.4	3.19	(0.98 – 5.39)	1.7	2.75	(0.76 – 4.74)	3.5
2nd thinning	10.47	(6.61 – 14.33)	2.9	–	–	–	1.42	(0.02 – 2.83)	1.8
subsequent thinning	26.51	(20.58 – 32.43)	7.4	0.03	(0.00 – 0.08)	0.02	10.04	(6.40 – 13.68)	12.7
temporarily unstocked	10.02	(6.12 – 13.92)	2.8	0.81	(0.00 – 1.92)	0.4	0.40	(0.00 – 1.20)	0.5
Total	359.41	(344.28 – 374.54)	100.0	186.99	(173.02 – 200.95)	100.0	79.35	(69.10 – 89.60)	100.0

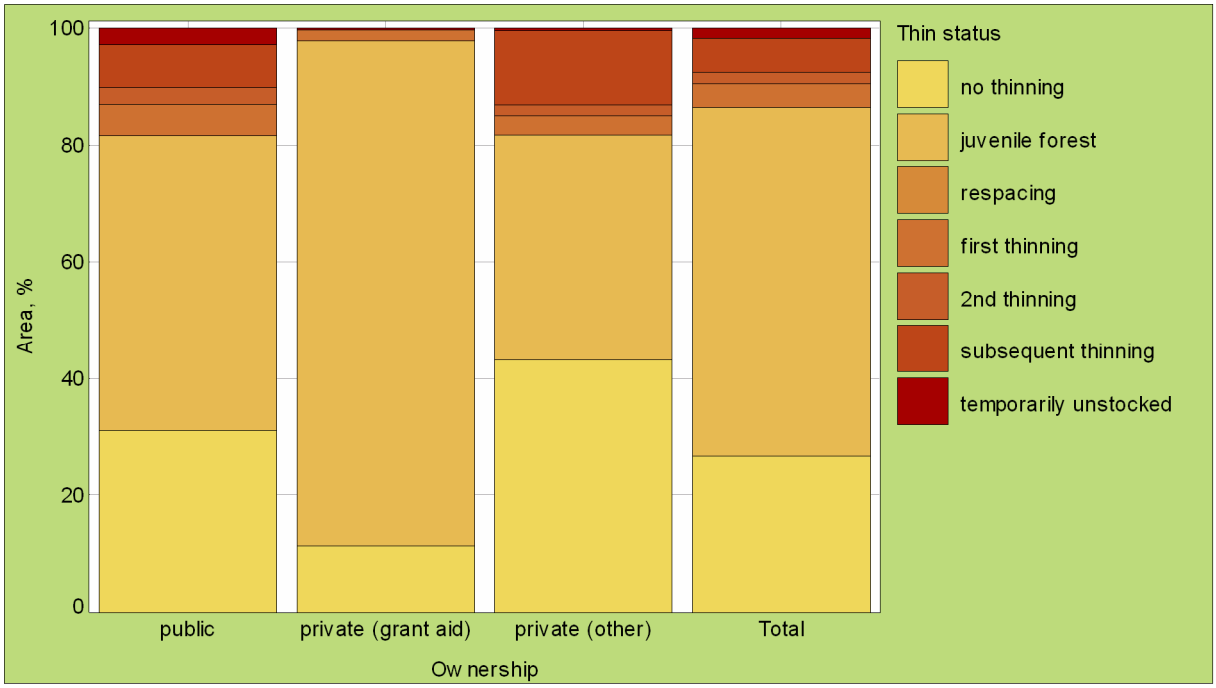

Figure 1. Total stocked forest estate classified by thin status and ownership.

4.2 Total stocked forest estate excluding juvenile forest

The difference between this sub-section and the previous is that the 'Juvenile forest' has been removed from the analysis, thereby concentrating on the portion of the estate that is at a development stage where a thinning could have taken place, but has not for some unknown reasons.

In total 240,880 ha were at a development stage where thinning could have taken place. The majority (69%) of this area has not been thinned (Table 3). The remainder of the area is at various stages of thinning, with subsequent thinning accounting for 15% of the area.

Table 3. Total stocked forest estate classified by thin status, excluding juvenile forest.

Thin status	Ownership / Area		
	Total		
	1000 ha	($\alpha = 0.05$)	%
no thinning	166.93	(153.53 – 180.34)	69.3
respacing	0.01	(0.00 – 0.02)	0.003
first thinning	25.47	(19.43 – 31.51)	10.6
2nd thinning	11.90	(7.80 – 15.99)	4.9
subsequent thinning	36.57	(29.77 – 43.37)	15.2
Total	240.88	(226.20 – 255.57)	100.0

The total stocked forest estate classified by thin status and ownership (excluding 'Juvenile forest') is presented in Table 4 and Figure 2. In total there is 24,590 ha of the Private (grant aid) estate at a development stage where a thinning could have

occurred. However 87% of this area has not been thinned. Two-thirds (66.4% or 111,308 ha) of the public estate is at a development stage where a thinning could have taken place, but has not for some unknown reasons.

Table 4. Total stocked forest estate classified by thin status and ownership, excluding juvenile forest.

Thin status	Ownership / Area								
	public			private (grant aid)			private (other)		
	1000 ha	($\alpha = 0.05$)	%	1000 ha	($\alpha = 0.05$)	%	1000 ha	($\alpha = 0.05$)	%
no thinning	111.38	(99.73 – 123.02)	66.4	21.38	(15.89 – 26.86)	86.9	34.18	(27.37 – 40.99)	70.7
respacing	–	–	–	–	–	–	0.01	(0.00 – 0.02)	0.02
first thinning	19.53	(14.21 – 24.85)	11.6	3.19	(0.98 – 5.39)	13.0	2.75	(0.76 – 4.74)	5.7
2nd thinning	10.47	(6.61 – 14.33)	6.2	–	–	–	1.42	(0.02 – 2.83)	2.9
subsequent thinning	26.51	(20.58 – 32.43)	15.8	0.03	(0.00 – 0.08)	0.1	10.04	(6.40 – 13.68)	20.7
Total	167.88	(154.34 – 181.43)	100.0	24.59	(18.71 – 30.48)	100.0	48.40	(40.40 – 56.41)	100.0

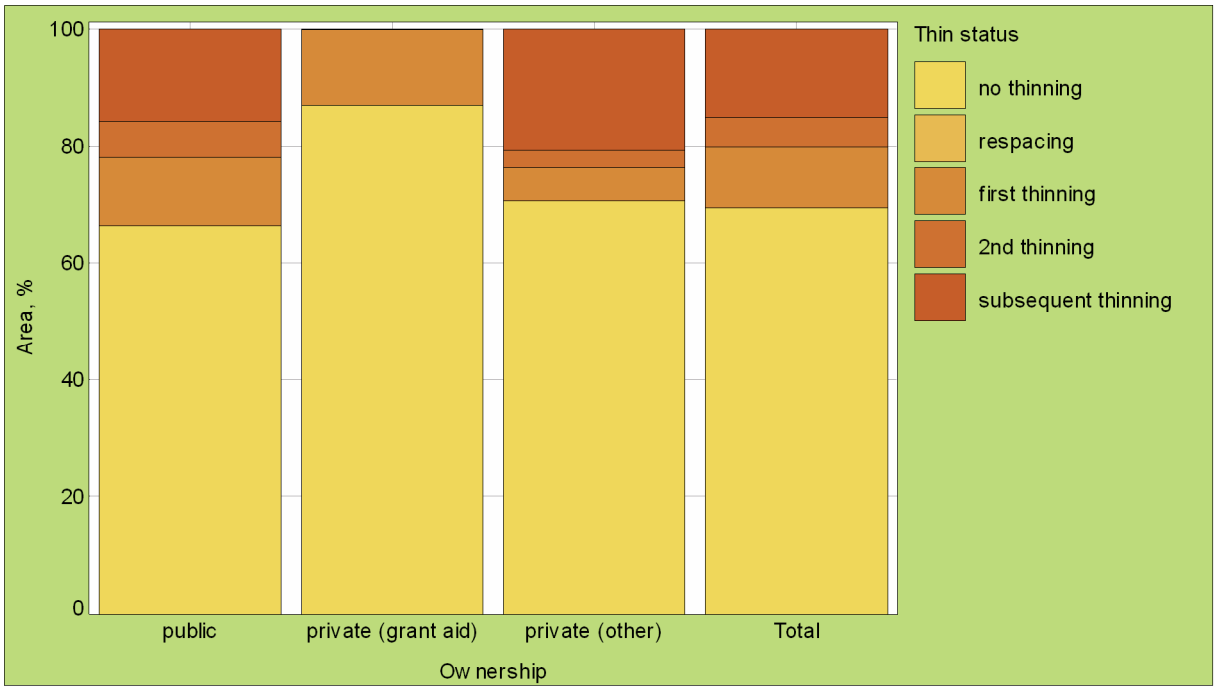

Figure 2. Total stocked forest estate classified by thin status and ownership, excluding juvenile forest.