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Ireland's National Forest Inventory 2017

Results



Ireland's National Forest Inventory 2017 – Results

Covering the National Forest Inventory, 2015 to 2017

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Spatial Data

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ABSTRACT

The 2006 National Forest Inventory (NFI) was the first statistical and multi-resource inventory carried out on the national forest estate. In order to assess changes in the forest estate over time repeated assessments are required. The second NFI was completed in 2012 and the third in 2017. On all occasions multi-resource information was recorded including information on forest area and species composition, growing stock volume (m³), biodiversity, health, and carbon content; for the entire national forest estate. The repeated NFI cycles have provided results on aspects such as forest area change, volume increment and latest felling volume estimates. This facilitates the assessment of changes in the state of Ireland's forests over time.

The national forest estate is still expanding and has now reached 11% of the total land area, with a wide variety of forest types present. The total forest area has increased from 697,842 ha in 2006 to 770,020 ha in 2017. Between 2013 and 2017 the forest area has increased by 38,368 ha as a result of afforestation and the identification of pre-existing forests for the first time during the third NFI cycle.

Over half (50.8%) of forests are in public ownership and 378,663 ha (49.2%) are in private ownership. The share of private forests in the national forest estate has increased by over 6% since 2006. Leitrim is the county with the highest percentage of forest cover (18.9%), while Cork has the largest forest area (90,020 ha).

Conifer species are the dominant species present, type representing 71.2% of the stocked forest area while broadleaved species accounted for 28.7% of the area. The share of broadleaf species in the forest estate has increased by 3% between 2013 and 2017. Nearly half (44.9%) of the stocked forest estate is less than 20 years of age, consisting of over half (59.4%) the private (grant aided) and 40.1% of the public estate.

The total growing stock of Irish forests is estimated to be over 116 million m³, an increase of over 19 million m³ on 2012. Growing stock volume increased by over half in the Private (grant aided) forests over this same time period. The private forests share of the total growing stock volume has increased from 38% in 2012 to 44% in 2017. The total growing stock volume consists mostly of spruce and pine species however there is a significant quantity of growing stock present in older broadleaf forests.

The balance between gross increment and fellings is an important indicator of SFM in a country as it describes the sustainability of wood production over time, the current availability of wood and the potential for the future. Gross annual volume increment between 2013 and 2017 was 8.5 million m³ per year. The mean annual standing volume felled within this period was 4.9 million m³ per year, a significant increase over the period 2006-2012 when mean annual volume felled was 3.6 million m³. Over half (58%) of the gross annual increment was felled between 2013 and 2017.

The majority of forests (84.8%) had no felling intervention between the second and third inventory cycles. Nearly half (45.7%) of forests were described as juvenile (i.e. at a maturity stage where they could not be thinned) and a further 12.7% were also deemed not suitable for thinning as it was classified as semi-natural or low stocking. A quarter (25.1%) of forests were categorised as "no thin", which in theory is defined by the forest maturity stage where it could be thinned but had not been thinned due to a variety of factors such as high windthrow risk, economic factors, owner intentions or thinning may be imminent. Apart from the limiting factors described, these "no thin" forests generally offer the best existing potential for thinning.

A picture emerges of much greater utilisation of the forest resource in the third NFI with nearly 63,000ha of forests thinned since 2013, of which 36,450 ha were thinned for the first time. Substantial mobilisation has arisen in Private (grant aided) forests, with 25,000ha of thinning interventions occurring in this cohort since 2013. The area of thinned forests in the Private (grant aided) forests was 16,410ha in 2012; while in 2017 the thinned area was 33,610ha.

The NFI results indicate that the national forest estate is an important and expanding sink for carbon, at 312 million tonnes. Based on the NFI data, Ireland's forests have removed (sequestered) 2.8 to 4.8 Mt of carbon dioxide equivalents per year from the atmosphere over the period 2006 to 2016. This carbon resource has proven to be of pivotal significance in Ireland achieving its Kyoto target under the first commitment period of 2008-2012.

There is an important biodiversity resource within Irish forests, with many non-tree plant species and lichens frequent across the forest estate. Nearly half (49.3%) of the forest area has vegetation coverage of greater than 90%. There are significant proportions of open areas and areas with natural regeneration present, the latter particularly so in the older private forest estate. Nearly three quarters (74.1%) of Ireland's forests have two or more tree species present. Large quantities of deadwood are present within the forest, with over 10.4 million m³ of deadwood present. There are a number of environmental designations that affect forest management but do not necessarily restrict all forest operations. Half of the forest area (50.4%) had one or more environmental designation, this figure is largely unchanged since 2012.

Overall, the forest estate appears healthy. While nearly half (44.1%) of stocked forest areas displayed signs of forest damage present, the severity of the damage was low. Abiotic damage was recorded on 19.9% of the forest area and biotic damage was recorded on 16.1% of the forest area. Both abiotic damage and biotic damage was recorded on 8.1% of the forest area. Damage caused by animals (e.g. browsing by deer) was the most common type of biotic damage, followed by vegetation and harvesting operations. In terms of abiotic damage, climatic factors (e.g. windthrow) were the most common type of damage, followed by nutrient deficiency and anthropogenic factors.

Over the last 40 years, fewer forests are being afforested on peatland. The proportion of minerotrophic peat being afforested has remained relatively static overtime, largely as a result of the afforestation of land that was reclaimed for agriculture. Afforestation of ombrotrophic peat is declining, reflecting a shift away from the unenclosed land type.

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CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

1.1.1 Background

Soon after the formation of the Irish State forest cover in Ireland had fallen to its lowest level in recorded history; in 1928 just 89,000 hectares (ha) or circa 1% of the national land area was under forest cover. During the first 85 years of the 20th century, afforestation in Ireland was almost exclusively the responsibility of the State, and by 1985 forest cover had increased to approximately 411,000ha. The mid 1980s saw a significant increase in private forest development, with the introduction of EU-funded grant schemes aimed at encouraging private land owners, mainly farmers, to become involved in forestry. As a result, the area of the national forest estate has now increased to approximately 731,000ha. Of this, circa 51% is in public ownership and 49% in private ownership.

Despite this increase in the amount of forest cover the State did not have comprehensive inventory information of the entire national forest estate until 2007. This previous lack of information on the composition of our forests, in relation to species, timber volumes, increment and biodiversity, had been an impediment to the sustainable management and utilisation of the national forest resource.

1.1.2 Description

The purpose of the National Forest Inventory (NFI) is to record and assess the extent and nature of Ireland's forests, both public and private, in a timely, accurate and reproducible manner to enable the sustainable development of our forest resource. Reliable, current and consistent information is required to inform domestic forest policy, to support forest research and fulfil national and international reporting commitments.

The undertaking of a NFI arose from a strategic action in the 1996 'Growing for the Future' (Anon. 1996) policy document for the development of the forest industry in Ireland. Data from the NFI is used to estimate carbon stocks through the calculation of forest biomass figures in Irish forests and greenhouse gas emissions associated with land-use change. The NFI was also initiated in response to demands for multi-resource information about Ireland's forests from international and national bodies such as the Food and Agricultural Organisation/Economic Commission for Europe (FAO/ECE).

Between 2004 and 2006 the Forest Service carried out the first NFI of Ireland's forests, with results published in 2007. The 2006 NFI was the first purely statistical forest inventory undertaken in Ireland providing an assessment of growing stock in both the public and private national forest estates. In addition the 2006 NFI was the first multi-resource inventory of the national forest estate.

In order to assess changes in the state of Ireland's forests over time, Ireland's NFI was designed using permanent sample plots which facilitated repeat measurement programmes. This robust reporting strategy was adopted to provide credible information to address strategic objectives and reporting commitments (Figure 1). The fieldwork for the second cycle of the NFI began in 2009 and was completed in 2012. The third NFI began in 2015 and was completed in 2017.

The underlying technology used in the NFI consisted of an integrated system of hardware and software (Field-Map™) developed by the Institute of Forest Ecosystem Research Ltd. (IFER), Czech Republic. It allowed for the preparation of a NFI database, background maps, and plot generation. This in turn allowed for the creation of projects for field teams, which facilitated the field data collection process.



Figure 1. NFI international reporting obligations.

In terms of design the NFI involved a detailed survey of permanent forest sample plots based on a randomised systematic grid sample design. A grid density of 2km x 2km provided sufficient forest plots to achieve a national estimate of volume with a precision of $\pm 5\%$, at the 95% confidence level. This grid density equated to 17,423 points nationally, each representing approximately 400 hectares (ha). Each circular NFI sample plot measures 25.24 metres (m) in diameter, comprising 500 m², and is permanent in nature to allow future re-sampling as required. Within each sample plot a variety of primary attributes were assessed, from the tree top to the soil underneath. For example, information was collected on: tree growth and development, the diversity of plant species and soil type.

To carry out the data collection work, the Forest Service recruited professional foresters, with six foresters working in the field at any one time. In total, 1,827 forest plots were assessed throughout the country in the 2012 NFI. Due to the expansion of the forest estate, additional plots were assessed in the 2017 NFI; bringing the total number of NFI plots to 1,923, with the number of plots in each county being relative to the size of the county and the level of forest cover. Training, field team support, validation and other quality control procedures were undertaken by two staff to ensure data quality and the smooth running of field operations.

Following the completion of the field data collection and primary data pre-processing, data analyses were carried out. During data pre-processing, the validity of the data was checked and data values were amended where necessary. Secondary variables, such as volume increment, were also calculated. Data analysis involved the production of statistics which describe components of the national forest estate, e.g. volume of standing deadwood per hectare by ownership. Data analysis and results generation were undertaken by the Forestry Inspectorate, in close collaboration with the IFER, and completed in 2017.

1.2 TECHNOLOGY FOR DATA PROCESSING

The Field-Map™ system was designed for the whole NFI process, starting with the preparation of the data collection database, through to the field data collection and on to comprehensive data processing.

The data collected in the field was stored directly into a field computer. During the field data collection the data were automatically checked and verified. Thus, the field data could be processed without any intermediate steps. All the data processing was done using the original field database without conversion. During the data processing the secondary attributes were added to the database (e.g. tree volume), but the database retained its original format which can easily be used for the next cycle of a repeat inventory.

A comprehensive set of data processing procedures, i.e. calculation of secondary attributes and statistical data processing, is incorporated in the Field-Map Inventory Analyst software. The software facilitates the step-by-step calculation of secondary attributes. The statistical data processing tasks are formulated and readily implemented.

1.3 PRESENTATION OF RESULTS

In this document, the main results from the third NFI are presented. Statistical outputs that describe aspects of the national forest estate are included. Forest attributes (e.g. ownership) are used to classify evaluated variables (e.g. area) through the calculation of statistics (e.g. totals and/or means).

The analysis software (Field-Map Inventory Analyst) produces standardised tables and charts for reporting purposes (Figure 2). As errors are associated with all forms of sampling, most tables detail the calculated statistics with associated confidence intervals ($\alpha=0.05$). The confidence interval quantifies the uncertainty in measurement by specifying the range of values within which the true value for the whole population lies. As a 95% confidence interval is used for the NFI analysis, there is a 95% probability that the true value for the population lies within the range of values. Only sampling error is included in the confidence interval; modelling errors (e.g. volume estimation) and measurement errors (e.g. Dbh data) are not incorporated in the confidence intervals. Sub-totals are provided where a variable is classified by more than one attribute. The proportion of the variable in each classifier class is also included. Interpretation of the results is aided by the use of charts and graphs.

The analysis of thirteen thematic areas are presented in a separate chapter, which includes a range of statistical outputs. For each statistical output, the attributes used for classification are defined. A brief methodology, which describes how the analysis was carried out, is also included with each analysis. The variables are commonly classified by ownership and by county. The thirteen thematic areas are:

- | | |
|--|----------------------------|
| 1. Area | 7. Felling |
| 2. Forest Structure | 8. Increment |
| 3. Species | 9. Deadwood |
| 4. Age | 10. Carbon |
| 5. Forest Attributes: Dbh, Height and Basal area | 11. Health and vitality |
| 6. Growing stock volume | 12. Vegetation and lichens |
| | 13. Site |

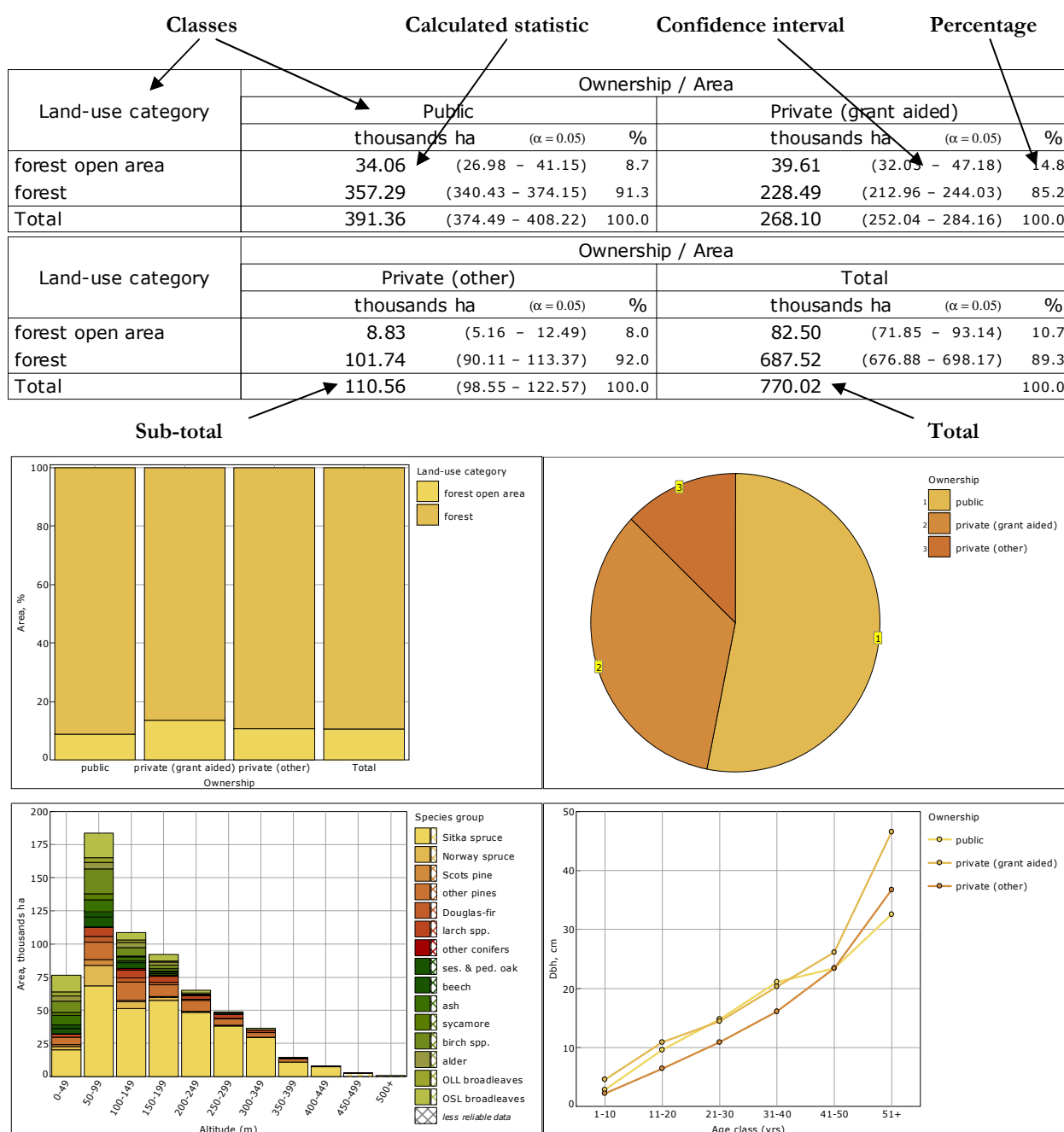


Figure 2. Example of standardised outputs.

1.4 INTERPRETATION OF RESULTS

The following sub-sections provide guidelines to be used for results interpretation.

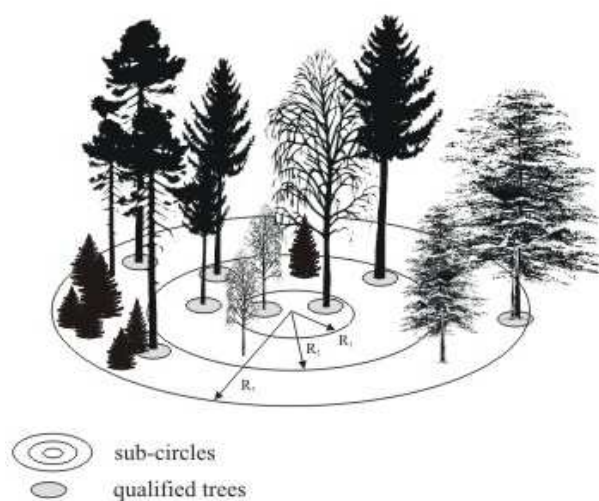
1.4.1 Species Composition

Careful consideration is needed in the interpretation of stocked areas of individual species presented, since many forests contain an intimate mixture of tree species. The total stocked area of a given species therefore does not represent distinct areas of land covered by pure stands of the species, but represent the sum of shares of areas of mixed forest apportioned to it.

Since the NFI used concentric circles not all trees present on the plot were assessed (Figure 3). Tree data on the inner sub-circles is expanded over the entire plot by weighting individual tree data by the respective

concentric circle size. This expansion assumes that what is observed in the inner sub-circles for smaller Dbh trees, can be replicated over the whole plot.

In order to enable area related calculations, such as the determination of species composition, a procedure for the calculation of the so-called representative area of a tree is used. The area of each inventory plot was distributed among the trees proportionate to their size. Larger trees were allocated larger areas. The sum of all the individual tree representative areas within the plot is equal to the total plot area of 0.05ha. These tree representative areas are used to scale up from plot to national species composition estimates.



	R_1	R_2	R_3
Sub-circle radius (m)	4	7	12.62
Sub-circle area (m ²)	50	153.9	500
Threshold Dbh (mm)	70	120	200

Figure 3. NFI plot design.

1.4.2 Forest Area

Forest area statistics are presented in three different ways in the results. As it is not possible to collect the same level of information on every plot (e.g. species) the total forest area is not always presented. For example, Forest Open Area plots will have no trees present, resulting in no species composition data for this plot. As a result there are three main types of forest area presented in the NFI (Figure 4):

1. Total Forest Area, 770,020 ha
Encompasses all forest land. Data collected at a plot level, such as altitude, can be presented.
2. Forest area, 687,525 ha
Excludes Forest Open Area. Data collected at a plot level, such as forest type, can be presented.
3. Stocked forest area, 673,112 ha
Excludes Forest Open Area and temporarily unstocked areas. Data that has been collected at tree level, such as species, can only be specified according to the stocked forest area.

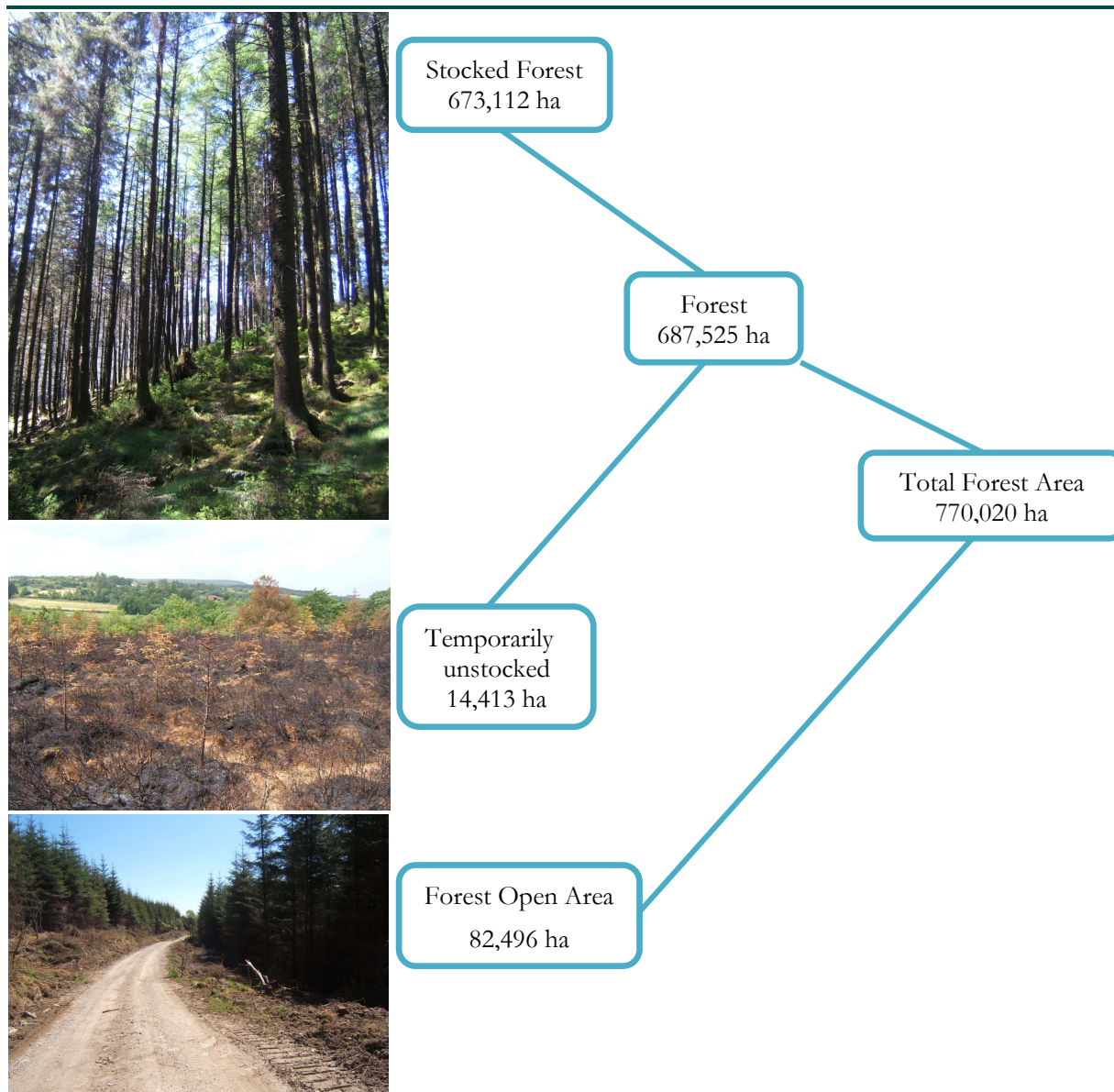


Figure 4. Forest area (ha) types reported in the NFI.

1.4.3 Accuracy of Results

The confidence interval quantifies the uncertainty in measurement by specifying the range of values within which the true value for the whole population lies. High levels of uncertainty may occur as a result of certain attributes occurring less frequently and level of classification. Particular care should be taken if the confidence interval includes zero or if the confidence interval has not been calculated. In both instances high levels of uncertainty exist around the generated statistic. Where the confidence interval has not been calculated it is indicated in the table using two hyphens and in the chart using hatched lines (Figure 5).

The frequency of which certain attributes occur in the forest varies. Attributes that occur less frequently tend to have poorer levels of accuracy. The problem can be exacerbated through classification. Classification by small geographic areas, results in higher error margins for those small counties. For example the mean annual volume increment per ha for Co. Dublin is $15.9\text{m}^3 \pm 8.9\text{m}^3$, while the figure for Co. Cork is $13.4\text{m}^3 \pm 1.8\text{m}^3$. As Co. Dublin has a much smaller area of forest than Co. Cork, far fewer sample plots contribute to the result for Co. Dublin. In turn fewer plots result in a larger error margin.

Assessment of the NFI results should always be done in conjunction with the evaluation of the confidence interval presented with the statistic, which indicates the reliability of the results.

Species group	Ownership / Annual height increment			
	public	private (grant aided)	private (other)	All
	m (α=0.05)	m (α=0.05)	m (α=0.05)	m (α=0.05)
Sitka spruce	0.54 (0.52 – 0.56)	0.69 (0.66 – 0.73)	0.42 (0.36 – 0.47)	0.59 (0.57 – 0.61)
Norway spruce	0.37 (0.33 – 0.41)	0.68 (0.65 – 0.72)	0.38 (0.12 – 0.64)	0.51 (0.42 – 0.60)
Scots pine	0.25 (0.21 – 0.30)	0.40 (0.31 – 0.49)	0.15 (0.11 – 0.18)	0.22 (0.17 – 0.27)
other pines	0.38 (0.00 – 0.88)	0.50 (0.40 – 0.60)	0.23 (0.00 – 0.46)	0.40 (0.00 – 0.89)
Douglas-fir	0.36 (0.32 – 0.40)	0.54 – –	0.44 (0.00 – 1.26)	0.41 (0.36 – 0.45)
larch spp.	0.56 (0.48 – 0.65)	0.79 (0.55 – 1.03)	0.08 (0.00 – 0.20)	0.58 (0.44 – 0.72)
other conifers	0.35 (0.00 – 0.72)	0.35 – –	0.31 (0.00 – 0.81)	0.32 (0.20 – 0.44)
ses. & ped. oak	0.17 (0.12 – 0.22)	0.28 – –	0.14 (0.00 – 0.28)	0.18 (0.14 – 0.23)
beech	0.25 (0.10 – 0.41)	– – –	0.24 (0.17 – 0.32)	0.24 (0.18 – 0.30)
ash	0.22 (0.09 – 0.36)	0.56 (0.52 – 0.60)	0.18 (0.14 – 0.22)	0.24 (0.19 – 0.30)
sycamore	0.21 (0.14 – 0.27)	0.70 – –	0.18 (0.09 – 0.27)	0.22 (0.16 – 0.28)
birch spp.	0.22 (0.16 – 0.28)	0.52 (0.00 – 1.29)	0.16 (0.11 – 0.22)	0.20 (0.17 – 0.24)
alder	0.25 (0.18 – 0.32)	0.35 (0.22 – 0.48)	0.15 (0.11 – 0.19)	0.19 (0.16 – 0.23)
OLL broadleaves	0.12 (0.06 – 0.18)	0.08 – –	0.14 (0.09 – 0.20)	0.14 (0.10 – 0.19)
OSL broadleaves	0.10 (0.06 – 0.14)	0.13 (0.00 – 0.42)	0.10 (0.06 – 0.14)	0.11 (0.08 – 0.13)
All	0.44 (0.42 – 0.46)	0.66 (0.61 – 0.70)	0.20 (0.16 – 0.24)	0.45 (0.44 – 0.47)

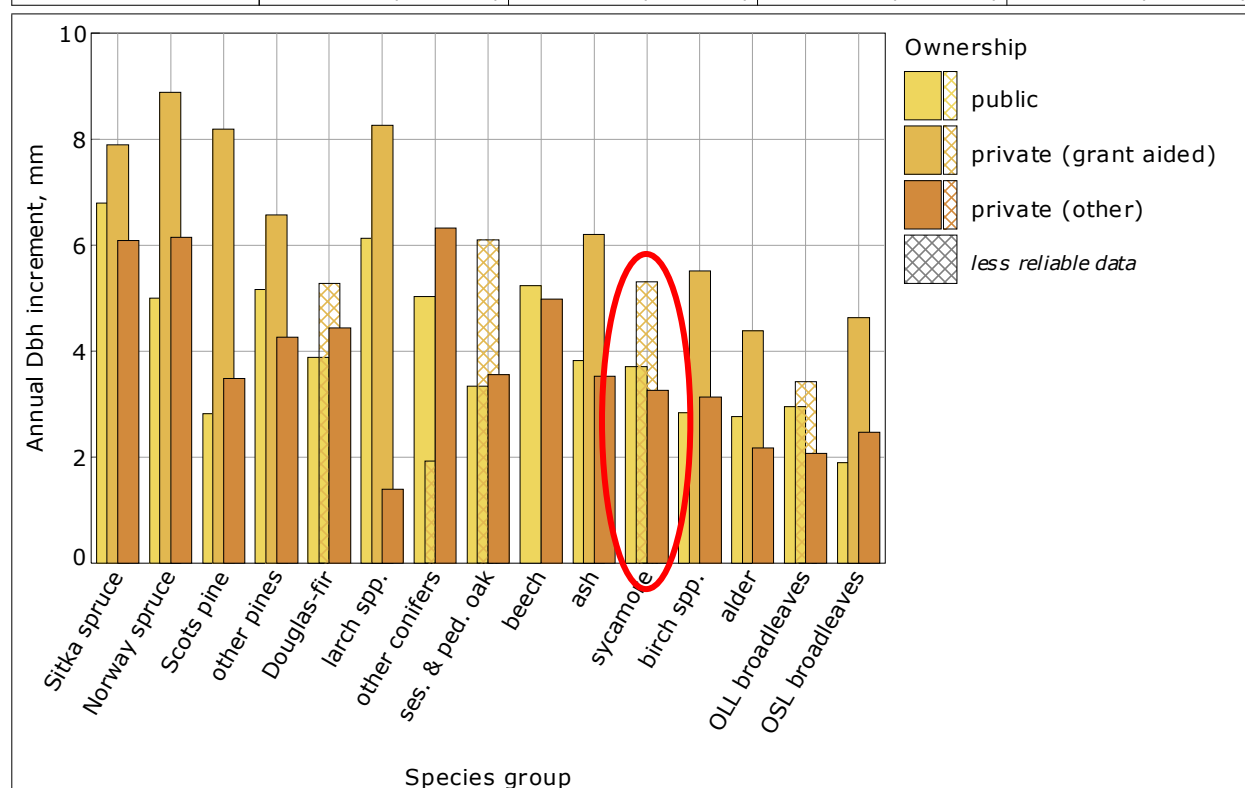


Figure 5. Statistics reported in the NFI, with associated confidence intervals.

1.5 OTHER NFI PUBLICATIONS

To gain a full understanding of the results presented in this document, the *Ireland's National Forest Inventory 2017 - Field Procedures and Methodology* document should be reviewed first, and should also be referred to during the course of the interpretation of this Results document. A summary of this results report is also available, namely: *Ireland's National Forest Inventory 2017 - NFI Main Findings*.

All documents are available for download at: <http://www.agriculture.gov.ie/nfi/>.

CHAPTER 2

AREA

The area of forest in Ireland in 2017 was 770,020ha or 11% of the land area excluding inland water bodies. Since 2012, forest area has increased by 38,368ha as a result of afforestation and the identification of pre-existing forests. In 2015 a combination of aerial photo interpretation & forest dataset intersection was carried out on all 17,423 grid points covering the land base of the country. The aerial photos used were of much higher resolution than those in previous NFI's, enabling identification of pre-existing forests for the first time in this third NFI cycle. Other land-use types were also recorded, allowing for trend analysis in land usage between three points in time. In terms of tree cover; Other Wooded Land (OWL) has increased from 47,681ha to 65,738ha and the area of hedgerows has also increased from 271,912ha to 281,952ha. The increase in both these areas resulted from the removal of the "scrub" category from the classification in 2017. The adoption of the OWL definition of the Food and Agriculture Organization (FAO) negated the need to have a separate "scrub" category. The total forest area has increased from 731,652ha to 770,020ha.

In terms of forest cover as a proportion of the total county land area, Co. Leitrim has the highest forest cover at 18.9%. Counties with the highest proportion of national forest area are primarily distributed along the western and south-western seaboard, with Co. Cork having the highest forest cover area at 90,020ha or 11.6% of the national forest estate.

Forest Open Areas (e.g. firebreaks) are integral to the forest and constitute 10.7% of the total forest area. The Private (grant aided) estate has 14.8% Forest Open Area, compared to 8.7% in the Public forest. As the majority of the private estate has yet to be roaded, the Forest Open Area differential between the two ownership types will increase over time.

Forest ownership specifies land ownership. Just over half (50.8%) of forests are in public ownership while 378,663ha (49.2%) are in private ownership. The share of private forests in the national forest estate has increased by 6.2% since 2006.

Since 2012, an additional 45,210ha of forest has been assessed. The majority (52% or 23,640ha) of this area is composed of forests missed in the last cycle due to much higher resolution aerial photos coming onstream in the interim. Of the remainder 17,160ha or 38% was land afforested in the interim since the last cycle and 4,400ha or 9.7% included afforested lands missed in the last NFI.

In the 2017 NFI, 6,432ha of forest area that was assessed in the 2012 NFI were no longer present. The primary cause of this reduction was deforestation, amounting to 4,832ha. It is important to state that the confidence interval on the estimate is wide (2,100ha – 7,564ha), ultimately reflecting the small sample size contributing to the estimate and resultant low accuracy of the estimate.

2.1 TOTAL AREA

The NFI is initially based on an aerial photography assessment of the entire land area, which is used to guide field sampling. An overview of the land classification system is presented in Figure 6 below.

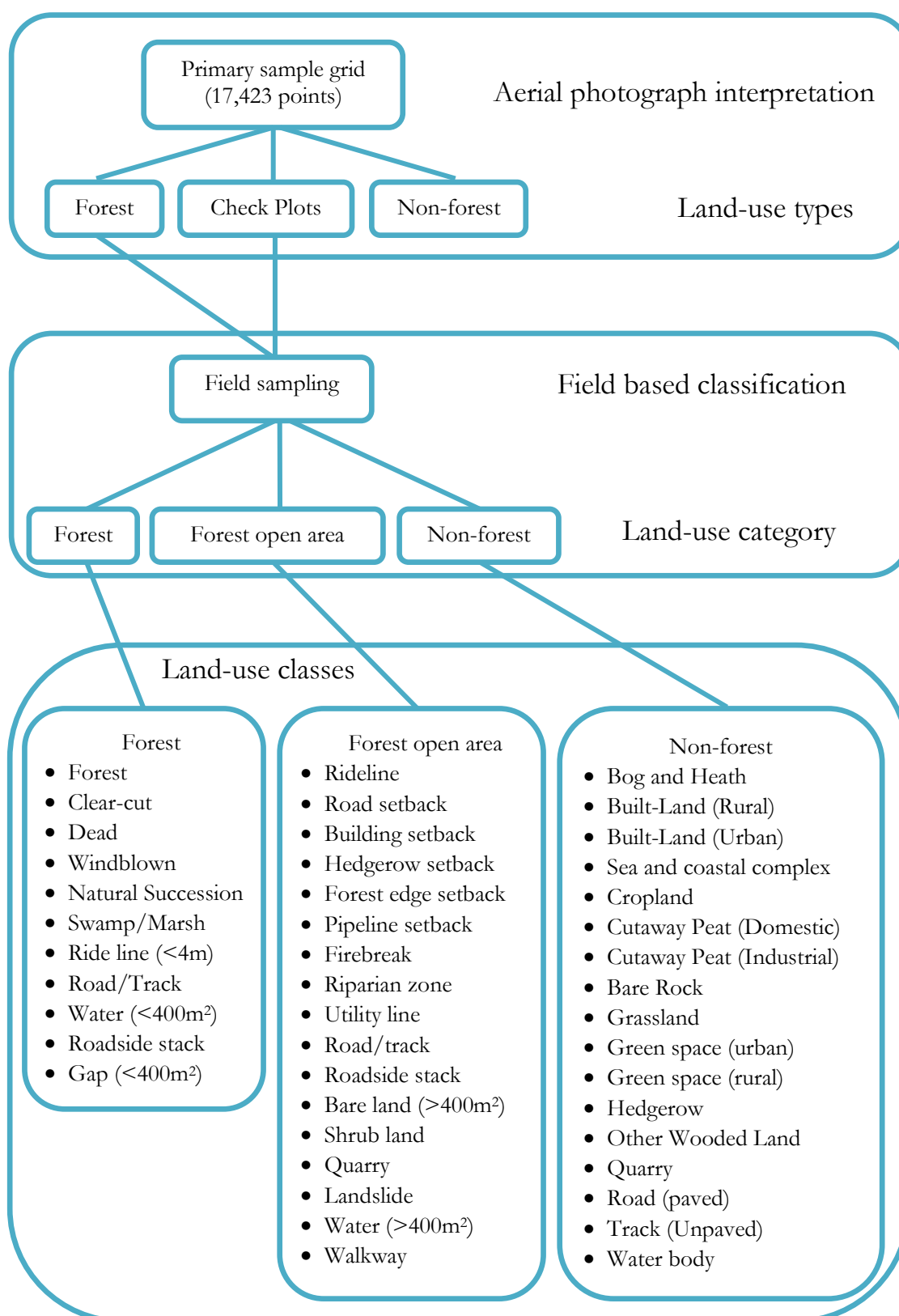


Figure 6. NFI land classification overview.

2.1.1 Total area of Ireland by land-use type summary

Definition
Forest Land with a minimum area of 0.1ha, a minimum width of 20m, trees higher than 5m and a canopy cover of more than 20% within the forest boundary, or trees able to reach these thresholds <i>in situ</i> .

Methodology
The entire land base of Ireland is represented by 17,423 NFI plots, each one representing approximately 400ha. Land-use types were assigned to each NFI plot during an aerial photography interpretation exercise using sub-metre resolution colour aerial photographs that were obtained in 2012. Plots identified as forest from the aerial photos became the focus of the ground survey. This land-use classification is very important as it forms the basis by which future land-use change may be monitored. Higher quality aerial photos became available from 2012 onwards which enabled the identification of previously unrecorded pre-existing forests for the first time in this third cycle NFI. The total area of Ireland classified by land-use class is summarised into the Forest and Non-Forest categories.

Land-use type	Area		
	thousands ha	($\alpha = 0.05$)	%
Forest	770.02	(737.72 – 802.32)	11.0
Non-forest	6,206.09	(6,173.79 – 6,238.39)	89.0
Total	6,976.11		100.0

2.1.2 Total area of Ireland by land-use type

Definition
Land-use type Categorises land-use into one of 18 classes.

Methodology
The total area of Ireland classified by land-use type.
In the third cycle the “scrub” category was removed from the classification. The adoption of the Other Wooded Land definition of the Food and Agriculture Organization (FAO) negated the need to have a separate “scrub” category.
The aerial photography used in the land-use type assessment was captured between 2011 and 2013. Therefore the land-use information presented below refers to this time-span.

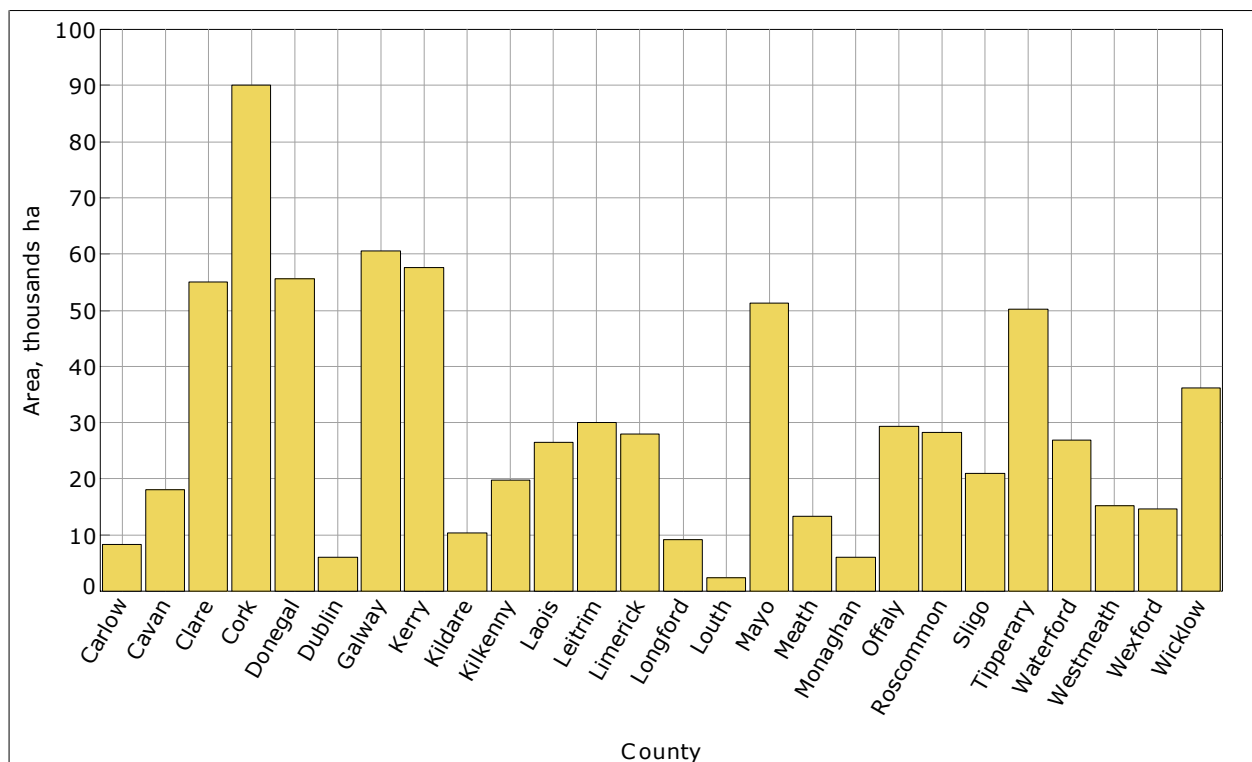
Land-use type	Area		
	thousands ha	($\alpha = 0.05$)	%
Forest	770.02	(737.72 – 802.32)	11.0
Hedgerow	281.95	(261.58 – 302.32)	4.0
Other Wooded Land	65.74	(55.73 – 75.75)	0.9
Grassland	3,592.26	(3,541.94 – 3,642.57)	51.5
Cropland	405.81	(382.79 – 428.83)	5.8
Bog and Heath	985.18	(951.68 – 1,018.68)	14.1
Cutaway Peat (Domestic)	97.76	(85.64 – 109.87)	1.4
Cutaway Peat (Industrial)	63.30	(53.69 – 72.90)	0.9
Bare Rock	74.48	(63.93 – 85.04)	1.1
Quarry	12.03	(7.73 – 16.33)	0.2
Road (Paved)	96.90	(84.78 – 109.02)	1.4
Built Land (Rural)	139.24	(124.78 – 153.71)	2.0
Built Land (Urban)	71.72	(61.60 – 81.83)	1.0
Green Space (Rural)	88.94	(77.32 – 100.56)	1.3
Green Space (Urban)	27.20	(20.80 – 33.60)	0.4
Track (Unpaved Road)	32.42	(25.38 – 39.46)	0.5
Water Body	146.37	(131.64 – 161.09)	2.1
Sea	24.80	(18.65 – 30.95)	0.4
Total	6,976.11		100.0

2.1.3 Total area of forest by county

Methodology

The total forest area in Ireland is classified by county.

County	Area		
	thousands ha	($\alpha = 0.05$)	%
Carlow	8.40	(4.97 – 11.83)	1.1
Cavan	18.03	(13.01 – 23.05)	2.3
Clare	55.11	(46.71 – 63.51)	7.2
Cork	90.02	(78.99 – 101.05)	11.6
Donegal	55.53	(46.78 – 64.29)	7.2
Dublin	6.01	(3.06 – 8.96)	0.8
Galway	60.60	(51.46 – 69.75)	7.9
Kerry	57.54	(48.76 – 66.32)	7.5
Kildare	10.40	(6.52 – 14.27)	1.4
Kilkenny	19.82	(14.54 – 25.11)	2.6
Laois	26.46	(20.58 – 32.34)	3.4
Leitrim	30.06	(23.97 – 36.16)	3.9
Limerick	27.93	(21.73 – 34.13)	3.6
Longford	9.16	(5.57 – 12.75)	1.2
Louth	2.43	(0.51 – 4.35)	0.3
Mayo	51.33	(42.85 – 59.80)	6.7
Meath	13.33	(8.91 – 17.74)	1.7
Monaghan	6.00	(3.03 – 8.97)	0.8
Offaly	29.33	(23.11 – 35.55)	3.8
Roscommon	28.31	(22.05 – 34.57)	3.7
Sligo	20.98	(15.66 – 26.30)	2.7
Tipperary	50.24	(42.00 – 58.48)	6.5
Waterford	26.95	(20.98 – 32.92)	3.5
Westmeath	15.16	(10.54 – 19.79)	2.0
Wexford	14.62	(10.05 – 19.19)	1.9
Wicklow	36.26	(29.47 – 43.06)	4.7
Total	770.02		100.0



2.1.4 Total county area by land-use type summary

Methodology

The total of each county is classified into Forest and Non-Forest.

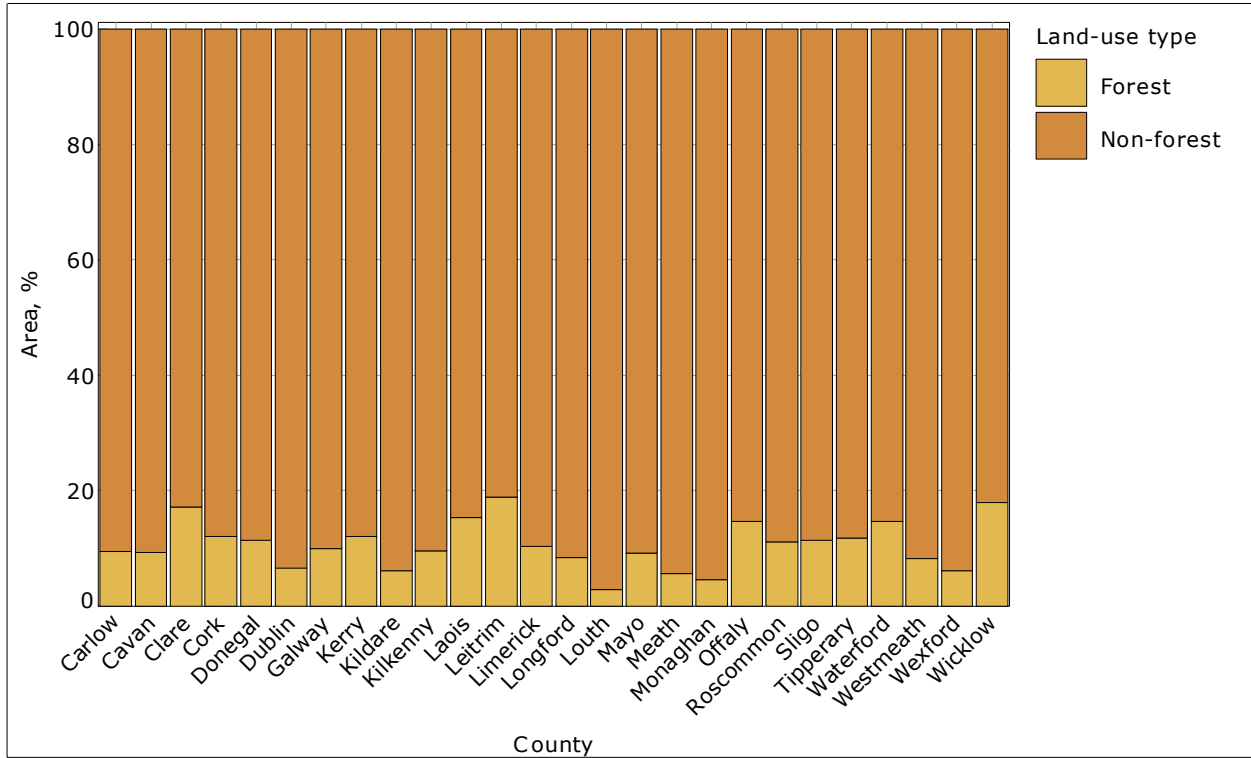
Land-use type	County / Area					
	Carlow			Cavan		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Forest	8.40	(4.97 - 11.83)	9.4	18.03	(13.01 - 23.05)	9.3
Non-forest	81.22	(77.80 - 84.65)	90.6	175.51	(170.49 - 180.53)	90.7
Total	89.63		100.0	193.54		100.0
Land-use type	County / Area					
	Clare			Cork		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Forest	55.11	(46.71 - 63.51)	17.2	90.02	(78.99 - 101.05)	12.1
Non-forest	264.67	(256.27 - 273.07)	82.8	656.55	(645.52 - 667.58)	87.9
Total	319.77		100.0	746.57		100.0
Land-use type	County / Area					
	Donegal			Dublin		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Forest	55.53	(46.78 - 64.29)	11.4	6.01	(3.06 - 8.96)	6.5
Non-forest	430.08	(421.33 - 438.84)	88.6	86.56	(83.61 - 89.50)	93.5
Total	485.62		100.0	92.57		100.0
Land-use type	County / Area					
	Galway			Kerry		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Forest	60.60	(51.46 - 69.75)	9.9	57.54	(48.76 - 66.32)	12.1
Non-forest	551.82	(542.68 - 560.97)	90.1	417.46	(408.68 - 426.24)	87.9
Total	612.43		100.0	475.00		100.0
Land-use type	County / Area					
	Kildare			Kilkenny		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Forest	10.40	(6.52 - 14.27)	6.1	19.82	(14.54 - 25.11)	9.6
Non-forest	159.14	(155.26 - 163.02)	93.9	186.51	(181.23 - 191.79)	90.4
Total	169.54		100.0	206.34		100.0
Land-use type	County / Area					
	Laois			Leitrim		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Forest	26.46	(20.58 - 32.34)	15.4	30.06	(23.97 - 36.16)	18.9
Non-forest	145.54	(139.66 - 151.42)	84.6	128.95	(122.85 - 135.04)	81.1
Total	172.00		100.0	159.01		100.0
Land-use type	County / Area					
	Limerick			Longford		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Forest	27.93	(21.73 - 34.13)	10.4	9.16	(5.57 - 12.75)	8.4
Non-forest	240.62	(234.43 - 246.82)	89.6	99.97	(96.38 - 103.56)	91.6
Total	268.56		100.0	109.13		100.0
Land-use type	County / Area					
	Louth			Mayo		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Forest	2.43	(0.51 - 4.35)	2.9	51.33	(42.85 - 59.80)	9.2
Non-forest	80.13	(78.21 - 82.05)	97.1	508.44	(499.96 - 516.91)	90.8
Total	82.56		100.0	559.76		100.0
Land-use type	County / Area					
	Meath			Monaghan		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Forest	13.33	(8.91 - 17.74)	5.7	6.00	(3.03 - 8.97)	4.6
Non-forest	220.88	(216.46 - 225.30)	94.3	123.55	(120.58 - 126.52)	95.4
Total	234.21		100.0	129.54		100.0

Land-use type	County / Area					
	Offaly			Roscommon		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Forest	29.33	(23.11 - 35.55)	14.7	28.31	(22.05 - 34.57)	11.1
Non-forest	170.77	(164.55 - 176.99)	85.3	226.49	(220.23 - 232.75)	88.9
Total	200.10		100.0	254.80		100.0

Land-use type	County / Area					
	Sligo			Tipperary		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Forest	20.98	(15.66 - 26.30)	11.4	50.24	(42.00 - 58.48)	11.8
Non-forest	162.69	(157.37 - 168.01)	88.6	375.21	(366.97 - 383.46)	88.2
Total	183.67		100.0	425.46		100.0

Land-use type	County / Area					
	Waterford			Westmeath		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Forest	26.95	(20.98 - 32.92)	14.7	15.16	(10.54 - 19.79)	8.2
Non-forest	156.86	(150.90 - 162.83)	85.3	168.79	(164.16 - 173.41)	91.8
Total	183.81		100.0	183.95		100.0

Land-use type	County / Area					
	Wexford			Wicklow		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Forest	14.62	(10.05 - 19.19)	6.2	36.26	(29.47 - 43.06)	17.9
Non-forest	221.27	(216.70 - 225.84)	93.8	166.40	(159.61 - 173.20)	82.1
Total	235.89		100.0	202.66		100.0



2.2 LAND-USE CLASS

2.2.1 Total forest area by land-use category

Definition

Land-use category

Classification of Forest land into Forest and Forest Open Area.

Definition

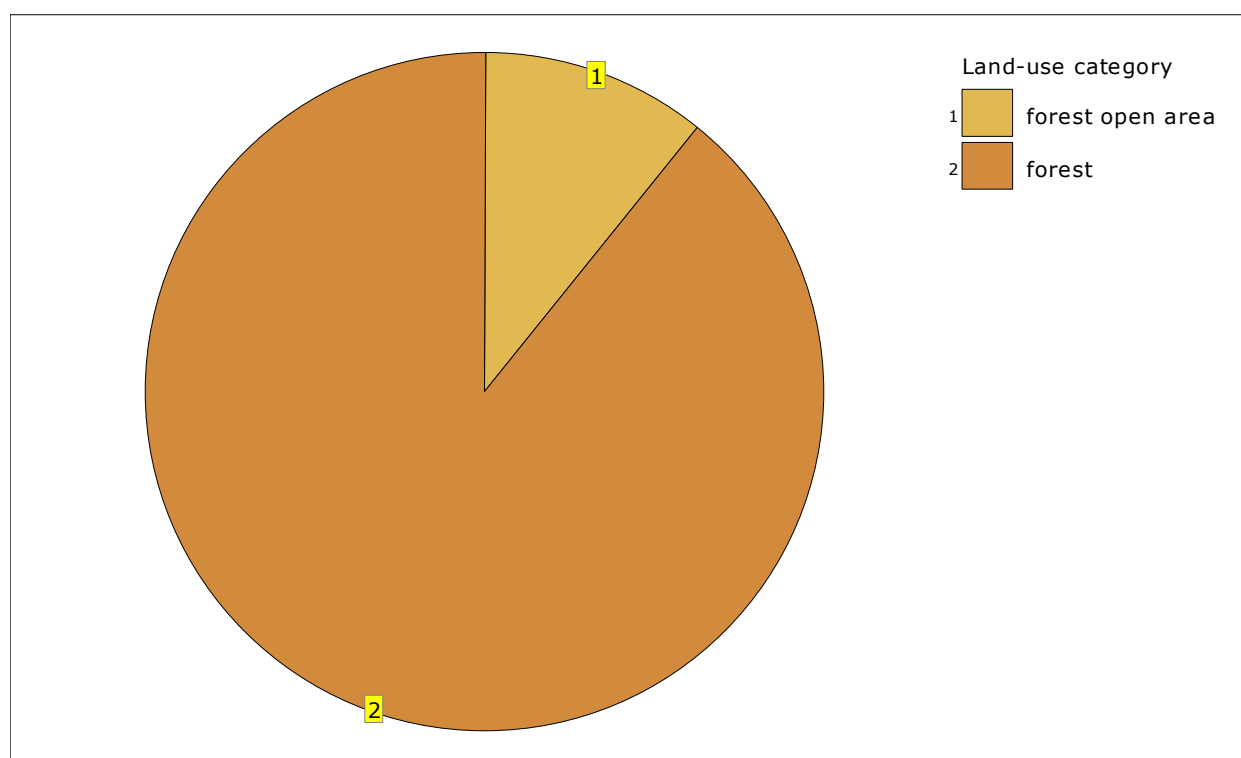
Forest Open Area

Forest Open Area is a non-stocked forest area ($>400\text{m}^2$) enclosed within the forest boundary. These areas are integral to the composition of Irish forests and can be readily verified by ground check e.g. firebreak or forest road.

Methodology

NFI plots classified as forest during an aerial photography interpretation exercise were verified by ground check and classified into land-use categories: Forest and Forest Open Area.

Land-use category	Area		
	thousands ha	($\alpha = 0.05$)	%
forest open area	82.50	(71.85 - 93.14)	10.7
forest	687.52	(676.88 - 698.17)	89.3
Total	770.02		100.0



2.2.2 Forest area by land-use class

Definition

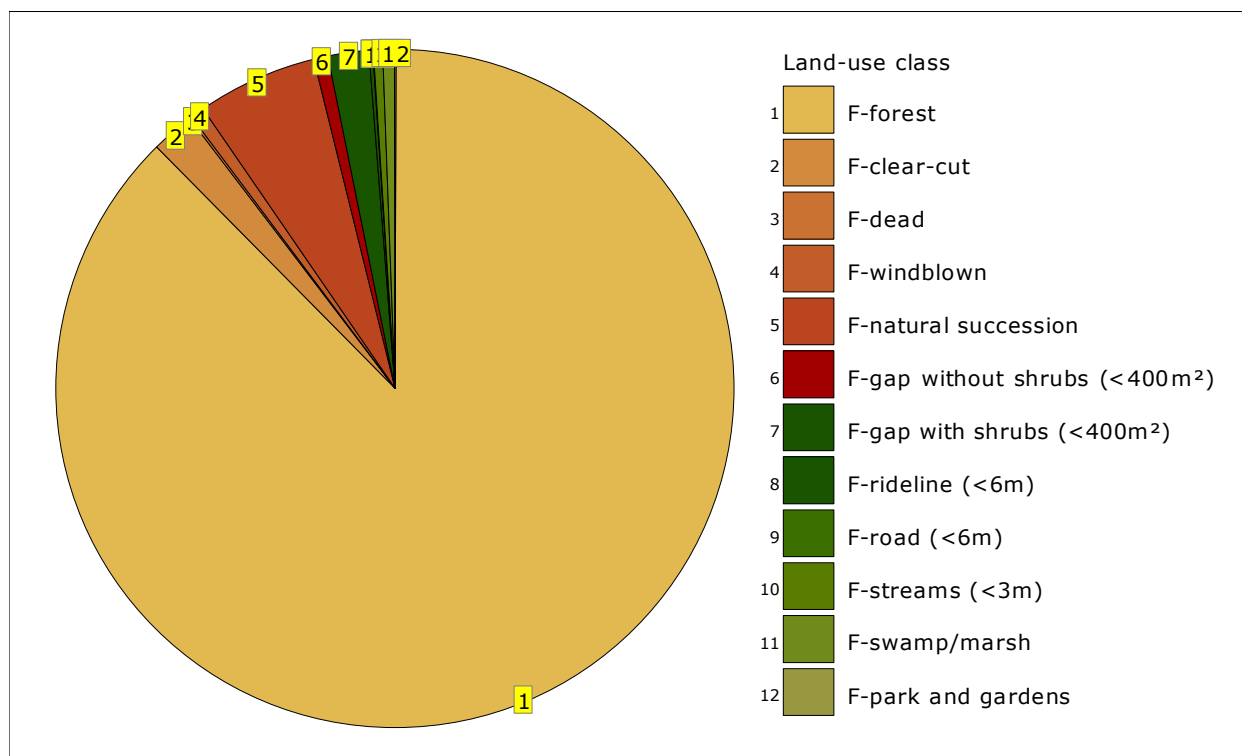
Land-use class

The sub-categorisation of the land-use categories Forest and Forest Open Area into classes that describe the forest estate in greater detail.

Methodology

The area in land-use category Forest is classified by land-use class.

Land-use class	Area		
	thousands ha	($\alpha = 0.05$)	%
F-forest	602.30	(591.70 – 612.90)	87.7
F-clear-cut	14.00	(9.41 – 18.59)	2.0
F-dead	0.80	(0.00 – 1.93)	0.1
F-windblown	4.40	(1.80 – 6.99)	0.6
F-natural succession	39.20	(31.76 – 46.64)	5.7
F-gap without shrubs (<400m ²)	4.81	(2.11 – 7.51)	0.7
F-gap with shrubs (<400m ²)	13.19	(8.76 – 17.62)	1.9
F-rideline (<6m)	1.20	(0.00 – 2.57)	0.2
F-road (<6m)	0.40	(0.00 – 1.19)	0.06
F-streams (<3m)	2.81	(0.74 – 4.88)	0.4
F-swamp/marsh	4.02	(1.56 – 6.48)	0.6
F-park and gardens	0.40	(0.00 – 1.26)	0.06
Total	687.52		100.0

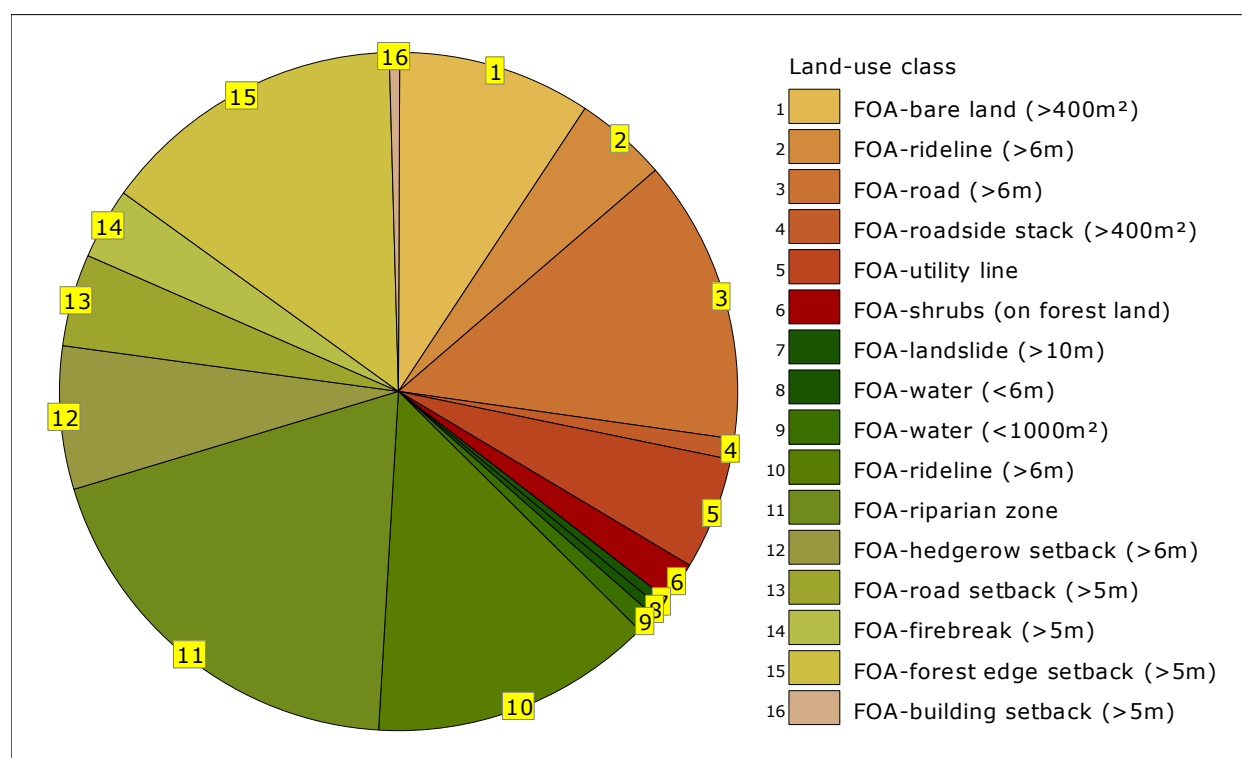


2.2.3 Total Forest Open Area by land-use class

Methodology

The total area in land-use category Forest Open Area (FOA) is classified by land-use class.

Land-use class	Area		
	thousands ha	($\alpha = 0.05$)	%
FOA-bare land (>400m ²)	7.61	(4.33 – 10.89)	9.2
FOA-rideline (>6m)	3.61	(1.31 – 5.92)	4.4
FOA-road (>6m)	11.22	(7.12 – 15.32)	13.6
FOA-roadside stack (>400m ²)	0.80	(0.00 – 2.01)	1.0
FOA-utility line	4.42	(1.79 – 7.04)	5.4
FOA-shrubs (on forest land)	1.61	(0.03 – 3.19)	2.0
FOA-landslide (>10m)	0.40	(0.00 – 1.30)	0.5
FOA-water (<6m)	0.40	(0.00 – 1.24)	0.5
FOA-water (<1000m ²)	0.80	(0.00 – 2.05)	1.0
FOA-rideline (>6m)	11.19	(7.39 – 14.98)	13.6
FOA-riparian zone	16.03	(11.63 – 20.43)	19.1
FOA-hedgerow setback (>6m)	5.60	(2.71 – 8.50)	6.8
FOA-road setback (>5m)	3.60	(1.23 – 5.98)	4.4
FOA-firebreak (>5m)	2.80	(0.72 – 4.88)	3.4
FOA-forest edge setback (>5m)	12.00	(8.04 – 15.97)	14.6
FOA-building setback (>5m)	0.40	(0.00 – 1.30)	0.5
Total	82.50		100.0



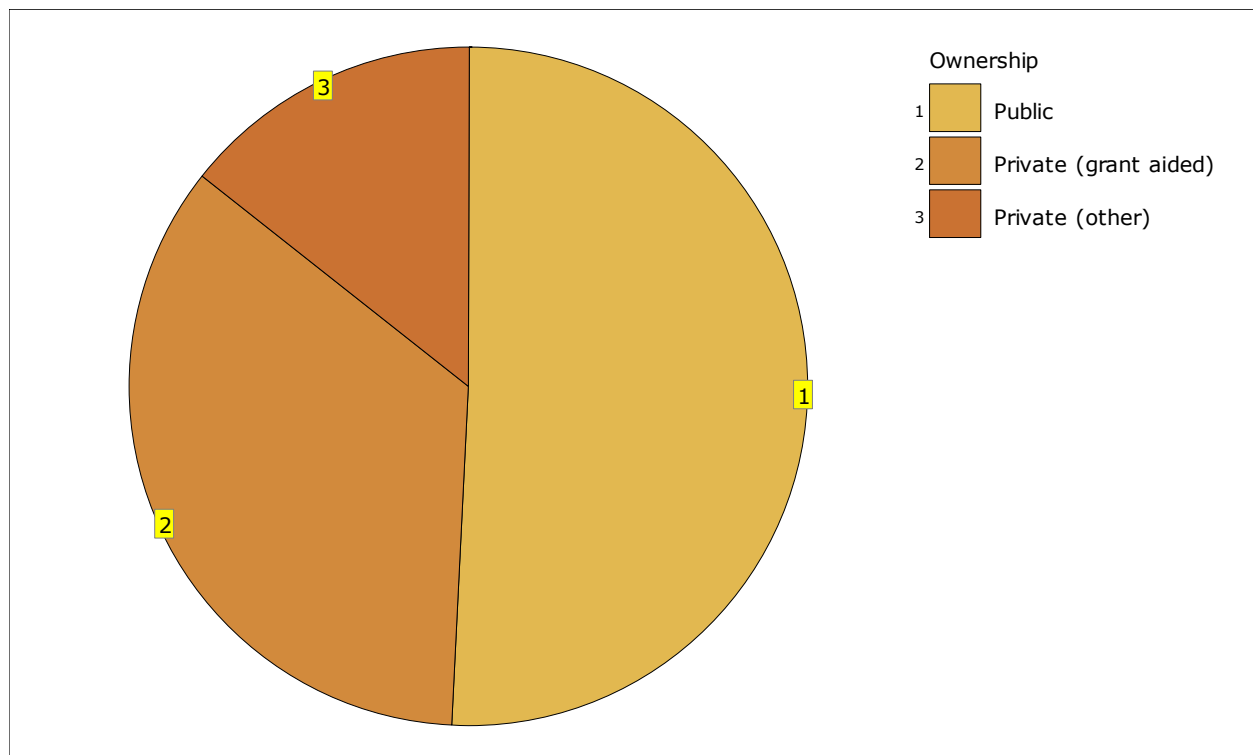
2.3 FOREST OWNERSHIP

2.3.1 Total forest area by ownership

Definition
Ownership Specifies forest land ownership. Public: All state owned forests Private (grant aided): Private afforested land in receipt of either grant and/or premium since 1980. Private (other): Private non grant aided plantations or naturally regenerated forests.

Methodology
The total forest area (i.e. Forest and Forest Open Area) is classified by ownership.

Ownership	Area		
	thousands ha	($\alpha = 0.05$)	%
Public	391.36	(374.49 – 408.22)	50.8
Private (grant aided)	268.10	(252.04 – 284.16)	34.8
Private (other)	110.56	(98.55 – 122.57)	14.4
Total	770.02		100.0



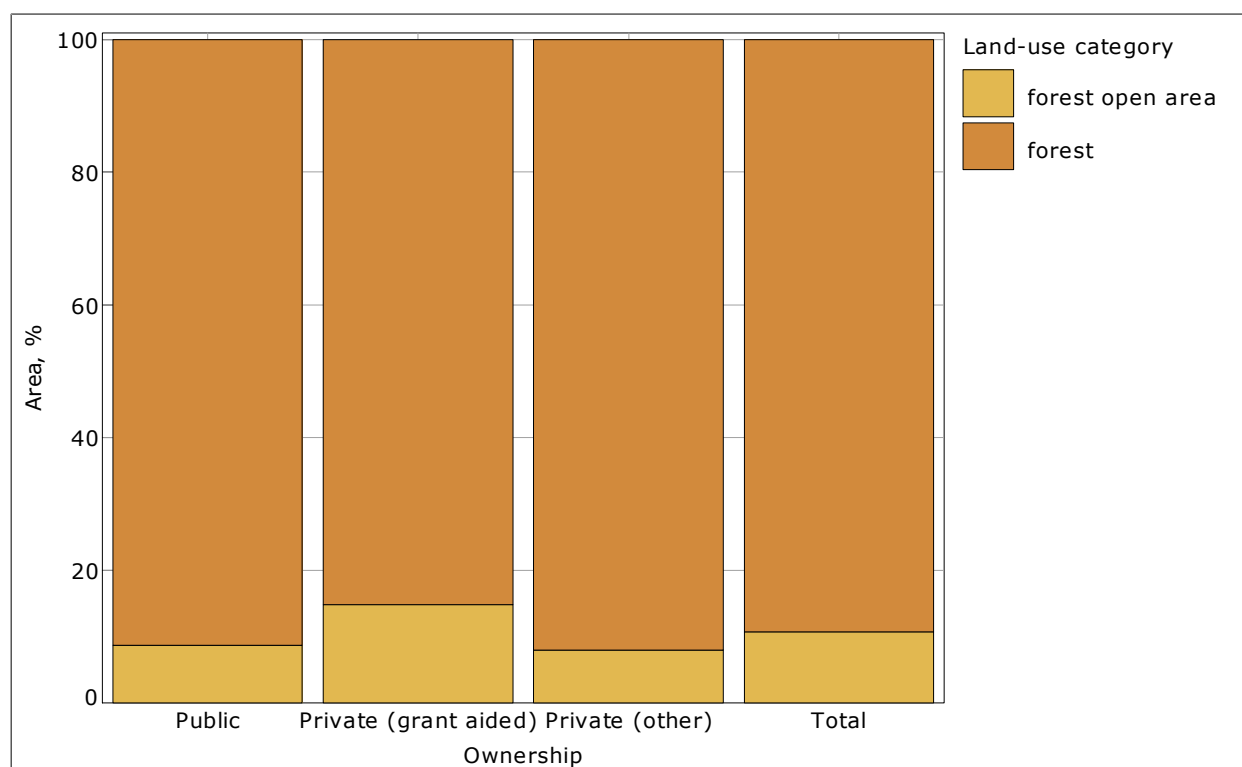
2.3.2 Total forest area by ownership and land-use category

Methodology

The total forest area is classified by ownership and land-use category.

Land-use category	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
forest open area	34.06	(26.98 - 41.15)	8.7	39.61	(32.03 - 47.18)	14.8
forest	357.29	(340.43 - 374.15)	91.3	228.49	(212.96 - 244.03)	85.2
Total	391.36	(374.49 - 408.22)	100.0	268.10	(252.04 - 284.16)	100.0

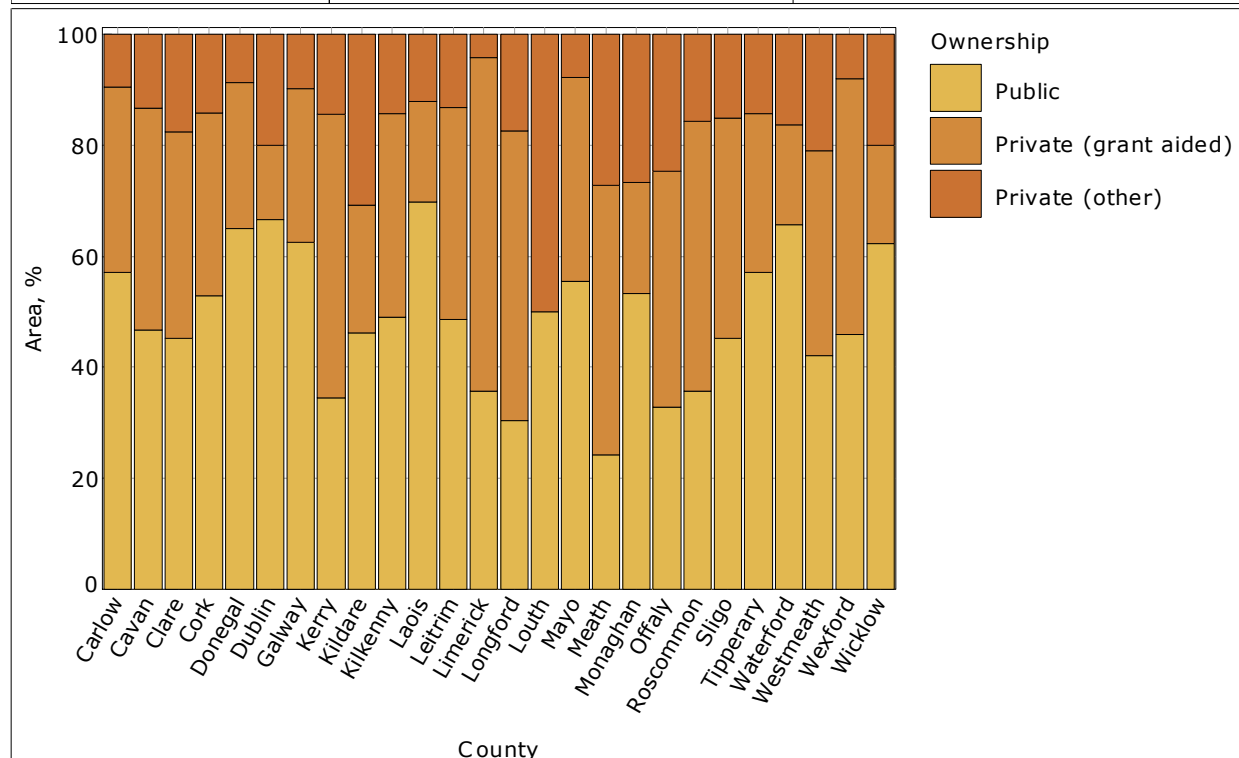
Land-use category	Ownership / Area					
	Private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
forest open area	8.83	(5.16 - 12.49)	8.0	82.50	(71.85 - 93.14)	10.7
forest	101.74	(90.11 - 113.37)	92.0	687.52	(676.88 - 698.17)	89.3
Total	110.56	(98.55 - 122.57)	100.0	770.02		100.0



2.3.3 Total forest area by county and ownership

Methodology						
The total forest area is classified by county and ownership.						
Ownership	County / Area					
	Carlow			Cavan		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Public	4.80	(2.86 – 6.74)	57.2	8.41	(5.68 – 11.15)	46.7
Private (grant aided)	2.80	(0.95 – 4.65)	33.3	7.21	(4.53 – 9.90)	40.0
Private (other)	0.80	(0.00 – 1.95)	9.5	2.40	(0.54 – 4.27)	13.3
Total	8.40		100.0	18.03		100.0
Ownership	County / Area					
	Clare			Cork		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Public	24.94	(20.33 – 29.55)	45.3	47.61	(41.73 – 53.50)	52.9
Private (grant aided)	20.51	(16.04 – 24.99)	37.2	29.61	(24.07 – 35.14)	32.9
Private (other)	9.65	(6.13 – 13.17)	17.5	12.80	(8.69 – 16.92)	14.2
Total	55.11		100.0	90.02		100.0
Ownership	County / Area					
	Donegal			Dublin		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Public	36.08	(31.62 – 40.53)	64.9	4.01	(2.38 – 5.63)	66.7
Private (grant aided)	14.59	(10.49 – 18.70)	26.3	0.80	(0.00 – 1.97)	13.3
Private (other)	4.86	(2.23 – 7.50)	8.8	1.20	(0.00 – 2.58)	20.0
Total	55.53		100.0	6.01		100.0
Ownership	County / Area					
	Galway			Kerry		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Public	37.88	(33.20 – 42.56)	62.5	19.84	(15.37 – 24.31)	34.5
Private (grant aided)	16.75	(12.42 – 21.07)	27.6	29.37	(24.67 – 34.06)	51.0
Private (other)	5.98	(3.10 – 8.86)	9.9	8.33	(5.03 – 11.64)	14.5
Total	60.60		100.0	57.54		100.0
Ownership	County / Area					
	Kildare			Kilkenny		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Public	4.80	(2.66 – 6.93)	46.1	9.71	(6.83 – 12.59)	49.0
Private (grant aided)	2.40	(0.59 – 4.20)	23.1	7.28	(4.51 – 10.06)	36.7
Private (other)	3.20	(1.22 – 5.18)	30.8	2.83	(0.82 – 4.85)	14.3
Total	10.40		100.0	19.82		100.0
Ownership	County / Area					
	Laois			Leitrim		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Public	18.44	(15.43 – 21.46)	69.7	14.64	(11.17 – 18.10)	48.6
Private (grant aided)	4.81	(2.28 – 7.34)	18.2	11.47	(8.11 – 14.83)	38.2
Private (other)	3.21	(1.07 – 5.35)	12.1	3.96	(1.61 – 6.30)	13.2
Total	26.46		100.0	30.06		100.0
Ownership	County / Area					
	Limerick			Longford		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Public	9.98	(6.76 – 13.19)	35.7	2.79	(0.92 – 4.65)	30.4
Private (grant aided)	16.76	(13.47 – 20.05)	60.0	4.78	(2.76 – 6.80)	52.2
Private (other)	1.20	(0.00 – 2.56)	4.3	1.59	(0.06 – 3.13)	17.4
Total	27.93		100.0	9.16		100.0
Ownership	County / Area					
	Louth			Mayo		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Public	1.21	(0.00 – 2.61)	50.0	28.47	(24.03 – 32.91)	55.5
Private (grant aided)	–	–	–	18.85	(14.54 – 23.15)	36.7
Private (other)	1.21	(0.00 – 2.61)	50.0	4.01	(1.61 – 6.41)	7.8
Total	2.43		100.0	51.33		100.0

Ownership	County / Area					
	Meath			Monaghan		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Public	3.23	(1.17 - 5.29)	24.2	3.20	(1.48 - 4.91)	53.3
Private (grant aided)	6.46	(4.06 - 8.86)	48.5	1.20	(0.00 - 2.57)	20.0
Private (other)	3.63	(1.50 - 5.77)	27.3	1.60	(0.08 - 3.12)	26.7
Total	13.33		100.0	6.00		100.0
Ownership	County / Area					
	Offaly			Roscommon		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Public	9.64	(6.40 - 12.88)	32.9	10.11	(6.85 - 13.37)	35.7
Private (grant aided)	12.46	(9.05 - 15.87)	42.4	13.75	(10.35 - 17.15)	48.6
Private (other)	7.23	(4.26 - 10.21)	24.7	4.45	(1.97 - 6.93)	15.7
Total	29.33		100.0	28.31		100.0
Ownership	County / Area					
	Sligo			Tipperary		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Public	9.50	(6.59 - 12.41)	45.3	28.71	(24.35 - 33.07)	57.1
Private (grant aided)	8.31	(5.45 - 11.17)	39.6	14.35	(10.38 - 18.33)	28.6
Private (other)	3.17	(1.08 - 5.26)	15.1	7.18	(4.10 - 10.26)	14.3
Total	20.98		100.0	50.24		100.0
Ownership	County / Area					
	Waterford			Westmeath		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Public	17.70	(14.55 - 20.84)	65.7	6.38	(3.89 - 8.88)	42.1
Private (grant aided)	4.83	(2.29 - 7.37)	17.9	5.59	(3.15 - 8.02)	36.8
Private (other)	4.42	(1.97 - 6.88)	16.4	3.19	(1.13 - 5.25)	21.1
Total	26.95		100.0	15.16		100.0
Ownership	County / Area					
	Wexford			Wicklow		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Public	6.72	(4.25 - 9.18)	46.0	22.56	(18.85 - 26.27)	62.2
Private (grant aided)	6.72	(4.25 - 9.18)	45.9	6.45	(3.52 - 9.37)	17.8
Private (other)	1.19	(0.00 - 2.54)	8.1	7.25	(4.19 - 10.31)	20.0
Total	14.62		100.0	36.26		100.0



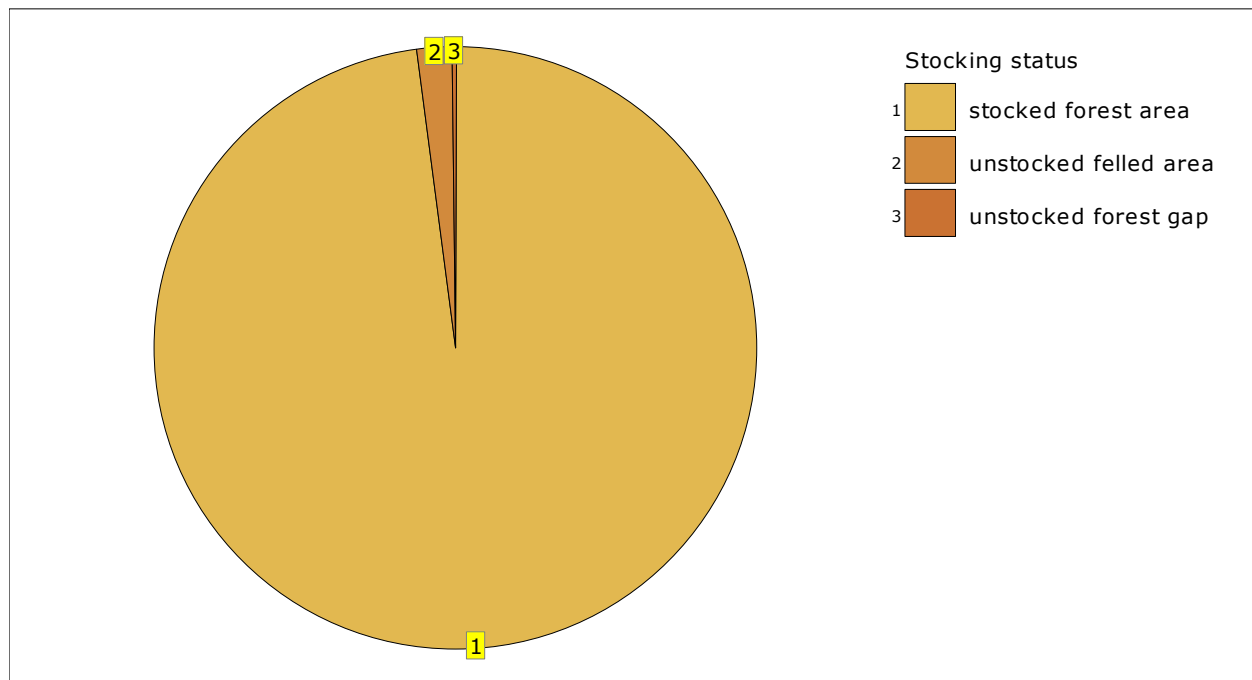
2.4 STOCKING STATUS

2.4.1 Forest area by stocking status

Definition
Stocking status Classifies the forest area into stocked and unstocked areas. Stocked forest area: Forest estate with trees present on site. Unstocked felled area: Recently felled forest area with no trees present. Unstocked forest gap: No small or mapped tree data was recorded on the plot. However there are trees present on the plot, but none were recorded due to the concentric plot sampling design.

Methodology
The total area in land-use category Forest is classified by stocking status (i.e. Forest Open Area is excluded).

Stocking status	Area		
	thousands ha	($\alpha = 0.05$)	%
stocked forest area	673.11	(668.45 – 677.77)	97.9
unstocked felled area	12.81	(8.41 – 17.20)	1.9
unstocked forest gap	1.61	(0.03 – 3.18)	0.2
Total	687.52		100.0



2.5 FOREST AREA CHANGE

2.5.1 Total forest area increase since the second cycle

Definition

Forest Area Increase m²

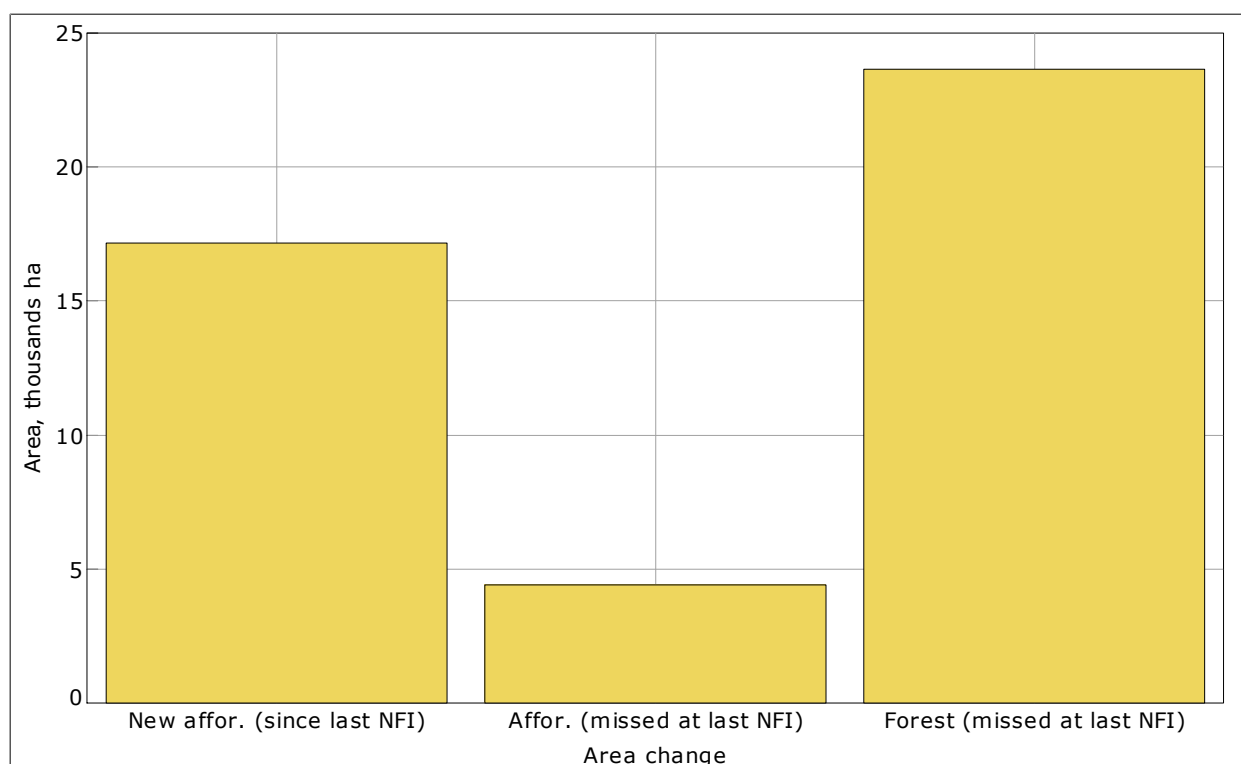
Details the status of the plots that were classified as forest for the first time in the third cycle.

1. **New afforestation (since last NFI):** A new plot centre is established due to afforestation since the last NFI
2. **Afforestation (missed at last NFI):** A new plot established due to afforestation, which was present during the 1st and/or 2nd cycle, but excluded in error at that time.
3. **Forest (missed at last NFI):** A new plot established due to the presence of pre-existing forest, which was present during the 1st and/or 2nd cycle, but excluded in error at that time.

Methodology

The total area of land that changed from Non-Forest to forest is presented.

Area change	Area		
	thousands ha	($\alpha = 0.05$)	%
New affor. (since last NFI)	17.16	(12.11 – 22.22)	38.0
Affor. (missed at last NFI)	4.40	(1.81 – 7.00)	9.7
Forest (missed at last NFI)	23.64	(17.71 – 29.56)	52.3
Total	45.21		100.0



2.5.2 Total forest area decrease since the second cycle

Definition

Forest Area Decrease

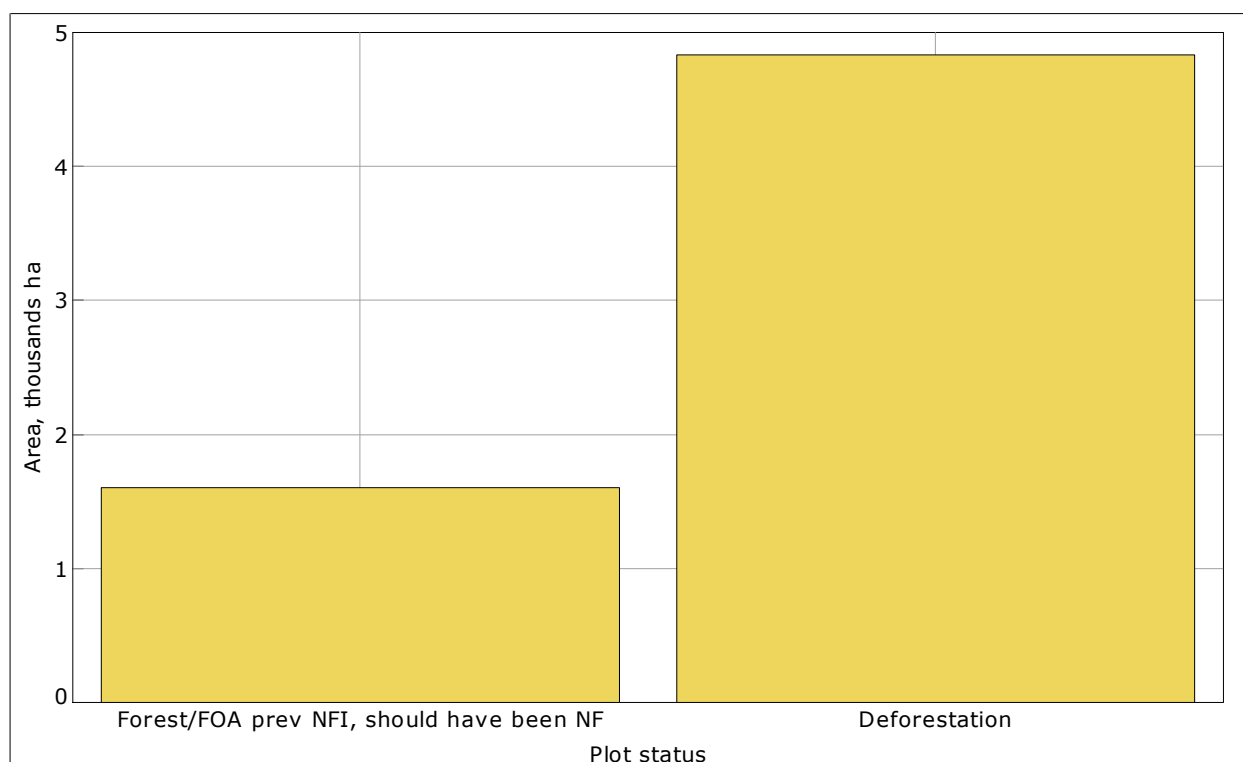
Details the status of the plot at each cycle.

1. **Forest or FOA in previous NFI, should have been NF:** Plot was classified as Forest or FOA in 2nd cycle in error. Should have been Non-Forest.
2. **Deforestation:** There has been a change of land use category on the plot from Forest (2nd cycle) to Non-Forest (3rd cycle).

Methodology

The total area of land that changed from Forest to Non-Forest is presented.

Plot status	Area		
	thousands ha	($\alpha = 0.05$)	%
Forest/FOA prev NFI, should have been NF	1.60	(0.03 – 3.17)	24.9
Deforestation	4.83	(2.10 – 7.56)	75.1
Total	6.43		100.0



2.5.3 Total area changes relating to Forest Open Area

Definition

Plot status

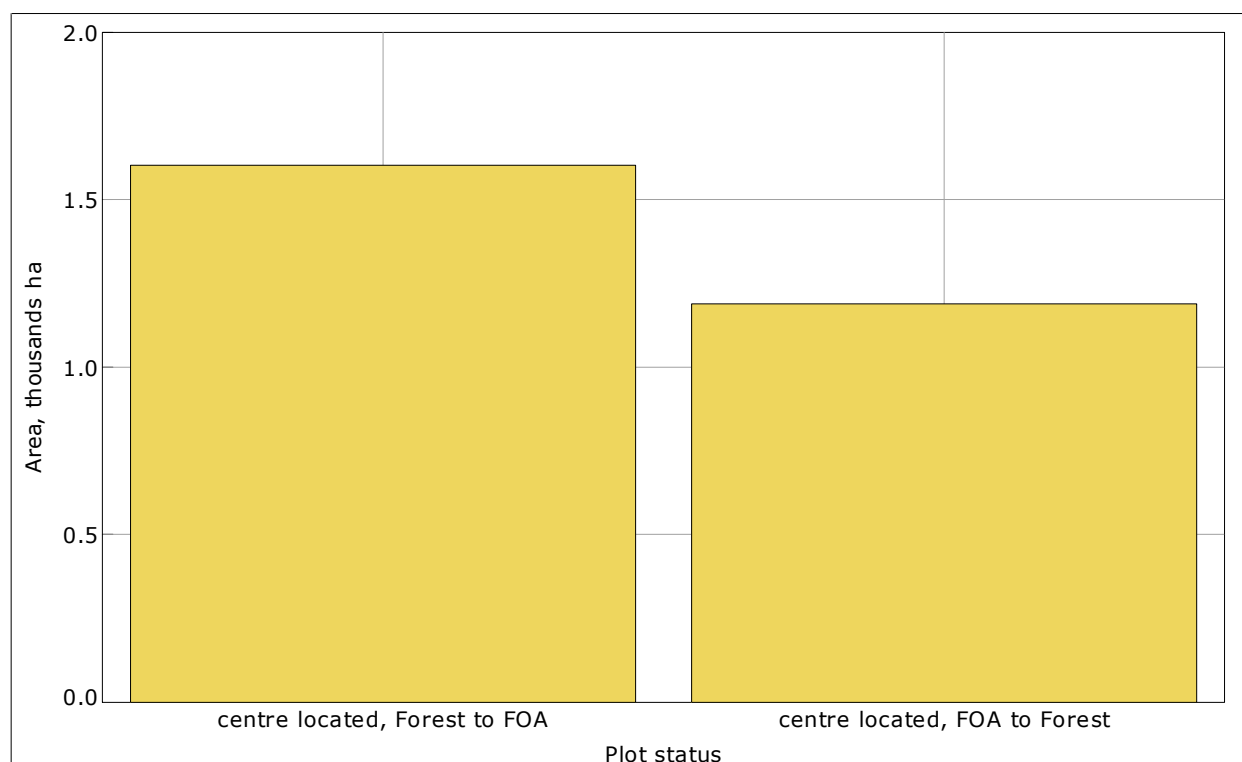
Details the status of the plot at each cycle.

1. **Centre located, Forest to FOA:** Plot centre from previous cycle is located, but land-use type has changed from Forest to Forest Open Area, e.g. forest road.
2. **Centre located, FOA to Forest:** Plot centre from previous cycle is located, but land-use type has changed from Forest Open Area to Forest, e.g. a rideline is replanted.

Methodology

The total area changes relating to the interaction of Forest and Forest Open Area is presented.

Plot status	Area		
	thousands ha	($\alpha = 0.05$)	%
centre located, Forest to FOA	1.60	(0.03 – 3.17)	57.4
centre located, FOA to Forest	1.19	(0.00 – 2.53)	42.6
Total	2.79		100.0



2.6 REVISIT INTERVAL

2.6.1 Forest area by revisit interval

Definition

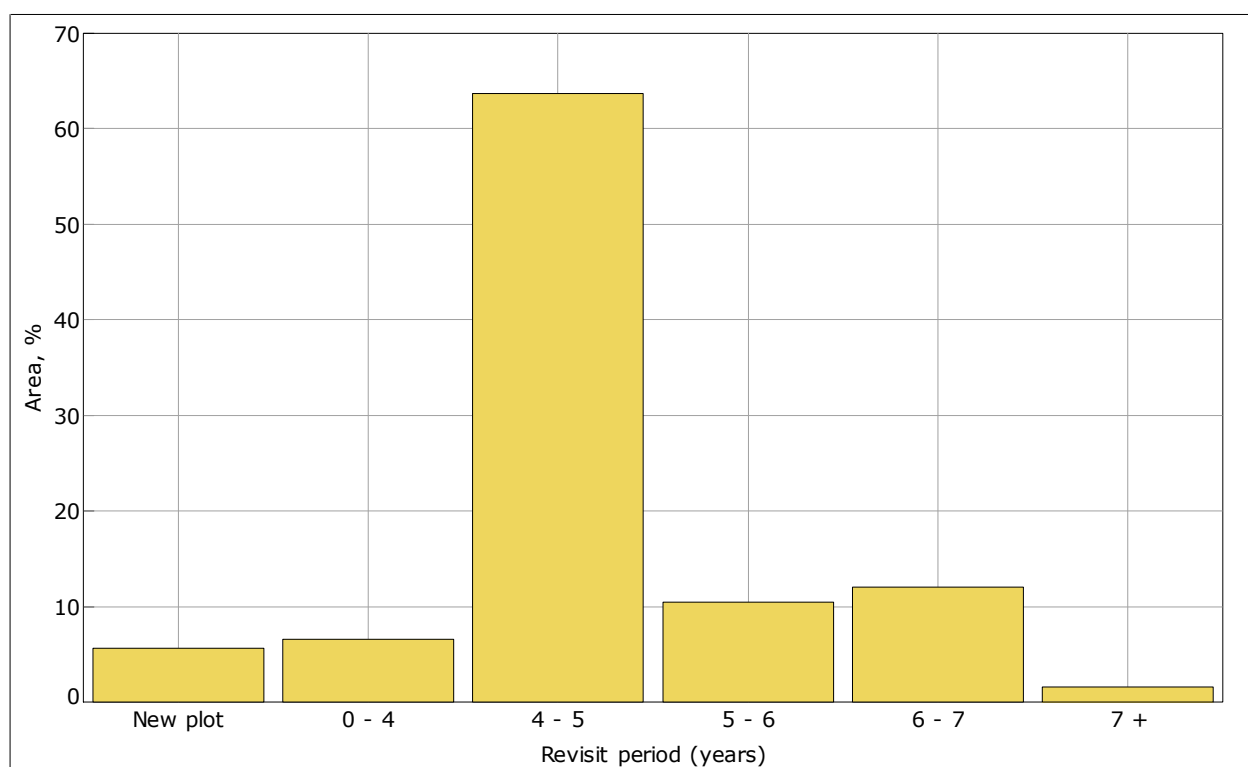
Revisit interval

The time period (years) taken to revisit the plot.

Methodology

The forest area is classified by the time period between field NFI plot visits.

Revisit period (years)	Area		
	thousands ha	($\alpha = 0.05$)	%
New plot	38.00	(30.62 - 45.38)	5.6
0 - 4	44.45	(38.46 - 50.44)	6.6
4 - 5	428.58	(414.61 - 442.54)	63.6
5 - 6	70.44	(61.87 - 79.01)	10.5
6 - 7	81.18	(70.96 - 91.40)	12.1
7 +	10.46	(6.88 - 14.03)	1.6
Total	673.11		100.0



CHAPTER 3

FOREST STRUCTURE

European Forest Type (EFT) applies broad species classes at forest level, categorising forests into Conifer, Broadleaf and Mixed types. Two-thirds (65.7%) of the stocked forest area is composed of forests with conifer species predominating, 20.6% of forests are broadleaf and 13.7% are of mixed composition.

Afforestation is the man-made establishment of new forests on treeless lands which did not carry forest in contemporary history. Forests established through afforestation dominate as the main method by which forests have become regenerated with 57.7% of forests established in this way. Reforestation, the man-made establishment of trees on lands that have been cleared of forest within the relatively recent past, comprises 28.1% of forests. Semi-natural forest, which are forests established by natural regeneration, occupy 14.2% of forests.

Development stage primarily categorises the maturity classes of the forest estate. The stages range from young post establishment forests to overmature forests along with multistoried forests. In the ownership class Private (grant aided) a high proportion of small-pole and pole stage forests occur, indicating their readiness for thinning.

The classification of Forest Available for Wood Supply (FAWS) describes the relative importance of the estate in terms of timber supply. The majority (76.4%) of forests in Ireland have no restrictions on timber supply. A small portion (0.7%) of the estate is considered not available due to the designations for National Parks and Nature Reserves. A significant portion (22.9%) of the estate is considered unlikely to contribute to wood supply, primarily due to the site constraints, physical productivity or wood quality limitations. Over three-quarters (74.6%) of the Private (other) estate is classified as unlikely to contribute to wood supply, primarily due to the significant presence of poorly performing broadleaf forests.

There are a number of environmental designations that affect forest management but do not necessarily restrict timber harvesting. Just under half (49.6%) of the forest area had one or more environmental designation. Eight environmental designations are included with some having greater affects than others in terms of restricting forest management operations.

3.1 FOREST STRUCTURE

This section describes forest structure in the portion of the forest estate that has tree cover present.

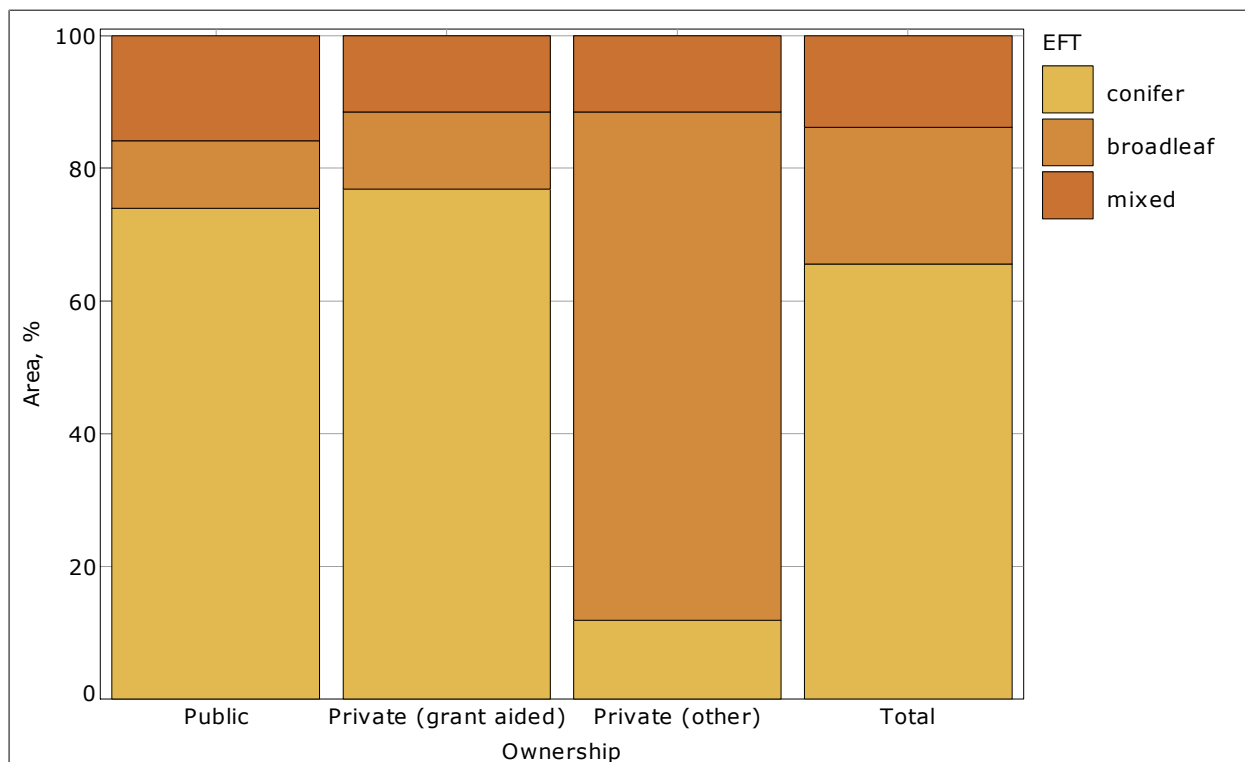
3.1.1 Stocked forest area by European Forest Type and ownership

Definition	
European Forest Type	
Broad forest type classification system based on species composition.	
1.	Conifer: Coniferous tree species occupy 80% or more of the canopy.
2.	Broadleaf: Broadleaf tree species occupy 80% or more of the canopy.
3.	Mixed: A forest composed of broadleaved and conifer species, the minor category making up at least 20% of the canopy.

Methodology
The stocked forest area is classified by ownership and European Forest Type.

EFT	Ownership / Area					
	public			private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
conifer	256.01	(240.85 – 271.18)	74.0	173.69	(159.85 – 187.54)	76.8
broadleaf	35.24	(28.14 – 42.33)	10.2	26.40	(20.18 – 32.61)	11.7
mixed	54.84	(46.06 – 63.61)	15.8	26.00	(19.83 – 32.17)	11.5
Total	346.09	(330.30 – 361.87)	100.0	226.09	(211.18 – 241.00)	100.0

EFT	Ownership / Area					
	private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
conifer	12.01	(7.77 – 16.26)	11.9	441.72	(426.90 – 456.54)	65.7
broadleaf	77.32	(67.10 – 87.54)	76.6	138.95	(126.22 – 151.69)	20.6
mixed	11.60	(7.42 – 15.78)	11.5	92.44	(81.47 – 103.41)	13.7
Total	100.94	(89.48 – 112.39)	100.0	673.11		100.0



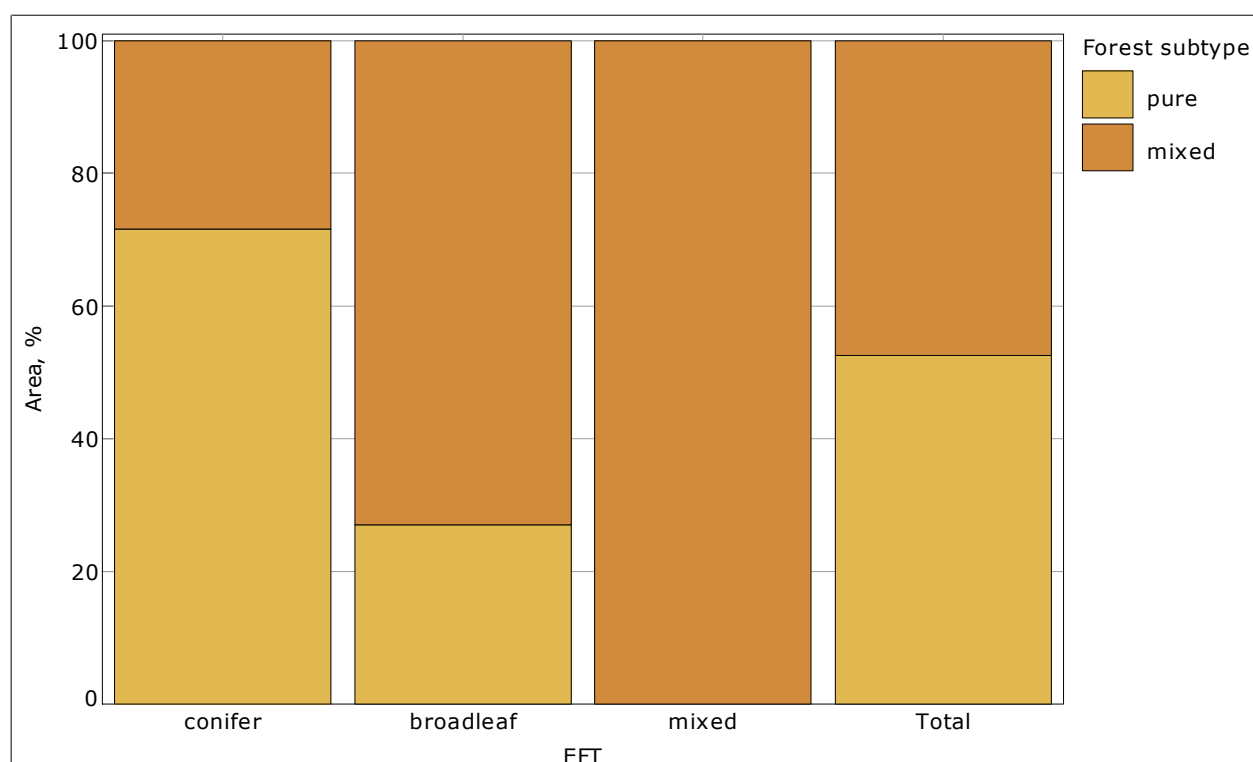
3.1.2 Stocked forest area by European Forest Type and forest sub-type

Definition
Forest sub-type Describes if one or more species occur. Pure: The dominant species occupies 80% or more of the canopy. Mixed: The dominant species occupies between 20-80% of the canopy.

Methodology
The stocked forest area is classified by European Forest Type and forest sub-type.

Forest subtype	EFT / Area					
	conifer			broadleaf		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
pure	316.40	(300.45 – 332.35)	71.6	37.63	(30.28 – 44.98)	27.1
mixed	125.31	(112.97 – 137.66)	28.4	101.32	(89.96 – 112.68)	72.9
Total	441.72	(426.90 – 456.54)	100.0	138.95	(126.22 – 151.69)	100.0

Forest subtype	EFT / Area					
	mixed			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
pure	–	–	–	354.04	(337.95 – 370.13)	52.6
mixed	92.44	(81.47 – 103.41)	100.0	319.08	(302.98 – 335.17)	47.4
Total	92.44	(81.47 – 103.41)	100.0	673.11		100.0



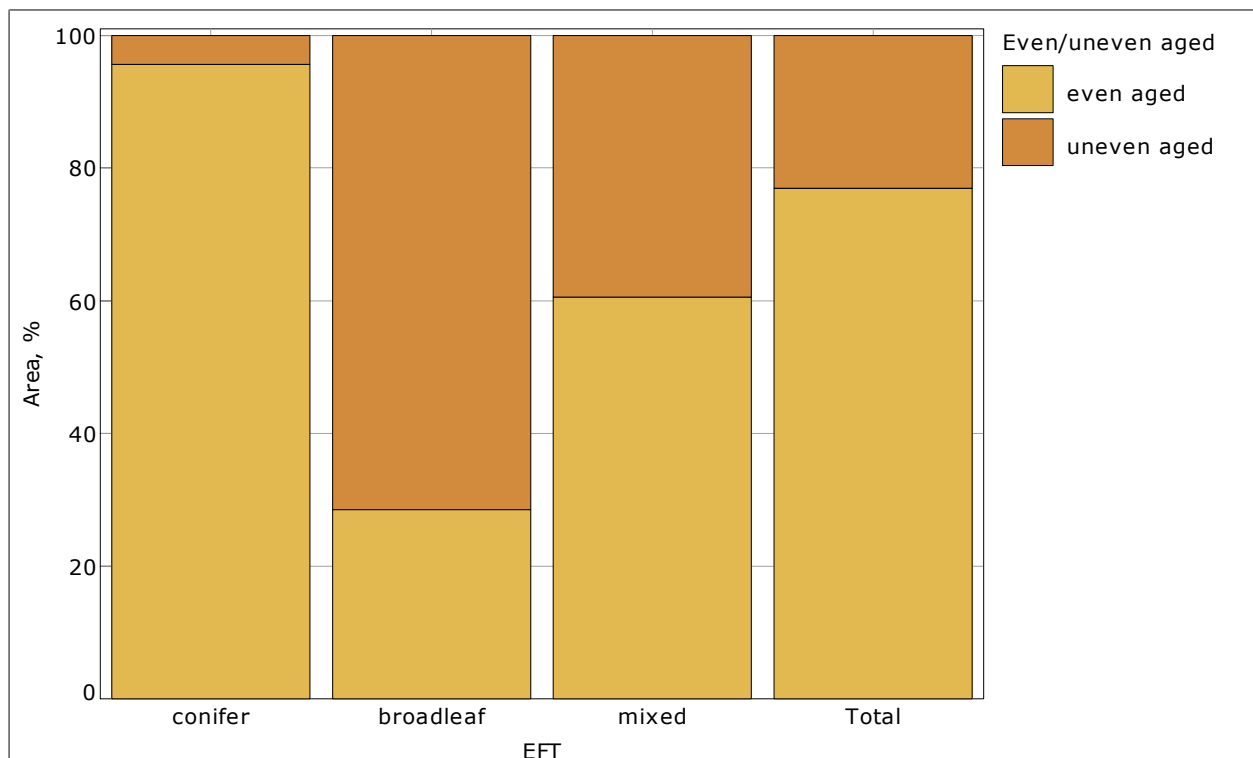
3.1.3 Stocked forest area by European Forest Type and even-uneven aged forest

Definition
Even/uneven aged Uniformity of the age of the tree species in a forest. Even aged: At least 80% or more of the canopy is made up of trees that have an age difference of 4 years or less. Uneven aged: Between 20-80% of the canopy is made up of trees that have an age difference of 5 years or more.

Methodology
The stocked forest area is classified by European Forest Type and even/uneven aged.

Even/uneven aged	EFT / Area					
	conifer			broadleaf		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
even aged	422.49	(407.33 - 437.65)	95.6	39.66	(32.12 - 47.19)	28.5
uneven aged	19.23	(13.86 - 24.60)	4.4	99.30	(88.04 - 110.56)	71.5
Total	441.72	(426.90 - 456.54)	100.0	138.95	(126.22 - 151.69)	100.0

Even/uneven aged	EFT / Area					
	mixed			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
even aged	56.02	(47.21 - 64.82)	60.6	518.16	(504.69 - 531.63)	77.0
uneven aged	36.42	(29.15 - 43.70)	39.4	154.95	(141.48 - 168.42)	23.0
Total	92.44	(81.47 - 103.41)	100.0	673.11		100.0



3.1.4 Stocked forest area by European Forest Type and tree distribution

Definition

Tree distribution

The distribution of trees in terms of their spatial arrangement.

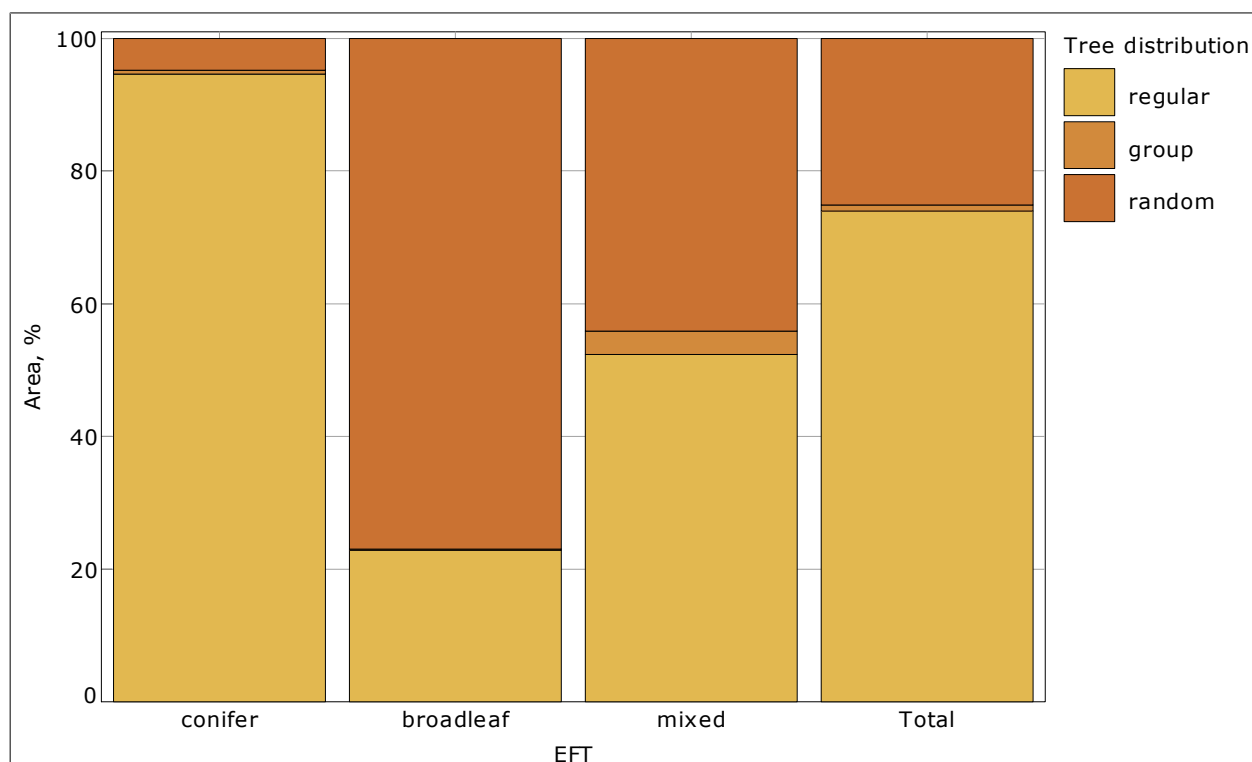
1. **Regular:** The trees are distributed uniformly, e.g. 2 m x 2 m square spacing.
2. **Group:** The trees are distributed in groups.
3. **Random:** The trees are distributed randomly with no particular pattern.

Methodology

The stocked forest area with regeneration present is classified by European Forest Type and tree distribution.

Tree distribution	EFT / Area					
	conifer			broadleaf		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
regular	418.07	(402.87 - 433.26)	94.7	31.63	(24.86 - 38.40)	22.8
group	2.41	(0.48 - 4.33)	0.5	0.40	(0.00 - 1.18)	0.3
random	21.24	(15.60 - 26.89)	4.8	106.93	(95.31 - 118.54)	76.9
Total	441.72	(426.90 - 456.54)	100.0	138.95	(126.22 - 151.69)	100.0

Tree distribution	EFT / Area					
	mixed			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
regular	48.40	(40.12 - 56.68)	52.3	498.10	(484.17 - 512.03)	74.0
group	3.21	(1.00 - 5.42)	3.5	6.02	(2.99 - 9.05)	0.9
random	40.83	(33.17 - 48.49)	44.2	169.00	(155.25 - 182.75)	25.1
Total	92.44	(81.47 - 103.41)	100.0	673.11		100.0



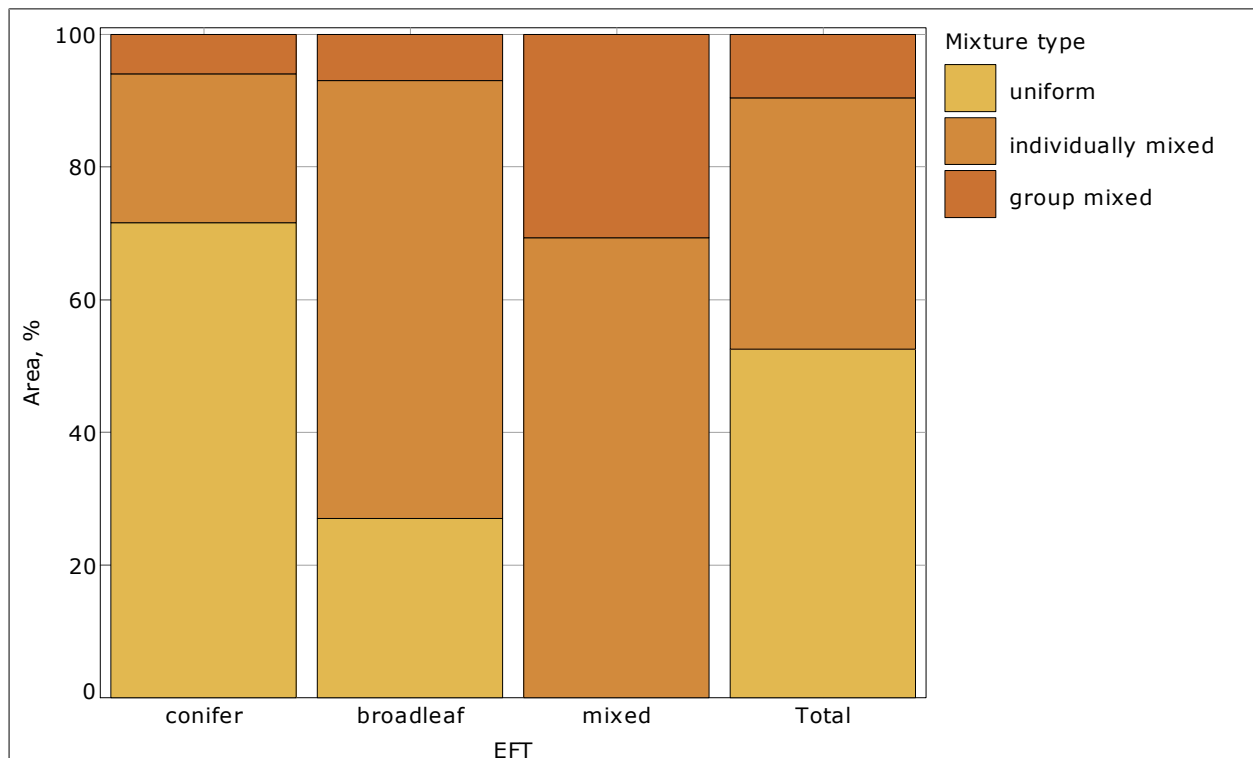
3.1.5 Stocked forest area by European Forest Type and mixture type

Definition	
Species structure	
Mixture type describes the species distribution of trees. If there is more than one species present, the plant distribution may follow a predefined structure e.g. planting in groups.	
1.	Uniform: Only one tree species is present.
2.	Individually mixed: More than one species present, with the species mixture occurring in a random manner.
3.	Group mixed: The structure is based on groups of trees of each species. Line mixtures are included in this category.

Methodology	
The stocked forest area with regeneration present is classified by European Forest Type and mixture type.	

Mixture type	EFT / Area					
	conifer			broadleaf		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
uniform	316.40	(300.45 – 332.35)	71.6	37.63	(30.28 – 44.98)	27.1
individually mixed	99.27	(87.95 – 110.59)	22.5	91.70	(80.79 – 102.61)	66.0
group mixed	26.05	(19.86 – 32.24)	5.9	9.62	(5.79 – 13.45)	6.9
Total	441.72	(426.90 – 456.54)	100.0	138.95	(126.22 – 151.69)	100.0

Mixture type	EFT / Area					
	mixed			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
uniform	–	–	–	354.04	(337.95 – 370.13)	52.6
individually mixed	64.04	(54.69 – 73.39)	69.3	255.01	(239.40 – 270.62)	37.9
group mixed	28.40	(21.94 – 34.85)	30.7	64.06	(54.61 – 73.52)	9.5
Total	92.44	(81.47 – 103.41)	100.0	673.11		100.0



3.1.6 Stocked forest area by European Forest Type and nativeness

Definition

Nativeness

Species that have arrived and inhabited an area naturally, without deliberate assistance by man. In Ireland usually taken to mean those trees present after post-glacial recolonisation and before historic times.

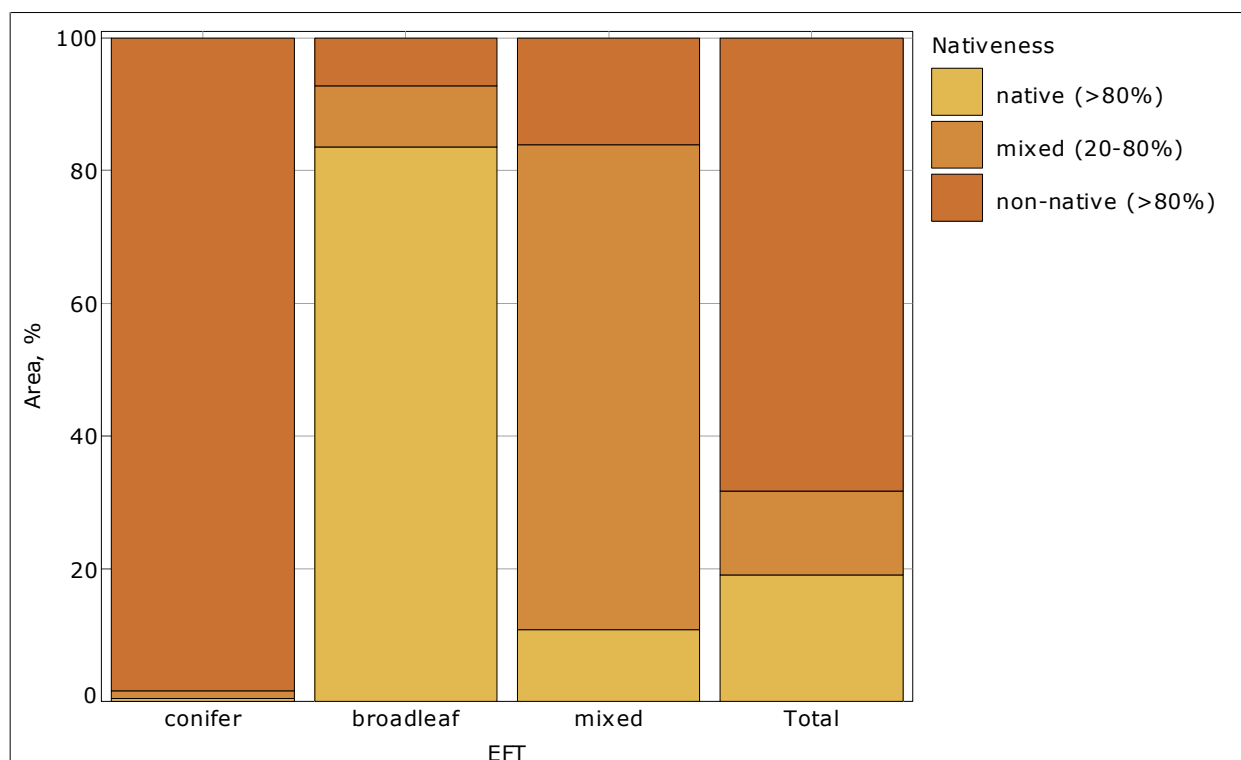
1. **Native:** Native species occupy 80% or more of the canopy.
2. **Mixed:** Native species occupy between 20-80% of the canopy.
3. **Non-native:** Exotic species occupy more than 80% of the canopy.

Methodology

The stocked forest area is classified by European Forest Type and nativeness.

Nativeness	EFT / Area					
	conifer			broadleaf		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
native (>80%)	2.00	(0.25 - 3.75)	0.5	116.12	(104.13 - 128.12)	83.6
mixed (20-80%)	5.19	(2.38 - 8.01)	1.2	12.82	(8.46 - 17.18)	9.2
non-native (>80%)	434.53	(419.64 - 449.41)	98.3	10.01	(6.13 - 13.89)	7.2
Total	441.72	(426.90 - 456.54)	100.0	138.95	(126.22 - 151.69)	100.0

Nativeness	EFT / Area					
	mixed			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
native (>80%)	10.01	(6.13 - 13.89)	10.8	128.13	(115.68 - 140.58)	19.0
mixed (20-80%)	67.59	(58.03 - 77.15)	73.1	85.61	(75.01 - 96.20)	12.7
non-native (>80%)	14.84	(10.11 - 19.57)	16.1	459.37	(444.81 - 473.93)	68.3
Total	92.44	(81.47 - 103.41)	100.0	673.11		100.0



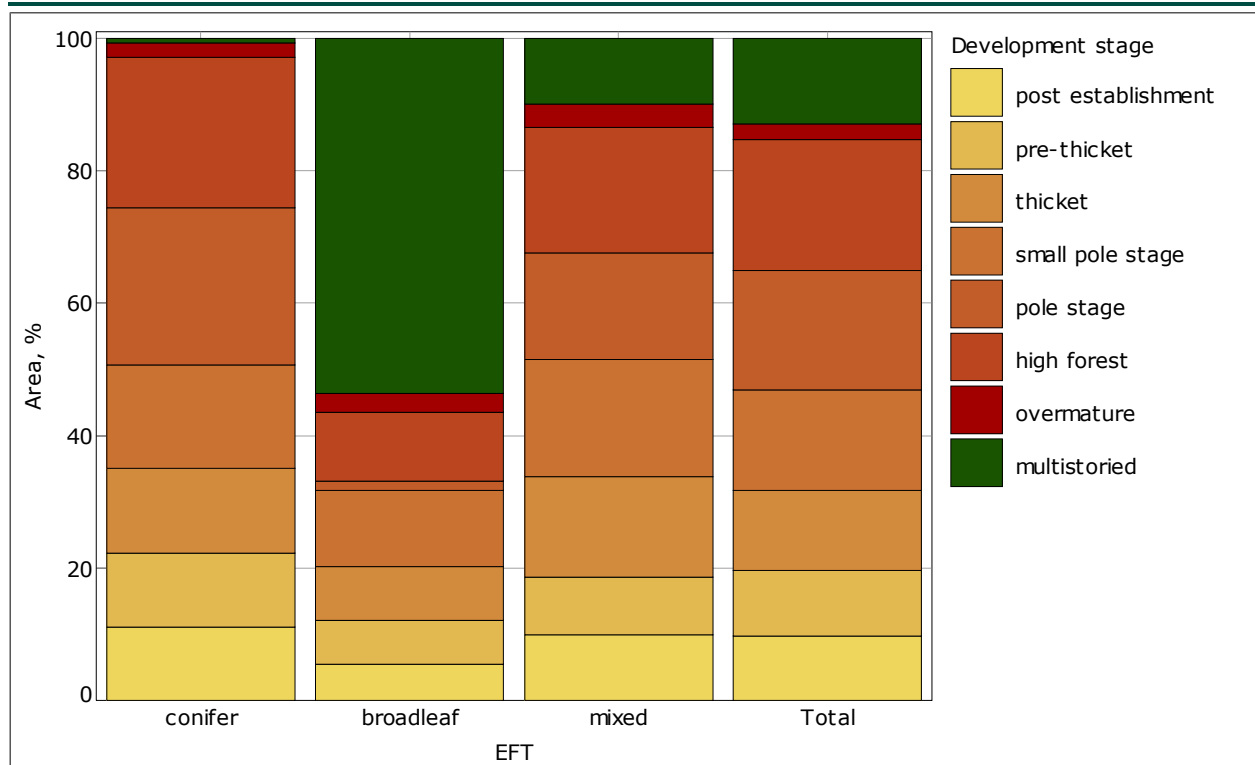
3.1.7 Stocked forest area by European Forest Type and development stage

Definition	
Development stage	
Describes the development stage of the forest.	
1.	Post establishment: A recently established forest that is not at free growing stage.
2.	Pre-thicket: The forest is established, but the green branches are not yet touching.
3.	Thicket: Forest where the canopy has closed but the lower branches are mainly green.
4.	Small pole: Forest where the canopy has fully closed and the lower branches are dead.
5.	Pole: A forest at a stage where it could be thinned or in the early stages of thinning.
6.	High forest: A forest that has a high proportion of sawlog approaching or at normal rotation length.
7.	Overmature: Forest retained beyond normal rotation length, resulting in the presence of large trees.
8.	Multistoried: Forest with trees present at various stages of development.

Methodology	
The stocked forest area is classified by European Forest Type and development stage.	

Development stage	EFT / Area					
	conifer			broadleaf		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
post establishment	48.81	(40.50 - 57.13)	11.1	7.59	(4.20 - 10.97)	5.5
pre-thicket	49.28	(40.90 - 57.66)	11.2	9.21	(5.50 - 12.93)	6.6
thicket	56.48	(47.64 - 65.33)	12.8	11.22	(7.09 - 15.35)	8.1
small pole stage	69.35	(59.61 - 79.10)	15.7	16.00	(11.19 - 20.82)	11.5
pole stage	104.88	(93.24 - 116.51)	23.6	2.00	(0.25 - 3.75)	1.4
high forest	100.52	(89.15 - 111.89)	22.8	14.44	(9.84 - 19.05)	10.4
overmature	9.20	(5.46 - 12.94)	2.1	4.01	(1.54 - 6.49)	2.9
multistoried	3.19	(0.98 - 5.41)	0.7	74.47	(64.45 - 84.50)	53.6
Total	441.72	(426.90 - 456.54)	100.0	138.95	(126.22 - 151.69)	100.0

Development stage	EFT / Area					
	mixed			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
post establishment	9.21	(5.46 - 12.95)	10.0	65.60	(56.08 - 75.13)	9.7
pre-thicket	7.99	(4.51 - 11.48)	8.6	66.49	(56.89 - 76.09)	9.9
thicket	14.01	(9.42 - 18.60)	15.2	81.71	(71.23 - 92.19)	12.1
small pole stage	16.43	(11.46 - 21.40)	17.8	101.79	(90.27 - 113.30)	15.1
pole stage	14.81	(10.10 - 19.52)	16.0	121.68	(109.33 - 134.04)	18.1
high forest	17.60	(12.48 - 22.72)	19.0	132.56	(119.89 - 145.22)	19.8
overmature	3.21	(0.99 - 5.43)	3.5	16.42	(11.47 - 21.37)	2.4
multistoried	9.19	(5.48 - 12.90)	9.9	86.86	(76.13 - 97.59)	12.9
Total	92.44	(81.47 - 103.41)	100.0	673.11		100.0



3.1.8 Stocked forest area by European Forest Type and forest establishment type

Definition

Establishment type

Describes the land type on which the forest has been established and how the forest was established (i.e. artificially or naturally).

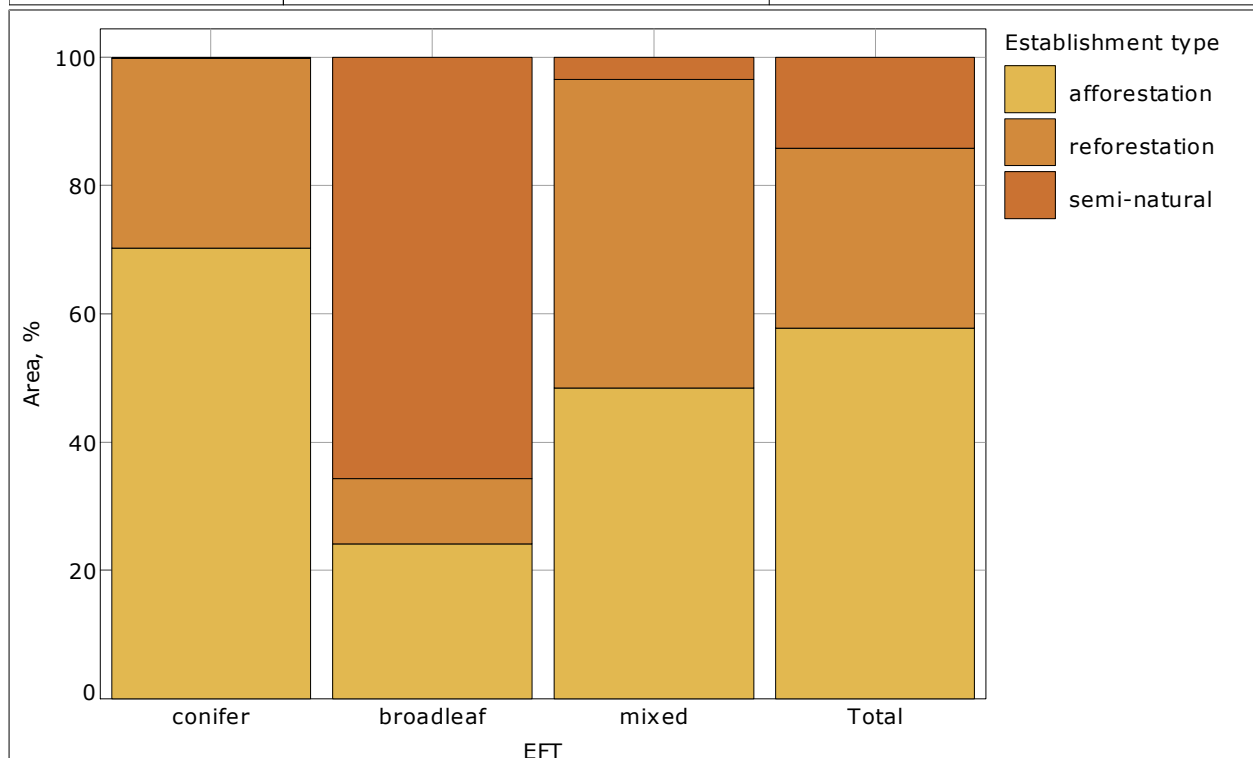
1. **Afforestation:** The man-made establishment of new forests on treeless lands which did not carry forest in contemporary history. Implies a transformation from Non-Forest to Forest.
2. **Reforestation:** The man-made establishment of trees on lands that have been cleared of forest within the relatively recent past. Generally identified by the presence of stumps and deadwood on the site.
3. **Semi-natural:** Forest land where greater than 80% of the tree species regenerated naturally. Native and non-native tree species are included. This forest land may not be managed in accordance with a formal or an informal plan applied regularly over a sufficiently long period (5 years or more). It generally indicates natural succession type forests.

Methodology

The total stocked forest area is classified by European Forest Type and forest establishment type.

Establishment type	EFT / Area					
	conifer			broadleaf		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
afforestation	310.34	(294.78 - 325.90)	70.2	33.63	(26.71 - 40.55)	24.2
reforestation	130.58	(118.11 - 143.04)	29.6	14.02	(9.44 - 18.60)	10.1
semi-natural	0.80	(0.00 - 1.93)	0.2	91.31	(80.38 - 102.24)	65.7
Total	441.72	(426.90 - 456.54)	100.0	138.95	(126.22 - 151.69)	100.0

Establishment type	EFT / Area					
	mixed			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
afforestation	44.82	(36.84 - 52.80)	48.5	388.79	(373.22 - 404.35)	57.7
reforestation	44.41	(36.47 - 52.34)	48.0	189.00	(174.95 - 203.05)	28.1
semi-natural	3.22	(0.99 - 5.44)	3.5	95.32	(84.18 - 106.47)	14.2
Total	92.44	(81.47 - 103.41)	100.0	673.11		100.0



3.1.9 Stocked forest area by European Forest Type and pruning status

Definition

Pruning status

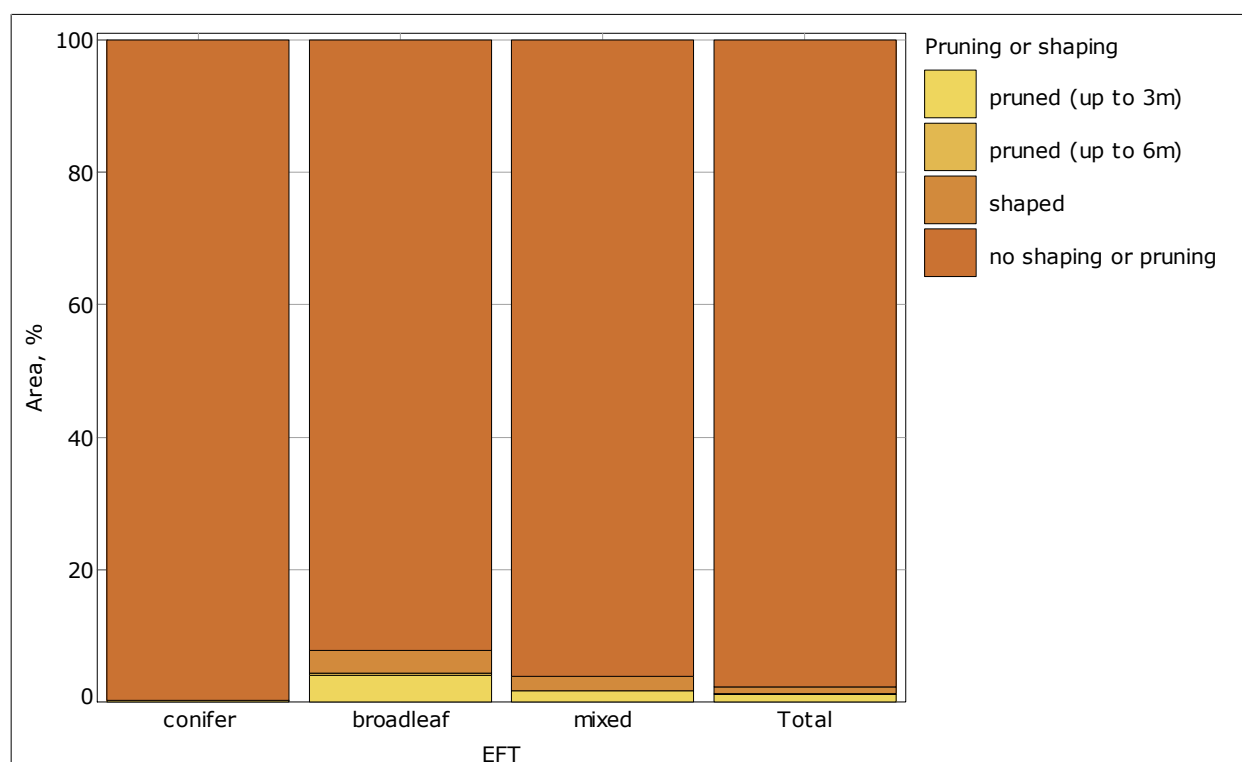
Indicates if the forest has been shaped or pruned.

Methodology

The stocked forest area is classified by European Forest Type and pruning status.

Pruning or shaping	EFT / Area					
	conifer			broadleaf		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
pruned (up to 3m)	0.79	(0.00 - 1.91)	0.2	5.63	(2.74 - 8.52)	4.1
pruned (up to 6m)	-	-	-	0.40	(0.00 - 1.23)	0.3
shaped	0.40	(0.00 - 1.20)	0.09	4.79	(2.11 - 7.48)	3.4
no shaping or pruning	440.52	(425.68 - 455.36)	99.7	128.13	(115.69 - 140.57)	92.2
Total	441.72	(426.90 - 456.54)	100.0	138.95	(126.22 - 151.69)	100.0

Pruning or shaping	EFT / Area					
	mixed			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
pruned (up to 3m)	1.60	(0.04 - 3.16)	1.7	8.02	(4.56 - 11.48)	1.2
pruned (up to 6m)	-	-	-	0.40	(0.00 - 1.23)	0.06
shaped	2.00	(0.25 - 3.75)	2.2	7.19	(3.89 - 10.49)	1.1
no shaping or pruning	88.84	(78.03 - 99.65)	96.1	657.50	(652.70 - 662.29)	97.6
Total	92.44	(81.47 - 103.41)	100.0	673.11		100.0



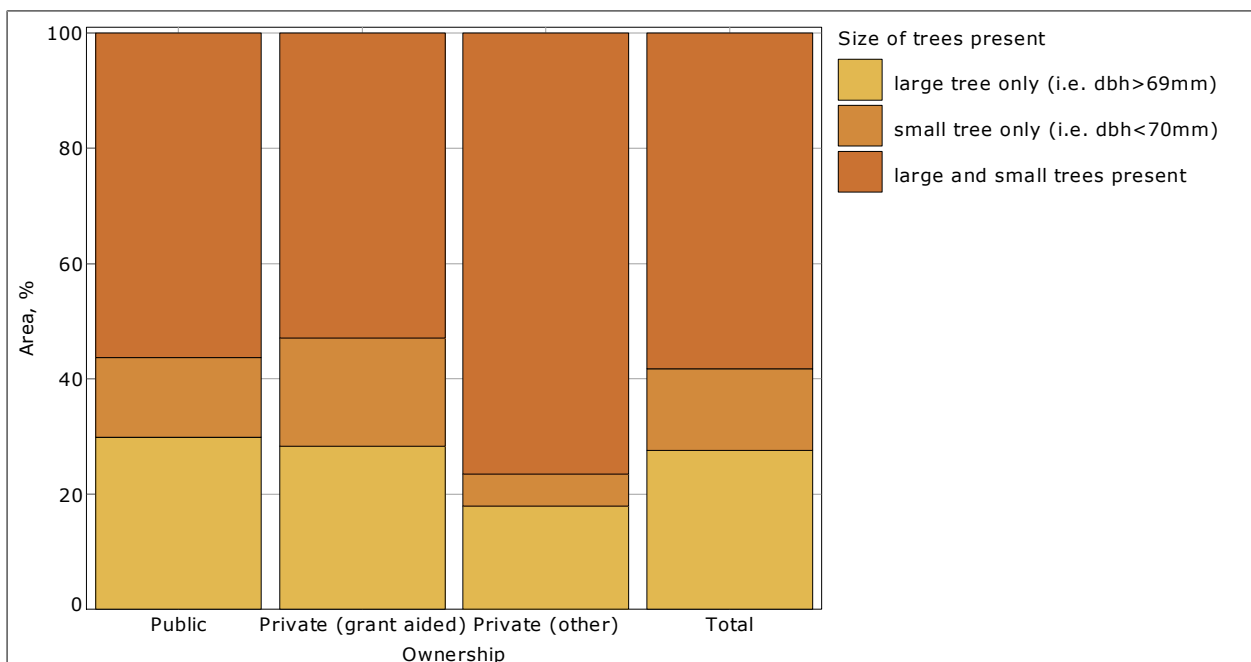
3.1.10 Stocked forest area by ownership and size of trees present

Definition	
Size of trees present	
1. Large tree:	Forest area with trees present with a diameter at breast height of greater than 69mm.
2. Small tree:	Forest area with trees present with a diameter at breast height of less than 70mm.
3. Large and small trees present:	Forest area with large and small trees present.

Methodology
The stocked forest area is classified by the size of the trees present.

Size of trees present	Ownership / Area					
	public			private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
large tree only (i.e. dbh>69mm)	103.37	(91.84 - 114.90)	29.9	64.03	(54.61 - 73.46)	28.3
small tree only (i.e. dbh<70mm)	47.69	(39.42 - 55.95)	13.8	42.39	(34.61 - 50.17)	18.7
large and small trees present	195.03	(180.63 - 209.42)	56.3	119.67	(107.50 - 131.83)	53.0
Total	346.09	(330.30 - 361.87)	100.0	226.09	(211.18 - 241.00)	100.0

Size of trees present	Ownership / Area					
	private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
large tree only (i.e. dbh>69mm)	18.08	(12.94 - 23.22)	17.9	185.49	(171.24 - 199.73)	27.6
small tree only (i.e. dbh<70mm)	5.60	(2.68 - 8.53)	5.5	95.67	(84.45 - 106.90)	14.2
large and small trees present	77.26	(67.04 - 87.48)	76.6	391.95	(376.16 - 407.75)	58.2
Total	100.94	(89.48 - 112.39)	100.0	673.11		100.0



3.2 ENVIRONMENTAL DESIGNATIONS

Definition	
Environmental Designations	
Designation to a land area which is protected by Irish and/or EU law, as the area is of scientific or public interest. Forest management in these areas may be influenced by the type of designation.	
Designations include:	
• Special Protection Area (SPA) • National Heritage Area (NHA) • Special Area of Conservation (SAC) • Nature Reserves • Hen Harrier Higher Likelihood Nesting Area (HLNA)	• National Park • Acid Sensitive • Fisheries Sensitive areas • Fresh Water Pearl Mussel (FWPM)

3.2.1 Forest area by designation type and status

Methodology
The forest area is classified by designation type and status.

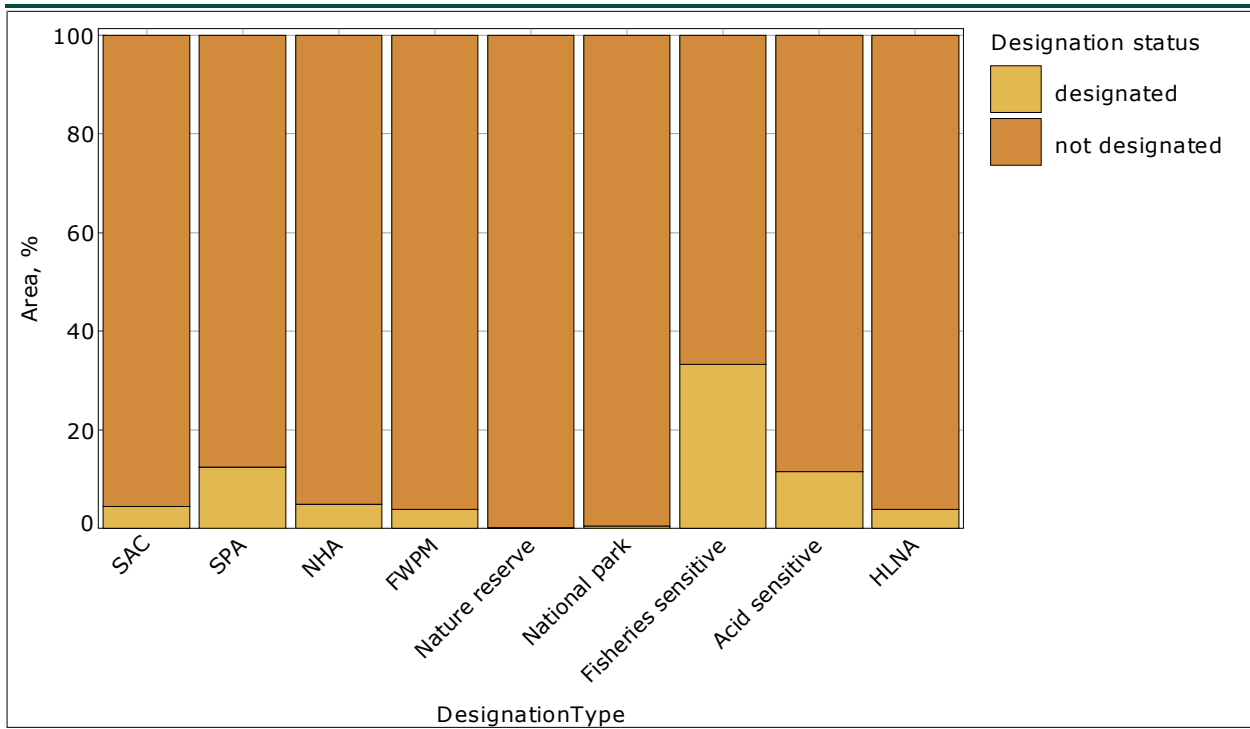
Designation status	DesignationType / Area					
	SAC			SPA		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
designated	34.81	(27.78 – 41.84)	4.5	95.10	(84.65 – 105.56)	12.4
not designated	735.21	(728.18 – 742.24)	95.5	674.92	(664.46 – 685.37)	87.6
Total	770.02	-	100.0	770.02	-	100.0

Designation status	DesignationType / Area					
	NHA			FWPM		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
designated	38.01	(30.59 – 45.42)	4.9	30.03	(23.57 – 36.50)	3.9
not designated	732.01	(724.60 – 739.43)	95.1	739.99	(733.52 – 746.45)	96.1
Total	770.02	-	100.0	770.02	-	100.0

Designation status	DesignationType / Area					
	Nature reserve			National park		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
designated	1.21	(0.00 – 2.57)	0.2	3.59	(1.27 – 5.90)	0.5
not designated	768.81	(767.45 – 770.18)	99.8	766.43	(764.12 – 768.75)	99.5
Total	770.02	-	100.0	770.02	-	100.0

Designation status	DesignationType / Area					
	Fisheries sensitive			Acid sensitive		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
designated	256.17	(243.68 – 268.66)	33.3	88.63	(79.21 – 98.06)	11.5
not designated	513.85	(501.36 – 526.34)	66.7	681.39	(671.96 – 690.81)	88.5
Total	770.02	-	100.0	770.02	-	100.0

Designation status	DesignationType / Area		
	HLNA		
	thousands ha	($\alpha=0.05$)	%
designated	29.56	(23.15 – 35.96)	3.8
not designated	740.46	(734.06 – 746.87)	96.2
Total	770.02	-	100.0

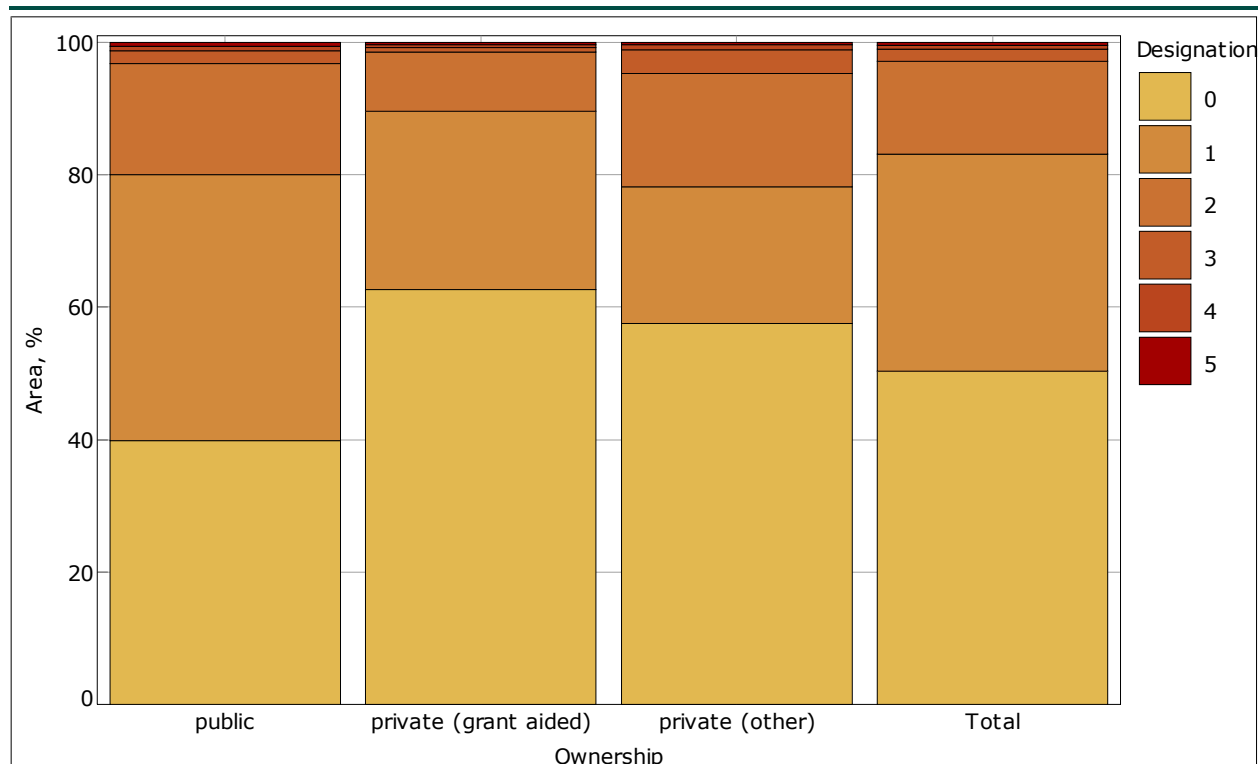


3.2.2 Forest area by ownership and number of environmental designations

Methodology
The stocked forest area is classified by ownership and number of environmental designations.

Number of designations	Ownership / Area					
	public			private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
0	156.08	(142.87 - 169.28)	39.9	168.09	(154.41 - 181.77)	62.8
1	157.15	(144.00 - 170.30)	40.2	72.05	(62.26 - 81.83)	26.9
2	65.73	(56.54 - 74.92)	16.8	23.98	(18.13 - 29.83)	8.9
3	7.61	(4.25 - 10.97)	1.9	2.00	(0.25 - 3.75)	0.7
4	2.80	(0.74 - 4.85)	0.7	1.19	(0.00 - 2.54)	0.4
5	2.00	(0.25 - 3.74)	0.5	0.79	(0.00 - 1.89)	0.3
Total	391.36	(374.49 - 408.22)	100.0	268.10	(252.04 - 284.16)	100.0

Number of designations	Ownership / Area					
	private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
0	63.64	(54.28 - 73.00)	57.5	387.81	(372.99 - 402.62)	50.4
1	22.84	(17.00 - 28.68)	20.7	252.03	(237.12 - 266.95)	32.7
2	18.87	(13.57 - 24.18)	17.1	108.58	(97.28 - 119.88)	14.1
3	4.01	(1.54 - 6.48)	3.6	13.62	(9.18 - 18.06)	1.8
4	0.80	(0.00 - 1.91)	0.7	4.79	(2.11 - 7.47)	0.6
5	0.40	(0.00 - 1.17)	0.4	3.19	(1.01 - 5.37)	0.4
Total	110.56	(98.55 - 122.57)	100.0	770.02		100.0



3.3 AVAILABILITY OF WOOD SUPPLY

Definition

Forest Available for Wood Supply (FAWS)

Describes the likely availability of the forest area in terms of supply of wood.

1. **Available:** Forest where any legal, economic, or specific environmental restrictions do not have a significant impact on the supply of wood. Includes: Areas where, although there are no such restrictions, harvesting is not taking place, for example areas included in long-term utilization plans or intentions.
2. **Unlikely:** Forest where physical productivity or wood quality is too low or harvesting and transport costs are too high to warrant wood harvesting, apart from occasional cuttings for autoconsumption. Areas include:
 - Non-commercial broadleaves – Plots classified as Semi-natural in the Establishment Type attribute (Forest table);
 - Nutrient Deficient Conifers - Plots classified as having Critical Nutrient deficiency in the Overall severity of damage on plot attribute (Abiotic Damage table);
 - Very poorly drained – Plots classified as Very poorly drained in the Drainage attribute (Site table);
 - Recreation – Plot is located in a forest area that is heavily used for recreation. Recreation is the primary objective and is likely to have an impact on wood mobilisation.
 - Excessive slope (≥ 30 degrees).
3. **Not available:** Forest with legal restrictions or restrictions resulting from other political decisions, which totally exclude or severely limit wood supply, *inter alia* for reasons of environmental or biological diversity conservation, e.g. protection forest and other protected areas, such as those of special environmental, scientific, historical, cultural or spiritual interest. Areas classified as National Parks and Nature Reserves are included in this class.

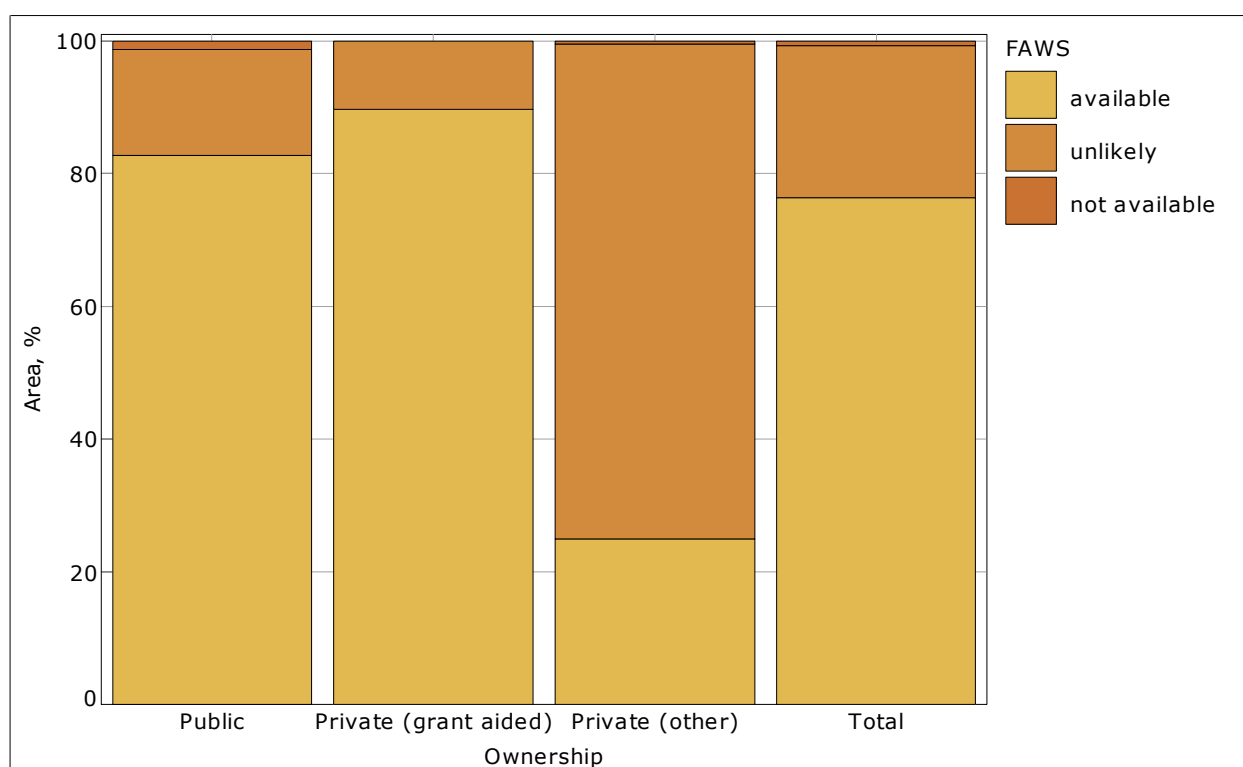
3.3.1 Stocked forest area by ownership and FAWS

Methodology

The stocked forest area is classified by ownership and FAWS.

Availability of wood for supply	Ownership / Area					
	public			private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
available	286.35	(270.69 - 302.01)	82.7	202.86	(188.35 - 217.37)	89.7
unlikely to be available	55.34	(46.52 - 64.15)	16.0	23.23	(17.41 - 29.04)	10.3
not available	4.40	(1.83 - 6.97)	1.3	-	-	-
Total	346.09	(330.30 - 361.87)	100.0	226.09	(211.18 - 241.00)	100.0

Availability of wood for supply	Ownership / Area					
	private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
available	25.23	(19.15 - 31.31)	25.0	514.44	(500.86 - 528.03)	76.4
unlikely to be available	75.31	(65.18 - 85.44)	74.6	153.88	(140.43 - 167.32)	22.9
not available	0.40	(0.00 - 1.18)	0.4	4.79	(2.12 - 7.47)	0.7
Total	100.94	(89.48 - 112.39)	100.0	673.11		100.0



3.3.2 Stocked forest area by availability of wood for supply and restriction class

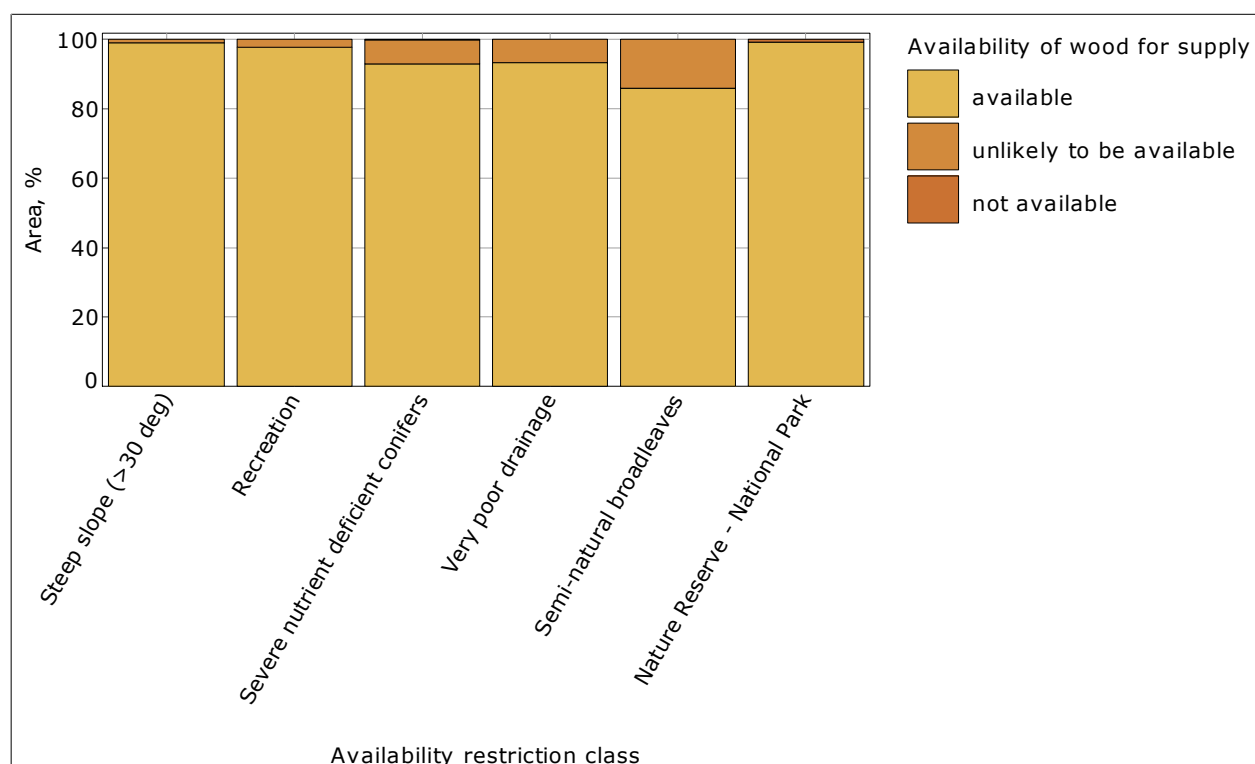
Methodology

The stocked forest area is classified by availability of wood for supply and restriction class.

Availability of wood for supply	Availability restriction class / Area					
	Severe nutrient deficient conifers			Very poor drainage		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
available	625.36	(617.24 - 633.48)	92.9	627.79	(619.86 - 635.71)	93.3
unlikely to be available	47.35	(39.26 - 55.44)	7.0	45.33	(37.40 - 53.25)	6.7
not available	0.40	(0.00 - 1.21)	0.06	-	-	-
Total	673.11	-	100.0	673.11	-	100.0

Availability of wood for supply	Availability restriction class / Area					
	Semi-natural broadleaves			Nature Reserve - National Park		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
available	578.19	(567.07 - 589.31)	85.9	668.32	(665.64 - 670.99)	99.3
unlikely to be available	94.92	(83.80 - 106.04)	14.1	-	-	-
not available	-	-	-	4.79	(2.12 - 7.47)	0.7
Total	673.11	-	100.0	673.11	-	100.0

Availability of wood for supply	Availability restriction class / Area					
	Steep slope (>30 deg)			Recreation		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
available	665.91	(662.60 - 669.21)	98.9	657.50	(652.82 - 662.18)	97.7
unlikely to be available	7.21	(3.90 - 10.51)	1.1	15.61	(10.93 - 20.29)	2.3
not available	-	-	-	-	-	-
Total	673.11	-	100.0	673.11	-	100.0



CHAPTER 4

SPECIES

In this chapter, the species composition within the forest estate is analysed. The portion of the forest estate that has tree cover or is available for planting is 687,525ha. At any one time a portion of this will be temporarily un-stocked due to events such as felling or fire. The removal of these temporarily unstocked areas leaves 673,112ha that has tree cover present. Conifer forest is the dominant forest type representing 71.2 % of all forests. Broadleaved forests represent 28.8%.

Both Private (grant aided) and public forests have a high proportion of conifer to broadleaved species in their makeup, with 79.6% conifer, 20.4% broadleaves in the former and 82.5% conifer, 17.5% broadleaves in the latter. While in the Private (other) forest estate broadleaves dominate the tree species makeup at 82.8%. The share of broadleaf species in the national forest estate has increased by 3% between 2013 and 2017. Pre-existing semi-natural broadleaf forests, identified for the first time in this NFI cycle, has contributed to the increase in the proportion of broadleaf species.

A relatively high proportion of native broadleaf tree species are present in the national forest estate, occupying 26.6% of the total stocked forest area. Not unexpectedly, native species especially comprise a major proportion (76.1%) of the Private (other) stocked forest area with Birch species and OSL broadleaves occupying 47.3% of the total species makeup in this ownership cohort.

The NFI enumerates a list of 53 tree species in the forest estate. Not surprisingly, the confidence bands on area estimates for minor species are wide. The main tree species is Sitka spruce occupying 343,310ha or 51.1% of all species. Other pines, composed primarily of Lodgepole pine, accounted for 9.6%. The most common broadleaf species present include Other short living broadleaves (OSL), such as willow and hazel, representing 7.9% of the forest estate. The two native Birch species, *Betula pubescens* and *B. pendula*, are the next most common broadleaf species occupying 7.0 % of the forest estate.

Altitude statistics identify the limited range of species suitable to higher elevations. Only Sitka spruce, 'other pines', Larch, Birch, Oak and a small area of other broadleaves are to be found at elevations over 300m. The occurrence of broadleaf tree species over 200m is uncommon.

The number of tree species per unit area is higher than sometimes perceived. Just over a quarter (25.9 %) of stands are identified as monocultures, with nearly half (48.8 %) of all forests consisting of at least three species. From a tree species diversity viewpoint, it is important to note that 17.9 % of the forest estate contains five or more tree species.

4.1 CONIFER/BROADLEAF

Definition

Representative area

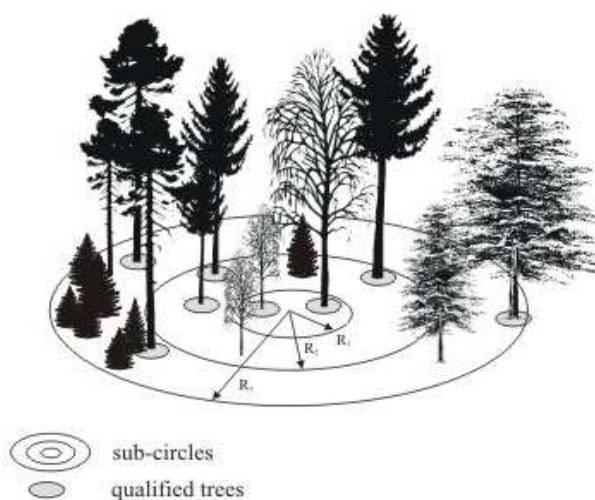
Methods are used to apportion the constituent individual species from intimate mixtures into the total area covered by the forest. In order to enable area related calculations, such as the determination of species composition, a procedure for the calculation of the so-called representative area of a tree is used. The area of an inventory plot was distributed among the trees proportionate to their size. Larger trees were allocated larger areas. The sum of all the individual tree representative areas within the plot is equal to the total plot area of 0.05 ha.

Careful consideration is needed in the interpretation of stocked areas of individual species presented in this chapter, since many forests contain an intimate mixture of species. The total stocked area of a given species therefore does not represent distinct areas of land covered by pure stands of the species, but by and large may represent the sum of shares of areas of mixed forest apportioned to it by these methods.

Definition

Concentric circles

Since the NFI used concentric circles, all trees on the plot were not assessed. Tree data on the inner sub-circles is expanded over the entire plot by weighting individual tree data by the respective concentric circle size. This expansion assumes that what is observed in the inner sub-circles for smaller Dbh trees, can be replicated over the whole plot.



	R_1	R_2	R_3
Sub-circle radius (m)	4	7	12.62
Sub-circle area (m ²)	50.3	153.9	500
Threshold Dbh (mm)	70	120	200

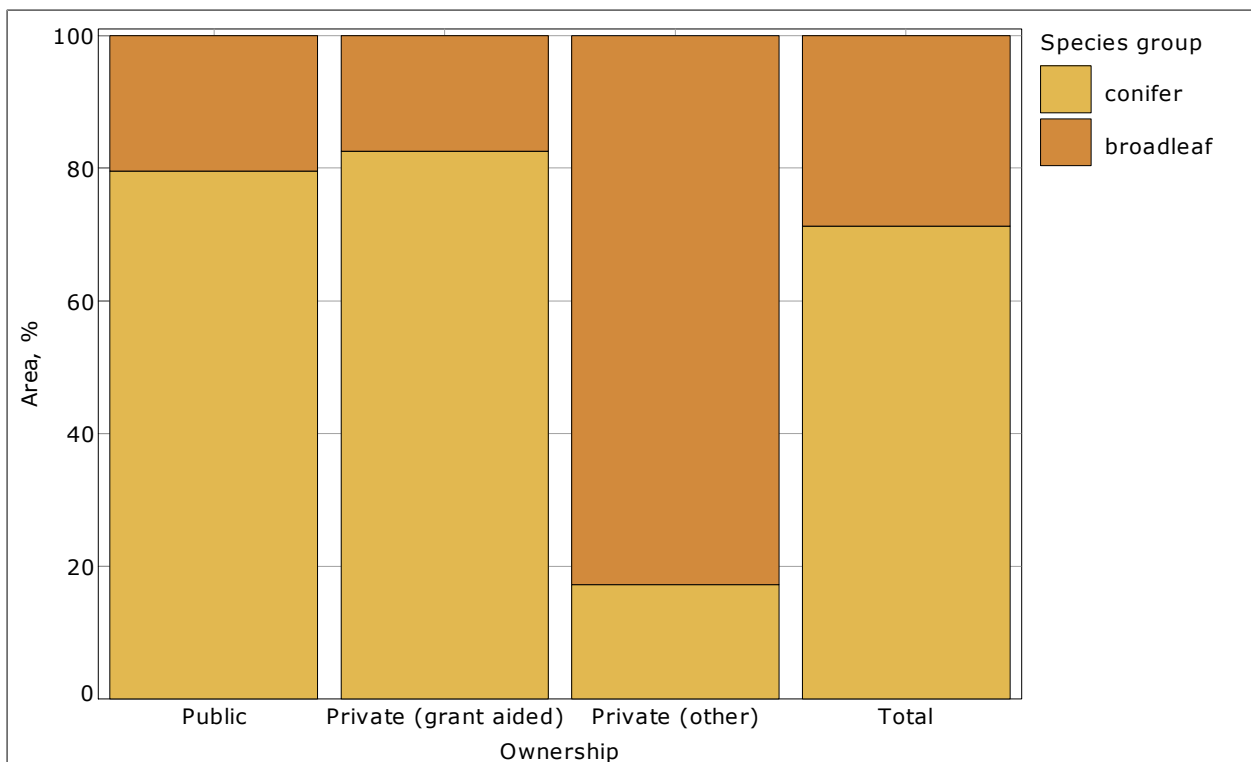
4.1.1 Stocked forest area by ownership and broad species group (conifer/broadleaf)

Definition
Conifer/broadleaf
Classification of individual tree species into two broad species groups: conifer and broadleaf.

Methodology
Stocked forest area is classified by ownership and broad species group (conifer/broadleaf).

Species group	Ownership / Area					
	public			private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
conifer	275.61	(270.34 - 280.87)	79.6	186.55	(183.52 - 189.58)	82.5
broadleaf	70.48	(64.80 - 76.16)	20.4	39.53	(35.09 - 43.97)	17.5
Total	346.09	(330.30 - 361.87)	100.0	226.09	(211.18 - 241.00)	100.0

Species group	Ownership / Area					
	private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
conifer	17.38	(15.11 - 19.64)	17.2	479.53	(472.44 - 486.63)	71.2
broadleaf	83.56	(80.11 - 87.02)	82.8	193.58	(184.34 - 202.81)	28.8
Total	100.94	(89.48 - 112.39)	100.0	673.11		100.0



4.1.2 Stocked forest area by county and species group (conifer/broadleaf)

Methodology

Stocked forest area is classified by county and species group (conifer/broadleaf).

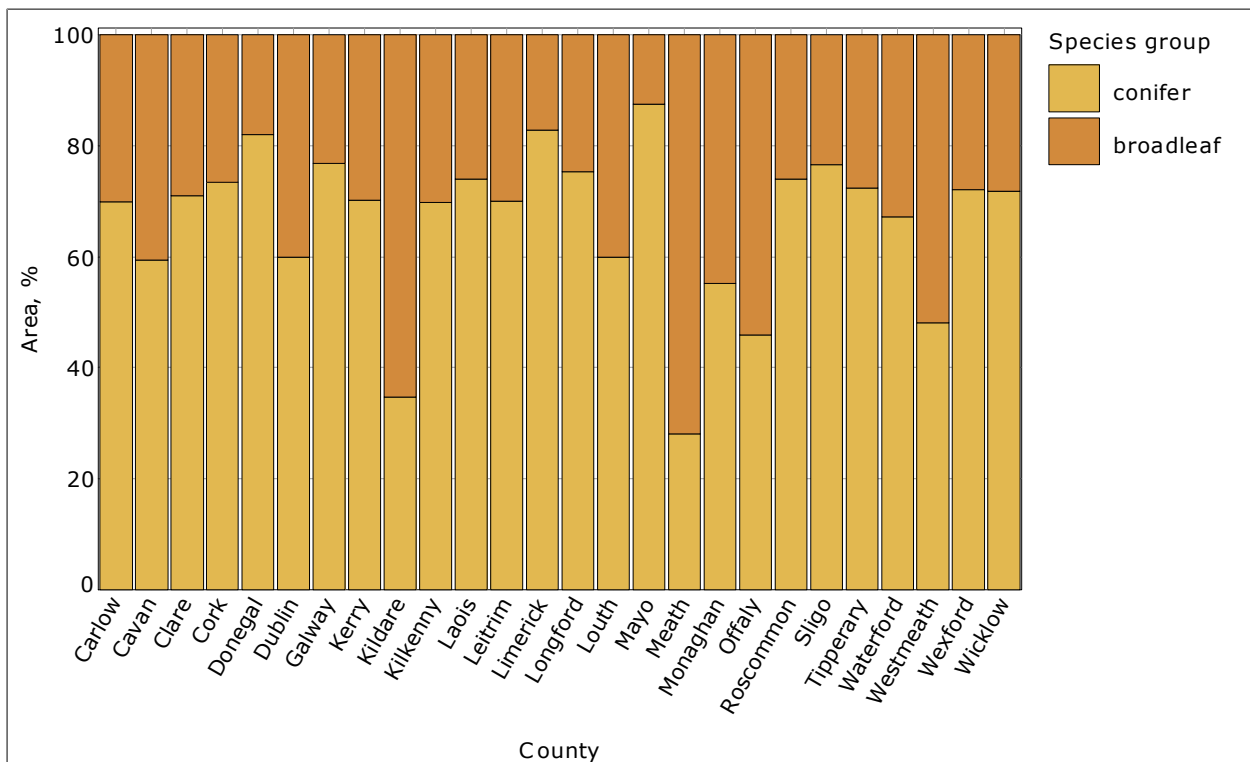
Species group	County / Area					
	Carlow			Cavan		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
conifer	4.75	(3.64 – 5.87)	69.9	8.81	(7.72 – 9.90)	59.4
broadleaf	2.05	(0.78 – 3.32)	30.1	6.01	(4.23 – 7.80)	40.6
Total	6.80		100.0	14.83		100.0
Species group	County / Area					
	Clare			Cork		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
conifer	31.66	(29.70 – 33.63)	70.9	57.23	(55.03 – 59.44)	73.4
broadleaf	12.98	(10.82 – 15.15)	29.1	20.78	(17.55 – 24.01)	26.6
Total	44.65		100.0	78.02		100.0
Species group	County / Area					
	Donegal			Dublin		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
conifer	41.24	(39.59 – 42.89)	82.0	3.36	(2.38 – 4.34)	59.9
broadleaf	9.02	(6.74 – 11.31)	18.0	2.25	(1.98 – 2.52)	40.1
Total	50.26		100.0	5.61		100.0
Species group	County / Area					
	Galway			Kerry		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
conifer	42.88	(40.78 – 44.98)	76.8	31.73	(29.77 – 33.68)	70.1
broadleaf	12.94	(10.25 – 15.63)	23.2	13.51	(10.81 – 16.21)	29.9
Total	55.82		100.0	45.24		100.0
Species group	County / Area					
	Kildare			Kilkenny		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
conifer	3.33	(2.11 – 4.54)	34.7	12.13	(10.92 – 13.33)	69.7
broadleaf	6.27	(5.00 – 7.54)	65.3	5.27	(3.66 – 6.88)	30.3
Total	9.60		100.0	17.40		100.0
Species group	County / Area					
	Laois			Leitrim		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
conifer	18.09	(16.50 – 19.69)	74.0	19.39	(17.84 – 20.93)	70.0
broadleaf	6.37	(4.78 – 7.96)	26.0	8.30	(6.11 – 10.49)	30.0
Total	24.46		100.0	27.69		100.0
Species group	County / Area					
	Limerick			Longford		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
conifer	19.18	(18.31 – 20.04)	82.9	6.00	(5.35 – 6.65)	75.3
broadleaf	3.97	(2.47 – 5.47)	17.1	1.97	(0.99 – 2.94)	24.7
Total	23.14		100.0	7.97		100.0
Species group	County / Area					
	Louth			Mayo		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
conifer	1.21		60.0	39.61	(38.28 – 40.94)	87.4
broadleaf	0.81		40.0	5.70	(3.55 – 7.85)	12.6
Total	2.02		100.0	45.31		100.0
Species group	County / Area					
	Meath			Monaghan		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
conifer	3.06	(1.74 – 4.39)	28.1	2.65	(2.06 – 3.23)	55.2
broadleaf	7.84	(6.72 – 8.95)	71.9	2.15	(0.92 – 3.39)	44.8
Total	10.90		100.0	4.80		100.0

Species group	County / Area					
	Offaly			Roscommon		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
conifer	11.80	(10.04 – 13.57)	45.9	18.25	(16.90 – 19.59)	74.0
broadleaf	13.91	(11.69 – 16.14)	54.1	6.42	(4.50 – 8.34)	26.0
Total	25.72		100.0	24.67		100.0

Species group	County / Area					
	Sligo			Tipperary		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
conifer	15.15	(14.11 – 16.19)	76.5	31.74	(29.75 – 33.72)	72.4
broadleaf	4.64	(2.78 – 6.51)	23.5	12.13	(9.81 – 14.44)	27.6
Total	19.79		100.0	43.86		100.0

Species group	County / Area					
	Waterford			Westmeath		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
conifer	15.67	(13.98 – 17.35)	67.2	6.91	(5.88 – 7.94)	48.1
broadleaf	7.66	(5.87 – 9.45)	32.8	7.46	(5.79 – 9.12)	51.9
Total	23.33		100.0	14.36		100.0

Species group	County / Area					
	Wexford			Wicklow		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
conifer	9.97	(8.88 – 11.06)	72.1	23.73	(22.22 – 25.24)	71.8
broadleaf	3.86	(2.40 – 5.31)	27.9	9.31	(7.25 – 11.36)	28.2
Total	13.83		100.0	33.04		100.0



4.1.3 Stocked forest area by ownership and species type (native/non-native)

Definition

Native/non-native

Classification of individual tree species into two broad species types: native and non-native.

Native tree species:

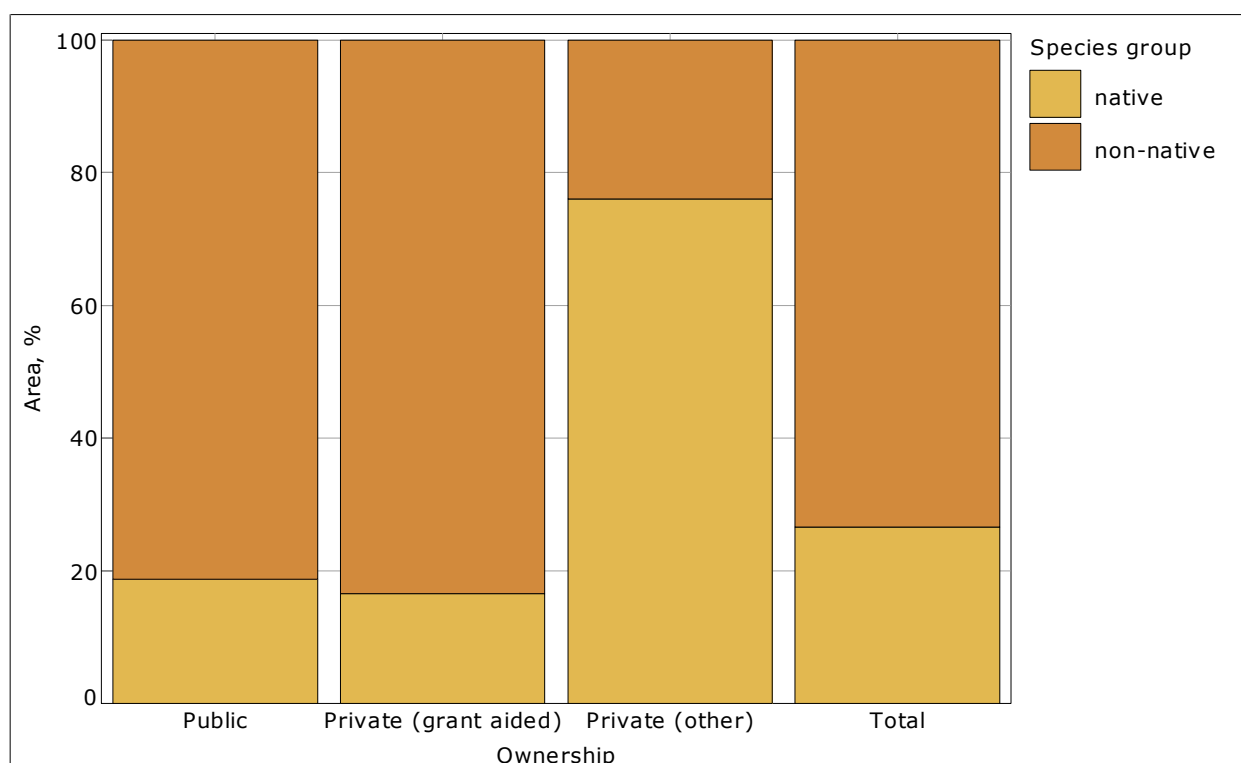
Common Name	Botanical Name	Common Name	Botanical Name
Alder	<i>Alnus glutinosa</i>	Crab apple	<i>Malus sylvestris</i>
Silver birch	<i>Betula pendula</i>	Aspen	<i>Populus tremula</i>
Downy birch	<i>Betula pubescens</i>	Wild cherry	<i>Prunus avium</i>
Ash	<i>Fraxinus excelsior</i>	Eared willow	<i>Salix aurita</i>
Sessile Oak	<i>Quercus petraea</i>	Goat willow	<i>Salix caprea</i>
Pedunculate Oak	<i>Quercus robur</i>	Rusty willow	<i>Salix cinerea ssp. Oleifolia</i>
Scots pine	<i>Pinus sylvestris</i>	Rowan	<i>Sorbus aucuparia</i>
Hazel	<i>Corylus avellana</i>	Yew	<i>Taxus baccata</i>
Holly	<i>Ilex aquifolium</i>		

Methodology

Stocked forest area is classified by ownership and species type (native/non-native).

Species (native/non-native)	Ownership / Area					
	public			private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
native	64.81	(59.24 - 70.39)	18.7	37.33	(32.86 - 41.81)	16.5
non-native	281.27	(276.12 - 286.42)	81.3	188.75	(185.30 - 192.21)	83.5
Total	346.09	(330.30 - 361.87)	100.0	226.09	(211.18 - 241.00)	100.0

Species (native/non-native)	Ownership / Area					
	private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
native	76.83	(73.32 - 80.34)	76.1	178.98	(169.82 - 188.14)	26.6
non-native	24.11	(21.20 - 27.01)	23.9	494.13	(486.41 - 501.85)	73.4
Total	100.94	(89.48 - 112.39)	100.0	673.11		100.0



4.1.4 Stocked forest area by county and species group (native/non-native)

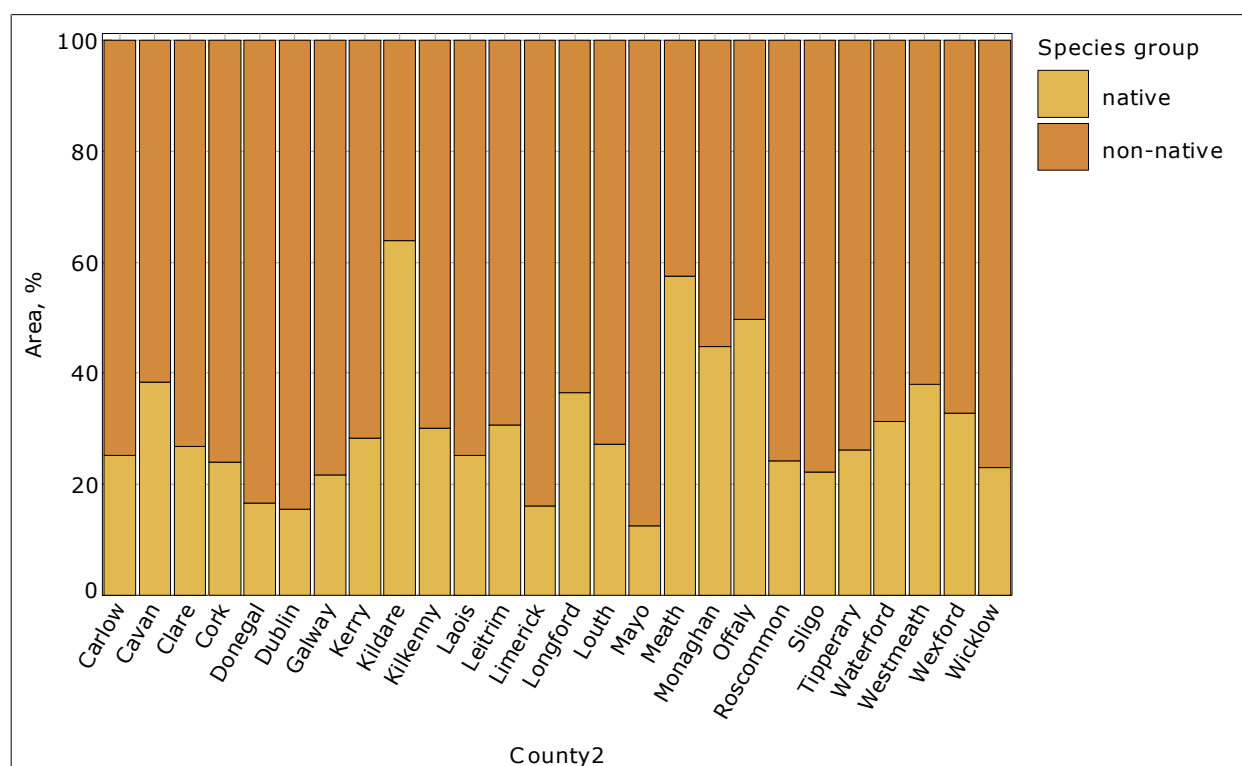
Methodology						
Stocked forest area is classified by county and species group (native/non-native).						
Species group	County / Area					
	Carlow			Cavan		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
native	1.71	(0.39 - 3.04)	25.2	5.70	(3.89 - 7.51)	38.5
non-native	5.09	(4.42 - 5.76)	74.8	9.12	(7.79 - 10.46)	61.5
Total	6.80		100.0	14.83		100.0
Species group	County / Area					
	Clare			Cork		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
native	11.97	(9.75 - 14.19)	26.8	18.67	(15.54 - 21.80)	23.9
non-native	32.67	(30.65 - 34.70)	73.2	59.35	(56.57 - 62.13)	76.1
Total	44.65		100.0	78.02		100.0
Species group	County / Area					
	Donegal			Dublin		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
native	8.32	(6.07 - 10.57)	16.6	0.87	(0.00 - 1.82)	15.6
non-native	41.94	(40.10 - 43.79)	83.4	4.74	(4.14 - 5.33)	84.4
Total	50.26		100.0	5.61		100.0
Species group	County / Area					
	Galway			Kerry		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
native	12.06	(9.49 - 14.62)	21.6	12.81	(10.19 - 15.43)	28.3
non-native	43.76	(41.62 - 45.90)	78.4	32.43	(30.41 - 34.45)	71.7
Total	55.82		100.0	45.24		100.0
Species group	County / Area					
	Kildare			Kilkenny		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
native	6.13	(4.94 - 7.32)	63.9	5.25	(3.65 - 6.84)	30.2
non-native	3.46	(2.21 - 4.72)	36.1	12.15	(10.78 - 13.52)	69.8
Total	9.60		100.0	17.40		100.0
Species group	County / Area					
	Laois			Leitrim		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
native	6.15	(4.56 - 7.74)	25.1	8.50	(6.29 - 10.72)	30.7
non-native	18.31	(16.53 - 20.09)	74.9	19.18	(17.29 - 21.08)	69.3
Total	24.46		100.0	27.69		100.0
Species group	County / Area					
	Limerick			Longford		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
native	3.72	(2.24 - 5.20)	16.1	2.91	(1.65 - 4.17)	36.5
non-native	19.43	(18.44 - 20.41)	83.9	5.06	(4.13 - 5.98)	63.5
Total	23.14		100.0	7.97		100.0
Species group	County / Area					
	Louth			Mayo		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
native	0.55	(0.00 - 1.29)	27.3	5.70	(3.57 - 7.84)	12.6
non-native	1.47	(0.52 - 2.42)	72.7	39.61	(38.08 - 41.14)	87.4
Total	2.02		100.0	45.31		100.0
Species group	County / Area					
	Meath			Monaghan		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
native	6.28	(4.88 - 7.67)	57.6	2.15	(0.91 - 3.39)	44.8
non-native	4.63	(3.34 - 5.91)	42.4	2.65	(2.05 - 3.24)	55.2
Total	10.90		100.0	4.80		100.0

Species group	County / Area					
	Offaly			Roscommon		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
native	12.78	(10.51 - 15.05)	49.7	5.97	(4.11 - 7.84)	24.2
non-native	12.93	(11.08 - 14.78)	50.3	18.70	(17.39 - 20.01)	75.8
Total	25.72		100.0	24.67		100.0

Species group	County / Area					
	Sligo			Tipperary		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
native	4.41	(2.63 - 6.19)	22.3	11.45	(9.23 - 13.66)	26.1
non-native	15.39	(14.65 - 16.12)	77.7	32.42	(30.10 - 34.73)	73.9
Total	19.79		100.0	43.86		100.0

Species group	County / Area					
	Waterford			Westmeath		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
native	7.32	(5.65 - 8.99)	31.4	5.47	(3.80 - 7.14)	38.1
non-native	16.01	(14.15 - 17.88)	68.6	8.90	(8.01 - 9.78)	61.9
Total	23.33		100.0	14.36		100.0

Species group	County / Area					
	Wexford			Wicklow		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
native	4.54	(2.91 - 6.16)	32.8	7.59	(5.69 - 9.49)	23.0
non-native	9.29	(8.00 - 10.58)	67.2	25.45	(23.99 - 26.91)	77.0
Total	13.83		100.0	33.04		100.0



4.2 SPECIES COMPOSITION

4.2.1 Stocked forest area by species

Methodology			
Stocked forest area is classified by individual tree species.			
Species	Area		
	thousands ha	($\alpha = 0.05$)	%
Sitka spruce	343.31	(329.52 – 357.10)	50.9
lodgepole pine v SC	52.34	(45.05 – 59.63)	7.8
Norway spruce	25.77	(20.47 – 31.08)	3.8
Japanese larch	22.14	(17.78 – 26.51)	3.3
Douglas-fir	10.38	(7.03 – 13.72)	1.5
Scots pine	7.66	(5.13 – 10.20)	1.1
lodgepole pine v. NC	10.17	(7.07 – 13.27)	1.5
noble fir	1.24	(0.21 – 2.28)	0.2
European larch	2.08	(0.57 – 3.59)	0.3
lodgepole pine v. inland	0.75	(0.00 – 1.72)	0.1
lodgepole pine v. lulu	1.06	(0.00 – 2.14)	0.2
grand fir	0.40	(0.11 – 0.70)	0.06
western hemlock	0.34	(0.00 – 0.86)	0.05
Lawson cypress	0.41	(0.00 – 0.84)	0.06
silver fir	0.25	(0.00 – 0.74)	0.04
Corsican pine	0.32	(0.00 – 0.90)	0.05
Monterey pine	0.25	(0.00 – 0.70)	0.04
horse chestnut	0.21	(0.00 – 0.57)	0.03
cedar of Lebanon	0.14	(0.00 – 0.42)	0.02
yew	0.04	(0.00 – 0.10)	0.006
western redcedar	0.01	(0.00 – 0.04)	0.002
coast redwood	0.18	(0.00 – 0.53)	0.03
goat willow	37.19	(32.05 – 42.33)	5.5
ash	25.28	(20.59 – 29.97)	3.8
silver birch	23.18	(18.66 – 27.69)	3.4
downy birch	24.09	(19.57 – 28.61)	3.6
alder	17.91	(13.68 – 22.14)	2.7
hazel	10.80	(7.81 – 13.80)	1.6
pedunculate oak	11.20	(7.97 – 14.43)	1.7
beech	10.03	(7.31 – 12.74)	1.5
sycamore	10.10	(7.06 – 13.15)	1.5
holly	8.43	(6.39 – 10.47)	1.3
sessile oak	6.68	(4.36 – 9.01)	1.0
mountain ash	5.13	(3.44 – 6.82)	0.8
wych elm	0.84	(0.13 – 1.55)	0.1
small-leaved lime	0.71	(0.00 – 1.56)	0.1
sweet chestnut	0.48	(0.00 – 1.17)	0.07
white willow	0.20	(0.00 – 0.58)	0.03
notofagus sp.	0.18	(0.00 – 0.53)	0.03
large-leaved lime	0.13	(0.00 – 0.39)	0.02
Strawberry tree	0.20	(0.00 – 0.47)	0.03
field maple	0.05	(0.00 – 0.13)	0.007
cherry	0.09	(0.00 – 0.21)	0.01
English elm	0.14	(0.00 – 0.43)	0.02
crab apple	0.04	(0.00 – 0.12)	0.007
whitebeam	0.03	(0.00 – 0.08)	0.005
eastern balsam	0.01	(0.00 – 0.04)	0.002
red oak	0.03	(0.00 – 0.06)	0.004
hybrid larch	0.26	(0.00 – 0.67)	0.04
Norway maple	0.10	(0.00 – 0.28)	0.01
Turkey oak	0.08	(0.00 – 0.23)	0.01
Eucalyptus gunnii	0.01	(0.00 – 0.04)	0.002
American sweetgum	0.01	(0.00 – 0.02)	0.001
Total	673.11		100.0

4.3 SPECIES GROUP COMPOSITION

Definition

Species group

Classification of less common tree species into groups of species, on the basis of similarity in growth rate and form.

Methodology

For most NFI statistical outputs, it was more convenient to work with the species groups than with individual species. The data would not have been sufficiently representative if processed by species. The species group composition is outlined below.

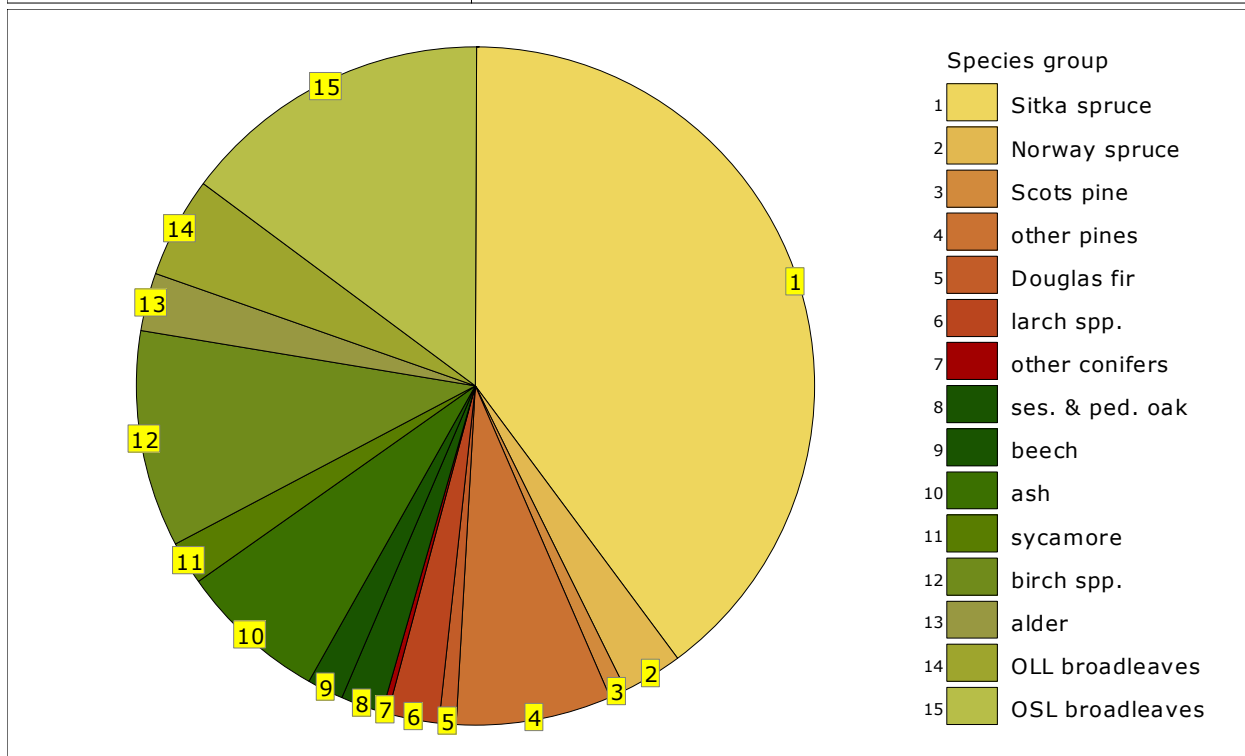
Species	Species group	Species	Species group
Sitka spruce	Sitka spruce	silver birch	birch spp.
Norway spruce	Norway spruce	downy birch	
Scots pine	Scots pine	alder	alder spp.
lodgepole pine v. inland	other pine spp.	field maple	other long living broadleaves (OLL)
lodgepole pine v. lulu		maple	
lodgepole pine v. NC		horse chestnut	
lodgepole pine v SC		strawberry tree	
Austrian pine v. maritima		hornbeam	
Monterey pine		sweet chestnut	
Douglas fir	Douglas fir	holly	
European larch	larch spp.	notofagus sp.	
Japanese larch		white poplar	
other larches		black poplar	
silver fir	other conifers	Turkey oak	
grand fir		red oak	
noble fir		whitebeam	
cedar of Lebanon		small-leaved lime	
Lawson cypress		large-leaved lime	
coast redwood		wych elm	
yew		crab apple	other short living broadleaves (OSL)
western red cedar		aspen	
western hemlock		cherry	
sessile oak	ses. and ped. oak	blackthorn	
pedunculate oak		goat willow	
beech	beech	other willows	
ash	ash	mountain ash	
sycamore	sycamore	hazel	

4.3.1 Total number of trees by species group

Methodology

The total number of trees is classified by species group.

Species group	Number of trees		
	thousands	($\alpha = 0.05$)	%
Sitka spruce	871,475	(837,041 – 905,909)	39.8
Norway spruce	62,480	(53,630 – 71,330)	2.9
Scots pine	17,706	(6,762 – 28,650)	0.8
other pines	162,694	(137,656 – 187,733)	7.4
Douglas fir	17,952	(14,079 – 21,825)	0.8
larch spp.	53,952	(45,818 – 62,086)	2.5
other conifers	5,692	(1,218 – 10,165)	0.3
ses. & ped. oak	44,164	(31,646 – 56,682)	2.0
beech	38,224	(0 – 80,922)	1.7
ash	153,288	(118,357 – 188,219)	7.0
sycamore	45,526	(26,462 – 64,590)	2.1
birch spp.	225,394	(186,722 – 264,067)	10.3
alder	60,246	(33,393 – 87,099)	2.8
OLL broadleaves	104,513	(84,869 – 124,158)	4.8
OSL broadleaves	323,819	(258,174 – 389,463)	14.8
Total	2,187,125	(2,080,100 – 2,294,150)	100.0

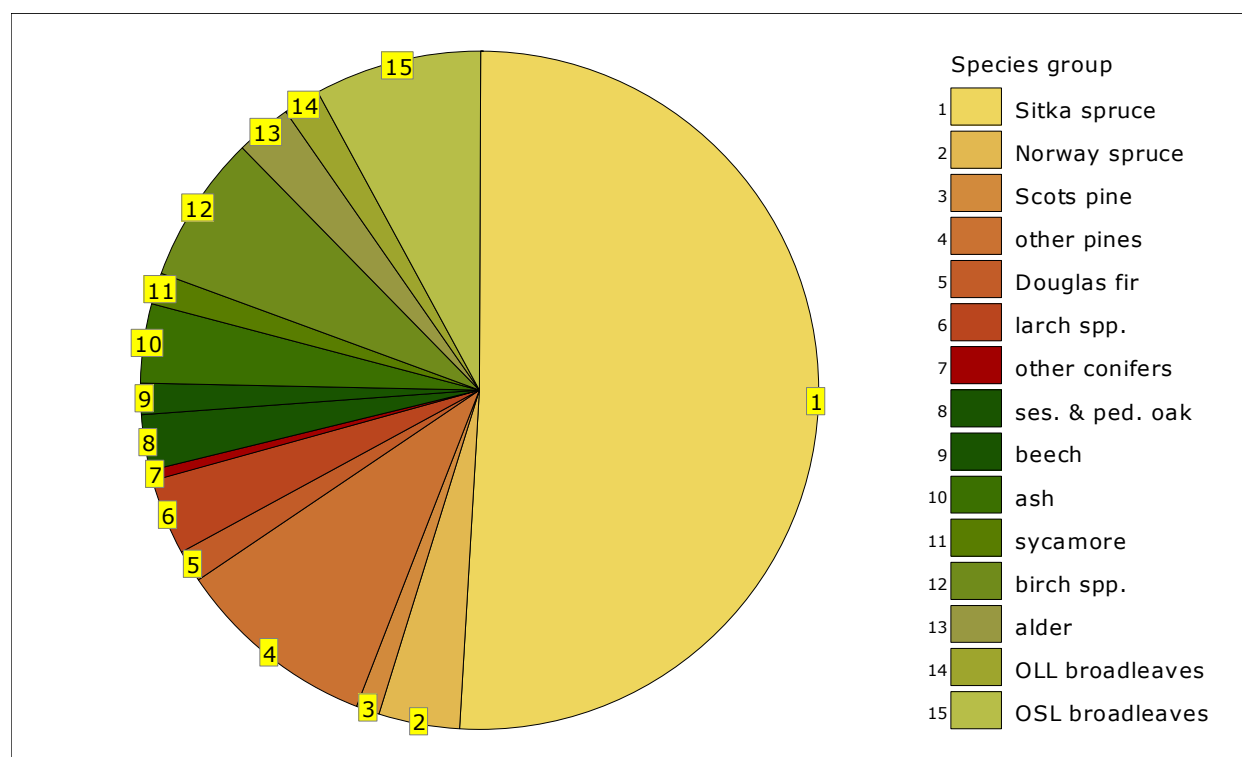


4.3.2 Stocked forest area by species group

Methodology

The stocked forest area is classified by species group.

Species group	Area		
	thousands ha	($\alpha = 0.05$)	%
Sitka spruce	343.31	(335.69 – 350.93)	51.1
Norway spruce	25.77	(22.88 – 28.66)	3.8
Scots pine	7.66	(5.83 – 9.50)	1.1
other pines	64.89	(59.71 – 70.08)	9.6
Douglas fir	10.38	(9.15 – 11.61)	1.5
larch spp.	24.49	(21.14 – 27.84)	3.6
other conifers	3.03	(1.96 – 4.09)	0.4
ses. & ped. oak	17.88	(14.78 – 20.98)	2.7
beech	10.03	(7.98 – 12.07)	1.5
ash	25.28	(21.50 – 29.05)	3.8
sycamore	10.10	(7.67 – 12.54)	1.5
birch spp.	47.27	(43.07 – 51.46)	7.0
alder	17.91	(14.89 – 20.93)	2.7
OLL broadleaves	11.82	(9.83 – 13.82)	1.8
OSL broadleaves	53.28	(48.17 – 58.39)	7.9
Total	673.11		100.0



4.3.3 Stocked forest area by county and species group

Methodology

The stocked forest area is classified by county and species group.

Species group	County / Area					
	Carlow			Cavan		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Sitka spruce	3.53	(2.50 - 4.55)	51.9	6.85	(5.75 - 7.95)	46.1
Norway spruce	0.07		1.0	0.84	(0.00 - 1.80)	5.7
Scots pine	0.17	(0.00 - 2.01)	2.5	0.20		1.4
other pines	-	-	-	0.39	(0.00 - 2.07)	2.6
Douglas fir	0.78	(0.77 - 0.79)	11.4	-	-	-
larch spp.	0.21	(0.00 - 0.78)	3.1	0.50	(0.00 - 1.03)	3.4
other conifers	-	-	-	0.03		0.2
ses. & ped. oak	0.24		3.6	0.69	(0.00 - 1.40)	4.7
beech	0.00		0.02	0.00		0.009
ash	0.43	(0.00 - 2.08)	6.4	0.84	(0.00 - 1.74)	5.7
sycamore	0.05	(0.00 - 0.63)	0.7	0.41	(0.00 - 2.07)	2.8
birch spp.	0.51	(0.00 - 1.89)	7.5	0.91	(0.18 - 1.64)	6.1
alder	0.19		2.8	0.84	(0.00 - 1.87)	5.6
OLL broadleaves	0.46	(0.00 - 1.65)	6.8	0.23	(0.03 - 0.44)	1.6
OSL broadleaves	0.16	(0.08 - 0.23)	2.3	2.09	(0.70 - 3.49)	14.1
Total	6.80		100.0	14.83		100.0

Species group	County / Area					
	Clare			Cork		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Sitka spruce	26.34	(24.30 - 28.39)	58.9	46.62	(43.69 - 49.55)	59.9
Norway spruce	0.59	(0.00 - 1.69)	1.3	0.46	(0.00 - 3.43)	0.6
Scots pine	-	-	-	0.57	(0.18 - 0.96)	0.7
other pines	3.49	(2.13 - 4.84)	7.8	5.01	(3.55 - 6.46)	6.4
Douglas fir	-	-	-	1.39	(0.60 - 2.17)	1.8
larch spp.	1.25	(0.55 - 1.95)	2.8	2.97	(1.71 - 4.23)	3.8
other conifers	-	-	-	0.23	(0.00 - 0.60)	0.3
ses. & ped. oak	0.14	(0.02 - 0.27)	0.3	2.38	(1.23 - 3.52)	3.0
beech	0.61	(0.00 - 1.42)	1.4	1.50	(0.54 - 2.47)	1.9
ash	3.62	(2.14 - 5.10)	8.1	2.76	(1.42 - 4.10)	3.5
sycamore	0.40	(0.00 - 1.01)	0.9	1.13	(0.16 - 2.09)	1.4
birch spp.	2.27	(1.10 - 3.44)	5.1	3.18	(1.98 - 4.38)	4.1
alder	1.20	(0.18 - 2.21)	2.7	3.04	(1.88 - 4.20)	3.9
OLL broadleaves	0.66	(0.00 - 1.40)	1.5	1.91	(1.27 - 2.54)	2.4
OSL broadleaves	4.09	(2.64 - 5.55)	9.2	4.89	(3.46 - 6.32)	6.3
Total	44.65		100.0	78.02		100.0

Species group	County / Area					
	Donegal			Dublin		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Sitka spruce	31.57	(29.18 – 33.96)	62.8	2.14	(1.72 – 2.55)	38.1
Norway spruce	0.31		0.6	–	–	–
Scots pine	–	–	–	0.05		0.9
other pines	7.70	(5.95 – 9.45)	15.3	0.87	(0.00 – 1.78)	15.6
Douglas fir	–	–	–	0.10		1.8
larch spp.	1.37	(0.44 – 2.31)	2.7	0.15	(0.00 – 1.91)	2.7
other conifers	0.29	(0.00 – 0.80)	0.6	0.05		0.8
ses. & ped. oak	0.40	(0.00 – 1.85)	0.8	0.40	(0.00 – 4.17)	7.2
beech	0.58	(0.09 – 1.07)	1.1	0.07	(0.00 – 0.53)	1.2
ash	0.49	(0.10 – 0.88)	1.0	0.35	(0.00 – 0.74)	6.2
sycamore	0.13	(0.00 – 1.63)	0.3	0.79	(0.00 – 1.60)	14.0
birch spp.	2.06	(1.03 – 3.08)	4.1	–	–	–
alder	1.18	(0.41 – 1.94)	2.3	0.04		0.7
OLL broadleaves	0.28	(0.00 – 0.70)	0.6	0.60	(0.00 – 2.04)	10.6
OSL broadleaves	3.93	(2.52 – 5.33)	7.8	0.01		0.2
Total	50.26		100.0	5.61		100.0

Species group	County / Area					
	Galway			Kerry		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Sitka spruce	28.47	(26.07 – 30.87)	51.0	26.65	(24.72 – 28.58)	58.9
Norway spruce	1.63	(0.89 – 2.37)	2.9	0.40		0.9
Scots pine	0.52	(0.00 – 1.33)	0.9	0.06	(0.00 – 0.57)	0.1
other pines	11.32	(9.06 – 13.57)	20.3	3.28	(2.06 – 4.49)	7.2
Douglas fir	–	–	–	0.01		0.02
larch spp.	0.87	(0.38 – 1.36)	1.6	1.30	(0.48 – 2.13)	2.9
other conifers	0.07	(0.00 – 0.27)	0.1	0.03	(0.00 – 0.39)	0.07
ses. & ped. oak	0.85	(0.00 – 1.89)	1.5	1.66	(0.69 – 2.62)	3.7
beech	0.52	(0.05 – 0.98)	0.9	0.26	(0.00 – 0.79)	0.6
ash	1.28	(0.37 – 2.20)	2.3	0.63	(0.34 – 0.93)	1.4
sycamore	0.89	(0.00 – 1.85)	1.6	0.44	(0.00 – 2.06)	1.0
birch spp.	3.38	(2.21 – 4.55)	6.1	3.80	(2.49 – 5.12)	8.4
alder	0.59	(0.00 – 1.19)	1.1	2.36	(1.15 – 3.57)	5.2
OLL broadleaves	0.49	(0.14 – 0.83)	0.9	2.18	(1.43 – 2.93)	4.8
OSL broadleaves	4.93	(3.27 – 6.60)	8.8	2.18	(1.37 – 2.99)	4.8
Total	55.82		100.0	45.24		100.0

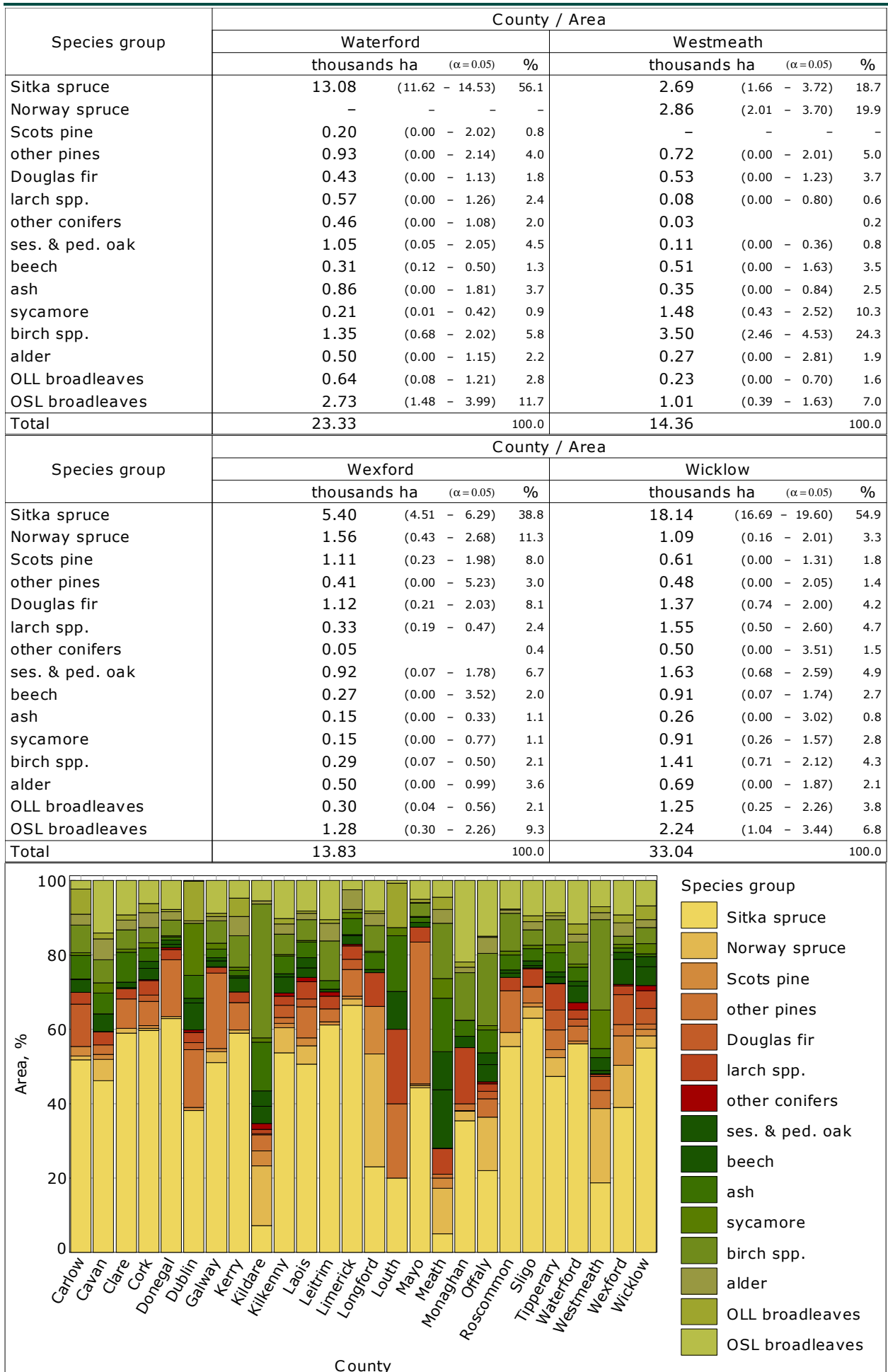
Species group	County / Area					
	Kildare			Kilkenny		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Sitka spruce	0.69	(0.00 – 1.61)	7.2	9.35	(8.07 – 10.62)	53.7
Norway spruce	1.55	(0.76 – 2.34)	16.1	1.17	(0.27 – 2.07)	6.7
Scots pine	0.39	(0.00 – 4.11)	4.0	0.20	(0.00 – 2.55)	1.2
other pines	0.41	(0.00 – 5.14)	4.3	0.27	(0.00 – 0.55)	1.5
Douglas fir	0.03	(0.00 – 0.17)	0.3	0.57	(0.00 – 1.89)	3.3
larch spp.	0.11	(0.00 – 0.93)	1.1	0.43	(0.00 – 1.29)	2.5
other conifers	0.15		1.6	0.14	(0.00 – 0.35)	0.8
ses. & ped. oak	0.44	(0.00 – 2.07)	4.6	0.77	(0.13 – 1.41)	4.4
beech	0.40	(0.15 – 0.65)	4.2	0.15	(0.00 – 0.34)	0.9
ash	1.25	(0.38 – 2.12)	13.0	0.82	(0.00 – 1.70)	4.7
sycamore	0.12	(0.00 – 0.39)	1.2	0.08		0.4
birch spp.	3.45	(2.11 – 4.78)	36.1	0.94	(0.22 – 1.66)	5.4
alder	0.08		0.8	0.48	(0.00 – 4.71)	2.7
OLL broadleaves	–	–	–	0.27	(0.00 – 0.75)	1.6
OSL broadleaves	0.53	(0.14 – 0.91)	5.5	1.77	(0.67 – 2.87)	10.2
Total	9.60		100.0	17.40		100.0

Species group	County / Area					
	Laois			Leitrim		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Sitka spruce	12.37	(10.85 - 13.89)	50.5	16.94	(15.29 - 18.60)	61.3
Norway spruce	1.20	(0.23 - 2.16)	4.9	-	-	-
Scots pine	0.55	(0.00 - 1.47)	2.3	0.23	(0.00 - 2.81)	0.8
other pines	2.04	(0.83 - 3.25)	8.3	0.94	(0.01 - 1.86)	3.4
Douglas fir	0.50	(0.06 - 0.95)	2.1	-	-	-
larch spp.	1.13	(0.05 - 2.20)	4.6	0.96	(0.22 - 1.70)	3.5
other conifers	0.30	(0.00 - 1.27)	1.2	0.32	-	1.1
ses. & ped. oak	0.62	(0.04 - 1.21)	2.6	0.20	(0.00 - 0.93)	0.7
beech	0.66	(0.29 - 1.04)	2.7	0.01	(0.00 - 0.14)	0.04
ash	1.03	(0.26 - 1.79)	4.2	0.62	(0.00 - 1.78)	2.2
sycamore	0.11	(0.00 - 0.22)	0.4	-	-	-
birch spp.	1.37	(0.85 - 1.88)	5.6	2.95	(1.80 - 4.10)	10.7
alder	0.43	(0.00 - 5.10)	1.8	1.34	(0.22 - 2.45)	4.8
OLL broadleaves	0.12	(0.01 - 0.22)	0.5	0.27	(0.06 - 0.49)	1.0
OSL broadleaves	2.02	(0.89 - 3.16)	8.3	2.91	(1.68 - 4.13)	10.5
Total	24.46		100.0	27.69		100.0
Species group	County / Area					
	Limerick			Longford		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Sitka spruce	15.40	(14.52 - 16.27)	66.4	1.83	(0.60 - 3.07)	23.0
Norway spruce	0.40		1.7	2.42	(1.37 - 3.47)	30.4
Scots pine	0.17		0.7	1.01	(0.07 - 1.96)	12.7
other pines	1.65	(0.33 - 2.97)	7.1	0.00		0.06
Douglas fir	0.65	(0.00 - 2.56)	2.8	-	-	-
larch spp.	0.81	(0.49 - 1.13)	3.5	0.72	(0.07 - 1.38)	9.1
other conifers	0.11	(0.00 - 0.67)	0.5	-	-	-
ses. & ped. oak	0.55	(0.00 - 2.03)	2.4	0.06		0.8
beech	0.04	(0.00 - 0.45)	0.2	-	-	-
ash	1.01	(0.00 - 2.12)	4.4	0.37	(0.00 - 0.91)	4.7
sycamore	0.37	(0.00 - 1.60)	1.6	0.02	(0.00 - 0.04)	0.3
birch spp.	0.18	(0.08 - 0.28)	0.8	0.55	(0.20 - 0.90)	6.9
alder	1.24	(0.26 - 2.22)	5.4	0.26	(0.00 - 0.53)	3.2
OLL broadleaves	-	-	-	0.05		0.6
OSL broadleaves	0.57	(0.30 - 0.85)	2.5	0.65	(0.00 - 1.54)	8.2
Total	23.14		100.0	7.97		100.0
Species group	County / Area					
	Louth			Mayo		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Sitka spruce	0.40		19.9	20.08	(17.72 - 22.43)	44.5
Norway spruce	-	-	-	0.29	(0.00 - 3.15)	0.6
Scots pine	-	-	-	0.17	(0.11 - 0.24)	0.4
other pines	0.40		20.0	17.24	(14.89 - 19.59)	38.0
Douglas fir	-	-	-	-	-	-
larch spp.	0.40		20.0	1.82	(0.85 - 2.79)	4.0
other conifers	-	-	-	0.01		0.02
ses. & ped. oak	-	-	-	0.59	(0.32 - 0.85)	1.3
beech	0.21	(0.00 - 1.43)	10.3	0.01		0.02
ash	0.30	(0.00 - 3.87)	14.9	0.58	(0.00 - 1.27)	1.3
sycamore	0.04		2.2	0.16	(0.00 - 0.37)	0.4
birch spp.	-	-	-	1.61	(0.59 - 2.62)	3.5
alder	-	-	-	0.06	(0.00 - 0.29)	0.1
OLL broadleaves	0.24		12.0	0.38	(0.12 - 0.65)	0.8
OSL broadleaves	0.01		0.7	2.31	(1.06 - 3.57)	5.1
Total	2.02		100.0	45.31		100.0

Species group	County / Area					
	Meath			Monaghan		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Sitka spruce	0.55	(0.00 – 1.70)	5.1	1.70	(0.82 – 2.57)	35.5
Norway spruce	1.33	(0.51 – 2.16)	12.2	0.12		2.6
Scots pine	0.29	(0.00 – 0.99)	2.6	0.01		0.1
other pines	0.12		1.1	0.09	(0.00 – 0.74)	1.8
Douglas fir	–	–	–	–	–	–
larch spp.	0.75	(0.00 – 2.27)	6.9	0.73	(0.00 – 2.30)	15.2
other conifers	0.01	(0.00 – 0.16)	0.1	–	–	–
ses. & ped. oak	1.70	(0.81 – 2.60)	15.7	0.14		3.0
beech	1.11	(0.33 – 1.90)	10.2	–	–	–
ash	1.57	(0.44 – 2.71)	14.4	0.20	(0.00 – 0.52)	4.1
sycamore	0.57	(0.00 – 1.16)	5.3	0.01		0.1
birch spp.	1.61	(1.11 – 2.12)	14.8	0.62	(0.09 – 1.14)	12.9
alder	0.40		3.7	0.07		1.4
OLL broadleaves	0.37	(0.07 – 0.67)	3.4	0.07	(0.00 – 0.90)	1.5
OSL broadleaves	0.49	(0.00 – 1.08)	4.5	1.05	(0.09 – 2.01)	21.8
Total	10.90		100.0	4.80		100.0

Species group	County / Area					
	Offaly			Roscommon		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Sitka spruce	5.66	(4.14 – 7.18)	22.1	13.66	(12.28 – 15.04)	55.6
Norway spruce	3.71	(2.52 – 4.91)	14.4	0.92	(0.16 – 1.68)	3.7
Scots pine	–	–	–	0.01		0.03
other pines	1.24	(0.24 – 2.25)	4.8	2.76	(1.61 – 3.90)	11.2
Douglas fir	0.52	(0.00 – 1.37)	2.0	–	–	–
larch spp.	0.52	(0.00 – 1.96)	2.0	0.90	(0.16 – 1.63)	3.6
other conifers	0.15	(0.00 – 1.88)	0.6	–	–	–
ses. & ped. oak	1.17	(0.05 – 2.30)	4.6	0.27	(0.00 – 1.00)	1.1
beech	0.84	(0.00 – 2.03)	3.3	0.21	(0.00 – 0.78)	0.8
ash	1.57	(0.55 – 2.58)	6.1	1.02	(0.25 – 1.78)	4.1
sycamore	0.29	(0.00 – 1.35)	1.1	0.25	(0.00 – 1.06)	1.0
birch spp.	5.00	(3.51 – 6.48)	19.4	2.52	(1.35 – 3.69)	10.2
alder	1.13	(0.06 – 2.20)	4.4	0.21	(0.00 – 1.13)	0.8
OLL broadleaves	0.05	(0.00 – 0.18)	0.2	0.06	(0.00 – 0.72)	0.2
OSL broadleaves	3.86	(2.51 – 5.22)	15.0	1.89	(1.11 – 2.67)	7.7
Total	25.72		100.0	24.67		100.0

Species group	County / Area					
	Sligo			Tipperary		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Sitka spruce	12.47	(11.18 – 13.75)	62.7	20.74	(18.99 – 22.48)	47.3
Norway spruce	0.60	(0.00 – 2.57)	3.1	2.24	(1.22 – 3.27)	5.1
Scots pine	0.20	(0.00 – 2.67)	1.0	0.95	(0.35 – 1.55)	2.2
other pines	0.84	(0.17 – 1.51)	4.3	2.29	(1.15 – 3.43)	5.2
Douglas fir	0.04		0.2	2.35	(1.94 – 2.75)	5.3
larch spp.	0.93	(0.13 – 1.73)	4.7	3.11	(1.60 – 4.63)	7.1
other conifers	0.06		0.3	0.05	(0.00 – 0.26)	0.1
ses. & ped. oak	0.10	(0.00 – 0.91)	0.5	0.78	(0.00 – 1.60)	1.8
beech	0.27	(0.00 – 0.72)	1.4	0.57	(0.00 – 1.14)	1.3
ash	0.65	(0.00 – 1.49)	3.3	2.27	(1.09 – 3.46)	5.2
sycamore	0.17		0.9	0.93	(0.00 – 2.11)	2.1
birch spp.	0.82	(0.07 – 1.57)	4.2	2.99	(1.85 – 4.13)	6.8
alder	0.45	(0.00 – 4.76)	2.3	0.38	(0.00 – 1.16)	0.9
OLL broadleaves	0.29	(0.00 – 0.70)	1.5	0.43	(0.09 – 0.76)	1.0
OSL broadleaves	1.90	(0.77 – 3.02)	9.6	3.78	(2.31 – 5.24)	8.6
Total	19.79		100.0	43.86		100.0



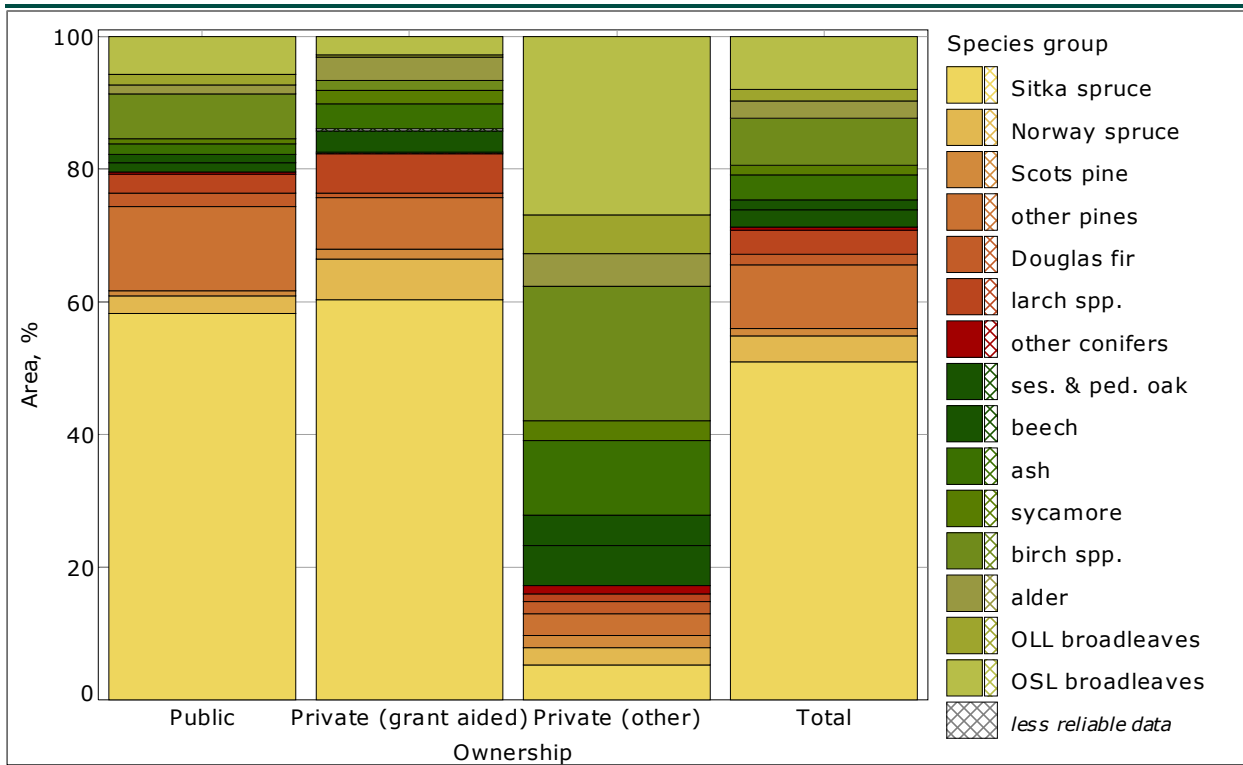
4.3.4 Stocked forest area by ownership and species group

Methodology

The stocked forest area is classified by ownership and species group.

Species group	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Sitka spruce	201.68	(195.94 – 207.43)	58.5	136.28	(132.08 – 140.48)	60.3
Norway spruce	9.14	(7.46 – 10.83)	2.6	14.01	(12.22 – 15.80)	6.2
Scots pine	2.50	(1.12 – 3.89)	0.7	3.36	(2.29 – 4.42)	1.5
other pines	43.92	(39.53 – 48.30)	12.7	17.59	(15.26 – 19.93)	7.8
Douglas fir	7.13	(6.13 – 8.13)	2.1	1.43	(1.31 – 1.56)	0.6
larch spp.	9.76	(7.38 – 12.15)	2.8	13.54	(11.33 – 15.75)	6.0
other conifers	1.46	(0.82 – 2.11)	0.4	0.34	–	0.1
ses. & ped. oak	4.42	(3.25 – 5.59)	1.3	7.39	(5.54 – 9.25)	3.3
beech	4.57	(3.02 – 6.11)	1.3	0.79	–	0.3
ash	5.59	(3.78 – 7.39)	1.6	8.30	(5.69 – 10.92)	3.7
sycamore	2.50	(1.18 – 3.82)	0.7	4.66	(2.79 – 6.52)	2.1
birch spp.	23.29	(20.30 – 26.28)	6.7	3.43	(2.26 – 4.60)	1.5
alder	4.95	(3.22 – 6.68)	1.4	8.09	(6.13 – 10.05)	3.6
OLL broadleaves	5.29	(3.88 – 6.70)	1.5	0.68	(0.25 – 1.11)	0.3
OSL broadleaves	19.89	(16.97 – 22.81)	5.7	6.18	(4.65 – 7.72)	2.7
Total	346.09	(330.30 – 361.87)	100.0	226.09	(211.18 – 241.00)	100.0

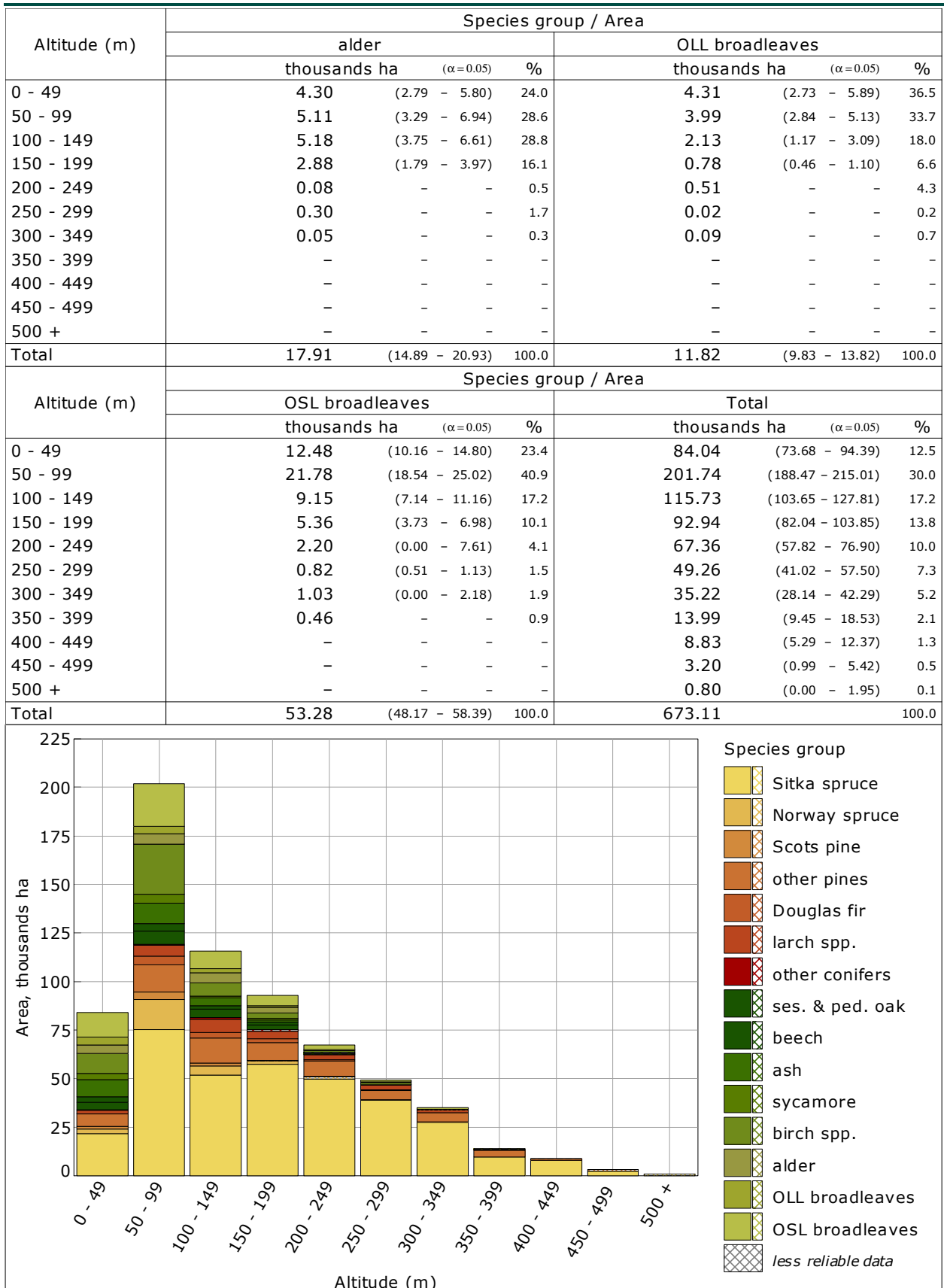
Species group	Ownership / Area					
	Private (other)			Total		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Sitka spruce	5.35	(3.61 – 7.09)	5.3	343.31	(335.69 – 350.93)	51.1
Norway spruce	2.62	(0.86 – 4.37)	2.6	25.77	(22.88 – 28.66)	3.8
Scots pine	1.80	(0.40 – 3.20)	1.8	7.66	(5.83 – 9.50)	1.1
other pines	3.38	(0.00 – 7.76)	3.4	64.89	(59.71 – 70.08)	9.6
Douglas fir	1.82	(0.60 – 3.04)	1.8	10.38	(9.15 – 11.61)	1.5
larch spp.	1.18	(0.31 – 2.06)	1.2	24.49	(21.14 – 27.84)	3.6
other conifers	1.22	(0.00 – 2.60)	1.2	3.03	(1.96 – 4.09)	0.4
ses. & ped. oak	6.07	(4.67 – 7.46)	6.0	17.88	(14.78 – 20.98)	2.7
beech	4.67	(3.51 – 5.83)	4.6	10.03	(7.98 – 12.07)	1.5
ash	11.39	(9.31 – 13.46)	11.3	25.28	(21.50 – 29.05)	3.8
sycamore	2.95	(1.77 – 4.13)	2.9	10.10	(7.67 – 12.54)	1.5
birch spp.	20.55	(18.23 – 22.87)	20.4	47.27	(43.07 – 51.46)	7.0
alder	4.87	(3.51 – 6.23)	4.8	17.91	(14.89 – 20.93)	2.7
OLL broadleaves	5.85	(4.65 – 7.06)	5.8	11.82	(9.83 – 13.82)	1.8
OSL broadleaves	27.21	(24.08 – 30.34)	26.9	53.28	(48.17 – 58.39)	7.9
Total	100.94	(89.48 – 112.39)	100.0	673.11		100.0



4.3.5 Stocked forest area by species group and altitude

Methodology						
The stocked forest area is classified by species group and altitude.						
Altitude (m)	Species group / Area					
	Sitka spruce			Norway spruce		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
0 - 49	21.61	(19.32 - 23.90)	6.3	2.52	(2.03 - 3.02)	9.8
50 - 99	75.26	(71.21 - 79.31)	22.1	15.53	(13.31 - 17.75)	60.2
100 - 149	51.74	(48.33 - 55.16)	15.1	4.68	(2.89 - 6.48)	18.2
150 - 199	57.47	(54.68 - 60.27)	16.7	1.61	(0.00 - 4.77)	6.2
200 - 249	49.93	(47.83 - 52.03)	14.5	1.02	-	4.0
250 - 299	38.85	(36.86 - 40.84)	11.3	0.40	-	1.6
300 - 349	27.63	(25.74 - 29.52)	8.0	-	-	-
350 - 399	9.66	(8.29 - 11.04)	2.8	-	-	-
400 - 449	7.89	(7.70 - 8.08)	2.3	-	-	-
450 - 499	2.46	(0.00 - 6.45)	0.7	-	-	-
500 +	0.80	-	0.2	-	-	-
Total	343.31	(335.69 - 350.93)	100.0	25.77	(22.88 - 28.66)	100.0
Altitude (m)	Species group / Area					
	Scots pine			other pines		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
0 - 49	1.44	(0.34 - 2.54)	18.8	6.24	(5.17 - 7.31)	9.6
50 - 99	3.91	(2.48 - 5.33)	50.9	14.03	(11.56 - 16.50)	21.8
100 - 149	1.57	(1.06 - 2.08)	20.5	12.94	(10.90 - 14.99)	19.9
150 - 199	0.37	-	4.8	9.21	(7.15 - 11.27)	14.2
200 - 249	0.23	-	3.0	7.91	(6.53 - 9.30)	12.2
250 - 299	-	-	-	4.64	(2.76 - 6.51)	7.1
300 - 349	0.15	-	2.0	4.77	(3.44 - 6.09)	7.3
350 - 399	-	-	-	3.46	(1.86 - 5.07)	5.3
400 - 449	-	-	-	0.93	(0.00 - 2.57)	1.4
450 - 499	-	-	-	0.75	-	1.2
500 +	-	-	-	-	-	-
Total	7.66	(5.83 - 9.50)	100.0	64.89	(59.71 - 70.08)	100.0

Altitude (m)	Species group / Area					
	Douglas fir			larch spp.		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
0 - 49	0.10	-	-	1.90	(0.15 - 3.66)	7.8
50 - 99	4.30	(3.48 - 5.11)	41.5	5.64	(4.36 - 6.92)	23.0
100 - 149	2.98	(2.46 - 3.51)	28.7	6.54	(4.85 - 8.23)	26.7
150 - 199	1.93	(1.05 - 2.82)	18.6	3.77	(2.34 - 5.20)	15.4
200 - 249	0.67	(0.15 - 1.19)	6.4	2.58	(1.72 - 3.43)	10.5
250 - 299	0.39	-	-	2.27	(0.76 - 3.78)	9.3
300 - 349	-	-	-	1.41	(0.00 - 3.44)	5.8
350 - 399	-	-	-	0.38	-	1.5
400 - 449	-	-	-	0.00	-	0.02
450 - 499	-	-	-	-	-	-
500 +	-	-	-	-	-	-
Total	10.38	(9.15 - 11.61)	100.0	24.49	(21.14 - 27.84)	100.0
Altitude (m)	Species group / Area					
	other conifers			ses. & ped. oak		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
0 - 49	0.13	(0.00 - 0.49)	4.2	3.79	(2.62 - 4.97)	21.2
50 - 99	0.67	(0.00 - 2.43)	22.1	6.77	(4.95 - 8.58)	38.0
100 - 149	1.01	(0.12 - 1.90)	33.3	4.26	(2.59 - 5.93)	23.8
150 - 199	0.81	-	-	2.49	(1.08 - 3.91)	13.9
200 - 249	0.19	-	-	0.42	-	2.3
250 - 299	0.23	-	-	0.07	-	0.4
300 - 349	-	-	-	0.06	-	0.3
350 - 399	-	-	-	0.02	-	0.1
400 - 449	-	-	-	-	-	-
450 - 499	-	-	-	-	-	-
500 +	-	-	-	-	-	-
Total	3.03	(1.96 - 4.09)	100.0	17.88	(14.78 - 20.98)	100.0
Altitude (m)	Species group / Area					
	beech			ash		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
0 - 49	2.85	(1.63 - 4.08)	28.5	9.01	(6.76 - 11.25)	35.6
50 - 99	3.77	(2.37 - 5.17)	37.6	10.43	(7.96 - 12.90)	41.3
100 - 149	1.81	(0.00 - 5.15)	18.1	4.17	(2.81 - 5.54)	16.5
150 - 199	1.46	(0.61 - 2.31)	14.5	1.05	(0.55 - 1.54)	4.1
200 - 249	0.13	-	-	0.61	-	2.4
250 - 299	-	-	-	0.01	-	0.05
300 - 349	-	-	-	-	-	-
350 - 399	-	-	-	-	-	-
400 - 449	-	-	-	-	-	-
450 - 499	-	-	-	-	-	-
500 +	-	-	-	-	-	-
Total	10.03	(7.98 - 12.07)	100.0	25.28	(21.50 - 29.05)	100.0
Altitude (m)	Species group / Area					
	sycamore			birch spp.		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
0 - 49	3.27	(1.90 - 4.64)	32.4	10.08	(8.41 - 11.74)	21.3
50 - 99	4.84	(2.91 - 6.76)	47.9	25.71	(22.68 - 28.74)	54.3
100 - 149	0.89	(0.05 - 1.73)	8.8	6.66	(4.90 - 8.42)	14.1
150 - 199	1.05	(0.69 - 1.42)	10.4	2.70	(1.71 - 3.70)	5.7
200 - 249	0.01	-	-	0.88	(0.00 - 2.01)	1.9
250 - 299	0.04	-	-	1.21	(0.00 - 2.63)	2.6
300 - 349	-	-	-	0.03	-	0.06
350 - 399	-	-	-	-	-	-
400 - 449	-	-	-	-	-	-
450 - 499	-	-	-	-	-	-
500 +	-	-	-	-	-	-
Total	10.10	(7.67 - 12.54)	100.0	47.27	(43.07 - 51.46)	100.0



4.4 NUMBER OF TREE SPECIES

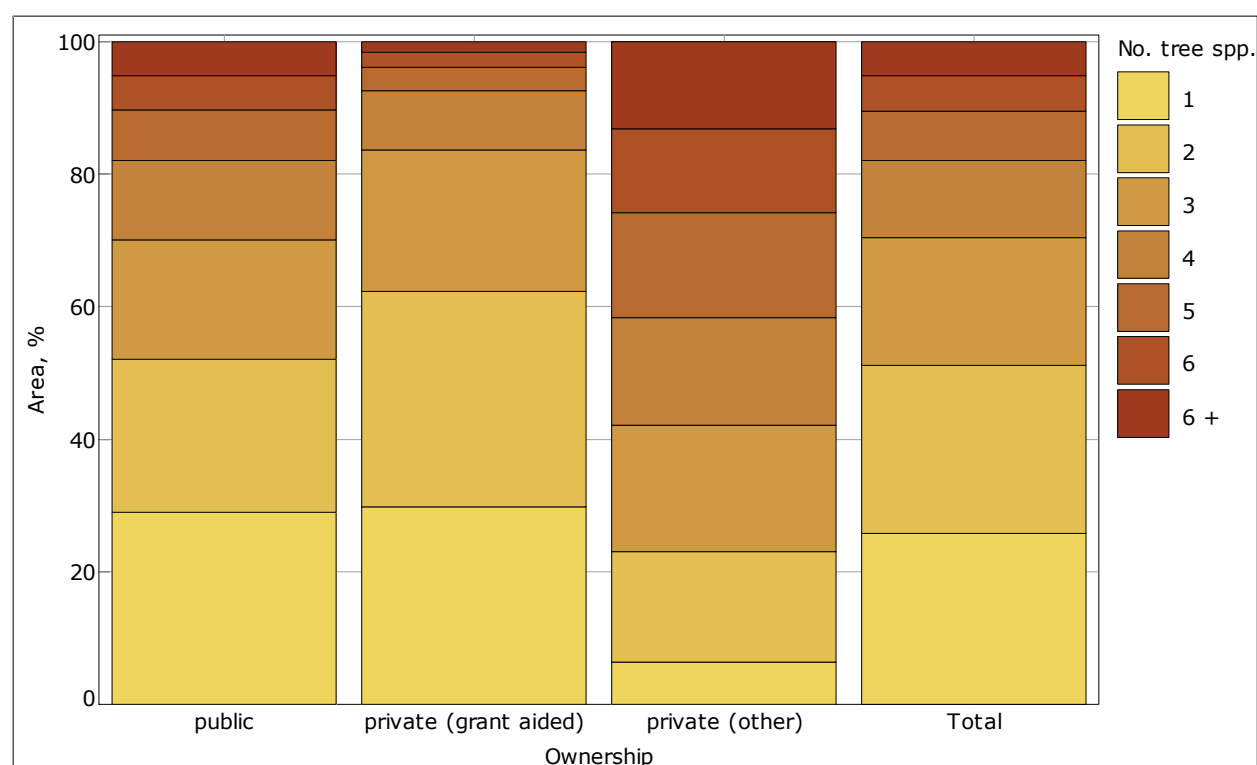
4.4.1 Stocked forest area by ownership and number of tree species

Definition
Number of tree species
The total number of unique tree species present.

Methodology
The stocked forest area is classified by ownership and number of tree species recorded in the plot.

No. tree spp.	Ownership / Area					
	public			private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
1	100.31	(89.05 – 111.57)	29.1	67.28	(57.70 – 76.87)	29.8
2	79.70	(69.37 – 90.02)	23.0	73.65	(63.67 – 83.63)	32.6
3	62.44	(53.16 – 71.73)	18.0	48.38	(40.12 – 56.64)	21.4
4	41.63	(33.88 – 49.39)	12.0	19.98	(14.53 – 25.42)	8.8
5	26.40	(20.15 – 32.65)	7.6	8.00	(4.51 – 11.50)	3.5
6	17.99	(12.82 – 23.15)	5.2	5.20	(2.38 – 8.02)	2.3
6 +	17.62	(12.51 – 22.72)	5.1	3.59	(1.25 – 5.94)	1.6
Total	346.09	(330.30 – 361.87)	100.0	226.09	(211.18 – 241.00)	100.0

No. tree spp.	Ownership / Area					
	private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
1	6.40	(3.27 – 9.53)	6.3	173.99	(160.11 – 187.87)	25.9
2	16.84	(11.81 – 21.86)	16.7	170.18	(156.25 – 184.11)	25.3
3	19.26	(13.91 – 24.61)	19.0	130.08	(117.38 – 142.78)	19.3
4	16.44	(11.46 – 21.42)	16.3	78.05	(67.77 – 88.33)	11.6
5	16.02	(11.11 – 20.93)	15.9	50.42	(41.93 – 58.92)	7.5
6	12.79	(8.42 – 17.17)	12.7	35.98	(28.79 – 43.17)	5.3
6 +	13.19	(8.73 – 17.65)	13.1	34.40	(27.35 – 41.46)	5.1
Total	100.94	(89.48 – 112.39)	100.0	673.11		100.0



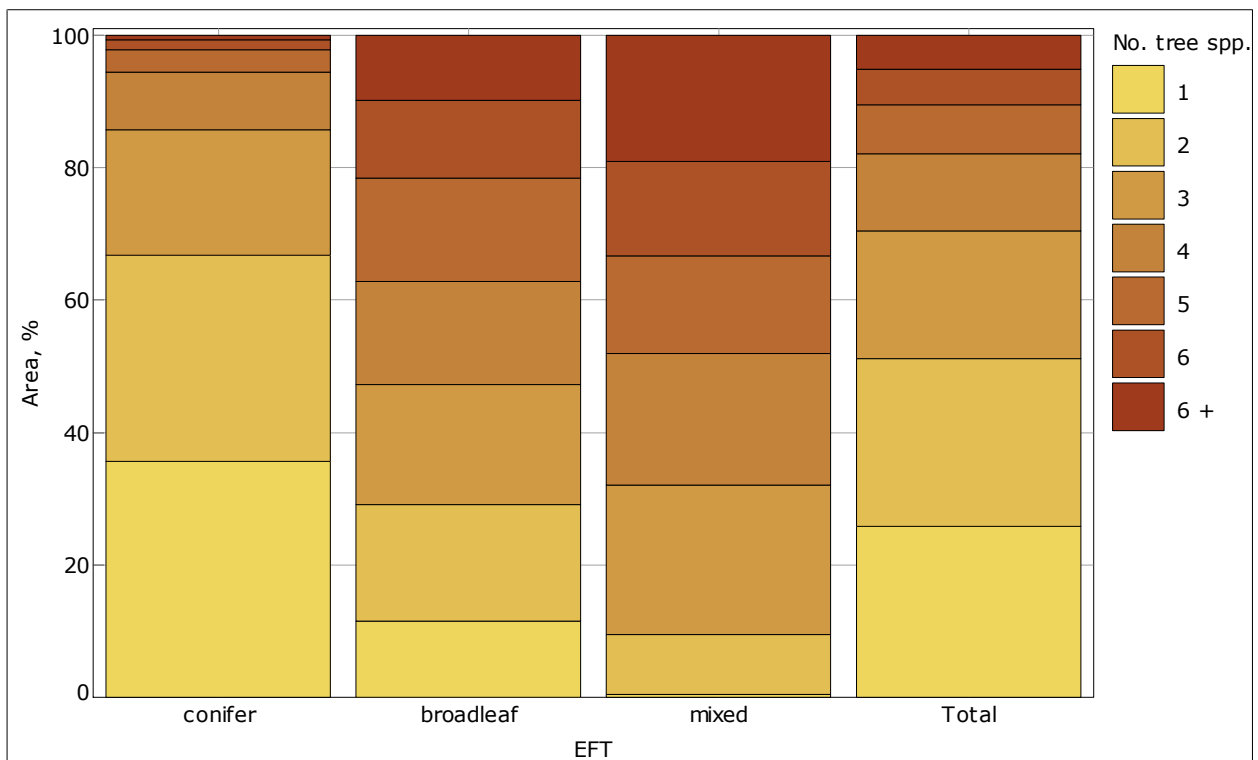
4.4.2 Stocked forest area by European Forest Type and number of tree species

Methodology

The stocked forest area is classified by European Forest Type and number of tree species occurring on the plot.

No. tree spp.	EFT / Area					
	conifer			broadleaf		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
1	157.59	(144.20 - 170.97)	35.8	16.01	(11.10 - 20.91)	11.5
2	137.33	(124.42 - 150.23)	31.1	24.45	(18.47 - 30.43)	17.6
3	84.02	(73.43 - 94.60)	19.0	25.23	(19.17 - 31.29)	18.1
4	38.01	(30.64 - 45.39)	8.6	21.64	(15.97 - 27.31)	15.6
5	15.18	(10.41 - 19.96)	3.4	21.63	(15.95 - 27.30)	15.6
6	6.39	(3.28 - 9.51)	1.4	16.39	(11.43 - 21.35)	11.8
6 +	3.20	(0.99 - 5.40)	0.7	13.61	(9.09 - 18.14)	9.8
Total	441.72	(426.90 - 456.54)	100.0	138.95	(126.22 - 151.69)	100.0

No. tree spp.	EFT / Area					
	mixed			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
1	0.40	(0.00 - 1.18)	0.4	173.99	(160.11 - 187.87)	25.9
2	8.41	(4.82 - 12.00)	9.1	170.18	(156.25 - 184.11)	25.3
3	20.83	(15.28 - 26.38)	22.6	130.08	(117.38 - 142.78)	19.3
4	18.40	(13.15 - 23.65)	19.9	78.05	(67.77 - 88.33)	11.6
5	13.61	(9.09 - 18.14)	14.7	50.42	(41.93 - 58.92)	7.5
6	13.20	(8.75 - 17.65)	14.3	35.98	(28.79 - 43.17)	5.3
6 +	17.59	(12.48 - 22.70)	19.0	34.40	(27.35 - 41.46)	5.1
Total	92.44	(81.47 - 103.41)	100.0	673.11		100.0



CHAPTER 5

AGE

The age of a forest is described as the number of growing seasons since initial planting or natural regeneration. The national forest estate is quite young, average tree age is just 21 years and 44.9% of the stocked forest estate is less than 20 years of age, reflecting both species choice and the successful uptake of private afforestation since 1985.

The Private (grant aided) forest estate has a younger age profile compared to the public estate, with 54.9% aged 20 years or less in the former. Private (other) forests are evenly distributed across the range of age classes with a dominance in the 51 years plus category, reflecting their partial composition of the older private estates.

In terms of the main conifer species, the average age of Sitka spruce is 20 years across the entire forest estate, but there is variation in age between ownership categories; in Public forests it is 23 years, Private (grant aided) 17 years and Private (other) 28 years. Amongst the broadleaf species the variation is even greater with for example, sessile and pedunculate oak averaging 57, 19 and 90 years of age in Public, Private (grant aided) and Private (other) respectively.

In general, there is a higher proportion of broadleaves in young forests due to higher levels of broadleaf afforestation and natural regeneration.

The proportion of conifer to broadleaf tree species across the age class distribution is similar, with the exception of the 51+ age class where mature broadleaves predominate. The oldest forest stands consist mainly of oak, beech, birch and Scots pine.

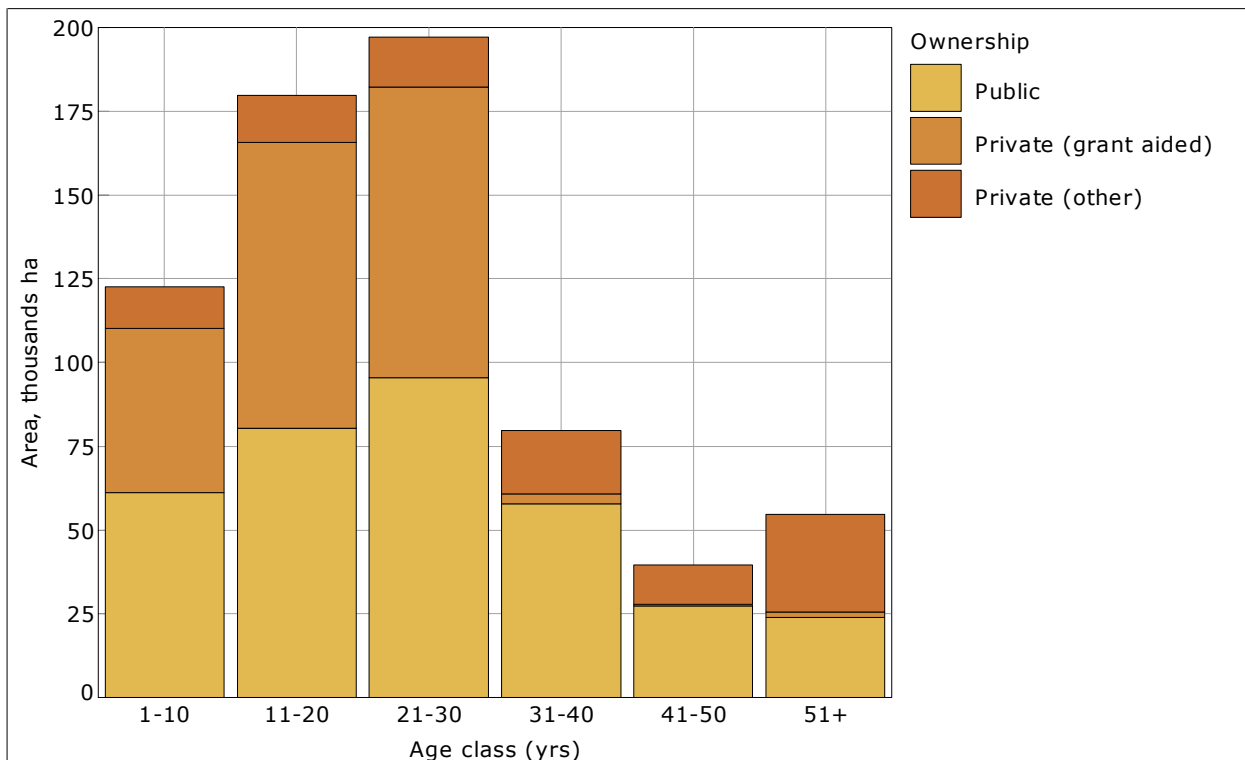
5.1 AGE CLASSES

5.1.1 Stocked forest area by ownership and age class (10 yr)

Methodology
The stocked forest area is classified by ownership and age class (10 yr).

Age Class (yrs)	Ownership / Area					
	public			private (grant aided)		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
1 - 10	61.23	(54.85 - 67.61)	17.7	48.89	(43.87 - 53.91)	21.6
11 - 20	80.28	(74.81 - 85.75)	23.2	85.51	(81.94 - 89.08)	37.8
21 - 30	95.46	(91.14 - 99.78)	27.6	86.70	(84.66 - 88.75)	38.4
31 - 40	57.84	(54.08 - 61.61)	16.7	2.99	(1.44 - 4.53)	1.3
41 - 50	27.26	(23.96 - 30.56)	7.9	0.58	(0.27 - 0.89)	0.3
51 +	24.02	(21.16 - 26.88)	6.9	1.42	(0.89 - 1.95)	0.6
Total	346.09	(330.30 - 361.87)	100.0	226.09	(211.18 - 241.00)	100.0

Age Class (yrs)	Ownership / Area					
	private (other)			Total		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
1 - 10	12.50	(9.76 - 15.25)	12.4	122.62	(113.45 - 131.80)	18.2
11 - 20	13.98	(11.65 - 16.30)	13.8	179.76	(171.51 - 188.02)	26.7
21 - 30	14.90	(12.44 - 17.36)	14.8	197.06	(189.87 - 204.25)	29.3
31 - 40	18.84	(16.24 - 21.44)	18.7	79.67	(74.25 - 85.09)	11.8
41 - 50	11.56	(9.45 - 13.66)	11.4	39.40	(34.87 - 43.92)	5.9
51 +	29.16	(26.36 - 31.96)	28.9	54.60	(50.32 - 58.88)	8.1
Total	100.94	(89.48 - 112.39)	100.0	673.11		100.0



5.1.2 Stocked forest area by age class (10 yr) and species group (broadleaf/conifer)

Methodology

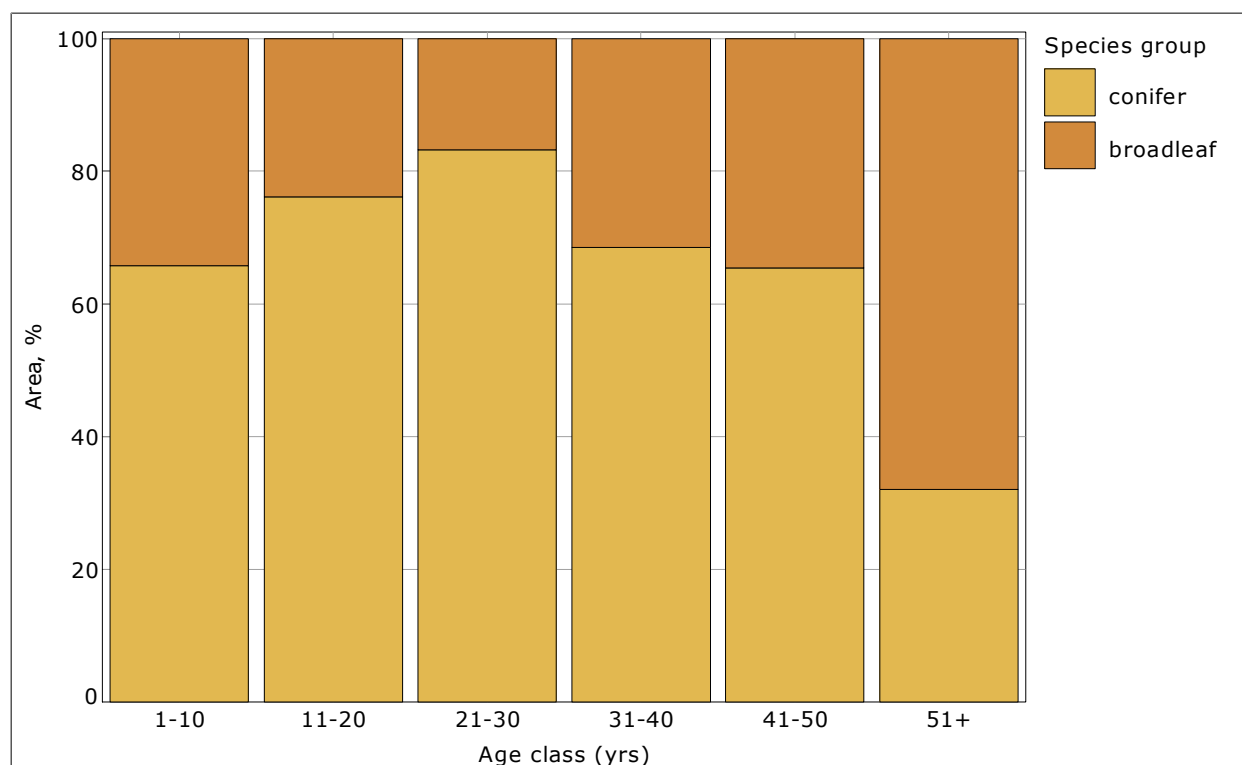
The stocked forest area is classified by species group (broadleaf/conifer) and age class (10 yr).

Species group	Age Class (yrs) / Area					
	1 - 10			11 - 20		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
conifer	80.62	(74.40 - 86.85)	65.8	136.91	(131.73 - 142.08)	76.2
broadleaf	42.00	(37.05 - 46.94)	34.2	42.85	(38.39 - 47.32)	23.8
Total	122.62	(113.45 - 131.80)	100.0	179.76	(171.51 - 188.02)	100.0

Species group	Age Class (yrs) / Area					
	21 - 30			31 - 40		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
conifer	164.10	(159.85 - 168.35)	83.3	54.63	(51.51 - 57.75)	68.6
broadleaf	32.96	(29.32 - 36.60)	16.7	25.04	(21.91 - 28.17)	31.4
Total	197.06	(189.87 - 204.25)	100.0	79.67	(74.25 - 85.09)	100.0

Species group	Age Class (yrs) / Area					
	41 - 50			51 +		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
conifer	25.77	(23.23 - 28.31)	65.4	17.50	(14.79 - 20.21)	32.1
broadleaf	13.63	(11.23 - 16.03)	34.6	37.10	(33.63 - 40.57)	67.9
Total	39.40	(34.87 - 43.92)	100.0	54.60	(50.32 - 58.88)	100.0

Species group	Age Class (yrs) / Area		
	Total		
	thousands ha	($\alpha=0.05$)	%
conifer	479.53	(472.44 - 486.63)	71.2
broadleaf	193.58	(184.34 - 202.81)	28.8
Total	673.11		100.0



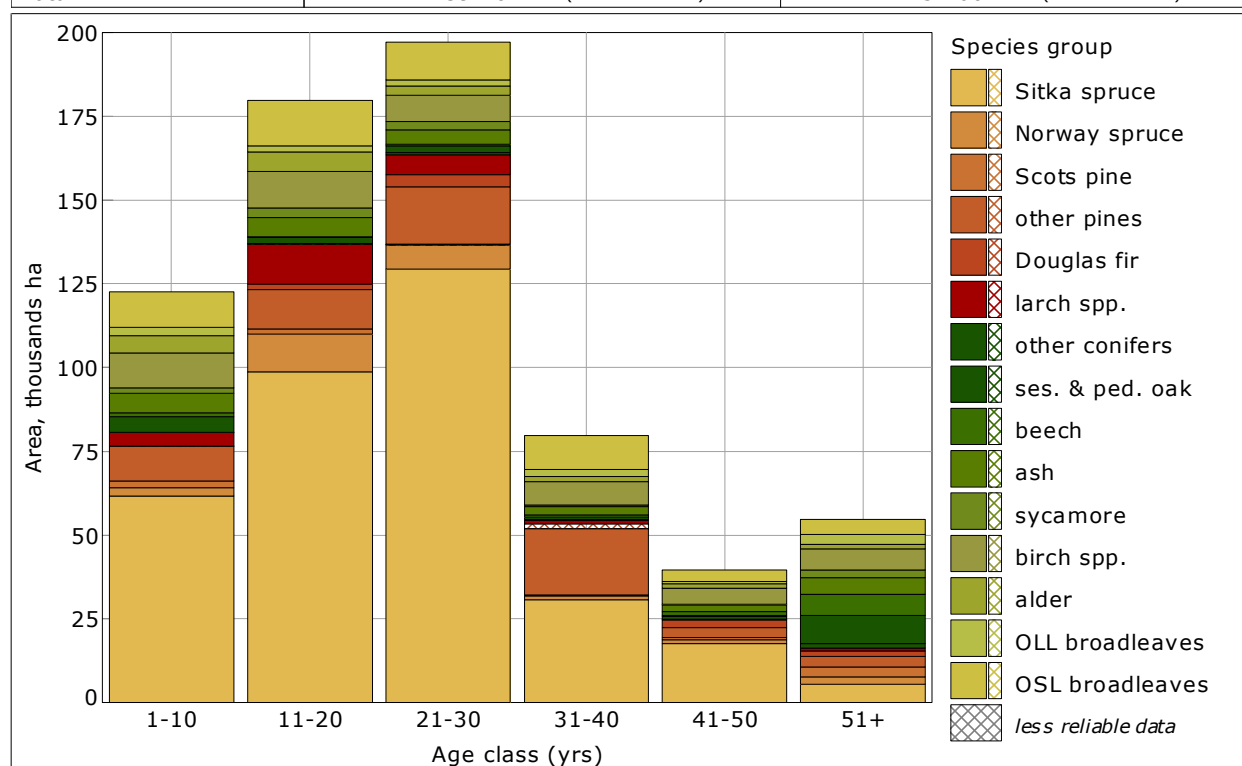
5.1.3 Stocked forest area by age class (10 yr) and species group

Methodology
The stocked forest area is classified by age class (10 yr) and species group.

Species group	Age class (yrs) / Area					
	1-10			11-20		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Sitka spruce	61.65	(56.20 - 67.09)	50.4	98.55	(93.87 - 103.23)	54.9
Norway spruce	2.48	(0.00 - 7.96)	2.0	11.37	(9.65 - 13.08)	6.3
Scots pine	2.10	(0.00 - 4.62)	1.7	1.64	(0.32 - 2.96)	0.9
other pines	10.29	(7.77 - 12.81)	8.4	11.59	(9.47 - 13.72)	6.4
Douglas fir	0.02	-	0.02	1.74	(1.10 - 2.38)	1.0
larch spp.	4.07	(3.10 - 5.05)	3.3	11.98	(9.76 - 14.21)	6.7
other conifers	0.01	(0.00 - 0.04)	0.01	0.04	-	0.02
ses. & ped. oak	4.81	(3.20 - 6.42)	3.9	1.87	(0.69 - 3.05)	1.0
beech	0.92	(0.00 - 2.26)	0.7	0.38	(0.00 - 0.81)	0.2
ash	6.03	(3.93 - 8.13)	4.9	5.50	(3.88 - 7.13)	3.1
sycamore	1.56	(0.51 - 2.61)	1.3	2.99	(1.66 - 4.32)	1.7
birch spp.	10.39	(8.27 - 12.51)	8.5	10.90	(8.78 - 13.01)	6.1
alder	5.07	(3.28 - 6.87)	4.1	5.80	(4.05 - 7.56)	3.2
OLL broadleaves	2.47	(1.85 - 3.08)	2.0	1.86	(0.70 - 3.02)	1.0
OSL broadleaves	10.75	(8.94 - 12.57)	8.8	13.55	(11.50 - 15.59)	7.5
Total	122.62	(113.45 - 131.80)	100.0	179.76	(171.51 - 188.02)	100.0

Species group	Age class (yrs) / Area					
	21-30			31-40		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Sitka spruce	129.31	(124.82 - 133.80)	65.7	30.77	(28.10 - 33.44)	38.7
Norway spruce	7.32	(5.73 - 8.90)	3.7	1.07	(0.00 - 5.12)	1.3
Scots pine	0.20	-	0.1	0.28	-	0.3
other pines	17.02	(14.40 - 19.65)	8.6	19.72	(17.74 - 21.70)	24.8
Douglas fir	3.65	(2.85 - 4.45)	1.9	1.41	-	1.8
larch spp.	5.99	(4.21 - 7.77)	3.0	1.11	(0.00 - 2.45)	1.4
other conifers	0.61	(0.00 - 1.35)	0.3	0.27	(0.00 - 0.88)	0.3
ses. & ped. oak	1.96	(0.00 - 4.02)	1.0	0.61	(0.57 - 0.64)	0.8
beech	0.58	(0.39 - 0.77)	0.3	0.76	(0.00 - 2.60)	0.9
ash	4.34	(2.83 - 5.84)	2.2	2.43	(1.68 - 3.19)	3.1
sycamore	2.35	(0.66 - 4.05)	1.2	0.49	(0.00 - 1.22)	0.6
birch spp.	7.96	(6.57 - 9.36)	4.0	7.03	(5.62 - 8.45)	8.8
alder	2.71	(1.55 - 3.87)	1.4	1.48	(1.14 - 1.81)	1.9
OLL broadleaves	1.85	(1.11 - 2.58)	0.9	2.10	(1.34 - 2.87)	2.6
OSL broadleaves	11.22	(9.04 - 13.39)	5.7	10.15	(7.87 - 12.42)	12.7
Total	197.06	(189.87 - 204.25)	100.0	79.67	(74.25 - 85.09)	100.0

Species group	Age class (yrs) / Area					
	41-50			51+		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Sitka spruce	17.52	(15.72 – 19.32)	44.4	5.51	(4.39 – 6.64)	10.1
Norway spruce	1.29	(0.48 – 2.10)	3.3	2.25	(0.42 – 4.07)	4.1
Scots pine	0.51	(0.00 – 1.21)	1.3	2.94	(1.33 – 4.55)	5.4
other pines	3.09	(2.12 – 4.05)	7.8	3.18	(1.72 – 4.63)	5.8
Douglas fir	2.13	(1.29 – 2.96)	5.4	1.43	(0.00 – 5.49)	2.6
larch spp.	0.34	–	0.9	0.99	(0.80 – 1.19)	1.8
other conifers	0.89	(0.00 – 4.57)	2.3	1.20	(0.00 – 3.83)	2.2
ses. & ped. oak	0.27	(0.00 – 0.53)	0.7	8.38	(6.80 – 9.95)	15.3
beech	0.97	(0.00 – 3.15)	2.5	6.43	(5.00 – 7.85)	11.8
ash	2.10	(1.36 – 2.84)	5.3	4.88	(3.42 – 6.34)	8.9
sycamore	0.31	(0.00 – 0.62)	0.8	2.40	(1.12 – 3.69)	4.4
birch spp.	4.77	(3.43 – 6.10)	12.1	6.21	(4.68 – 7.74)	11.4
alder	1.37	(0.58 – 2.16)	3.5	1.48	(1.00 – 1.96)	2.7
OLL broadleaves	0.68	(0.53 – 0.83)	1.7	2.87	(1.27 – 4.47)	5.3
OSL broadleaves	3.17	(2.02 – 4.31)	8.0	4.45	(2.84 – 6.06)	8.2
Total	39.40	(34.87 – 43.92)	100.0	54.60	(50.32 – 58.88)	100.0



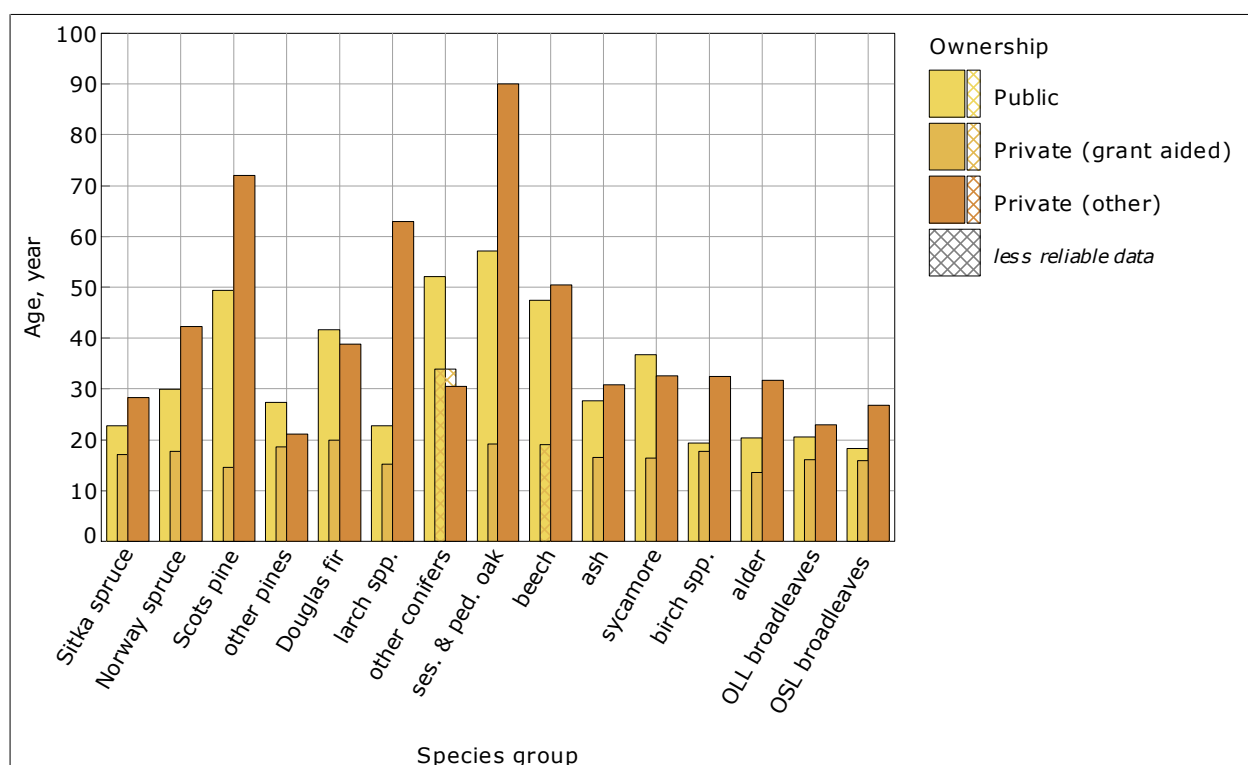
5.2 MEAN AGE

5.2.1 Mean tree age by ownership and species group (tree height ≥ 20 cm)

Methodology

Mean tree age is classified by ownership and species group. All trees with a minimum height of 20 cm were included in the analysis.

Species group	Ownership / Age			
	Public	Private (grant aided)	Private (other)	All
	year ($\alpha = 0.05$)	year ($\alpha = 0.05$)	year ($\alpha = 0.05$)	year ($\alpha = 0.05$)
Sitka spruce	23 (22 - 24)	17 (16 - 18)	28 (24 - 32)	20 (20 - 21)
Norway spruce	30 (25 - 35)	18 (16 - 20)	42 (40 - 44)	23 (18 - 29)
Scots pine	49 (38 - 61)	15 (0 - 30)	72 (64 - 81)	49 (40 - 58)
other pines	27 (25 - 30)	19 (17 - 20)	21 (0 - 77)	25 (23 - 27)
Douglas fir	42 (38 - 46)	20 (10 - 30)	39 (11 - 67)	40 (36 - 44)
larch spp.	23 (19 - 26)	15 (14 - 16)	63 (56 - 70)	19 (17 - 21)
other conifers	52 (37 - 67)	34 - -	31 (26 - 35)	50 (40 - 60)
ses. & ped. oak	57 (51 - 64)	19 (0 - 94)	90 (74 - 106)	56 (47 - 65)
beech	47 (37 - 58)	19 - -	50 (42 - 59)	45 (39 - 51)
ash	28 (10 - 45)	17 (14 - 19)	31 (28 - 34)	23 (20 - 26)
sycamore	37 (4 - 70)	16 (11 - 21)	33 (26 - 39)	30 (25 - 35)
birch spp.	19 (17 - 22)	18 (11 - 24)	32 (29 - 36)	25 (23 - 27)
alder	20 (16 - 24)	14 (12 - 15)	32 (28 - 36)	21 (17 - 24)
OLL broadleaves	20 (17 - 24)	16 (2 - 30)	23 (19 - 27)	23 (20 - 26)
OSL broadleaves	18 (17 - 20)	16 (14 - 18)	27 (24 - 29)	23 (22 - 24)
All	22 (21 - 23)	17 (16 - 17)	27 (24 - 30)	21 (21 - 22)



5.2.2 Mean tree age by species group and Dbh class (tree height ≥ 20 cm)

Definition
Diameter class Diameter class is used to describe trees all trees assessed on the plot in terms of diameter at breast height (Dbh).

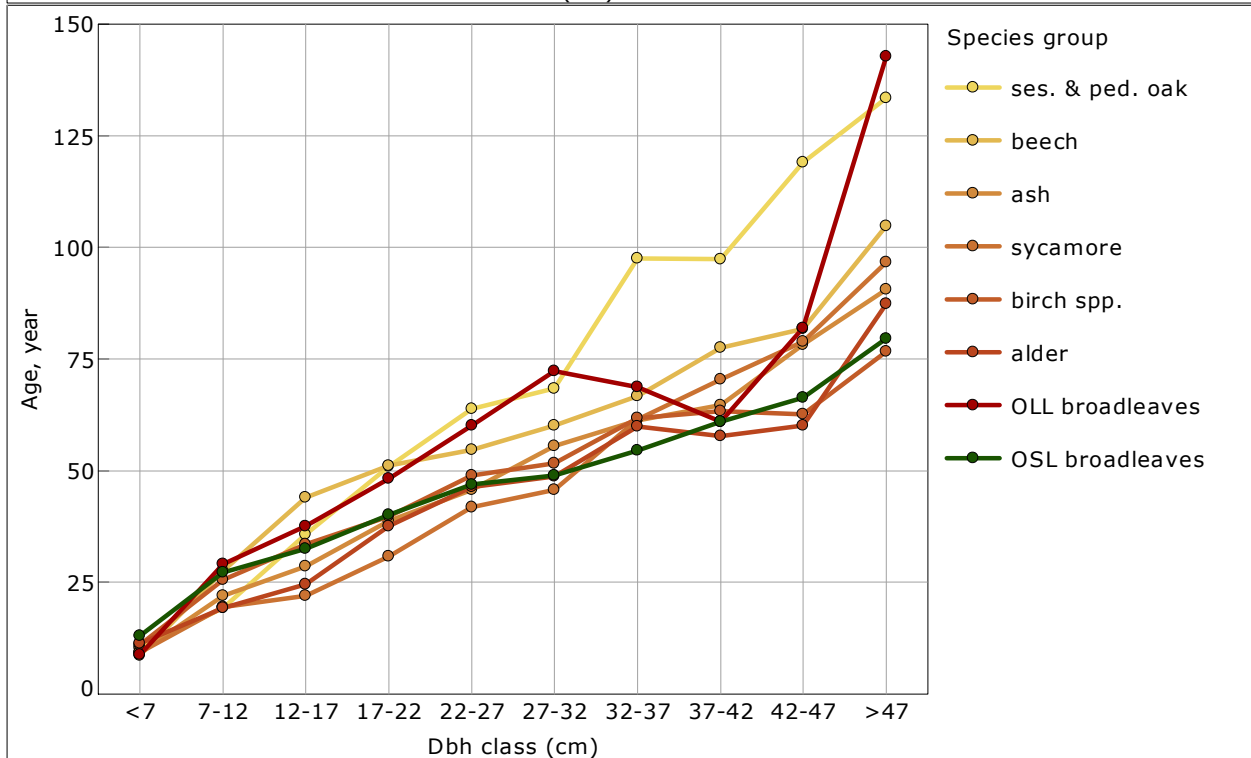
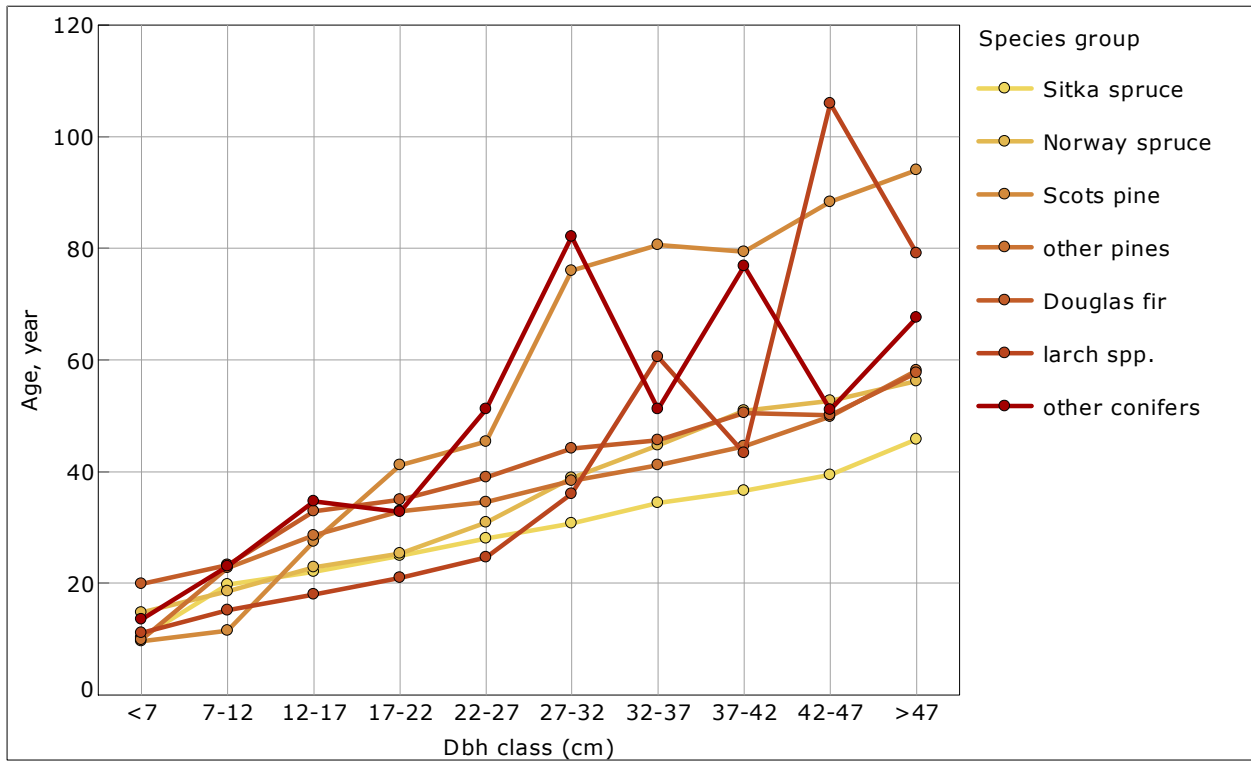
Methodology
Mean tree age is classified by species group and Dbh class. All trees with a minimum height of 20 cm were included.

Dbh class (cm)	Species group / Age			
	Sitka spruce	Norway spruce	Scots pine	other pines
	year ($\alpha=0.05$)	year ($\alpha=0.05$)	year ($\alpha=0.05$)	year ($\alpha=0.05$)
<7	10 (9 – 11)	15 (14 – 16)	10 (7 – 12)	10 (8 – 12)
7-12	20 (19 – 20)	19 (17 – 20)	11 (0 – 34)	23 (21 – 24)
12-17	22 (21 – 23)	23 (20 – 26)	28 (16 – 39)	29 (25 – 32)
17-22	25 (24 – 25)	25 (22 – 28)	41 (32 – 51)	33 (31 – 34)
22-27	28 (27 – 29)	31 (4 – 58)	45 (33 – 58)	34 (33 – 36)
27-32	31 (30 – 32)	39 (34 – 44)	76 (69 – 83)	38 (36 – 41)
32-37	34 (33 – 36)	45 (42 – 47)	81 (77 – 84)	41 (36 – 47)
37-42	37 (35 – 38)	51 (46 – 56)	79 (42 – 116)	45 (43 – 46)
42-47	39 (37 – 41)	53 (44 – 62)	88 (76 – 101)	50 (39 – 61)
>47	46 (44 – 48)	56 – –	94 (64 – 123)	58 (44 – 73)

Dbh class (cm)	Species group / Age			
	Douglas fir	larch spp.	other conifers	ses. & ped. oak
	year ($\alpha=0.05$)	year ($\alpha=0.05$)	year ($\alpha=0.05$)	year ($\alpha=0.05$)
<7	20 (0 – 57)	11 (9 – 13)	14 (8 – 19)	10 (6 – 15)
7-12	23 (17 – 30)	15 (13 – 17)	23 – –	19 (0 – 41)
12-17	33 (29 – 37)	18 (16 – 20)	35 (34 – 35)	36 (33 – 39)
17-22	35 (31 – 39)	21 (19 – 23)	33 (31 – 35)	51 (44 – 58)
22-27	39 (36 – 42)	25 (22 – 27)	51 (47 – 55)	64 (60 – 68)
27-32	44 (34 – 54)	36 (0 – 125)	82 (76 – 88)	68 (59 – 78)
32-37	46 (36 – 56)	60 (16 – 105)	51 – –	98 (93 – 103)
37-42	51 (45 – 56)	43 (9 – 77)	77 (69 – 85)	97 (17 – 178)
42-47	50 (46 – 54)	106 – –	51 (39 – 63)	119 (47 – 191)
>47	58 (54 – 61)	79 – –	68 (46 – 89)	133 (111 – 156)

Dbh class (cm)	Species group / Age			
	beech	ash	sycamore	birch spp.
	year ($\alpha=0.05$)	year ($\alpha=0.05$)	year ($\alpha=0.05$)	year ($\alpha=0.05$)
<7	9 (7 – 11)	9 (8 – 10)	9 (8 – 10)	11 (10 – 12)
7-12	28 (0 – 76)	22 (19 – 25)	19 (17 – 22)	26 (23 – 28)
12-17	44 (27 – 61)	29 (26 – 31)	22 (18 – 25)	33 (31 – 36)
17-22	51 (41 – 61)	39 (37 – 41)	31 (20 – 41)	40 (37 – 42)
22-27	55 (48 – 61)	46 (43 – 48)	42 (37 – 47)	49 (46 – 51)
27-32	60 (56 – 65)	56 (50 – 61)	46 (34 – 57)	52 (48 – 55)
32-37	67 (26 – 107)	61 (59 – 64)	61 (54 – 69)	62 (58 – 66)
37-42	78 (69 – 86)	65 (52 – 77)	71 (53 – 88)	63 (57 – 69)
42-47	82 (77 – 86)	78 (67 – 89)	79 – –	63 (58 – 67)
>47	105 (98 – 112)	90 (79 – 102)	97 (93 – 100)	77 (65 – 88)

Dbh class (cm)	Species group / Age							
	alder		OLL broadleaves		OSL broadleaves		All	
	year	($\alpha = 0.05$)	year	($\alpha = 0.05$)	year	($\alpha = 0.05$)	year	($\alpha = 0.05$)
<7	11	(7 - 16)	9	(8 - 10)	13	(12 - 14)	10	(10 - 10)
7-12	19	(16 - 22)	29	(25 - 33)	27	(25 - 29)	21	(21 - 22)
12-17	25	(22 - 27)	38	(34 - 41)	32	(31 - 34)	24	(24 - 25)
17-22	38	(34 - 41)	48	(45 - 52)	40	(38 - 42)	28	(28 - 29)
22-27	46	(41 - 52)	60	(57 - 63)	47	(44 - 50)	34	(33 - 34)
27-32	49	(45 - 53)	72	(62 - 83)	49	(44 - 54)	40	(38 - 41)
32-37	60	(53 - 67)	69	(54 - 84)	55	(50 - 59)	46	(44 - 47)
37-42	58	(35 - 80)	61	(51 - 70)	61	(55 - 67)	53	(50 - 56)
42-47	60	(24 - 96)	82	- -	66	(37 - 95)	63	(58 - 68)
>47	87	- -	143	(121 - 164)	80	(65 - 94)	92	(86 - 98)



CHAPTER 6

FOREST ATTRIBUTES: DBH, HEIGHT AND BASAL AREA

In this chapter, tree diameter at breast height (Dbh), height and basal area are assessed. The forest estate is firstly described in terms of Dbh and height. The statistics are presented using classification with species group and age class.

Sitka spruce trees in the oldest age-class (51+) have smaller Dbh and height values compared to those of other conifer species groups. In fact, higher height values are recorded for Sitka spruce in the 41-50 year age class than in the older 51+ age class. This could indicate that the most vigorous stands are being felled before trees reach the older age class, leaving mainly less productive stands in the 51+ category.

Douglas fir, and 'other conifer' trees, reach the largest diameters and heights, while the older broadleaf trees also reach substantial diameters. When height and Dbh class are combined, Sitka spruce shows average vigour among the conifers. On an ownership basis, the oldest trees are found in the Private (other) forests, across the range of species and Dbh classes.

Basal area is the term used in forest management that defines the area of a given section of land that is occupied by the cross-section of tree stems at height of 1.3 m from the tree base. The mean basal area for all Irish forests is 27.5 m² per ha. The Private (grant aided) estate basal area increased from 21 m² per ha to 27.1 m² per ha between 2013 and 2017, due to the rapid growth phase of these forests and the low levels of removals (harvesting). All public and Private (grant aided) ownership cohorts have the same mean basal area per ha of 27.1 m², which demonstrates that private forests have now caught up with public forests and is an important indicator of production potential indicator.

6.1 DIAMETER AT BREAST HEIGHT

Definition
Diameter at breast height (Dbh)
Diameter of a tree at 1.3m above ground level.

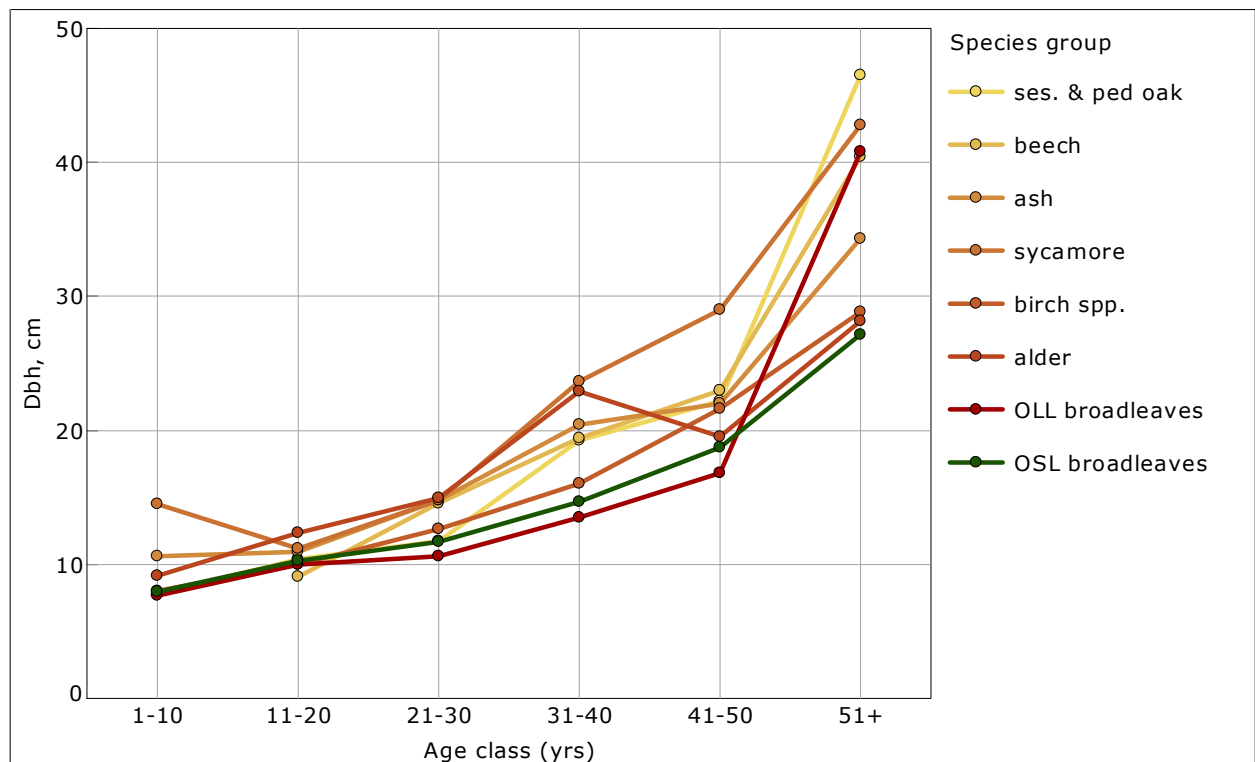
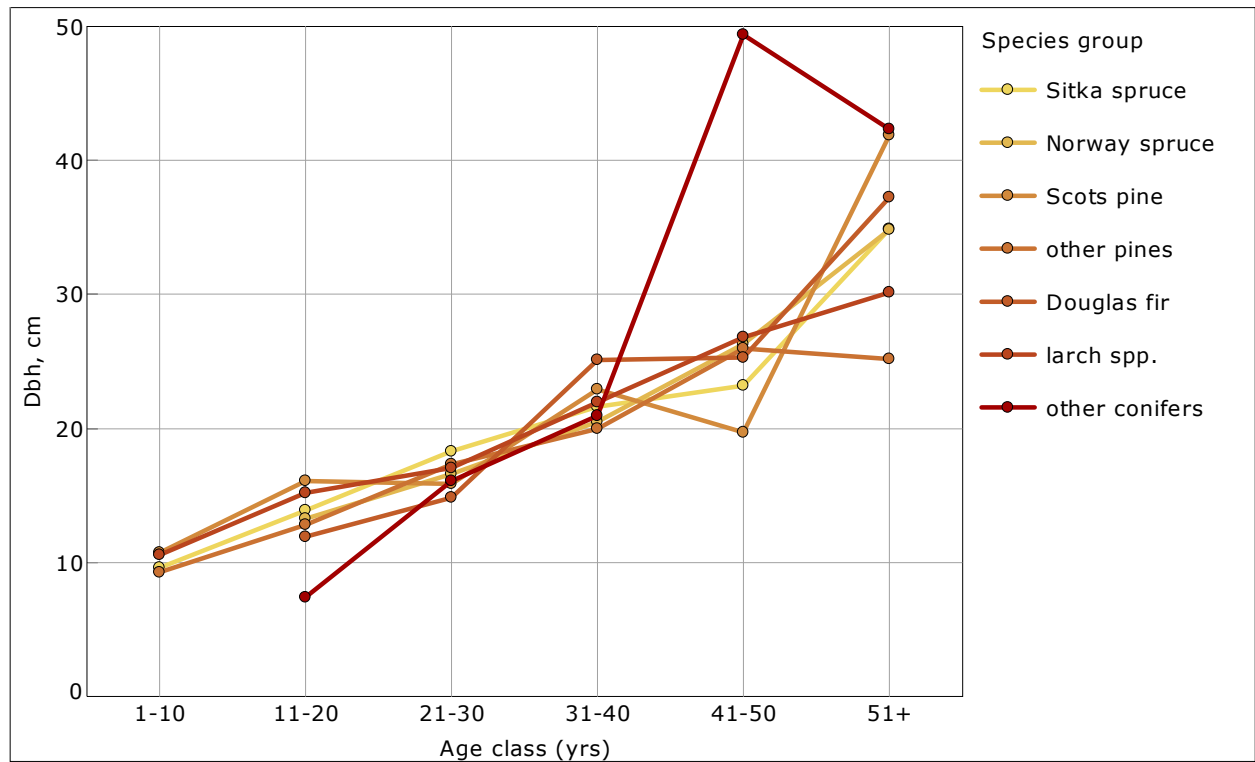
6.1.1 Mean tree Dbh by species group and age class (10 yr)

Methodology
Weighted mean tree Dbh is classified by species group and age class. All trees with a Dbh were included in the analysis, i.e. minimum height of 130cm.
The evaluated variable, Dbh, is weighted by representative tree number. Weighting by the representative tree number removes the effect of the concentric circles. However in the first NFI results (2006) this task weights Dbh by representative area, which gave larger trees a higher weight. Weighting by representative area is most effective where there are large numbers of natural regeneration. Due to the absence of large numbers of natural regeneration in Ireland's forests, mean Dbh was calculated using the representative tree number as a weight for both the second and third cycle.

Age class (yrs)	Species group / Dbh				
	Sitka spruce	Norway spruce	Scots pine	other pines	Douglas fir
	cm ($\alpha=0.05$)	cm ($\alpha=0.05$)	cm ($\alpha=0.05$)	cm ($\alpha=0.05$)	cm ($\alpha=0.05$)
1-10	10 (9 - 10)	- - -	11 - -	9 - -	- - -
11-20	14 (13 - 14)	13 (13 - 14)	16 (15 - 17)	13 (12 - 14)	12 (9 - 14)
21-30	18 (18 - 19)	17 (11 - 22)	16 - -	17 (16 - 19)	15 (14 - 16)
31-40	22 (20 - 23)	21 - -	23 - -	20 (19 - 21)	25 - -
41-50	23 (22 - 24)	26 (25 - 27)	20 (13 - 26)	26 (24 - 28)	25 (15 - 36)
51+	35 (20 - 50)	35 (29 - 40)	42 (37 - 47)	25 (15 - 36)	37 (32 - 43)
All	17 (17 - 18)	19 (16 - 21)	30 (26 - 33)	19 (17 - 20)	25 (22 - 27)

Age class (yrs)	Species group / Dbh				
	larch spp.	other conifers	ses. & ped oak	beech	ash
	cm ($\alpha=0.05$)	cm ($\alpha=0.05$)	cm ($\alpha=0.05$)	cm ($\alpha=0.05$)	cm ($\alpha=0.05$)
1-10	11 (9 - 12)	- - -	8 - -	- - -	11 - -
11-20	15 (15 - 16)	7 - -	10 (10 - 10)	9 - -	11 (9 - 13)
21-30	17 (15 - 19)	16 (10 - 22)	12 (11 - 12)	15 (10 - 19)	15 (14 - 15)
31-40	22 (17 - 27)	21 (16 - 26)	19 (13 - 26)	19 (16 - 22)	20 (19 - 22)
41-50	27 - -	49 (24 - 75)	22 (1 - 43)	23 (21 - 25)	22 (20 - 24)
51+	30 (28 - 32)	42 (42 - 43)	47 (43 - 51)	40 (37 - 44)	34 (32 - 36)
All	17 (16 - 17)	37 (32 - 41)	35 (31 - 40)	34 (30 - 37)	19 (17 - 20)

Age class (yrs)	Species group / Dbh				
	sycamore	birch spp.	alder	OLL broadleaves	OSL broadleaves
	cm ($\alpha=0.05$)	cm ($\alpha=0.05$)	cm ($\alpha=0.05$)	cm ($\alpha=0.05$)	cm ($\alpha=0.05$)
1-10	14 - -	8 - -	9 (8 - 10)	8 - -	8 (3 - 13)
11-20	11 (11 - 12)	10 (9 - 10)	12 (12 - 13)	10 (3 - 17)	10 (9 - 11)
21-30	15 (14 - 15)	13 (12 - 13)	15 (13 - 17)	11 (10 - 12)	12 (11 - 12)
31-40	24 (18 - 30)	16 (15 - 17)	23 (21 - 25)	13 (13 - 14)	15 (13 - 16)
41-50	29 (24 - 34)	22 (20 - 24)	20 (17 - 22)	17 (14 - 19)	19 (17 - 21)
51+	43 (29 - 57)	29 (27 - 31)	28 (0 - 57)	41 (37 - 45)	27 (21 - 34)
All	24 (21 - 26)	16 (15 - 17)	15 (14 - 16)	20 (9 - 31)	14 (13 - 14)



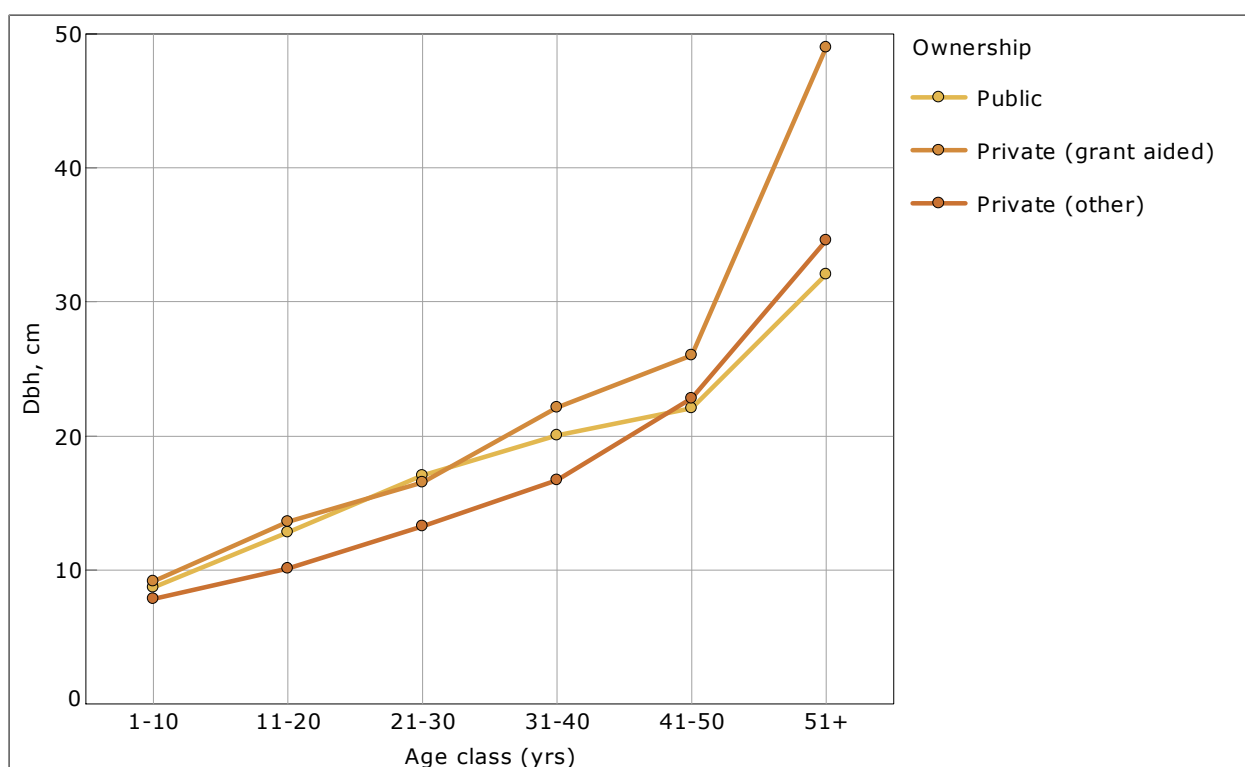
6.1.2 Mean tree Dbh by ownership and age class (10 yr)

Methodology

Weighted mean tree Dbh is classified by ownership and age class. All trees with a Dbh were included in the analysis, i.e. minimum height of 130cm.

The evaluated variable, Dbh, is weighted by representative tree number. Weighting by the representative tree number removes the effect of the concentric circles. However in the 2006 NFI results this task weights Dbh by representative area, which gave larger trees a higher weight. Weighting by representative area is most effective where there are large numbers of natural regeneration. Due to the absence of large numbers of natural regeneration in Ireland's forests, mean Dbh was calculated using the representative tree number as a weight.

Age class (yrs)	Ownership / Dbh			
	public	private (grant aided)	private (other)	All
	cm ($\alpha=0.05$)	cm ($\alpha=0.05$)	cm ($\alpha=0.05$)	cm ($\alpha=0.05$)
1-10	9 (6 - 12)	9 (8 - 10)	8 - -	9 (9 - 9)
11-20	13 (12 - 13)	14 (13 - 14)	10 (9 - 11)	13 (13 - 13)
21-30	17 (16 - 18)	17 (16 - 17)	13 (12 - 14)	16 (16 - 17)
31-40	20 (19 - 21)	22 (19 - 25)	17 (16 - 18)	19 (18 - 20)
41-50	22 (21 - 23)	26 (25 - 27)	23 (21 - 24)	22 (21 - 23)
51+	32 (30 - 35)	49 (45 - 53)	35 (32 - 37)	34 (32 - 36)
All	19 (18 - 19)	15 (15 - 16)	20 (19 - 22)	18 (17 - 18)



6.2 HEIGHT

Definition
Height
The height of a tree is the vertical distance between the base of the tree and its tip.

6.2.1 Mean tree height by species group and age class (10 yr)

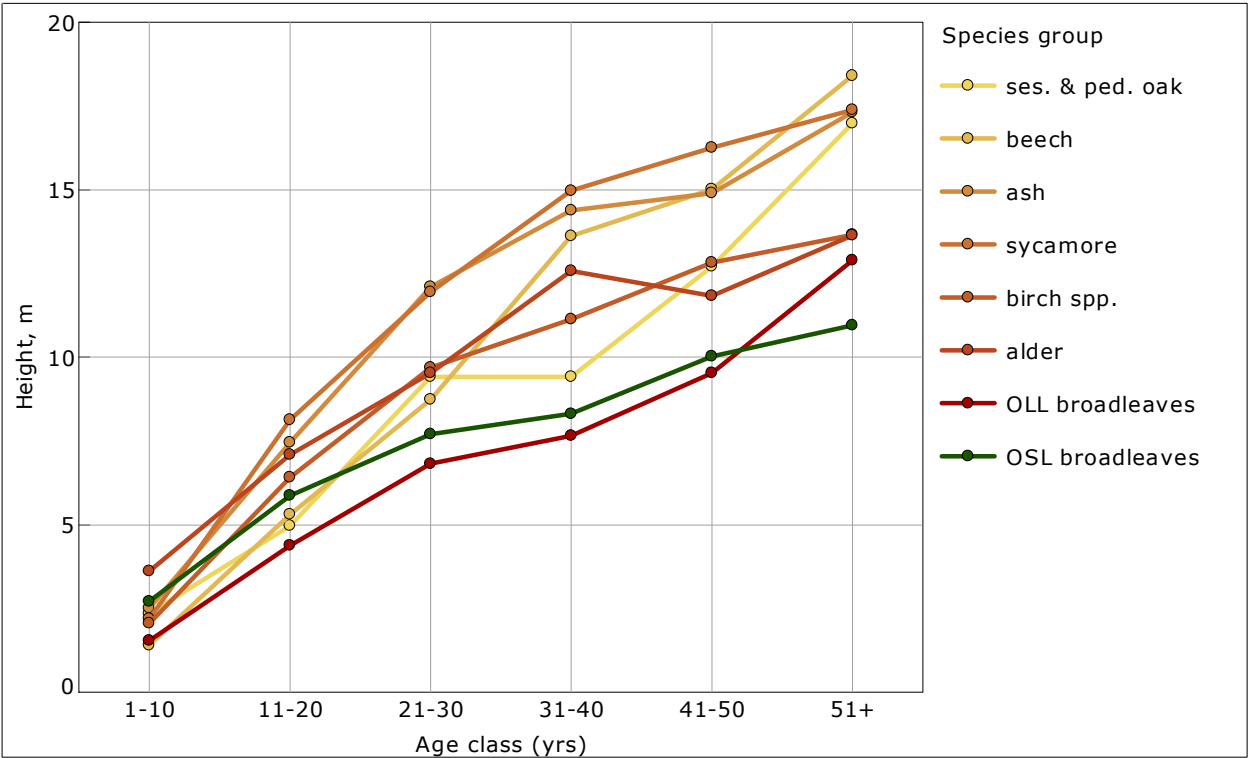
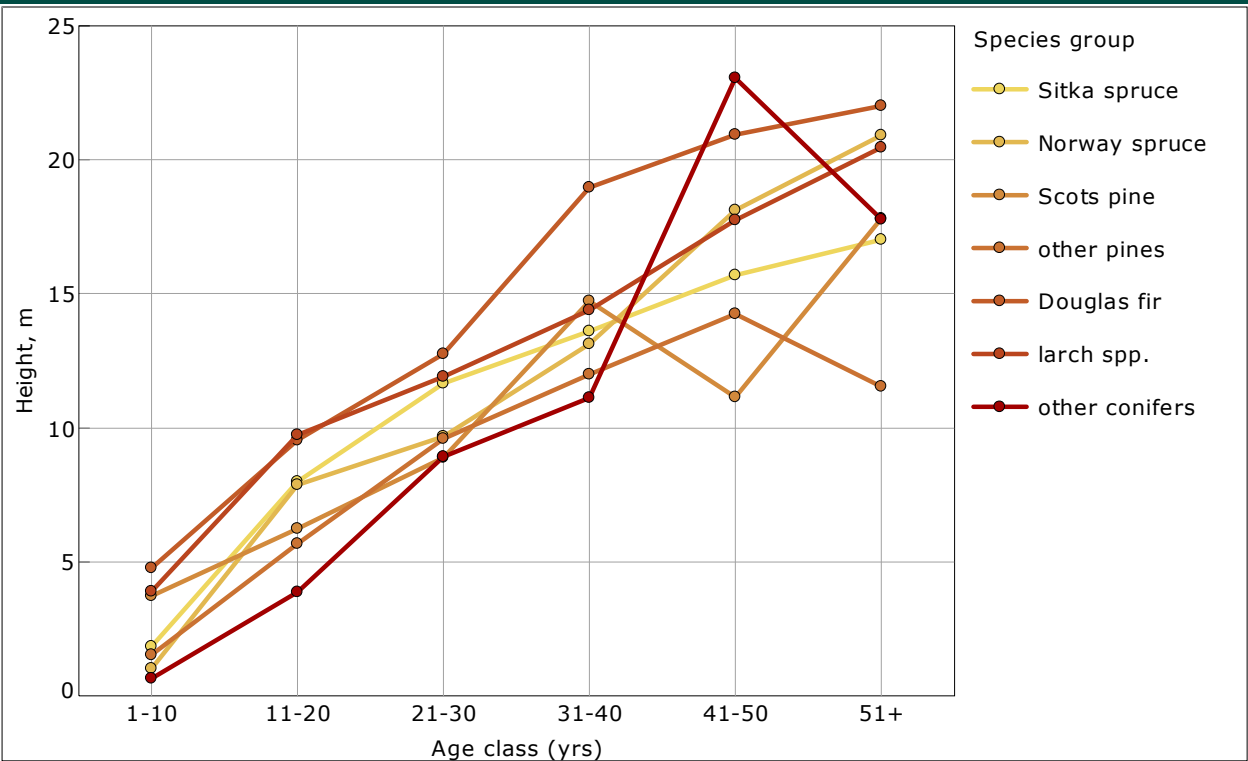
Definition
Mean tree height
The average tree height (m).

Methodology
Mean tree height is classified by species group and age class. All trees assessed for height were included in the analysis, i.e. a minimum height of 20cm.
The evaluated variable, height, is weighted by representative tree number. Weighting by the representative tree number removes the effect of the concentric circles.

Age class (yrs)	Species group / Height				
	Sitka spruce	Norway spruce	Scots pine	other pines	Douglas fir
	m ($\alpha=0.05$)	m ($\alpha=0.05$)	m ($\alpha=0.05$)	m ($\alpha=0.05$)	m ($\alpha=0.05$)
1-10	1.8 (1.6 - 2.0)	1.0 (0.8 - 1.2)	3.7 (2.8 - 4.6)	1.5 (1.3 - 1.7)	4.8 - -
11-20	8.0 (7.6 - 8.4)	7.9 (7.3 - 8.4)	6.2 (5.1 - 7.4)	5.7 (5.2 - 6.2)	9.5 (8.6 - 10.5)
21-30	11.6 (11.2 - 12.1)	9.7 (4.6 - 14.7)	8.9 - -	9.6 (9.0 - 10.2)	12.8 (11.6 - 13.9)
31-40	13.6 (12.6 - 14.6)	13.1 (4.9 - 21.4)	14.7 - -	12.0 (11.2 - 12.8)	19.0 - -
41-50	15.7 (14.6 - 16.7)	18.1 (17.1 - 19.2)	11.1 (8.6 - 13.7)	14.2 (13.1 - 15.4)	20.9 (18.4 - 23.5)
51+	17.0 (14.6 - 19.5)	20.9 (20.2 - 21.6)	17.8 (16.8 - 18.8)	11.5 (6.6 - 16.4)	22.0 (0.0 - 44.8)
All	9.2 (8.9 - 9.6)	10.2 (8.4 - 12.1)	12.0 (8.3 - 15.6)	8.0 (7.4 - 8.6)	17.4 (15.9 - 18.9)

Age class (yrs)	Species group / Height				
	larch spp.	other conifers	ses. & ped. oak	beech	ash
	m ($\alpha=0.05$)	m ($\alpha=0.05$)	m ($\alpha=0.05$)	m ($\alpha=0.05$)	m ($\alpha=0.05$)
1-10	3.9 (3.3 - 4.5)	0.7 (0.0 - 2.4)	2.3 (2.1 - 2.6)	1.4 (0.0 - 5.4)	2.5 (2.3 - 2.7)
11-20	9.7 (9.2 - 10.2)	3.9 - -	5.0 (4.8 - 5.1)	5.3 (2.8 - 7.7)	7.5 (6.6 - 8.3)
21-30	11.9 (10.9 - 12.9)	8.9 (7.3 - 10.5)	9.4 (9.0 - 9.8)	8.7 (4.2 - 13.3)	12.1 (11.4 - 12.9)
31-40	14.4 (10.8 - 18.0)	11.1 (9.2 - 13.0)	9.4 (8.2 - 10.7)	13.6 (13.5 - 13.7)	14.4 (13.6 - 15.1)
41-50	17.7 - -	23.1 (20.6 - 25.5)	12.7 (10.5 - 14.9)	15.0 (13.7 - 16.3)	14.9 (14.3 - 15.5)
51+	20.5 (16.5 - 24.4)	17.8 (15.1 - 20.5)	17.0 (16.3 - 17.7)	18.4 (17.4 - 19.4)	17.3 (16.6 - 18.0)
All	10.0 (9.4 - 10.6)	12.7 (11.5 - 13.9)	10.3 (9.3 - 11.3)	10.9 (9.6 - 12.2)	8.7 (8.0 - 9.3)

Age class (yrs)	Species group / Height				
	sycamore	birch spp.	alder	OLL broadleaves	OSL broadleaves
	m ($\alpha=0.05$)	m ($\alpha=0.05$)	m ($\alpha=0.05$)	m ($\alpha=0.05$)	m ($\alpha=0.05$)
1-10	2.2 (1.7 - 2.7)	2.1 (1.8 - 2.3)	3.6 (3.1 - 4.2)	1.5 (1.3 - 1.7)	2.7 (2.5 - 2.9)
11-20	8.1 (7.8 - 8.5)	6.4 (6.0 - 6.8)	7.1 (6.1 - 8.1)	4.4 (3.8 - 5.0)	5.9 (5.6 - 6.2)
21-30	11.9 (10.2 - 13.7)	9.7 (9.1 - 10.3)	9.5 (9.1 - 9.9)	6.8 (5.8 - 7.9)	7.7 (7.3 - 8.0)
31-40	15.0 (14.5 - 15.4)	11.1 (10.7 - 11.6)	12.6 (11.0 - 14.1)	7.6 (6.8 - 8.5)	8.3 (7.9 - 8.7)
41-50	16.2 (14.6 - 17.9)	12.8 (11.8 - 13.8)	11.8 (7.5 - 16.1)	9.5 (8.6 - 10.5)	10.0 (9.5 - 10.6)
51+	17.4 (15.4 - 19.4)	13.7 (13.2 - 14.1)	13.6 (12.0 - 15.3)	12.9 (11.2 - 14.5)	10.9 (10.3 - 11.5)
All	9.7 (8.4 - 11.0)	7.7 (7.1 - 8.2)	7.3 (6.5 - 8.2)	4.9 (4.4 - 5.4)	6.1 (5.8 - 6.3)



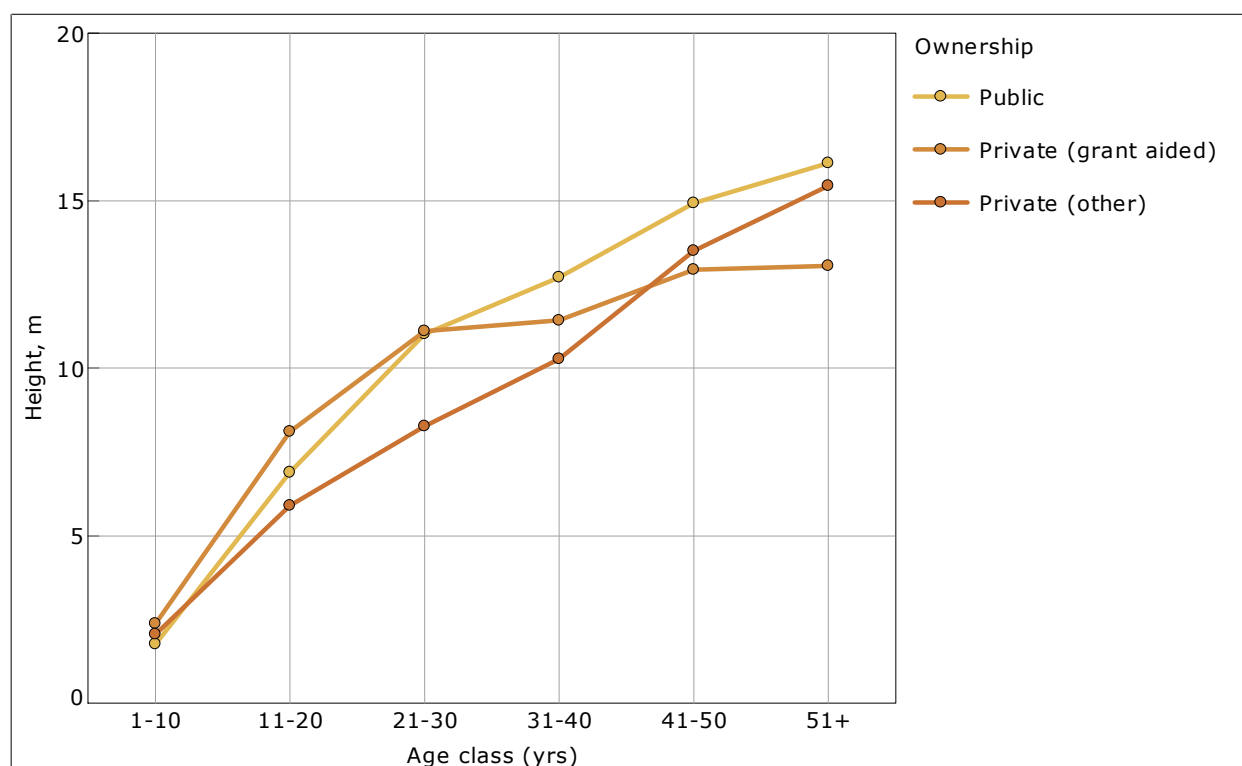
6.2.2 Mean tree height by ownership and age class (10 yr)

Methodology

Mean tree height is classified by ownership and age class (10 yr). All trees with a minimum height of 20cm were included.

The evaluated variable, height, is weighted by representative tree number. Weighting by the representative tree number removes the effect of the concentric circles.

Age class (yrs)	Ownership / Height			
	public	private (grant aided)	private (other)	All
	m ($\alpha=0.05$)	m ($\alpha=0.05$)	m ($\alpha=0.05$)	m ($\alpha=0.05$)
1-10	1.8 (1.6 - 1.9)	2.4 (2.2 - 2.6)	2.1 (1.8 - 2.3)	2.0 (1.9 - 2.1)
11-20	6.9 (6.5 - 7.3)	8.1 (7.7 - 8.5)	5.9 (5.6 - 6.2)	7.5 (7.2 - 7.7)
21-30	11.0 (10.5 - 11.6)	11.1 (10.5 - 11.7)	8.3 (7.7 - 8.8)	10.9 (10.5 - 11.2)
31-40	12.7 (12.1 - 13.3)	11.4 (9.2 - 13.7)	10.3 (9.7 - 10.9)	12.1 (11.6 - 12.6)
41-50	14.9 (14.0 - 15.8)	12.9 (12.9 - 13.0)	13.5 (12.6 - 14.3)	14.7 (14.1 - 15.3)
51+	16.1 (15.1 - 17.1)	13.0 (11.8 - 14.3)	15.4 (14.7 - 16.2)	15.8 (15.2 - 16.4)
All	8.4 (8.1 - 8.8)	7.8 (7.4 - 8.2)	6.9 (6.4 - 7.4)	8.1 (7.8 - 8.3)



6.3 BASAL AREA

Definition

Basal area

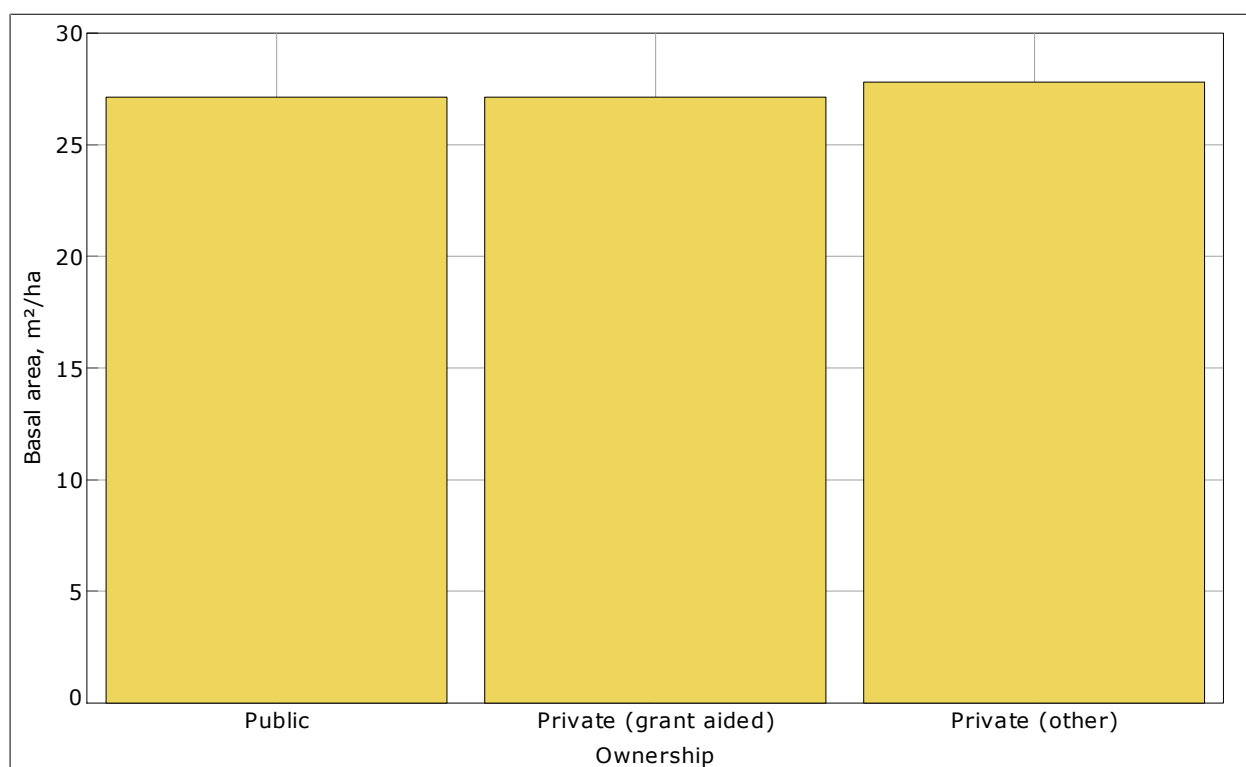
The overbark cross-sectional area of the tree stem at breast height (i.e. 1.3m).

6.3.1 Mean basal area per hectare by ownership

Methodology

Mean basal area per hectare is classified by ownership. All living trees assessed for Dbh were included.

Ownership	Basal area	
	m ² /ha	($\alpha = 0.05$)
public	27.1	(25.7 - 28.5)
private (grant aided)	27.1	(25.5 - 28.8)
private (other)	27.8	(25.7 - 29.9)
All	27.5	(26.5 - 28.5)



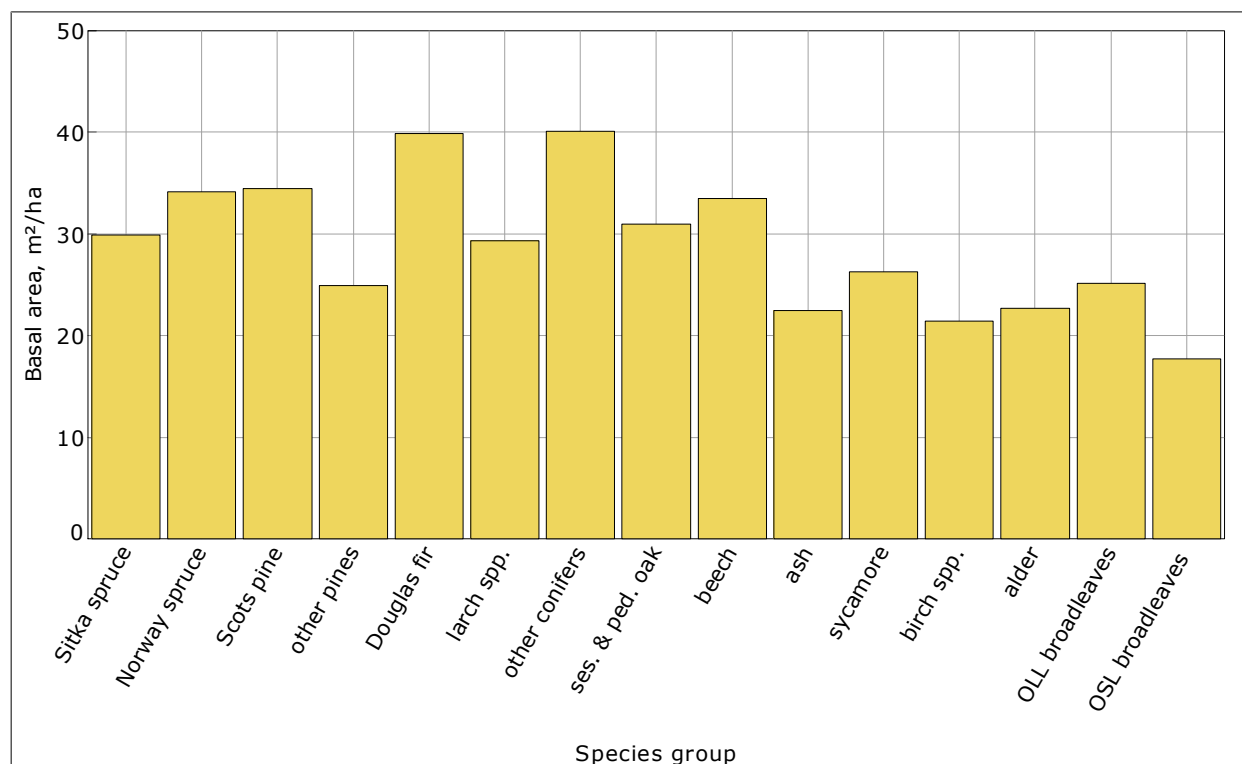
6.3.2 Normalised mean basal area per hectare by ownership and species group

Methodology

The normalised mean basal area per hectare is classified by species group and ownership.

The calculated value of the variable under consideration for a plot (i.e. basal area) is divided not by the whole plot area, but by the area of the part of the plot where the given variable is present. Therefore the sum of basal area for a particular species on a plot is related only to the area occupied by those trees, not to the whole plot.

Species group	Ownership / Basal area			
	Public	Private (grant aided)	Private (other)	All
	m ² /ha ($\alpha=0.05$)	m ² /ha ($\alpha=0.05$)	m ² /ha ($\alpha=0.05$)	m ² /ha ($\alpha=0.05$)
Sitka spruce	31 (29 – 33)	29 (27 – 31)	27 (21 – 33)	30 (29 – 31)
Norway spruce	37 (32 – 43)	31 (26 – 36)	43 (33 – 53)	34 (21 – 48)
Scots pine	36 (4 – 68)	23 (6 – 40)	44 (0 – 122)	34 (17 – 52)
other pines	26 (23 – 30)	22 (19 – 25)	21 (0 – 113)	25 (23 – 27)
Douglas fir	41 (33 – 49)	35 (27 – 43)	33 (0 – 175)	40 (34 – 46)
larch spp.	32 (29 – 35)	30 (27 – 34)	39 (35 – 42)	29 (27 – 32)
other conifers	33 (30 – 37)	27 – –	37 (4 – 70)	40 (24 – 56)
ses. & ped. oak	36 (32 – 40)	15 (0 – 30)	47 (39 – 55)	31 (26 – 36)
beech	40 (32 – 48)	22 – –	36 (32 – 39)	33 (30 – 37)
ash	22 (17 – 27)	21 (18 – 24)	30 (22 – 38)	22 (20 – 25)
sycamore	34 (23 – 45)	19 (15 – 23)	29 (25 – 34)	26 (23 – 30)
birch spp.	18 (16 – 20)	20 (15 – 25)	25 (22 – 27)	21 (19 – 23)
alder	22 (18 – 26)	17 (13 – 21)	32 (26 – 39)	23 (20 – 26)
OLL broadleaves	18 (14 – 22)	14 (3 – 25)	27 (22 – 32)	25 (22 – 28)
OSL broadleaves	15 (13 – 17)	15 (12 – 18)	21 (19 – 22)	18 (17 – 19)
All	28 (27 – 30)	27 (26 – 29)	28 (26 – 30)	28 (27 – 29)



6.3.3 Normalised mean basal area per hectare by species group and age class (10yr)

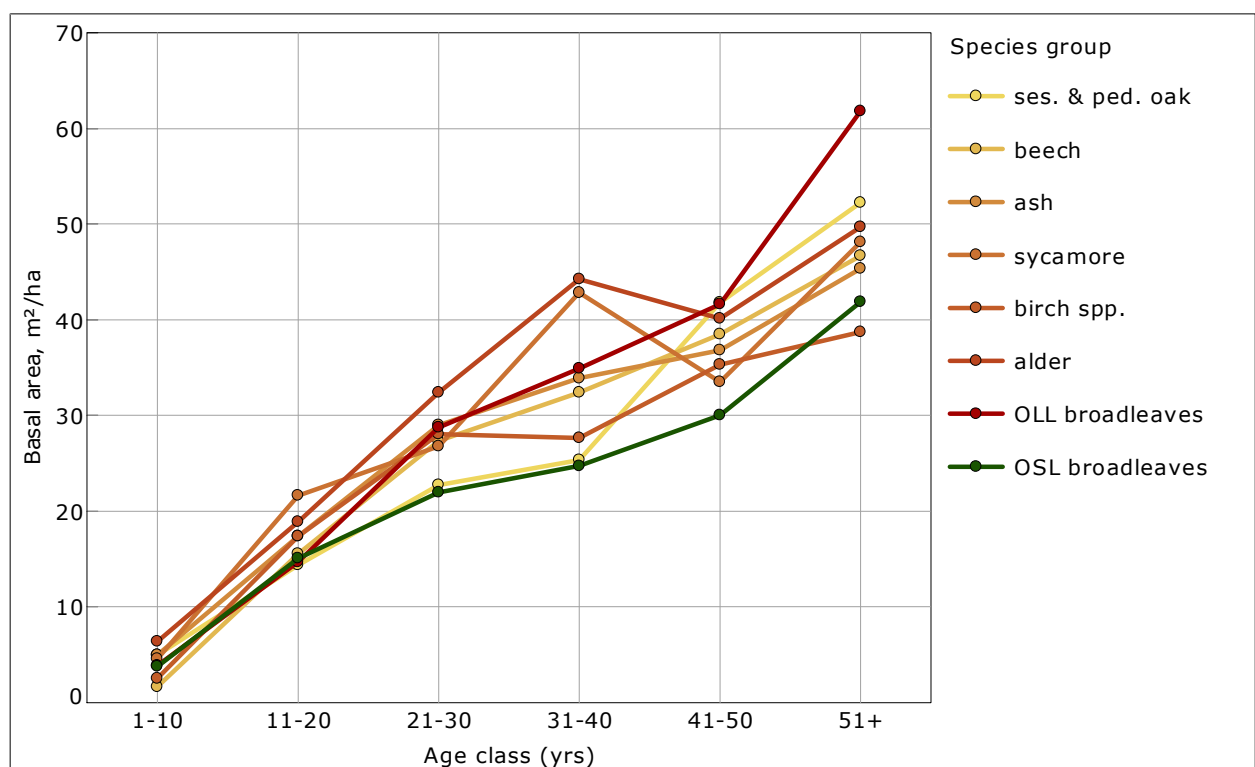
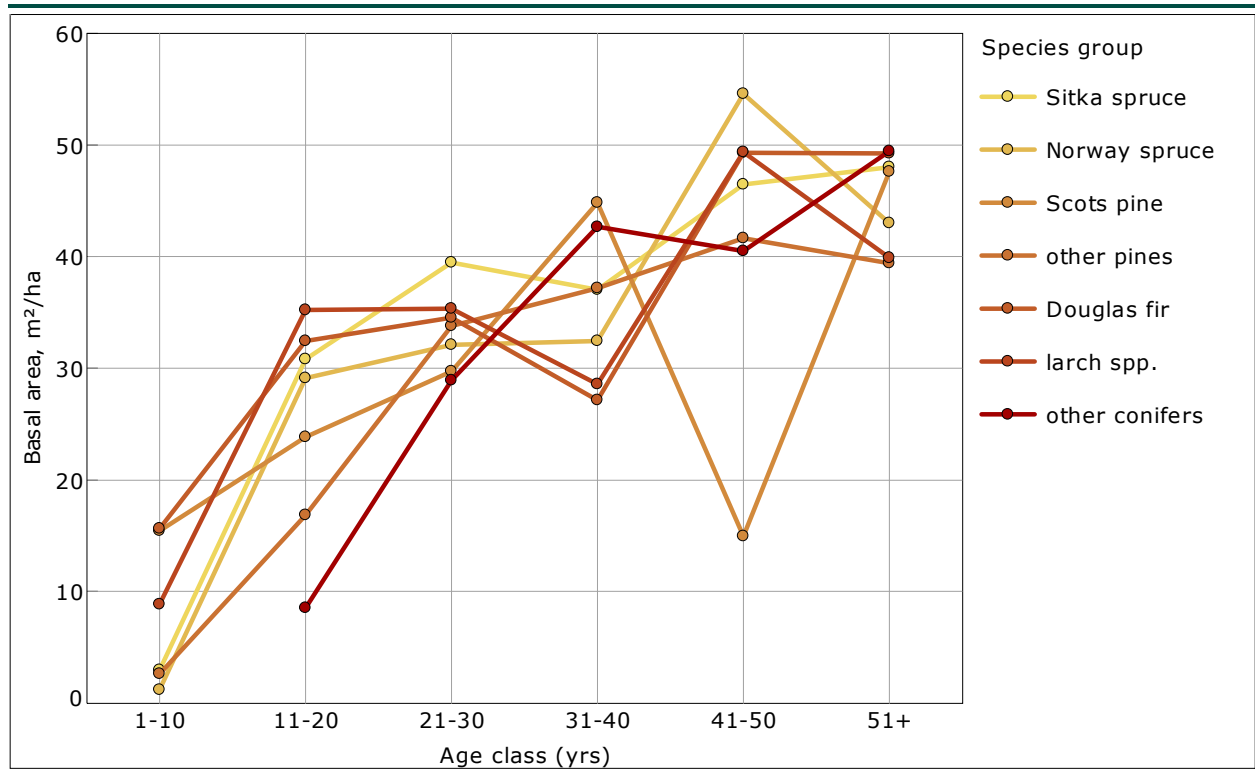
Methodology	
The normalised mean basal area per hectare is classified by species group and age class (10yr).	
The calculated value of the variable under consideration for a plot (i.e. basal area) is divided not by the whole plot area, but by the area of the part of the plot where the given variable is present. Therefore the sum of basal area for a particular species on a plot is related only to the area occupied by those trees, not to the whole plot.	

Age class (yrs)	Species group / Basal area			
	Sitka spruce	Norway spruce	Scots pine	other pines
	m ² /ha ($\alpha=0.05$)	m ² /ha ($\alpha=0.05$)	m ² /ha ($\alpha=0.05$)	m ² /ha ($\alpha=0.05$)
1-10	3 (2 - 4)	1 (1 - 2)	15 (9 - 22)	3 (1 - 4)
11-20	31 (29 - 33)	29 (27 - 31)	24 (15 - 32)	17 (14 - 20)
21-30	39 (38 - 41)	32 (25 - 39)	30 - -	34 (31 - 37)
31-40	37 (33 - 41)	32 (27 - 38)	45 - -	37 (34 - 41)
41-50	46 (42 - 51)	55 (50 - 59)	15 (6 - 24)	42 (35 - 48)
51+	48 (38 - 58)	43 (37 - 49)	48 (36 - 59)	39 (8 - 71)
All	30 (29 - 31)	34 (21 - 48)	34 (17 - 52)	25 (23 - 27)

Age class (yrs)	Species group / Basal area			
	Douglas fir	larch spp.	other conifers	ses. & ped. oak
	m ² /ha ($\alpha=0.05$)	m ² /ha ($\alpha=0.05$)	m ² /ha ($\alpha=0.05$)	m ² /ha ($\alpha=0.05$)
1-10	16 - -	9 (7 - 11)	- - -	5 (4 - 6)
11-20	32 (19 - 46)	35 (33 - 38)	9 - -	14 (13 - 16)
21-30	35 (31 - 38)	35 (31 - 40)	29 (25 - 33)	23 (19 - 27)
31-40	27 - -	29 (19 - 38)	43 (26 - 59)	25 (25 - 26)
41-50	49 (36 - 62)	49 - -	41 (2 - 79)	42 (30 - 53)
51+	49 (0 - 145)	40 (0 - 100)	49 (49 - 50)	52 (46 - 58)
All	40 (34 - 46)	29 (27 - 32)	40 (24 - 56)	31 (26 - 36)

Age class (yrs)	Species group / Basal area			
	beech	ash	sycamore	birch spp.
	m ² /ha ($\alpha=0.05$)	m ² /ha ($\alpha=0.05$)	m ² /ha ($\alpha=0.05$)	m ² /ha ($\alpha=0.05$)
1-10	2 (1 - 2)	5 (4 - 6)	5 (2 - 7)	2 (2 - 3)
11-20	16 (0 - 31)	17 (15 - 20)	22 (19 - 24)	17 (15 - 19)
21-30	27 (10 - 45)	29 (27 - 31)	27 (26 - 28)	28 (26 - 30)
31-40	32 (25 - 40)	34 (31 - 37)	43 (41 - 45)	28 (25 - 30)
41-50	38 (27 - 50)	37 (32 - 41)	33 (24 - 43)	35 (32 - 38)
51+	47 (42 - 51)	45 (41 - 50)	48 (39 - 57)	39 (36 - 41)
All	33 (30 - 37)	22 (20 - 25)	26 (23 - 30)	21 (19 - 23)

Age class (yrs)	Species group / Basal area			
	alder	OLL broadleaves	OSL broadleaves	All
	m ² /ha ($\alpha=0.05$)	m ² /ha ($\alpha=0.05$)	m ² /ha ($\alpha=0.05$)	m ² /ha ($\alpha=0.05$)
1-10	6 (4 - 8)	4 (3 - 5)	4 (3 - 4)	4 (3 - 4)
11-20	19 (14 - 23)	15 (13 - 17)	15 (14 - 16)	27 (26 - 28)
21-30	32 (31 - 34)	29 (26 - 31)	22 (20 - 24)	36 (34 - 37)
31-40	44 (39 - 49)	35 (27 - 43)	25 (22 - 28)	34 (32 - 36)
41-50	40 (33 - 47)	42 (36 - 47)	30 (27 - 33)	41 (38 - 43)
51+	50 (44 - 55)	62 (58 - 66)	42 (36 - 48)	42 (40 - 45)
All	23 (20 - 26)	25 (22 - 28)	18 (17 - 19)	28 (27 - 29)



CHAPTER 7

GROWING STOCK VOLUME

The total standing growing stock of Irish forests is estimated to be over 116 million m³, an increase of over 19 million m³ on the 2012 estimate, while growing stock volume has increased by 55% in the Private (grant aided) forests over this same time period. The gap between public and private forest growing stock volume has been closing in, with the latter's share expanding from 28% in 2006 to 44% in 2017.

It is important to note that the difference in growing stock volume between time periods does not represent the total increment, as the increment of trees which have been felled or have died during the reference period are not included. See Chapter 9 for details on gross volume increment.

In terms of broad species groups, 80.6% of growing stock volume refers to conifer species, while 19.4% is contained in broadleaf species. Sitka spruce contains 58.5% of the growing stock, followed by other pines at 9.4%. With regard to broadleaves Birch species contain 3.5% of total growing stock volume followed by Sessile and Pedunculate oak at 3.4% and Beech at 2.6%. Some 73.3% of the growing stock volume is contained within forests between 11 and 40 years of age.

Counties in the west of Ireland have the highest proportion of growing stock, with Co. Cork having the highest volume at 14.4 million m³.

The mean growing stock per hectare for the national forest estate is 170m³. In terms of forest ownership categories the average growing stock in Public forests is 177m³ per hectare, 173m³ per hectare in Private (other) forests and 150m³ per hectare in Private (grant aided) forests. Average growing stock in Private (grant aided) forests has increased by 51% between 2013 and 2017.

In terms of timber quality of the growing stock, Norway spruce has the highest proportion of straight logs, with 65.7% of trees having at least 5m of straight log in the first 6 m from ground level. Douglas fir had the next highest proportion of straight logs at 53%.

Definition

Growing stock volume

Volume over bark of all living trees (Dbh $\geq$ 7 cm) from stump to 7cm top diameter with Dbh greater than 7 cm.

Single tree stem profile models that were parameterised using Irish data were used to generate tree volume. Models for six conifer and four broadleaf species were produced, which use the explanatory variables of Dbh and height to generate volume. Funded by the National Council for Forest Research and Development (COFORD), the TREEMODEL project¹ developed models for six conifer species; Sitka spruce, Lodgepole pine, Japanese larch, Douglas-fir, Norway spruce, and Scots pine. Following the completion of the second cycle field-work, NFI field-staff non-destructively collected stem diameter data from broadleaf forests across Ireland. Single tree stem profile models were developed for four broadleaf species; oak, ash, beech and birch.

¹<http://www.coford.ie/researchprogramme/thematicareestablishingandgrowingforests/forestplanningandmanagement/treemodel/>

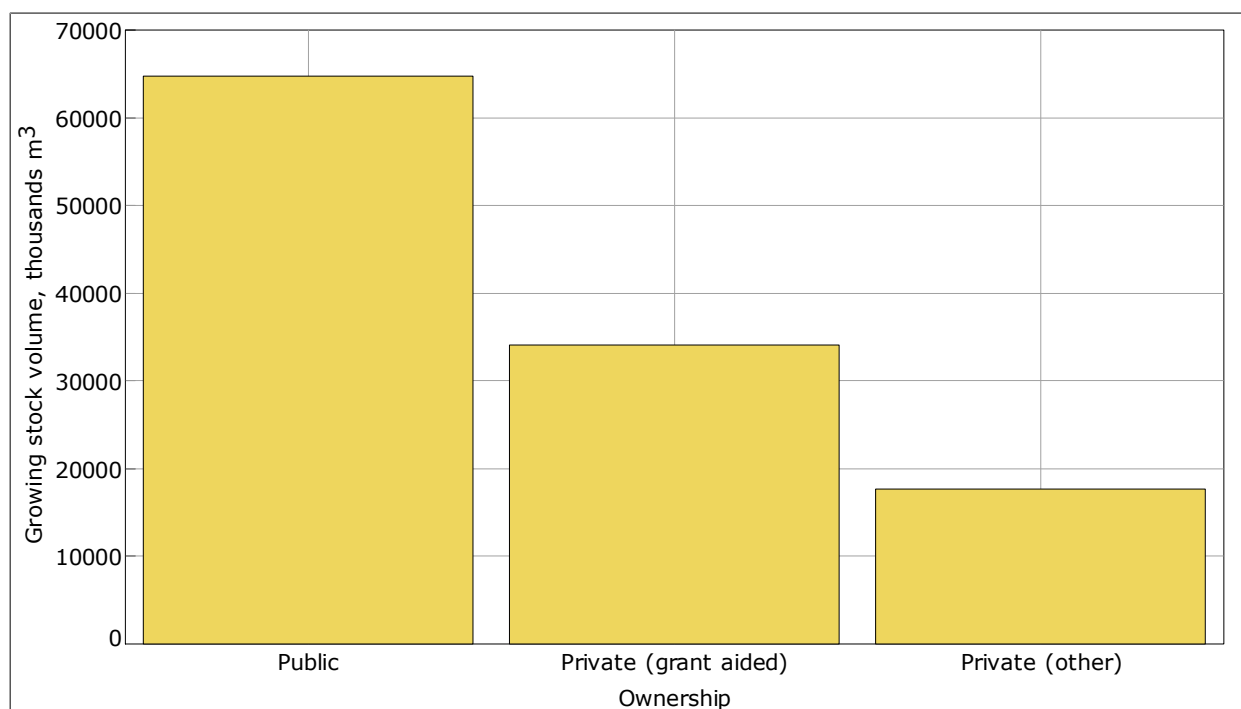
7.1 SPECIES

7.1.1 Total growing stock volume by ownership

Methodology

The total growing stock volume is classified by ownership.

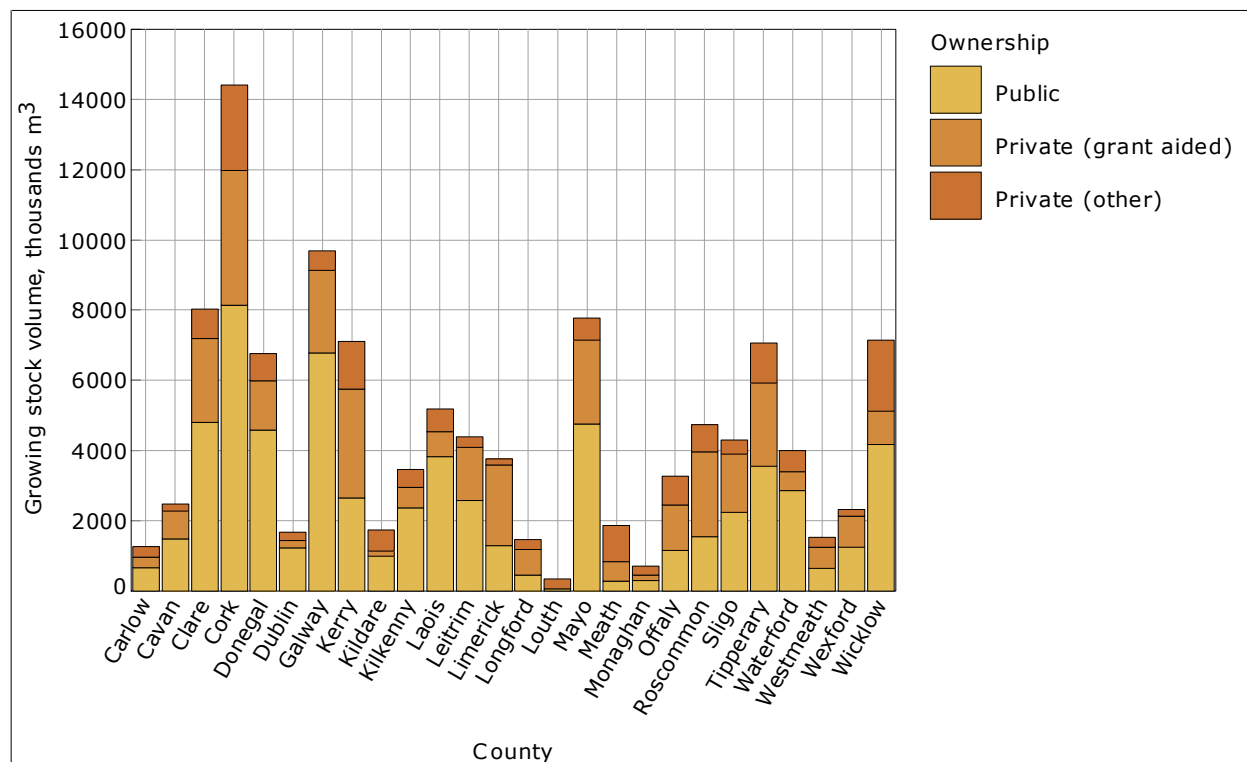
Ownership	Growing stock volume		
	thousands m ³	($\alpha = 0.05$)	%
Public	64,783	(60,904 – 68,663)	55.6
Private (grant aided)	34,090	(31,630 – 36,551)	29.3
Private (other)	17,651	(15,677 – 19,625)	15.1
Total	116,525	(111,459 – 121,591)	100.0



7.1.2 Total growing stock volume by ownership and county

Methodology						
The total growing stock volume is classified by ownership and county.						
County	Ownership / Growing stock volume					
	Public			Private (grant aided)		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
Carlow	671.8	(407.1 - 936.5)	1.0	291.5	(89.0 - 494.1)	0.9
Cavan	1,491.2	(826.1 - 2,156.3)	2.3	790.9	(356.4 - 1,225.4)	2.3
Clare	4,811.8	(3,784.5 - 5,839.1)	7.4	2,374.3	(1,449.6 - 3,299.0)	7.0
Cork	8,146.6	(6,554.2 - 9,739.0)	12.6	3,820.1	(2,998.4 - 4,641.7)	11.1
Donegal	4,579.1	(3,541.6 - 5,616.5)	7.1	1,399.5	(903.5 - 1,895.4)	4.1
Dublin	1,234.5	(529.5 - 1,939.5)	1.9	204.6	(0.0 - 775.7)	0.6
Galway	6,774.5	(5,780.3 - 7,768.6)	10.5	2,362.6	(1,718.3 - 3,007.0)	6.9
Kerry	2,655.3	(1,755.0 - 3,555.6)	4.1	3,100.8	(2,280.6 - 3,921.0)	9.1
Kildare	997.4	(680.3 - 1,314.6)	1.5	151.2	(124.1 - 178.3)	0.4
Kilkenny	2,367.1	(1,770.1 - 2,964.2)	3.7	585.4	(221.0 - 949.7)	1.7
Laois	3,840.2	(2,871.4 - 4,809.0)	5.9	701.4	(472.3 - 930.5)	2.1
Leitrim	2,585.2	(1,530.3 - 3,640.0)	4.0	1,513.7	(998.7 - 2,028.8)	4.4
Limerick	1,297.3	(679.3 - 1,915.2)	2.0	2,297.7	(1,613.8 - 2,981.6)	6.7
Longford	450.5	(76.1 - 824.9)	0.7	725.8	(420.7 - 1,030.8)	2.1
Louth	66.8	(0.0 - 155.2)	0.1	-	-	-
Mayo	4,764.8	(3,839.1 - 5,690.4)	7.4	2,381.0	(1,724.9 - 3,037.1)	7.0
Meath	290.1	(0.0 - 622.9)	0.4	542.6	(307.6 - 777.6)	1.6
Monaghan	303.7	(0.0 - 662.7)	0.5	155.5	(0.0 - 1,312.9)	0.5
Offaly	1,172.5	(589.0 - 1,756.0)	1.8	1,280.8	(797.4 - 1,764.1)	3.8
Roscommon	1,550.5	(1,034.1 - 2,066.8)	2.4	2,411.0	(1,628.6 - 3,193.4)	7.1
Sligo	2,230.8	(1,370.4 - 3,091.2)	3.4	1,664.3	(1,013.2 - 2,315.4)	4.9
Tipperary	3,545.7	(2,678.8 - 4,412.6)	5.5	2,386.6	(1,749.2 - 3,024.0)	7.0
Waterford	2,872.4	(2,027.7 - 3,717.2)	4.4	535.0	(188.8 - 881.1)	1.6
Westmeath	655.5	(256.5 - 1,054.5)	1.0	582.9	(271.7 - 894.1)	1.7
Wexford	1,249.5	(943.2 - 1,555.8)	1.9	882.7	(435.4 - 1,329.9)	2.6
Wicklow	4,178.8	(2,826.8 - 5,530.8)	6.5	948.6	(663.7 - 1,233.4)	2.8
Total	64,783.5	(60,903.9 - 68,663.1)	100.0	34,090.4	(31,630.1 - 36,550.6)	100.0

County	Ownership / Growing stock volume					
	Private (other)			Total		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
Carlow	309.4	(0.0 - 681.7)	1.8	1,272.8	(847.6 - 1,698.0)	1.1
Cavan	196.4	(66.3 - 326.5)	1.1	2,478.5	(1,705.2 - 3,251.9)	2.1
Clare	844.9	(561.8 - 1,127.9)	4.8	8,030.9	(6,588.6 - 9,473.2)	6.9
Cork	2,438.2	(1,794.0 - 3,082.3)	13.9	14,404.9	(12,547.0 - 16,262.8)	12.4
Donegal	780.1	(479.0 - 1,081.2)	4.4	6,758.7	(5,586.6 - 7,930.8)	5.8
Dublin	247.7	(0.0 - 611.5)	1.4	1,686.8	(982.2 - 2,391.5)	1.4
Galway	553.6	(254.0 - 853.3)	3.1	9,690.7	(8,477.6 - 10,903.9)	8.3
Kerry	1,350.1	(356.2 - 2,343.9)	7.6	7,106.2	(5,610.8 - 8,601.5)	6.1
Kildare	585.2	(178.6 - 991.7)	3.3	1,733.8	(1,254.2 - 2,213.4)	1.5
Kilkenny	504.3	(49.3 - 959.3)	2.9	3,456.8	(2,620.1 - 4,293.5)	3.0
Laois	639.3	(167.8 - 1,110.9)	3.6	5,180.9	(4,139.3 - 6,222.5)	4.4
Leitrim	289.6	(129.1 - 450.1)	1.6	4,388.5	(3,217.6 - 5,559.4)	3.8
Limerick	173.5	(0.0 - 675.3)	1.0	3,768.5	(2,887.7 - 4,649.3)	3.2
Longford	289.4	(0.0 - 673.9)	1.6	1,465.7	(1,008.0 - 1,923.4)	1.3
Louth	277.3	(0.0 - 1,840.7)	1.6	344.2	(0.0 - 826.0)	0.3
Mayo	622.9	(194.7 - 1,051.2)	3.5	7,768.7	(6,564.8 - 8,972.6)	6.7
Meath	1,033.1	(610.4 - 1,455.8)	5.9	1,865.8	(1,241.7 - 2,489.9)	1.6
Monaghan	258.5	(10.9 - 506.2)	1.5	717.7	(367.2 - 1,068.1)	0.6
Offaly	810.1	(329.3 - 1,290.9)	4.6	3,263.3	(2,422.0 - 4,104.7)	2.8
Roscommon	779.6	(116.7 - 1,442.5)	4.4	4,741.1	(3,676.7 - 5,805.5)	4.1
Sligo	419.7	(111.5 - 727.9)	2.4	4,314.8	(3,227.4 - 5,402.1)	3.7
Tipperary	1,135.0	(508.6 - 1,761.5)	6.4	7,067.4	(5,854.6 - 8,280.1)	6.1
Waterford	604.4	(442.2 - 766.6)	3.4	4,011.8	(3,121.6 - 4,902.0)	3.4
Westmeath	299.1	(125.8 - 472.5)	1.7	1,537.5	(1,052.0 - 2,023.0)	1.3
Wexford	192.7	(0.0 - 747.5)	1.1	2,324.8	(1,757.3 - 2,892.4)	2.0
Wicklow	2,016.7	(1,164.3 - 2,869.1)	11.4	7,144.1	(5,547.7 - 8,740.5)	6.1
Total	17,651.1	(15,677.1 - 19,625.0)	100.0	116,524.9	(111,459.3 - 121,590.6)	100.0



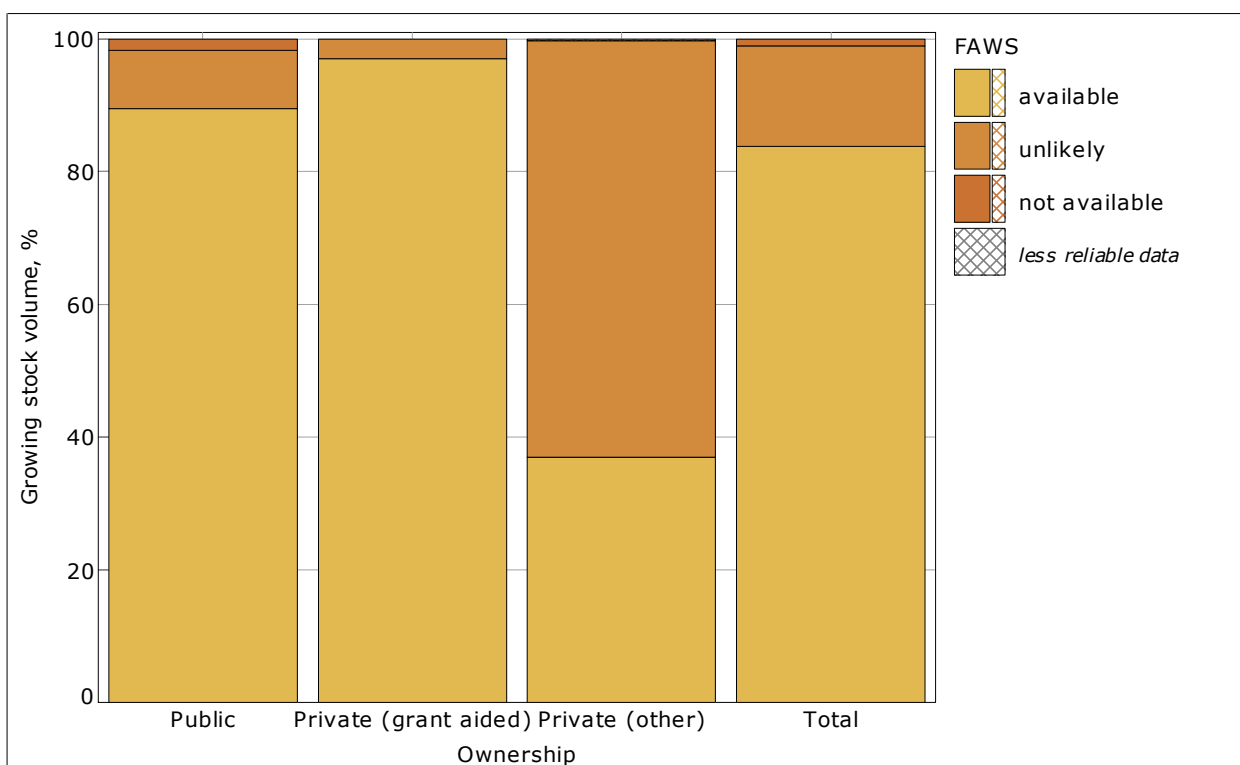
7.1.3 Total growing stock volume by ownership and Forest Available for Wood Supply

Methodology

The total growing stock volume is classified by ownership and Forest Available for Wood Supply (FAWS).

FAWS	Ownership / Growing stock volume					
	Public			Private (grant aided)		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
available	58,024.6	(54,614.2 – 61,435.0)	89.6	33,093.1	(30,773.1 – 35,413.1)	97.1
unlikely	5,633.0	(4,005.4 – 7,260.6)	8.7	997.3	(176.9 – 1,817.7)	2.9
not available	1,125.9	(727.8 – 1,523.9)	1.7	–	–	–
Total	64,783.5	(60,903.9 – 68,663.1)	100.0	34,090.4	(31,630.1 – 36,550.6)	100.0

FAWS	Ownership / Growing stock volume					
	Private (other)			Total		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
available	6,526.9	(4,556.4 – 8,497.4)	37.0	97,644.6	(93,244.9 – 102,044.3)	83.8
unlikely	11,078.2	(9,780.9 – 12,375.5)	62.7	17,708.5	(15,606.8 – 19,810.2)	15.2
not available	46.0	–	0.3	1,171.9	(763.7 – 1,580.1)	1.0
Total	17,651.1	(15,677.1 – 19,625.0)	100.0	116,524.9	(111,459.3 – 121,590.6)	100.0



7.2 SPECIES

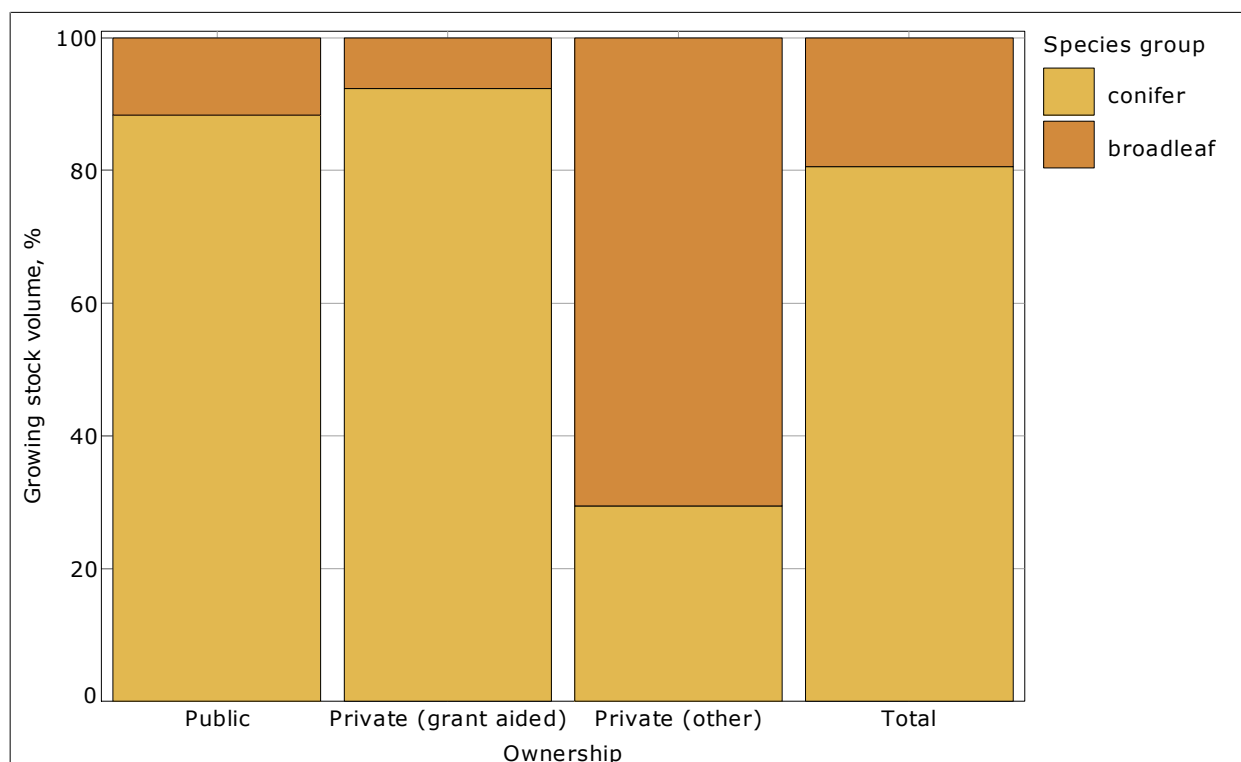
7.2.1 Total growing stock volume by ownership and species group (broadleaf/conifer)

Methodology

The total growing stock is classified by ownership and species group (broadleaf/conifer).

Species group	Ownership / Growing stock volume					
	Public			Private (grant aided)		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
conifer	57,255.5	(53,477.0 – 61,034.0)	88.4	31,490.9	(29,087.3 – 33,894.5)	92.4
broadleaf	7,528.0	(6,356.1 – 8,699.8)	11.6	2,599.5	(2,072.5 – 3,126.4)	7.6
Total	64,783.5	(60,903.9 – 68,663.1)	100.0	34,090.4	(31,630.1 – 36,550.6)	100.0

Species group	Ownership / Growing stock volume					
	Private (other)			Total		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
conifer	5,187.7	(3,312.7 – 7,062.8)	29.4	93,934.1	(89,217.0 – 98,651.3)	80.6
broadleaf	12,463.4	(11,114.8 – 13,811.9)	70.6	22,590.8	(20,616.1 – 24,565.6)	19.4
Total	17,651.1	(15,677.1 – 19,625.0)	100.0	116,524.9	(111,459.3 – 121,590.6)	100.0



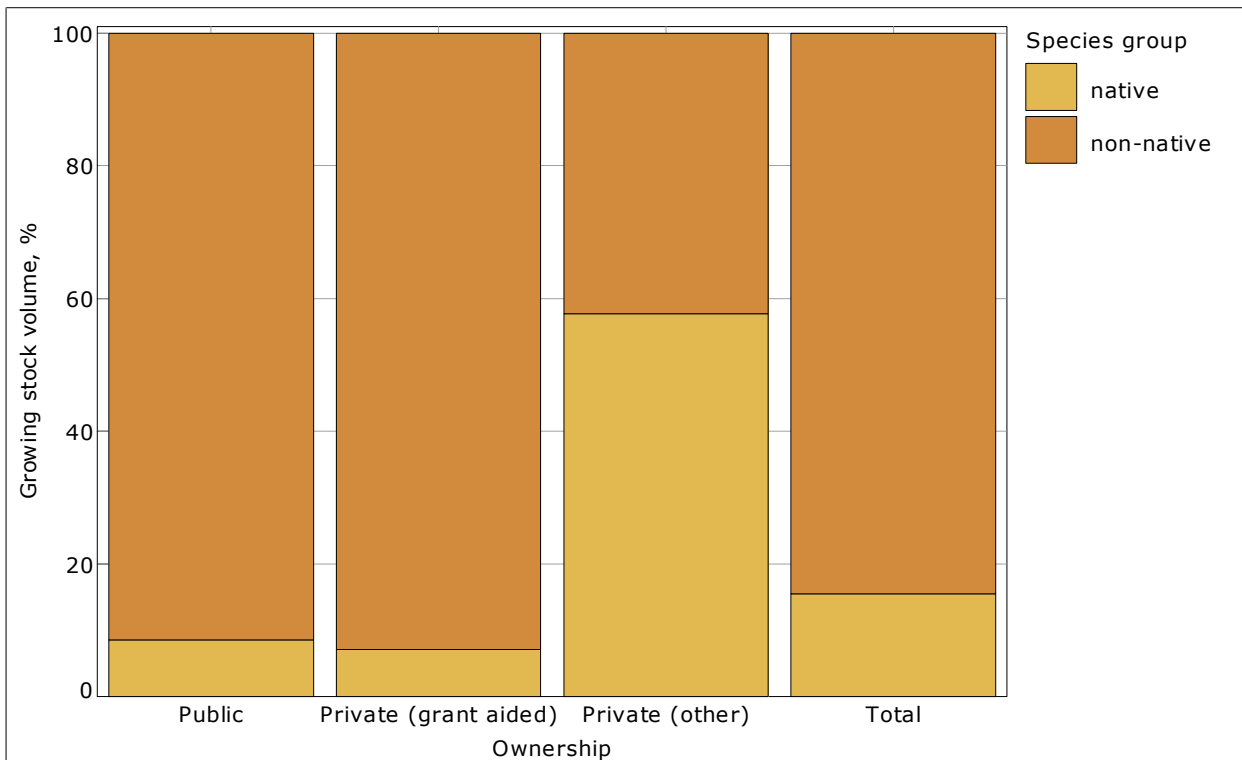
7.2.2 Total growing stock volume by ownership and species type (native/non-native)

Methodology

The total growing stock volume is classified by ownership and species group (native/non-native).

Species group	Ownership / Growing stock volume					
	Public			Private (grant aided)		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
native	5,511.7	(4,695.1 - 6,328.4)	8.5	2,421.3	(1,915.8 - 2,926.7)	7.1
non-native	59,271.8	(55,459.5 - 63,084.0)	91.5	31,669.1	(29,265.4 - 34,072.8)	92.9
Total	64,783.5	(60,903.9 - 68,663.1)	100.0	34,090.4	(31,630.1 - 36,550.6)	100.0

Species group	Ownership / Growing stock volume					
	Private (other)			Total		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
native	10,181.7	(9,095.5 - 11,267.9)	57.7	18,114.7	(16,581.9 - 19,647.4)	15.5
non-native	7,469.4	(5,801.9 - 9,136.9)	42.3	98,410.3	(93,595.3 - 103,225.2)	84.5
Total	17,651.1	(15,677.1 - 19,625.0)	100.0	116,524.9	(111,459.3 - 121,590.6)	100.0

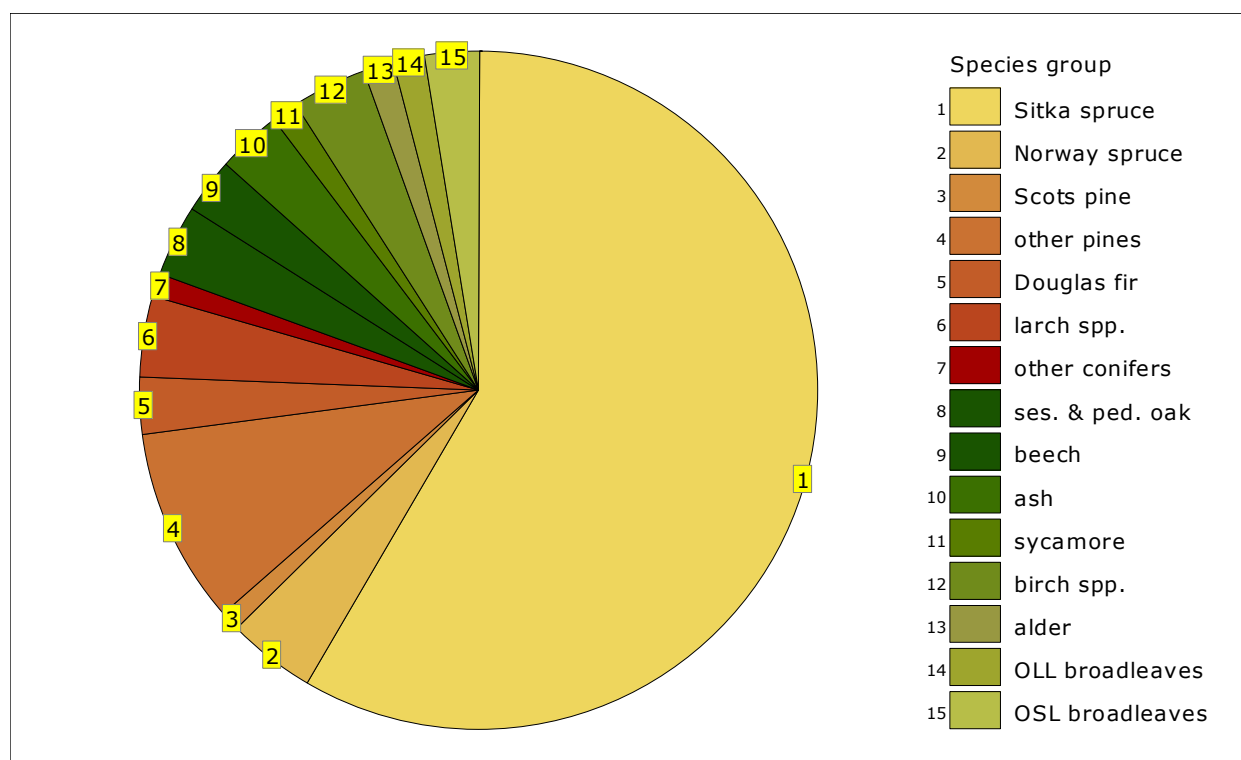


7.2.3 Total growing stock volume by species groups

Methodology

The total growing stock volume is classified by species group.

Species group	Growing stock volume		
	thousands m ³	($\alpha = 0.05$)	%
Sitka spruce	68,159.5	(63,943.0 – 72,376.0)	58.5
Norway spruce	4,920.2	(4,085.5 – 5,754.9)	4.2
Scots pine	1,043.4	(757.1 – 1,329.8)	0.9
other pines	10,920.3	(9,235.3 – 12,605.3)	9.4
Douglas fir	3,121.7	(2,489.5 – 3,753.9)	2.7
larch spp.	4,484.7	(3,575.9 – 5,393.6)	3.8
other conifers	1,284.2	(734.9 – 1,833.6)	1.1
ses. & ped. oak	3,941.8	(3,050.7 – 4,833.0)	3.4
beech	3,061.3	(2,282.7 – 3,839.8)	2.6
ash	3,563.6	(2,968.6 – 4,158.7)	3.1
sycamore	1,465.8	(1,016.5 – 1,915.2)	1.3
birch spp.	4,111.9	(3,549.4 – 4,674.5)	3.5
alder	1,676.4	(1,292.9 – 2,059.9)	1.4
OLL broadleaves	1,740.0	(845.9 – 2,634.1)	1.5
OSL broadleaves	3,029.9	(2,604.1 – 3,455.6)	2.6
Total	116,524.9	(111,459.3 – 121,590.6)	100.0



7.2.4 Total growing stock volume by county and species group

Methodology
The total growing stock volume is classified by county and species group.

Species group	County / Growing stock volume					
	Carlow			Cavan		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
Sitka spruce	619.5	(216.5 - 1,022.6)	48.7	1,568.8	(868.4 - 2,269.1)	63.4
Norway spruce	44.9		3.5	141.4	(0.0 - 317.8)	5.7
Scots pine	15.5	(0.0 - 35.9)	1.2	6.6		0.3
other pines	-	-	-	25.8		1.0
Douglas fir	208.2	(0.0 - 883.0)	16.4	-	-	-
larch spp.	77.6	(0.0 - 870.6)	6.1	122.5	(0.0 - 317.9)	4.9
other conifers	-	-	-	6.0		0.2
ses. & ped. oak	-	-	-	140.0	(0.0 - 349.2)	5.6
beech	-	-	-	-	-	-
ash	86.9	(0.0 - 351.4)	6.8	86.8	(18.8 - 154.7)	3.5
sycamore	-	-	-	51.1	(0.0 - 597.4)	2.1
birch spp.	27.9	(0.0 - 125.5)	2.2	89.2	(35.3 - 143.1)	3.6
alder	44.5		3.5	81.1	(0.0 - 193.6)	3.3
OLL broadleaves	134.4	(0.0 - 1,665.9)	10.6	10.2	(0.0 - 37.9)	0.4
OSL broadleaves	13.3	(0.0 - 41.6)	1.0	149.2	(48.9 - 249.6)	6.0
Total	1,272.8	(847.6 - 1,698.0)	100.0	2,478.5	(1,705.2 - 3,251.9)	100.0

Species group	County / Growing stock volume					
	Clare			Cork		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
Sitka spruce	5,732.8	(4,407.3 - 7,058.3)	71.5	10,190.2	(8,514.8 - 11,865.6)	70.5
Norway spruce	83.5	(0.0 - 273.4)	1.0	129.3	(0.0 - 807.8)	0.9
Scots pine	-	-	-	112.7	(2.6 - 222.8)	0.8
other pines	522.9	(141.8 - 904.1)	6.5	443.8	(290.1 - 597.5)	3.1
Douglas fir	-	-	-	476.7	(86.5 - 866.9)	3.3
larch spp.	300.4	(150.5 - 450.3)	3.7	301.0	(150.0 - 452.0)	2.1
other conifers	-	-	-	13.1	(0.0 - 34.9)	0.09
ses. & ped. oak	49.2	(2.9 - 95.5)	0.6	516.2	(284.8 - 747.6)	3.6
beech	272.0	(0.0 - 601.1)	3.4	485.2	(43.5 - 927.0)	3.4
ash	442.2	(163.1 - 721.2)	5.5	335.6	(147.7 - 523.6)	2.3
sycamore	35.5	(21.2 - 49.9)	0.4	169.2	(0.0 - 364.1)	1.2
birch spp.	215.5	(66.5 - 364.5)	2.7	295.8	(177.6 - 414.0)	2.1
alder	62.5	(0.0 - 132.6)	0.8	402.0	(177.1 - 626.8)	2.8
OLL broadleaves	33.5	(0.0 - 79.9)	0.4	180.2	(96.1 - 264.4)	1.3
OSL broadleaves	280.9	(171.2 - 390.6)	3.5	353.9	(197.8 - 510.0)	2.5
Total	8,030.9	(6,588.6 - 9,473.2)	100.0	14,404.9	(12,547.0 - 16,262.8)	100.0

Species group	County / Growing stock volume					
	Donegal			Dublin		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
Sitka spruce	4,341.7	(3,265.7 - 5,417.6)	64.2	585.3	(70.9 - 1,099.6)	34.8
Norway spruce	44.6		0.7	-	-	-
Scots pine	-	-	-	11.5		0.7
other pines	1,165.2	(612.8 - 1,717.6)	17.2	280.4	(0.0 - 688.7)	16.6
Douglas fir	-	-	-	50.3		3.0
larch spp.	195.3	(0.0 - 430.7)	2.9	54.1	(0.0 - 682.8)	3.2
other conifers	67.8	(19.3 - 116.4)	1.0	22.4		1.3
ses. & ped. oak	92.3	(0.0 - 831.3)	1.4	90.6	(0.0 - 1,048.8)	5.4
beech	160.4	(8.9 - 312.0)	2.4	4.1		0.2
ash	83.8	(0.0 - 186.8)	1.2	71.4	(0.0 - 180.9)	4.2
sycamore	44.3		0.7	132.2	(0.0 - 341.6)	7.8
birch spp.	236.9	(133.7 - 340.2)	3.5	-	-	-
alder	84.5	(32.6 - 136.3)	1.2	5.2		0.3
OLL broadleaves	20.3	(0.0 - 77.3)	0.3	377.8	(0.0 - 1,499.6)	22.4
OSL broadleaves	221.6	(95.4 - 347.7)	3.3	1.4		0.08
Total	6,758.7	(5,586.6 - 7,930.8)	100.0	1,686.8	(982.2 - 2,391.5)	100.0

Species group	County / Growing stock volume					
	Galway			Kerry		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
Sitka spruce	5,597.4	(4,525.3 - 6,669.5)	57.7	4,354.1	(3,203.5 - 5,504.7)	61.4
Norway spruce	319.3	(89.3 - 549.3)	3.3	62.7		0.9
Scots pine	135.7	(0.0 - 390.1)	1.4	48.4		0.7
other pines	2,579.7	(1,832.9 - 3,326.5)	26.6	881.1	(0.0 - 1,828.2)	12.4
Douglas fir	-	-	-	2.7		0.04
larch spp.	107.4	(5.9 - 209.0)	1.1	57.2	(13.2 - 101.1)	0.8
other conifers	20.5	(0.0 - 44.7)	0.2	7.5		0.1
ses. & ped. oak	64.7	(0.0 - 145.8)	0.7	396.8	(132.3 - 661.3)	5.6
beech	200.5	(28.5 - 372.4)	2.1	66.2	(0.0 - 192.6)	0.9
ash	141.1	(36.1 - 246.1)	1.5	115.1	(48.1 - 182.0)	1.6
sycamore	72.4	(10.7 - 134.0)	0.7	31.8	(0.0 - 102.3)	0.4
birch spp.	243.3	(139.3 - 347.3)	2.5	474.2	(163.1 - 785.2)	6.7
alder	62.1	(0.0 - 130.5)	0.6	192.1	(54.7 - 329.6)	2.7
OLL broadleaves	24.8	(9.5 - 40.0)	0.3	257.3	(133.1 - 381.5)	3.6
OSL broadleaves	121.8	(66.4 - 177.3)	1.3	159.1	(61.3 - 256.9)	2.2
Total	9,690.7	(8,477.6 - 10,903.9)	100.0	7,106.2	(5,610.8 - 8,601.5)	100.0

Species group	County / Growing stock volume					
	Kildare			Kilkenny		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
Sitka spruce	248.1	(0.0 - 523.4)	14.3	2,005.0	(1,310.7 - 2,699.2)	58.0
Norway spruce	374.5	(67.4 - 681.7)	21.7	231.3	(23.7 - 438.8)	6.7
Scots pine	42.2	(0.0 - 385.4)	2.4	45.1		1.3
other pines	140.7	(0.0 - 1,828.2)	8.1	42.0	(0.0 - 144.4)	1.2
Douglas fir	9.5	(0.0 - 67.3)	0.6	237.7	(0.0 - 1,825.9)	6.9
larch spp.	38.1	(0.0 - 173.1)	2.2	70.7	(0.0 - 195.4)	2.0
other conifers	43.1		2.5	46.3	(13.1 - 79.4)	1.3
ses. & ped. oak	61.5	(0.0 - 276.1)	3.5	272.2	(0.0 - 706.2)	7.9
beech	113.4	(42.6 - 184.2)	6.5	35.0	(2.1 - 67.9)	1.0
ash	296.0	(13.2 - 578.9)	17.1	64.4	(24.7 - 104.2)	1.9
sycamore	22.9	(0.0 - 61.3)	1.3	9.6		0.3
birch spp.	262.3	(133.4 - 391.2)	15.1	210.0	(0.9 - 419.1)	6.1
alder	26.3		1.5	7.5		0.2
OLL broadleaves	-	-	-	98.0	(0.0 - 1,273.0)	2.8
OSL broadleaves	55.2	(0.0 - 148.8)	3.2	82.1	(46.8 - 117.3)	2.4
Total	1,733.8	(1,254.2 - 2,213.4)	100.0	3,456.8	(2,620.1 - 4,293.5)	100.0

Species group	County / Growing stock volume					
	Laois			Leitrim		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
Sitka spruce	2,959.6	(2,114.4 - 3,804.8)	57.2	3,459.9	(2,381.9 - 4,537.8)	78.9
Norway spruce	222.6	(0.0 - 490.4)	4.3	-	-	-
Scots pine	69.6	(0.0 - 216.9)	1.3	17.1	(16.7 - 17.5)	0.4
other pines	258.1	(62.5 - 453.6)	5.0	60.4	(0.0 - 175.7)	1.4
Douglas fir	167.2	(0.0 - 363.7)	3.2	-	-	-
larch spp.	364.6	(0.0 - 997.4)	7.0	195.0	(12.5 - 377.4)	4.4
other conifers	197.3	(0.0 - 918.4)	3.8	232.0	-	5.3
ses. & ped. oak	180.5	(0.0 - 429.5)	3.5	2.7	-	0.06
beech	169.8	(53.5 - 286.1)	3.3	2.8	-	0.06
ash	299.2	(61.1 - 537.2)	5.8	28.3	(0.0 - 84.6)	0.6
sycamore	19.8	(0.0 - 65.3)	0.4	-	-	-
birch spp.	157.0	(33.7 - 280.4)	3.0	205.2	(44.8 - 365.6)	4.7
alder	6.2	-	0.1	62.5	(0.0 - 206.2)	1.4
OLL broadleaves	4.2	(2.9 - 5.6)	0.08	10.2	(0.0 - 30.5)	0.2
OSL broadleaves	105.3	(11.6 - 199.0)	2.0	112.4	(14.4 - 210.5)	2.6
Total	5,180.9	(4,139.3 - 6,222.5)	100.0	4,388.5	(3,217.6 - 5,559.4)	100.0

Species group	County / Growing stock volume					
	Limerick			Longford		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
Sitka spruce	2,854.6	(2,042.4 - 3,666.7)	75.7	283.0	(73.2 - 492.8)	19.3
Norway spruce	52.9	-	1.4	701.4	(356.9 - 1,045.9)	48.0
Scots pine	11.9	-	0.3	52.6	(0.0 - 121.0)	3.6
other pines	70.9	(0.0 - 153.1)	1.9	2.0	-	0.1
Douglas fir	166.8	(0.0 - 387.1)	4.4	-	-	-
larch spp.	116.1	(44.9 - 187.4)	3.1	216.7	(0.0 - 1,196.1)	14.8
other conifers	61.0	(0.0 - 407.4)	1.6	-	-	-
ses. & ped. oak	6.6	(0.0 - 33.0)	0.2	2.0	-	0.1
beech	21.3	(0.0 - 218.4)	0.6	-	-	-
ash	109.6	(0.0 - 246.3)	2.9	88.6	(0.0 - 215.0)	6.0
sycamore	52.6	(0.0 - 251.2)	1.4	5.7	-	0.4
birch spp.	21.0	(0.0 - 236.4)	0.6	26.9	(0.0 - 57.9)	1.8
alder	200.3	(0.0 - 433.7)	5.3	34.2	(0.0 - 421.7)	2.3
OLL broadleaves	-	-	-	11.6	-	0.8
OSL broadleaves	22.8	(1.2 - 44.4)	0.6	41.1	(0.0 - 91.3)	2.8
Total	3,768.5	(2,887.7 - 4,649.3)	100.0	1,465.7	(1,008.0 - 1,923.4)	100.0

Species group	County / Growing stock volume					
	Louth			Mayo		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
Sitka spruce	10.1	-	2.9	3,537.6	(2,611.0 - 4,464.2)	45.6
Norway spruce	-	-	-	69.4	(0.0 - 892.9)	0.9
Scots pine	-	-	-	60.7	(0.0 - 486.0)	0.8
other pines	33.7	-	9.8	3,281.8	(2,372.5 - 4,191.0)	42.2
Douglas fir	-	-	-	-	-	-
larch spp.	23.1	-	6.7	260.9	(61.7 - 460.0)	3.4
other conifers	-	-	-	-	-	-
ses. & ped. oak	-	-	-	204.1	(0.0 - 614.6)	2.6
beech	183.9	(0.0 - 2,036.6)	53.4	-	-	-
ash	52.5	(0.0 - 584.2)	15.3	64.9	(3.4 - 126.4)	0.8
sycamore	9.3	-	2.7	29.1	(0.0 - 68.3)	0.4
birch spp.	-	-	-	157.6	(72.2 - 243.0)	2.0
alder	-	-	-	-	-	-
OLL broadleaves	30.0	-	8.7	30.6	(0.0 - 84.1)	0.4
OSL broadleaves	1.6	-	0.5	72.0	(32.6 - 111.4)	0.9
Total	344.2	(0.0 - 826.0)	100.0	7,768.7	(6,564.8 - 8,972.6)	100.0

Species group	County / Growing stock volume					
	Meath			Monaghan		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
Sitka spruce	10.5	(0.0 - 106.0)	0.6	314.3	(0.0 - 696.9)	43.8
Norway spruce	307.2	(85.5 - 529.0)	16.5	45.7		6.4
Scots pine	29.8	(0.0 - 120.8)	1.6	2.6		0.4
other pines	-	-	-	12.4		1.7
Douglas fir	-	-	-	-	-	-
larch spp.	106.6	(0.0 - 247.9)	5.7	125.2	(0.0 - 928.9)	17.4
other conifers	5.5		0.3	-	-	-
ses. & ped. oak	504.8	(75.8 - 933.9)	27.0	-	-	-
beech	349.7	(40.8 - 658.6)	18.7	-	-	-
ash	259.6	(57.7 - 461.4)	13.9	18.6	(0.0 - 64.2)	2.6
sycamore	103.0	(32.7 - 173.3)	5.5	-	-	-
birch spp.	21.5		1.2	120.0	(0.0 - 381.6)	16.7
alder	16.5		0.9	6.7		0.9
OLL broadleaves	115.6	(0.0 - 316.1)	6.2	3.3		0.5
OSL broadleaves	35.6	(0.0 - 88.0)	1.9	68.7	(0.0 - 226.3)	9.6
Total	1,865.8	(1,241.7 - 2,489.9)	100.0	717.7	(367.2 - 1,068.1)	100.0

Species group	County / Growing stock volume					
	Offaly			Roscommon		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
Sitka spruce	1,330.0	(679.6 - 1,980.3)	40.8	3,357.0	(2,416.5 - 4,297.4)	70.8
Norway spruce	443.5	(228.6 - 658.4)	13.6	166.0	(36.3 - 295.7)	3.5
Scots pine	-	-	-	-	-	-
other pines	171.0	(4.8 - 337.1)	5.2	451.3	(100.5 - 802.0)	9.5
Douglas fir	142.9	(0.0 - 970.8)	4.4	-	-	-
larch spp.	92.2	(0.0 - 513.5)	2.8	103.0	(0.0 - 217.5)	2.2
other conifers	45.1		1.4	-	-	-
ses. & ped. oak	221.1	(0.0 - 736.3)	6.8	95.0	(0.0 - 298.5)	2.0
beech	124.0	(0.0 - 374.5)	3.8	80.3	(0.0 - 657.9)	1.7
ash	185.6	(49.9 - 321.2)	5.7	110.9	(44.9 - 176.9)	2.3
sycamore	17.2	(0.0 - 39.9)	0.5	113.2	(0.0 - 1,410.2)	2.4
birch spp.	219.6	(95.1 - 344.2)	6.7	165.8	(66.1 - 265.5)	3.5
alder	45.2	(0.0 - 161.2)	1.4	22.4	(0.0 - 50.7)	0.5
OLL broadleaves	-	-	-	1.4		0.03
OSL broadleaves	226.0	(75.6 - 376.4)	6.9	75.0	(23.9 - 126.1)	1.6
Total	3,263.3	(2,422.0 - 4,104.7)	100.0	4,741.1	(3,676.7 - 5,805.5)	100.0

Species group	County / Growing stock volume					
	Sligo			Tipperary		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
Sitka spruce	3,031.4	(2,040.8 - 4,021.9)	70.1	3,736.5	(2,808.2 - 4,664.8)	52.9
Norway spruce	162.9	(0.0 - 566.6)	3.8	271.6	(0.0 - 642.0)	3.8
Scots pine	43.7		1.0	153.9	(59.5 - 248.4)	2.2
other pines	121.7	(0.0 - 312.8)	2.8	256.0	(66.1 - 445.8)	3.6
Douglas fir	27.6		0.6	519.1	(329.0 - 709.2)	7.3
larch spp.	321.3	(0.0 - 709.3)	7.4	613.0	(259.6 - 966.4)	8.7
other conifers	15.7		0.4	24.9		0.4
ses. & ped. oak	24.3	(0.0 - 276.6)	0.6	206.3	(38.1 - 374.5)	2.9
beech	51.4	(8.1 - 94.7)	1.2	152.7	(0.0 - 355.6)	2.2
ash	93.2	(10.3 - 176.0)	2.2	274.7	(102.4 - 446.9)	3.9
sycamore	111.6		2.6	90.1	(0.0 - 226.8)	1.3
birch spp.	98.9	(26.2 - 171.7)	2.3	271.6	(93.9 - 449.3)	3.8
alder	51.1		1.2	120.7	(0.0 - 377.6)	1.7
OLL broadleaves	19.4	(0.0 - 52.9)	0.5	170.5	(0.0 - 858.3)	2.4
OSL broadleaves	140.6	(47.8 - 233.4)	3.3	205.9	(118.4 - 293.3)	2.9
Total	4,314.8	(3,227.4 - 5,402.1)	100.0	7,067.4	(5,854.6 - 8,280.1)	100.0

Species group	County / Growing stock volume					
	Waterford			Westmeath		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
Sitka spruce	2,599.1	(1,776.1 - 3,422.0)	64.8	277.2	(61.0 - 493.3)	18.0
Norway spruce	-	-	-	381.9	(236.2 - 527.6)	24.8
Scots pine	25.5	(0.0 - 184.3)	0.6	-	-	-
other pines	53.8	(0.0 - 117.8)	1.3	-	-	-
Douglas fir	134.4	(0.0 - 468.0)	3.4	158.0	(0.0 - 929.7)	10.3
larch spp.	148.1	(0.0 - 377.9)	3.7	9.9	(0.0 - 104.9)	0.6
other conifers	147.5	(0.0 - 467.0)	3.7	12.4	-	0.8
ses. & ped. oak	221.2	(0.0 - 521.4)	5.5	59.5	(0.0 - 695.8)	3.9
beech	63.6	(23.5 - 103.6)	1.6	160.7	(0.0 - 1,368.1)	10.5
ash	171.7	(0.0 - 352.2)	4.3	18.4	-	1.2
sycamore	25.0	(0.0 - 72.7)	0.6	107.4	(25.1 - 189.6)	7.0
birch spp.	118.3	(55.4 - 181.2)	2.9	279.3	(92.5 - 466.1)	18.2
alder	14.9	(0.0 - 37.6)	0.4	12.8	(0.0 - 123.2)	0.8
OLL broadleaves	54.5	(0.0 - 135.5)	1.4	3.0	-	0.2
OSL broadleaves	234.2	(0.0 - 474.0)	5.8	57.0	(6.7 - 107.3)	3.7
Total	4,011.8	(3,121.6 - 4,902.0)	100.0	1,537.5	(1,052.0 - 2,023.0)	100.0
Species group	County / Growing stock volume					
	Wexford			Wicklow		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
Sitka spruce	1,190.4	(766.8 - 1,614.0)	51.2	3,965.9	(2,616.0 - 5,315.8)	55.5
Norway spruce	320.9	(126.0 - 515.8)	13.8	342.8	(0.0 - 943.0)	4.8
Scots pine	38.4	(0.0 - 110.6)	1.7	119.9	(23.7 - 216.2)	1.7
other pines	31.3	(0.0 - 307.4)	1.3	34.4	(0.0 - 257.8)	0.5
Douglas fir	239.3	(17.4 - 461.3)	10.3	581.3	(234.8 - 927.8)	8.1
larch spp.	66.4	(15.4 - 117.3)	2.9	398.3	(123.9 - 672.7)	5.6
other conifers	12.7	-	0.5	303.4	(228.3 - 378.4)	4.2
ses. & ped. oak	83.7	(0.0 - 168.9)	3.6	446.5	(97.6 - 795.5)	6.3
beech	90.3	(0.0 - 1,102.4)	3.9	274.1	(0.0 - 566.7)	3.8
ash	14.3	(0.0 - 41.2)	0.6	50.1	(0.0 - 407.9)	0.7
sycamore	42.3	(0.0 - 335.2)	1.8	170.7	(0.0 - 456.8)	2.4
birch spp.	34.9	(0.0 - 79.2)	1.5	159.2	(84.4 - 234.0)	2.2
alder	74.4	(23.1 - 125.7)	3.2	40.6	(0.0 - 122.4)	0.6
OLL broadleaves	4.4	(0.0 - 25.5)	0.2	144.8	(0.0 - 342.7)	2.0
OSL broadleaves	81.3	(29.2 - 133.5)	3.5	111.9	(46.7 - 177.1)	1.6
Total	2,324.8	(1,757.3 - 2,892.4)	100.0	7,144.1	(5,547.7 - 8,740.5)	100.0

Species group

- Sitka spruce
- Norway spruce
- Scots pine
- other pines
- Douglas fir
- larch spp.
- other conifers
- ses. & ped. oak
- beech
- ash
- sycamore
- birch spp.
- alder
- OLL broadleaves
- OSL broadleaves

County

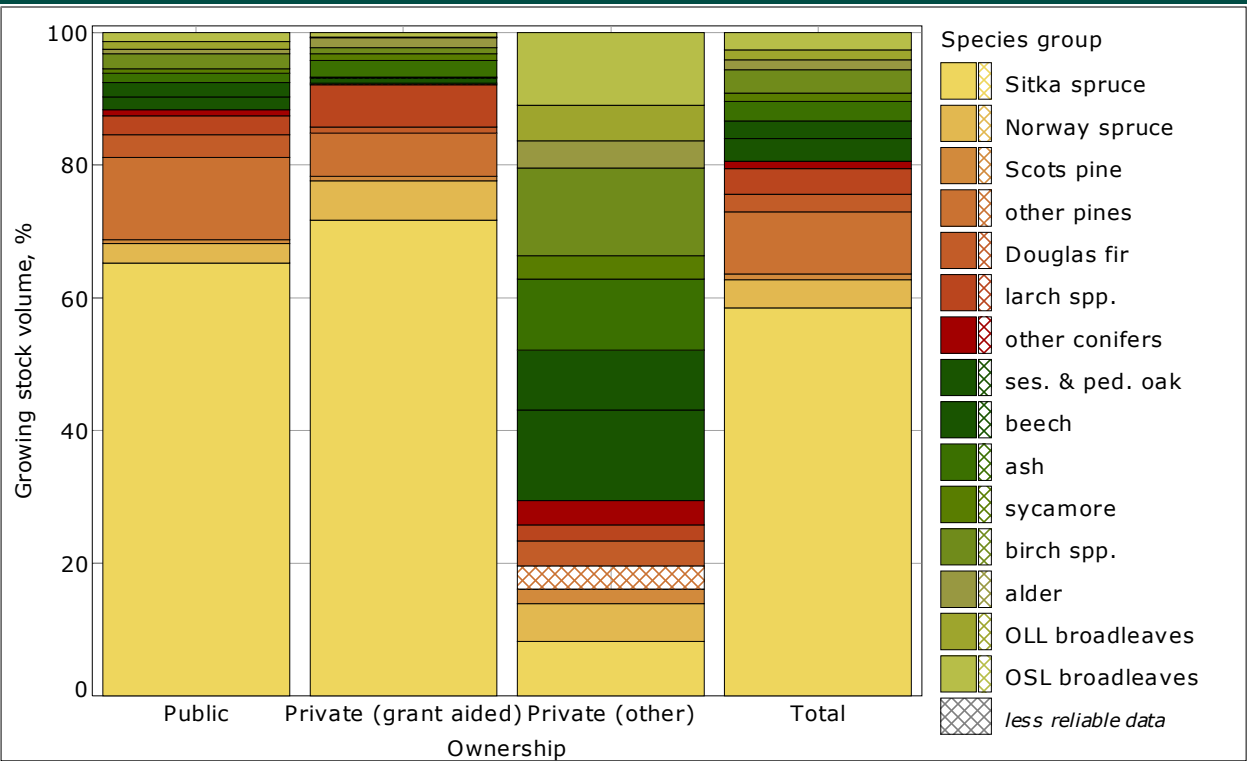
7.2.5 Total growing stock volume by ownership and species group

Methodology

The total growing stock volume is classified by ownership and species group.

Species group	Ownership / Growing stock volume					
	Public			Private (grant aided)		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
Sitka spruce	42,258.0	(38,735.5 – 45,780.5)	65.3	24,461.3	(22,250.1 – 26,672.6)	71.8
Norway spruce	1,888.3	(1,381.1 – 2,395.5)	2.9	2,014.5	(1,674.9 – 2,354.1)	5.9
Scots pine	421.1	(0.0 – 936.5)	0.7	239.5	(147.1 – 331.8)	0.7
other pines	8,070.4	(6,768.3 – 9,372.5)	12.5	2,218.8	(1,556.0 – 2,881.6)	6.5
Douglas fir	2,168.6	(1,656.3 – 2,680.8)	3.3	290.3	(203.9 – 376.8)	0.9
larch spp.	1,865.4	(1,062.2 – 2,668.5)	2.9	2,196.9	(1,648.0 – 2,745.8)	6.4
other conifers	583.7	(263.4 – 904.1)	0.9	69.7	– –	0.2
ses. & ped. oak	1,239.3	(784.3 – 1,694.2)	1.9	277.7	(122.7 – 432.7)	0.8
beech	1,443.0	(863.0 – 2,023.1)	2.2	25.5	– –	0.07
ash	841.0	(418.7 – 1,263.2)	1.3	843.9	(505.2 – 1,182.5)	2.5
sycamore	460.2	(144.4 – 776.0)	0.7	381.5	(0.0 – 789.8)	1.1
birch spp.	1,466.3	(1,170.6 – 1,761.9)	2.3	301.1	(152.5 – 449.6)	0.9
alder	470.0	(282.7 – 657.2)	0.7	493.9	(308.5 – 679.4)	1.4
OLL broadleaves	741.1	(0.0 – 3,651.8)	1.1	49.7	– –	0.1
OSL broadleaves	867.0	(673.5 – 1,060.6)	1.3	226.2	(135.2 – 317.3)	0.7
Total	64,783.5	(60,903.9 – 68,663.1)	100.0	34,090.4	(31,630.1 – 36,550.6)	100.0

Species group	Ownership / Growing stock volume					
	Private (other)			Total		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
Sitka spruce	1,440.2	(742.3 – 2,138.0)	8.2	68,159.5	(63,943.0 – 72,376.0)	58.5
Norway spruce	1,017.4	(0.0 – 4,269.0)	5.8	4,920.2	(4,085.5 – 5,754.9)	4.2
Scots pine	382.9	(283.0 – 482.7)	2.2	1,043.4	(757.1 – 1,329.8)	0.9
other pines	631.1	– –	3.6	10,920.3	(9,235.3 – 12,605.3)	9.4
Douglas fir	662.8	(482.9 – 842.7)	3.8	3,121.7	(2,489.5 – 3,753.9)	2.7
larch spp.	422.5	(120.4 – 724.6)	2.4	4,484.7	(3,575.9 – 5,393.6)	3.8
other conifers	630.8	(0.0 – 2,669.5)	3.6	1,284.2	(734.9 – 1,833.6)	1.1
ses. & ped. oak	2,424.9	(1,785.8 – 3,064.0)	13.6	3,941.8	(3,050.7 – 4,833.0)	3.4
beech	1,592.8	(956.4 – 2,229.1)	9.0	3,061.3	(2,282.7 – 3,839.8)	2.6
ash	1,878.8	(1,495.5 – 2,262.2)	10.6	3,563.6	(2,968.6 – 4,158.7)	3.1
sycamore	624.1	(194.5 – 1,053.6)	3.5	1,465.8	(1,016.5 – 1,915.2)	1.3
birch spp.	2,344.6	(1,906.7 – 2,782.5)	13.3	4,111.9	(3,549.4 – 4,674.5)	3.5
alder	712.5	(489.5 – 935.4)	4.0	1,676.4	(1,292.9 – 2,059.9)	1.4
OLL broadleaves	949.2	(288.2 – 1,610.2)	5.4	1,740.0	(845.9 – 2,634.1)	1.5
OSL broadleaves	1,936.6	(1,643.9 – 2,229.3)	11.0	3,029.9	(2,604.1 – 3,455.6)	2.6
Total	17,651.1	(15,677.1 – 19,625.0)	100.0	116,524.9	(111,459.3 – 121,590.6)	100.0



7.2.6 Total growing stock volume by conifer species groups and Dbh class

Methodology

The total growing stock volume for conifer species is classified by species group and Dbh class.

Species group	DBH class	Growing stock volume		
		thousands m ³	($\alpha = 0.05$)	%
Sitka spruce	20 cm +	40,669.4	(37,345.0 – 43,993.9)	72.6
	12-19.9 cm	23,485.0	(22,016.8 – 24,953.2)	
	7-11.9 cm	4,005.1	(3,755.9 – 4,254.3)	
	All	68,159.5	(64,516.8 – 71,802.3)	
Norway spruce	20 cm +	2,671.1	(1,915.7 – 3,426.6)	5.2
	12-19.9 cm	1,864.9	(1,493.5 – 2,236.3)	
	7-11.9 cm	384.1	(302.3 – 465.9)	
	All	4,920.2	(4,074.4 – 5,766.0)	
Scots pine	20 cm +	801.9	(515.7 – 1,088.0)	1.1
	12-19.9 cm	140.0	(79.1 – 201.0)	
	7-11.9 cm	101.5	(60.1 – 142.9)	
	All	1,043.4	(748.0 – 1,338.9)	
other pines	20 cm +	6,568.8	(5,274.4 – 7,863.3)	11.6
	12-19.9 cm	3,725.1	(3,139.8 – 4,310.4)	
	7-11.9 cm	626.3	(546.1 – 706.6)	
	All	10,920.3	(9,497.4 – 12,343.2)	
Douglas fir	20 cm +	2,200.7	(1,509.3 – 2,892.2)	3.3
	12-19.9 cm	785.7	(559.3 – 1,012.1)	
	7-11.9 cm	135.3	(92.5 – 178.0)	
	All	3,121.7	(2,392.9 – 3,850.5)	
larch spp.	20 cm +	2,206.2	(1,454.8 – 2,957.6)	4.8
	12-19.9 cm	2,036.7	(1,686.0 – 2,387.3)	
	7-11.9 cm	241.9	(193.1 – 290.8)	
	All	4,484.7	(3,654.1 – 5,315.4)	
other conifers	20 cm +	1,202.1	(579.9 – 1,824.3)	1.4
	12-19.9 cm	71.7	(59.8 – 83.6)	
	7-11.9 cm	10.4	- -	
	All	1,284.2	(662.0 – 1,906.5)	
Total	20 cm +	56,320.3	(52,454.0 – 60,186.6)	100.0
	12-19.9 cm	32,109.2	(30,428.7 – 33,789.6)	
	7-11.9 cm	5,504.7	(5,216.3 – 5,793.0)	
	All	93,934.1	(89,708.6 – 98,159.7)	

7.2.7 Total growing stock volume by broadleaf species groups and Dbh class

Methodology				
The total growing stock for broadleaf species is classified by species group and Dbh class.				
Species group	DBH class	Growing stock volume		
		thousands m ³	($\alpha = 0.05$)	%
ses. & ped. oak	20 cm +	3,605.9	(2,783.2 – 4,428.7)	17.4
	12-19.9 cm	233.8	(69.4 – 398.2)	
	7-11.9 cm	102.1	(68.2 – 136.0)	
	All	3,941.8	(3,102.2 – 4,781.5)	
beech	20 cm +	2,850.6	(2,103.0 – 3,598.3)	13.6
	12-19.9 cm	177.5	(98.3 – 256.7)	
	7-11.9 cm	33.2	(0.0 – 112.5)	
	All	3,061.3	(2,305.3 – 3,817.3)	
ash	20 cm +	2,122.7	(1,691.3 – 2,554.0)	15.8
	12-19.9 cm	1,052.8	(760.1 – 1,345.6)	
	7-11.9 cm	388.1	(299.7 – 476.5)	
	All	3,563.6	(3,034.9 – 4,092.4)	
sycamore	20 cm +	1,000.6	(573.2 – 1,427.9)	6.5
	12-19.9 cm	297.4	(93.2 – 501.6)	
	7-11.9 cm	167.8	(89.0 – 246.7)	
	All	1,465.8	(985.7 – 1,946.0)	
birch spp.	20 cm +	1,876.5	(1,485.0 – 2,267.9)	18.2
	12-19.9 cm	1,507.1	(1,295.5 – 1,718.6)	
	7-11.9 cm	728.4	(622.4 – 834.4)	
	All	4,111.9	(3,654.6 – 4,569.3)	
alder	20 cm +	751.2	(514.9 – 987.4)	7.4
	12-19.9 cm	575.9	(426.8 – 725.0)	
	7-11.9 cm	349.3	(255.6 – 443.0)	
	All	1,676.4	(1,381.8 – 1,971.0)	
OLL broadleaves	20 cm +	1,223.0	(316.6 – 2,129.3)	7.7
	12-19.9 cm	304.2	(166.8 – 441.6)	
	7-11.9 cm	212.8	(150.3 – 275.4)	
	All	1,740.0	(821.2 – 2,658.8)	
OSL broadleaves	20 cm +	1,077.1	(863.9 – 1,290.3)	13.4
	12-19.9 cm	1,038.0	(862.0 – 1,214.0)	
	7-11.9 cm	914.8	(762.7 – 1,066.8)	
	All	3,029.9	(2,714.4 – 3,345.4)	
Total	20 cm +	14,507.5	(12,816.7 – 16,198.4)	100.0
	12-19.9 cm	5,186.8	(4,692.7 – 5,680.8)	
	7-11.9 cm	2,896.5	(2,647.4 – 3,145.6)	
	All	22,590.8	(20,811.8 – 24,369.9)	

7.2.8 Total growing stock volume by species group and age class (10yr)

Methodology

The total growing stock volume is classified by species group and age class (10 yr).

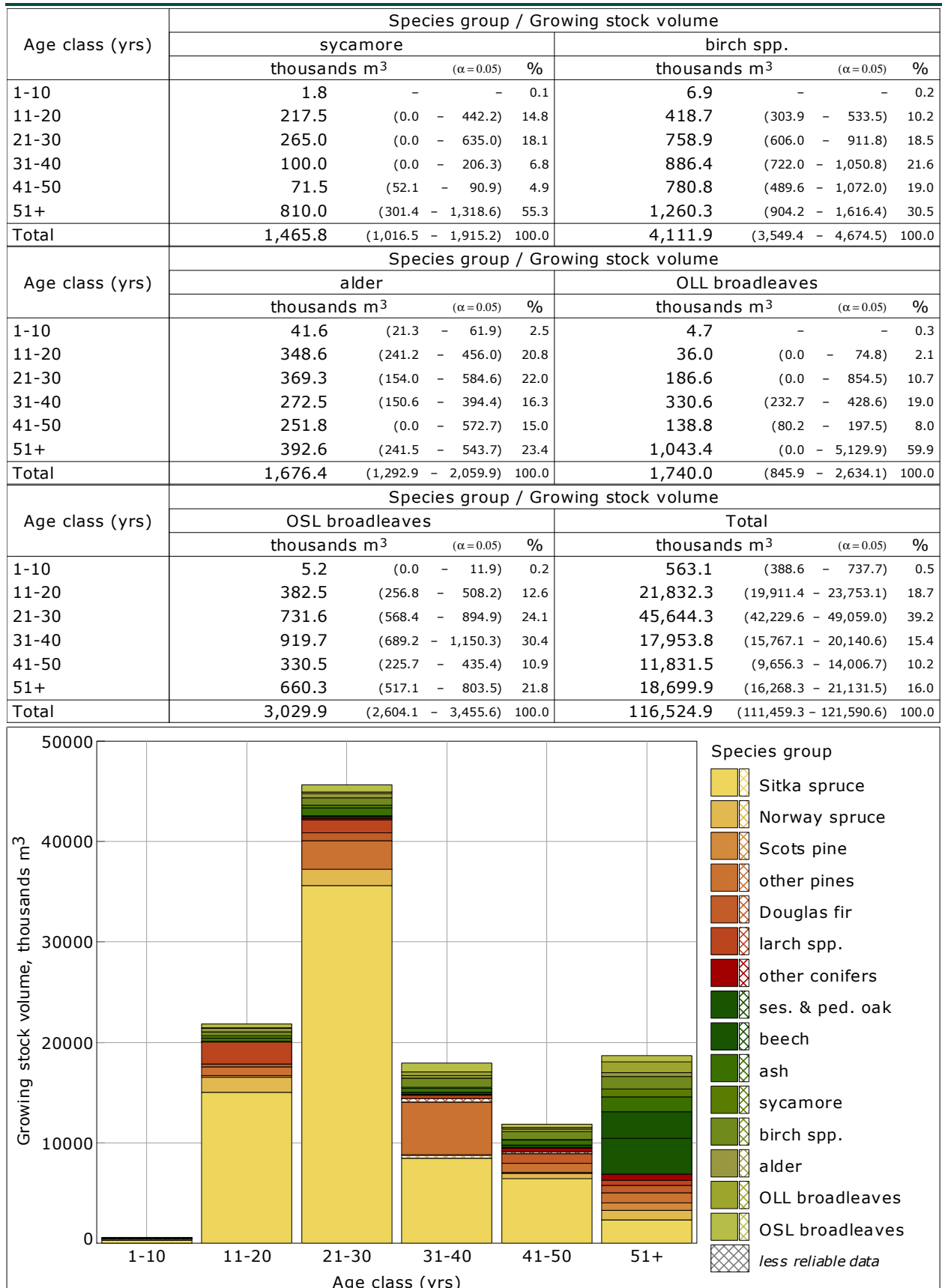
Age class (yrs)	Species group / Growing stock volume					
	Sitka spruce			Norway spruce		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
1-10	284.9	(111.6 - 458.2)	0.4	-	-	-
11-20	15,019.2	(13,472.7 - 16,565.8)	22.0	1,539.0	(1,168.6 - 1,909.4)	31.3
21-30	35,636.8	(32,852.9 - 38,420.7)	52.4	1,585.9	(1,232.9 - 1,938.9)	32.1
31-40	8,446.7	(7,011.8 - 9,881.7)	12.4	327.9	-	6.7
41-50	6,437.4	(5,004.3 - 7,870.5)	9.4	529.2	(117.5 - 940.8)	10.8
51+	2,334.5	(0.0 - 5,029.6)	3.4	938.3	(321.0 - 1,555.6)	19.1
Total	68,159.5	(63,943.0 - 72,376.0)	100.0	4,920.2	(4,085.5 - 5,754.9)	100.0

Age class (yrs)	Species group / Growing stock volume					
	Scots pine			other pines		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
1-10	95.2	-	9.1	11.3	-	0.1
11-20	118.5	(0.0 - 323.6)	11.4	892.3	(629.2 - 1,155.4)	8.2
21-30	23.7	-	2.3	2,826.0	(2,058.6 - 3,593.3)	25.9
31-40	14.7	-	1.4	5,241.0	(4,426.7 - 6,055.3)	48.0
41-50	68.0	(0.0 - 174.4)	6.5	918.6	(419.3 - 1,417.9)	8.4
51+	723.4	(436.0 - 1,010.7)	69.3	1,031.1	(0.0 - 2,305.0)	9.4
Total	1,043.4	(757.1 - 1,329.8)	100.0	10,920.3	(9,235.3 - 12,605.3)	100.0

Age class (yrs)	Species group / Growing stock volume					
	Douglas fir			larch spp.		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
1-10	-	-	-	63.5	(1.7 - 125.3)	1.4
11-20	292.1	(186.2 - 398.0)	9.4	2,158.3	(1,627.8 - 2,688.8)	48.2
21-30	808.0	(546.9 - 1,069.0)	25.9	1,255.9	(754.4 - 1,757.4)	28.0
31-40	359.6	-	11.5	318.9	(265.7 - 372.1)	7.1
41-50	944.3	(767.5 - 1,121.2)	30.2	161.9	-	3.6
51+	717.7	(487.1 - 948.4)	23.0	526.3	(442.6 - 609.9)	11.7
Total	3,121.7	(2,489.5 - 3,753.9)	100.0	4,484.7	(3,575.9 - 5,393.6)	100.0

Age class (yrs)	Species group / Growing stock volume					
	other conifers			ses. & ped. oak		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
1-10	-	-	-	17.5	-	0.4
11-20	1.3	-	0.1	44.6	(0.0 - 151.9)	1.1
21-30	171.1	(0.0 - 593.4)	13.3	182.5	(40.9 - 324.2)	4.6
31-40	59.1	(0.0 - 150.3)	4.6	88.1	(85.1 - 91.0)	2.2
41-50	417.5	(246.1 - 588.9)	32.5	77.8	(18.0 - 137.6)	2.0
51+	635.3	(0.0 - 2,671.9)	49.5	3,531.3	(2,723.3 - 4,339.3)	89.7
Total	1,284.2	(734.9 - 1,833.6)	100.0	3,941.8	(3,050.7 - 4,833.0)	100.0

Age class (yrs)	Species group / Growing stock volume					
	beech			ash		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
1-10	-	-	-	30.6	-	0.9
11-20	15.6	-	0.5	348.2	(225.2 - 471.2)	9.8
21-30	49.7	(45.9 - 53.6)	1.6	793.3	(440.4 - 1,146.2)	22.3
31-40	138.8	(0.0 - 659.9)	4.5	449.7	(298.8 - 600.7)	12.6
41-50	185.3	(45.0 - 325.6)	6.1	518.1	(290.9 - 745.4)	14.5
51+	2,671.8	(1,946.4 - 3,397.3)	87.3	1,423.7	(1,073.2 - 1,774.1)	39.9
Total	3,061.3	(2,282.7 - 3,839.8)	100.0	3,563.6	(2,968.6 - 4,158.7)	100.0



7.2.9 Total growing stock volume by species group and diameter class (5cm)

Methodology

The total growing stock volume is classified by species group and Dbh class (5cm).

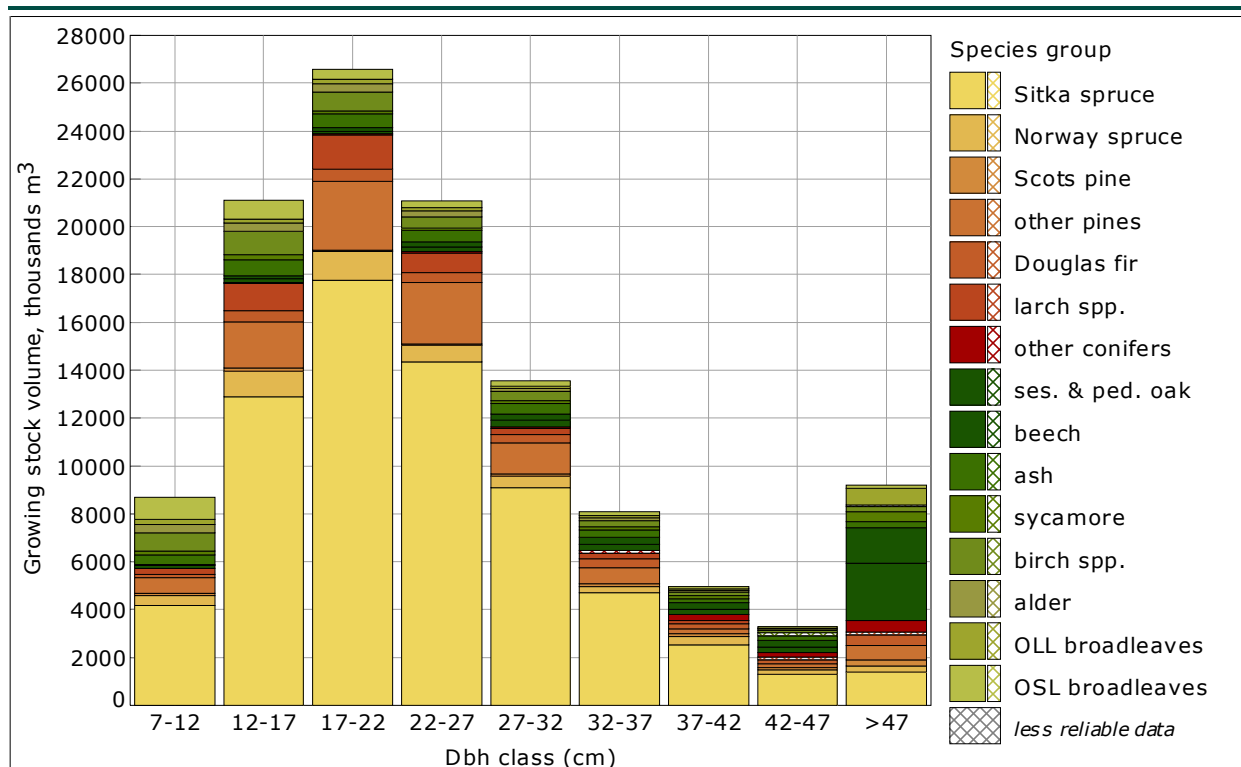
Dbh class (cm)	Species group / Growing stock volume					
	Sitka spruce			Norway spruce		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
7-12	4,176.3	(3,919.2 – 4,433.5)	6.1	398.2	(317.4 – 478.9)	8.1
12-17	12,881.0	(12,053.6 – 13,708.3)	18.9	1,097.3	(855.6 – 1,339.1)	22.3
17-22	17,749.9	(16,595.8 – 18,904.0)	26.1	1,212.0	(983.6 – 1,440.4)	24.5
22-27	14,342.6	(13,227.6 – 15,457.6)	21.0	696.9	(503.7 – 890.0)	14.2
27-32	9,105.6	(8,266.7 – 9,944.4)	13.4	485.0	(386.5 – 583.5)	9.9
32-37	4,706.7	(4,154.8 – 5,258.6)	6.9	246.5	(170.0 – 323.0)	5.0
37-42	2,513.0	(2,121.9 – 2,904.0)	3.7	350.7	(0.0 – 1,210.4)	7.1
42-47	1,296.9	(881.1 – 1,712.7)	1.9	175.1	(141.2 – 208.9)	3.6
>47	1,387.7	(771.7 – 2,003.7)	2.0	258.5	(233.9 – 283.0)	5.3
Total	68,159.5	(63,943.0 – 72,376.0)	100.0	4,920.2	(4,085.5 – 5,754.9)	100.0

Dbh class (cm)	Species group / Growing stock volume					
	Scots pine			other pines		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
7-12	103.6	(62.2 – 145.0)	9.9	648.3	(565.0 – 731.5)	5.9
12-17	110.6	(80.3 – 140.9)	10.6	1,920.3	(1,634.8 – 2,205.8)	17.6
17-22	51.0	(29.4 – 72.6)	4.9	2,894.2	(2,419.3 – 3,369.2)	26.5
22-27	57.8	(25.1 – 90.6)	5.5	2,575.0	(2,167.2 – 2,982.8)	23.6
27-32	79.7	(35.7 – 123.7)	7.6	1,310.4	(1,063.6 – 1,557.3)	12.0
32-37	149.8	(0.0 – 480.3)	14.4	637.0	(497.1 – 776.9)	5.8
37-42	150.3	(0.0 – 345.5)	14.4	174.2	(142.3 – 206.0)	1.6
42-47	97.4	(53.6 – 141.2)	9.3	159.2	(0.0 – 322.9)	1.5
>47	243.1	(102.0 – 384.3)	23.4	601.7	(0.0 – 2,144.0)	5.5
Total	1,043.4	(757.1 – 1,329.8)	100.0	10,920.3	(9,235.3 – 12,605.3)	100.0

Dbh class (cm)	Species group / Growing stock volume					
	Douglas fir			larch spp.		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
7-12	141.2	(99.1 – 183.4)	4.5	257.6	(200.0 – 315.1)	5.7
12-17	494.4	(348.0 – 640.8)	15.8	1,128.1	(939.7 – 1,316.6)	25.2
17-22	497.6	(346.4 – 648.8)	16.0	1,430.2	(1,112.3 – 1,748.1)	31.8
22-27	398.8	(228.6 – 569.0)	12.8	816.1	(568.2 – 1,064.0)	18.2
27-32	337.3	(244.4 – 430.1)	10.8	243.0	(0.0 – 868.7)	5.4
32-37	405.1	(300.8 – 509.4)	13.0	204.6	(38.1 – 371.2)	4.6
37-42	216.8	(131.7 – 301.9)	6.9	146.3	(29.8 – 262.9)	3.3
42-47	174.5	(12.7 – 336.2)	5.6	130.2	- -	2.9
>47	456.0	(284.7 – 627.4)	14.6	128.5	- -	2.9
Total	3,121.7	(2,489.5 – 3,753.9)	100.0	4,484.7	(3,575.9 – 5,393.6)	100.0

Dbh class (cm)	Species group / Growing stock volume					
	other conifers			ses. & ped. oak		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
7-12	10.4	- -	0.8	108.6	(72.1 – 145.1)	2.8
12-17	31.7	(22.2 – 41.3)	2.5	175.3	(62.8 – 287.9)	4.4
17-22	53.6	(0.0 – 132.5)	4.2	112.3	(91.8 – 132.7)	2.8
22-27	73.4	(6.1 – 140.6)	5.7	194.0	(143.2 – 244.8)	4.9
27-32	79.2	(0.0 – 204.2)	6.2	268.6	(205.6 – 331.7)	6.8
32-37	141.5	- -	11.0	244.7	(169.7 – 319.6)	6.2
37-42	231.7	(0.0 – 569.5)	18.0	218.0	(0.0 – 739.1)	5.5
42-47	188.8	(188.1 – 189.6)	14.7	217.0	(122.5 – 311.6)	5.5
>47	473.8	(0.0 – 2,166.4)	36.9	2,403.5	(1,706.7 – 3,100.2)	61.1
Total	1,284.2	(734.9 – 1,833.6)	100.0	3,941.8	(3,050.7 – 4,833.0)	100.0

Dbh class (cm)	Species group / Growing stock volume					
	beech			ash		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
7-12	34.4	(0.5 - 68.4)	1.1	398.5	(306.4 - 490.5)	11.2
12-17	101.4	(66.4 - 136.4)	3.3	674.7	(490.4 - 858.9)	18.9
17-22	129.3	(70.8 - 187.8)	4.2	587.6	(471.5 - 703.6)	16.5
22-27	206.3	(166.2 - 246.4)	6.7	492.4	(399.2 - 585.5)	13.8
27-32	254.9	(171.9 - 337.9)	8.3	458.0	(371.9 - 544.1)	12.9
32-37	275.0	(215.6 - 334.4)	9.0	334.7	(36.9 - 632.5)	9.4
37-42	287.7	(0.0 - 708.9)	9.4	169.6	(147.6 - 191.6)	4.8
42-47	288.6	(209.5 - 367.7)	9.4	190.1	(175.8 - 204.5)	5.3
>47	1,483.7	(859.1 - 2,108.3)	48.6	258.1	(141.9 - 374.4)	7.2
Total	3,061.3	(2,282.7 - 3,839.8)	100.0	3,563.6	(2,968.6 - 4,158.7)	100.0
Dbh class (cm)	Species group / Growing stock volume					
	sycamore			birch spp.		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
7-12	171.9	(100.6 - 243.3)	11.7	752.2	(641.6 - 862.8)	18.3
12-17	207.6	(85.4 - 329.8)	14.2	991.2	(859.9 - 1,122.5)	24.2
17-22	122.3	(33.5 - 211.0)	8.3	780.7	(638.8 - 922.6)	19.0
22-27	92.1	(54.0 - 130.2)	6.3	468.5	(369.5 - 567.5)	11.4
27-32	125.2	(68.4 - 181.9)	8.5	367.0	(284.0 - 450.0)	8.9
32-37	125.6	(29.8 - 221.5)	8.6	231.6	(198.4 - 264.7)	5.6
37-42	127.6	(33.9 - 221.3)	8.7	157.8	(72.0 - 243.7)	3.8
42-47	105.4	- -	7.2	119.7	(77.0 - 162.4)	2.9
>47	388.0	(339.9 - 436.2)	26.5	243.2	(196.1 - 290.3)	5.9
Total	1,465.8	(1,016.5 - 1,915.2)	100.0	4,111.9	(3,549.4 - 4,674.5)	100.0
Dbh class (cm)	Species group / Growing stock volume					
	alder			OLL broadleaves		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
7-12	359.7	(263.1 - 456.4)	21.5	217.3	(152.1 - 282.4)	12.5
12-17	338.8	(243.1 - 434.4)	20.2	171.8	(126.7 - 217.0)	9.9
17-22	349.0	(271.2 - 426.8)	20.8	199.6	(157.4 - 241.8)	11.5
22-27	245.1	(152.2 - 338.1)	14.6	129.7	(97.4 - 162.0)	7.5
27-32	113.7	(90.9 - 136.5)	6.8	116.6	(81.3 - 151.9)	6.7
32-37	125.5	(44.6 - 206.3)	7.5	90.7	(0.0 - 242.3)	5.2
37-42	53.2	(30.7 - 75.7)	3.2	72.9	(71.0 - 74.9)	4.2
42-47	42.0	(36.4 - 47.6)	2.5	50.0	- -	2.9
>47	49.4	- -	2.9	691.4	(0.0 - 4,241.9)	39.6
Total	1,676.4	(1,292.9 - 2,059.9)	100.0	1,740.0	(845.9 - 2,634.1)	100.0
Dbh class (cm)	Species group / Growing stock volume					
	OSL broadleaves			Total		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
7-12	922.9	(770.0 - 1,075.8)	30.4	8,701.1	(8,305.1 - 9,097.2)	7.5
12-17	775.1	(654.2 - 896.1)	25.6	21,099.5	(20,061.9 - 22,137.0)	18.1
17-22	406.1	(334.7 - 477.4)	13.4	26,575.2	(25,153.1 - 27,997.4)	22.8
22-27	282.6	(220.9 - 344.3)	9.3	21,071.2	(19,740.5 - 22,401.9)	18.1
27-32	198.5	(173.3 - 223.6)	6.6	13,542.7	(12,553.7 - 14,531.7)	11.6
32-37	157.7	(122.7 - 192.6)	5.2	8,076.7	(7,364.8 - 8,788.7)	6.9
37-42	83.9	(0.0 - 208.6)	2.8	4,953.7	(4,431.1 - 5,476.2)	4.3
42-47	57.8	(46.5 - 69.1)	1.9	3,292.8	(2,857.2 - 3,728.4)	2.8
>47	145.4	(126.6 - 164.1)	4.8	9,212.0	(7,703.8 - 10,720.2)	7.9
Total	3,029.9	(2,604.1 - 3,455.6)	100.0	116,524.9	(111,459.3 - 121,590.6)	100.0



7.3 TIMBER QUALITY

7.3.1 Total growing stock volume by species group and stem straightness

Definition

Potential log length

Describes the straightness of the first 6 m of a tree's stem in terms of straight log lengths.

1. **Greater than or equal to 5m:** A log with a minimum length of 5m.
2. **One 4-5m log:** A log with a minimum length of 4m and maximum length of 5m.
3. **One 3 m and one 2m log:** One log 3m in length and one log 2m in length.
4. **One 2-3m log:** A log with a minimum length of 2m and maximum length of 3m.
5. **Two 2m logs:** Two logs with a minimum length of 2m.
6. **One 2m log:** A log with a minimum length of 2m.
7. **No straight logs:** There are no straight logs present.

Methodology

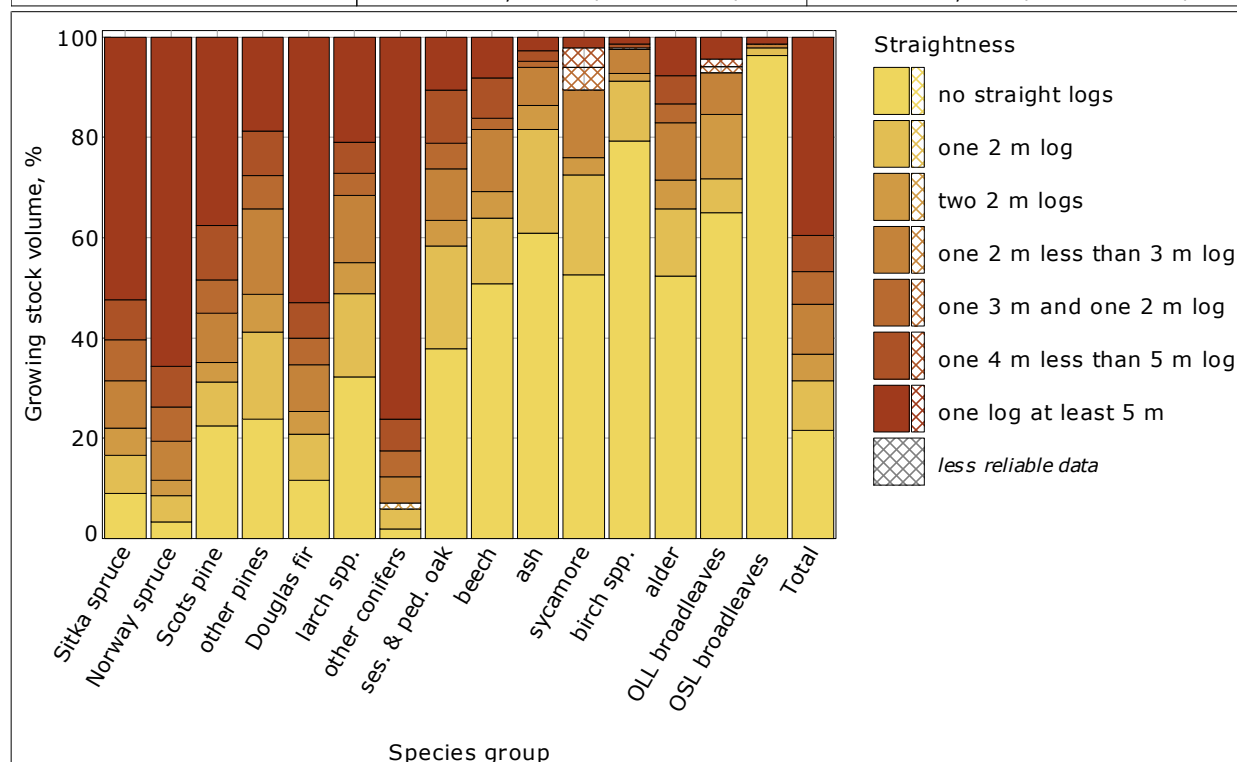
The total growing stock is classified by species group and potential log length.

Straightness	Species group / Growing stock volume						
	Sitka spruce				Norway spruce		
	thousands m³	($\alpha=0.05$)	%		thousands m³	($\alpha=0.05$)	%
no straight logs	6,137	(5,648 – 6,627)	9.0		164	(135 – 193)	3.3
one 2 m log	5,219	(4,836 – 5,601)	7.7		256	(200 – 312)	5.2
two 2 m logs	3,661	(3,365 – 3,956)	5.4		155	(114 – 195)	3.1
one 2 m less than 3 m log	6,471	(6,012 – 6,929)	9.5		384	(304 – 465)	7.8
one 3 m and one 2 m log	5,523	(5,066 – 5,981)	8.1		331	(248 – 415)	6.7
one 4 m less than 5 m log	5,476	(5,043 – 5,909)	8.0		403	(325 – 480)	8.2
one log at least 5 m	35,672	(32,912 – 38,433)	52.3		3,227	(2,540 – 3,914)	65.7
Total	68,160	(63,943 – 72,376)	100.0		4,920	(4,085 – 5,755)	100.0

Straightness	Species group / Growing stock volume					
	Scots pine			other pines		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
no straight logs	235	(147 - 323)	22.5	2,603	(2,220 - 2,986)	23.9
one 2 m log	91	(50 - 132)	8.7	1,891	(1,602 - 2,181)	17.3
two 2 m logs	42	(0 - 87)	4.0	821	(646 - 996)	7.5
one 2 m less than 3 m log	102	(63 - 141)	9.8	1,861	(1,583 - 2,139)	17.0
one 3 m and one 2 m log	68	(0 - 192)	6.6	727	(577 - 878)	6.7
one 4 m less than 5 m log	114	(31 - 196)	10.9	975	(815 - 1,135)	8.9
one log at least 5 m	392	(286 - 498)	37.5	2,041	(1,128 - 2,955)	18.7
Total	1,043	(757 - 1,330)	100.0	10,920	(9,235 - 12,605)	100.0
Straightness	Species group / Growing stock volume					
	Douglas fir			larch spp.		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
no straight logs	360	(221 - 499)	11.5	1,447	(1,146 - 1,749)	32.3
one 2 m log	288	(200 - 375)	9.2	743	(583 - 904)	16.6
two 2 m logs	145	(86 - 204)	4.6	280	(207 - 353)	6.2
one 2 m less than 3 m log	289	(98 - 480)	9.2	598	(479 - 718)	13.3
one 3 m and one 2 m log	165	(135 - 195)	5.3	197	(163 - 232)	4.4
one 4 m less than 5 m log	223	(155 - 291)	7.2	278	(184 - 373)	6.2
one log at least 5 m	1,652	(1,160 - 2,143)	53.0	940	(152 - 1,729)	21.0
Total	3,122	(2,490 - 3,754)	100.0	4,485	(3,576 - 5,394)	100.0
Straightness	Species group / Growing stock volume					
	other conifers			ses. & ped. oak		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
no straight logs	25	(14 - 37)	2.0	1,495	(1,164 - 1,826)	37.9
one 2 m log	50	(0 - 118)	3.9	805	(186 - 1,424)	20.4
two 2 m logs	15	-	1.2	202	(0 - 1,326)	5.1
one 2 m less than 3 m log	68	(0 - 137)	5.3	405	(235 - 574)	10.3
one 3 m and one 2 m log	65	(0 - 147)	5.1	204	(62 - 346)	5.2
one 4 m less than 5 m log	83	(0 - 216)	6.5	412	(207 - 616)	10.4
one log at least 5 m	978	(0 - 2,768)	76.0	420	(0 - 1,844)	10.7
Total	1,284	(735 - 1,834)	100.0	3,942	(3,051 - 4,833)	100.0
Straightness	Species group / Growing stock volume					
	beech			ash		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
no straight logs	1,554	(1,116 - 1,992)	50.8	2,169	(1,831 - 2,507)	60.9
one 2 m log	401	(301 - 501)	13.1	737	(571 - 903)	20.7
two 2 m logs	162	(0 - 377)	5.3	173	(85 - 260)	4.8
one 2 m less than 3 m log	381	(109 - 654)	12.5	272	(220 - 325)	7.6
one 3 m and one 2 m log	68	(49 - 87)	2.2	43	(20 - 65)	1.2
one 4 m less than 5 m log	246	(0 - 955)	8.0	72	(39 - 104)	2.0
one log at least 5 m	249	(13 - 485)	8.1	99	(32 - 165)	2.8
Total	3,061	(2,283 - 3,840)	100.0	3,564	(2,969 - 4,159)	100.0
Straightness	Species group / Growing stock volume					
	sycamore			birch spp.		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
no straight logs	772	(588 - 957)	52.7	3,262	(2,856 - 3,668)	79.3
one 2 m log	290	(184 - 397)	19.8	486	(389 - 584)	11.8
two 2 m logs	52	(0 - 244)	3.5	65	(50 - 79)	1.6
one 2 m less than 3 m log	197	(183 - 212)	13.4	198	(133 - 263)	4.8
one 3 m and one 2 m log	66	-	4.5	15	-	0.4
one 4 m less than 5 m log	57	-	3.9	31	(0 - 63)	0.7
one log at least 5 m	32	(1 - 63)	2.2	56	(36 - 75)	1.4
Total	1,466	(1,016 - 1,915)	100.0	4,112	(3,549 - 4,675)	100.0

Straightness	Species group / Growing stock volume					
	alder			OLL broadleaves		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
no straight logs	876	(659 - 1,093)	52.3	1,132	(385 - 1,878)	65.0
one 2 m log	227	(188 - 267)	13.5	118	(0 - 345)	6.8
two 2 m logs	96	(74 - 118)	5.7	222	(0 - 1,927)	12.8
one 2 m less than 3 m log	191	(105 - 278)	11.4	143	(0 - 1,026)	8.2
one 3 m and one 2 m log	63	(0 - 142)	3.8	22	-	1.3
one 4 m less than 5 m log	94	(61 - 126)	5.6	26	-	1.5
one log at least 5 m	129	(25 - 233)	7.7	77	(0 - 211)	4.4
Total	1,676	(1,293 - 2,060)	100.0	1,740	(846 - 2,634)	100.0

Straightness	Species group / Growing stock volume					
	OSL broadleaves			Total		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
no straight logs	2,917	(2,498 - 3,336)	96.3	25,150	(23,711 - 26,590)	21.6
one 2 m log	48	(21 - 74)	1.6	11,650	(10,947 - 12,354)	10.0
two 2 m logs	-	-	-	6,088	(5,573 - 6,604)	5.2
one 2 m less than 3 m log	23	(0 - 62)	0.7	11,583	(10,914 - 12,252)	9.9
one 3 m and one 2 m log	-	-	-	7,558	(7,027 - 8,090)	6.5
one 4 m less than 5 m log	3	-	0.09	8,491	(7,929 - 9,054)	7.3
one log at least 5 m	40	(15 - 65)	1.3	46,003	(42,772 - 49,235)	39.5
Total	3,030	(2,604 - 3,456)	100.0	116,525	(111,459 - 121,591)	100.0



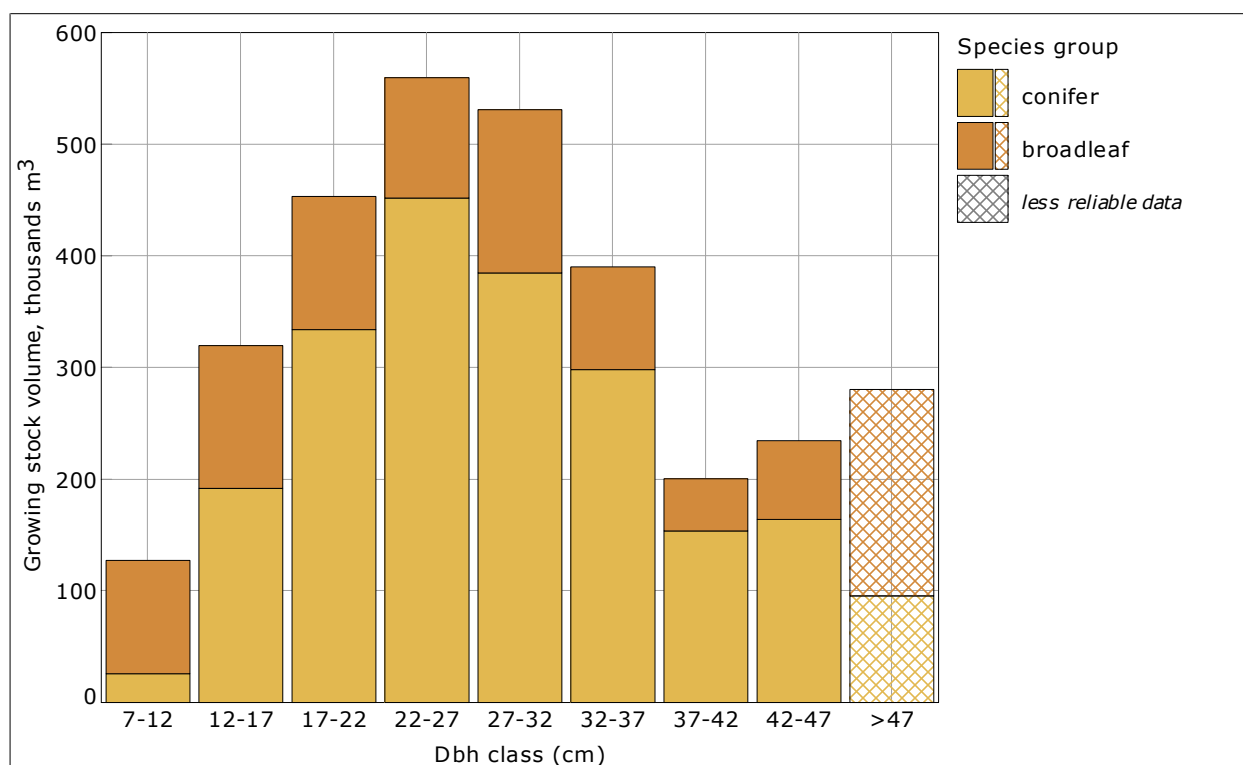
7.3.2 Total growing stock volume windblown by species group and Dbh Class (Dbh>7cm)

Methodology

The total growing stock volume that is windblown is classified by species group and Dbh class(7cm)

Dbh class (cm)	Species group / Growing stock volume					
	conifer			broadleaf		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
7-12	25.6	(14.7 - 36.6)	1.2	101.7	(49.2 - 154.3)	10.2
12-17	191.4	(112.6 - 270.2)	9.1	128.0	(92.1 - 164.0)	12.8
17-22	334.1	(221.6 - 446.6)	15.9	119.1	(84.8 - 153.4)	11.9
22-27	451.4	(377.2 - 525.7)	21.7	107.7	(81.8 - 133.6)	10.8
27-32	384.9	(246.5 - 523.3)	18.3	145.8	(115.2 - 176.3)	14.6
32-37	297.8	(206.6 - 389.0)	14.2	92.3	(0.0 - 207.3)	9.3
37-42	153.7	(87.4 - 220.0)	7.3	46.5	(0.0 - 159.7)	4.7
42-47	164.0	(0.0 - 518.4)	7.8	70.1	(0.0 - 154.6)	7.0
>47	95.2	-	4.5	185.4	-	18.7
Total	2,098.1	(1,586.4 - 2,609.8)	100.0	996.6	(716.5 - 1,276.7)	100.0

Dbh class (cm)	Species group / Growing stock volume		
	Total		
	thousands m ³	($\alpha=0.05$)	%
7-12	127.3	(75.1 - 179.6)	4.1
12-17	319.4	(240.8 - 398.0)	10.3
17-22	453.2	(341.0 - 565.4)	14.6
22-27	559.1	(423.0 - 695.2)	18.1
27-32	530.7	(424.3 - 637.1)	17.1
32-37	390.1	(298.6 - 481.6)	12.6
37-42	200.2	(126.7 - 273.7)	6.5
42-47	234.1	(98.6 - 369.6)	7.6
>47	280.5	(0.0 - 937.3)	9.1
Total	3,094.7	(2,533.9 - 3,655.5)	100.0



7.4 MEAN GROWING VOLUME STOCK

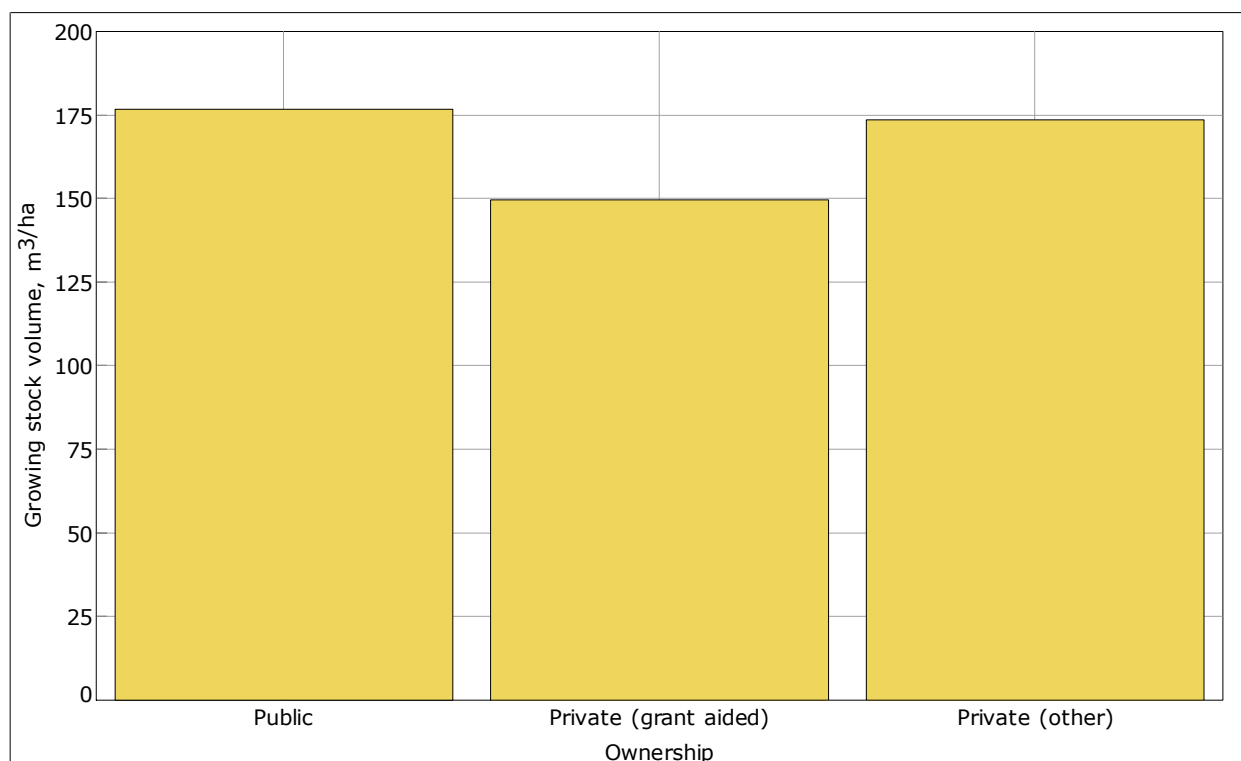
7.4.1 Mean growing volume stock per hectare by ownership

Methodology

The mean growing stock volume per hectare is classified by ownership.

The calculated value of the variable under consideration for a plot (i.e. growing stock volume) is divided by the whole plot area. The mean of plot sums is then calculated to give an overall mean value. Both stocked and temporarily unstocked plots are included in the analysis.

Ownership	Growing stock volume	
	m ³ /ha	($\alpha = 0.05$)
Public	177	(165 – 189)
Private (grant aided)	150	(137 – 162)
Private (other)	173	(154 – 193)
All	170	(161 – 178)



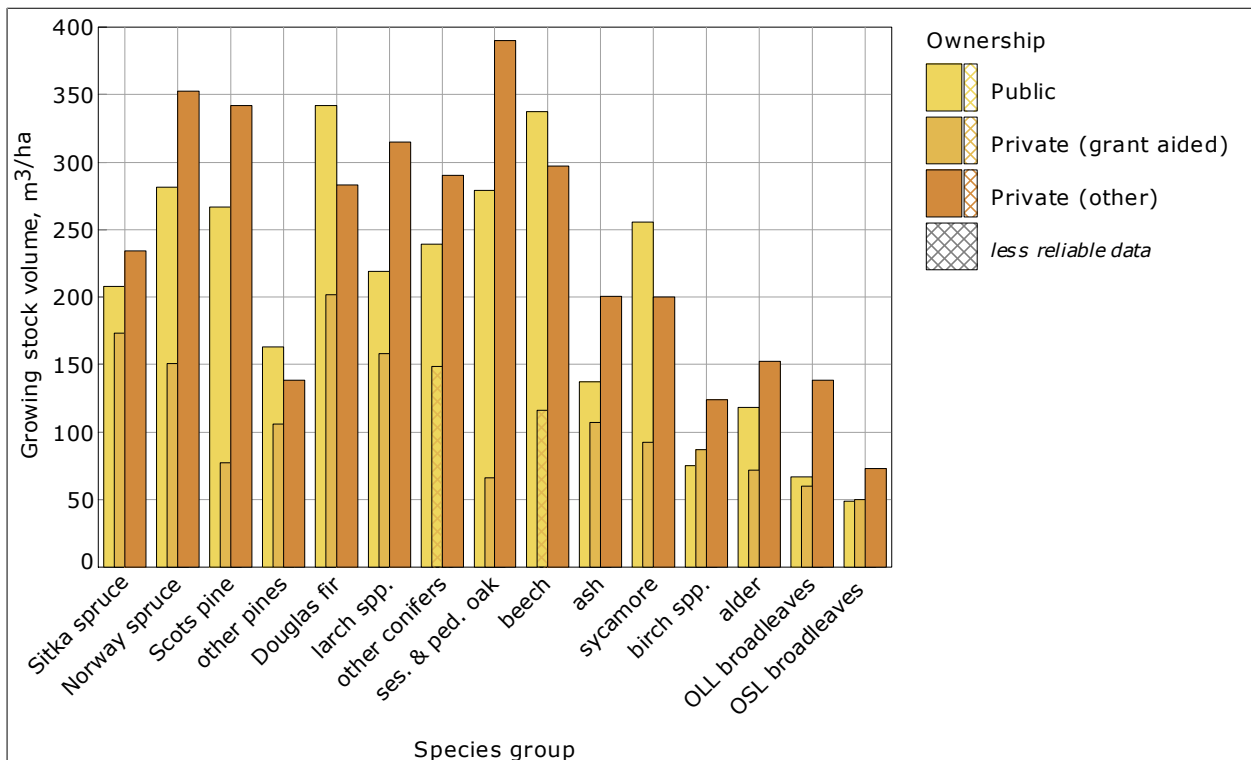
7.4.2 Normalised mean growing stock volume per hectare by ownership and species group

Methodology

The normalised mean growing stock per hectare is classified by ownership and species group.

The calculated value of the variable under consideration (i.e. growing stock) is divided not by the whole plot area, but by the area of the part of the plot where the given variable is present. Therefore the sum of the species tree volume for a plot is related only to the area occupied by those trees, not to the whole plot.

Species group	Ownership / Growing stock volume			
	Public	Private (grant aided)	Private (other)	All
	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)
Sitka spruce	208 (191 - 225)	173 (157 - 189)	234 (153 - 316)	193 (182 - 205)
Norway spruce	281 (236 - 326)	150 (120 - 181)	352 (198 - 507)	207 (0 - 739)
Scots pine	267 (0 - 539)	77 (32 - 122)	341 (149 - 534)	233 (75 - 392)
other pines	163 (139 - 187)	106 (84 - 128)	138 (0 - 1,174)	146 (126 - 165)
Douglas fir	342 (272 - 412)	202 (89 - 314)	283 (0 - 1,578)	329 (269 - 389)
larch spp.	219 (193 - 246)	158 (138 - 179)	315 (282 - 348)	174 (153 - 195)
other conifers	239 (177 - 302)	149 - -	290 (0 - 733)	294 (144 - 443)
ses. & ped. oak	279 (244 - 315)	66 (0 - 193)	390 (316 - 463)	222 (180 - 264)
beech	337 (247 - 427)	116 - -	297 (261 - 332)	275 (243 - 308)
ash	137 (95 - 179)	107 (86 - 128)	200 (164 - 237)	138 (119 - 157)
sycamore	255 (129 - 382)	93 (66 - 119)	200 (164 - 236)	173 (140 - 207)
birch spp.	75 (65 - 85)	87 (56 - 117)	124 (108 - 139)	98 (85 - 112)
alder	118 (94 - 142)	72 (48 - 96)	152 (111 - 194)	104 (87 - 120)
OLL broadleaves	67 (48 - 85)	60 (3 - 116)	139 (94 - 183)	122 (96 - 148)
OSL broadleaves	49 (40 - 57)	50 (31 - 69)	73 (64 - 81)	61 (55 - 66)
All	184 (171 - 196)	151 (139 - 163)	174 (154 - 195)	173 (165 - 182)



7.4.3 Normalised mean of growing stock volume per hectare by species group and age class (10 yr)

Methodology

The normalised mean growing stock volume per hectare is classified by species group and age class (10yr).

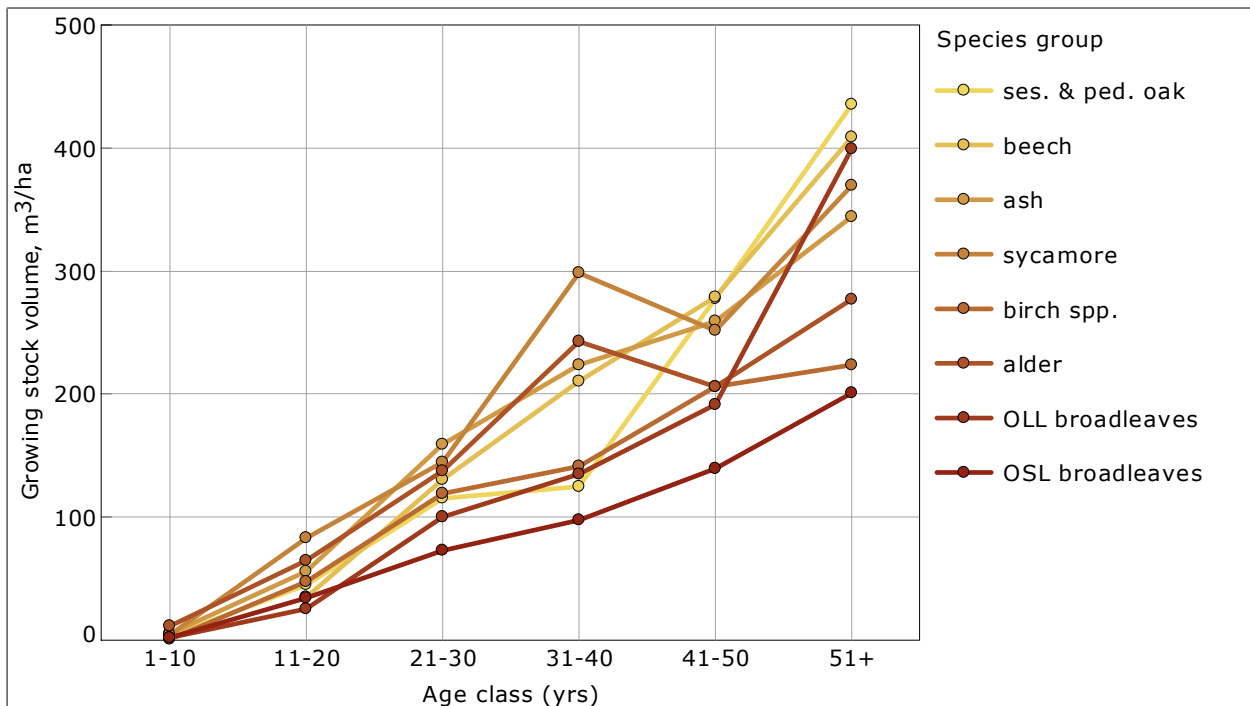
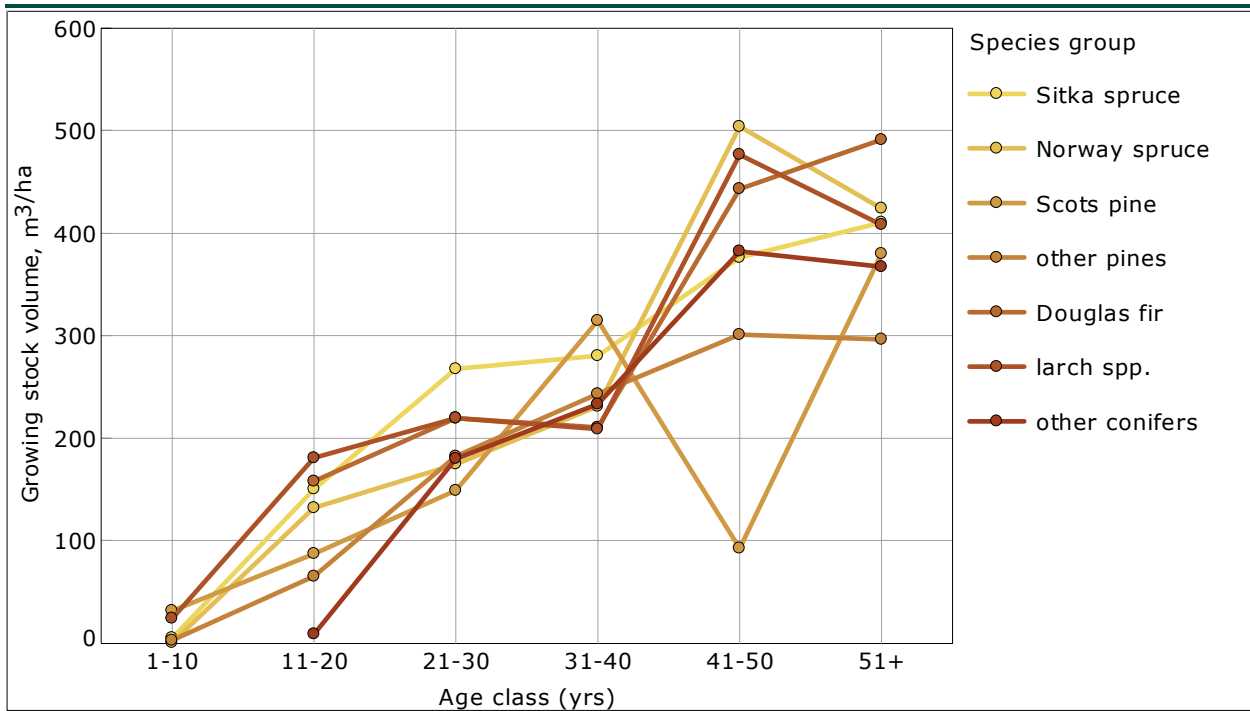
The calculated value of the variable under consideration (i.e. growing stock) is divided not by the whole plot area, but by the area of the part of the plot where the given variable is present. Therefore the sum of species tree volume, at a given age class, for a plot is related only to the area occupied by those trees, not to the whole plot.

Age class (yrs)	Species group / Growing stock volume			
	Sitka spruce	Norway spruce	Scots pine	other pines
	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)
1-10	6 (4 - 8)	0 (0 - 1)	32 (14 - 51)	3 (2 - 4)
11-20	151 (137 - 164)	132 (115 - 150)	88 (41 - 134)	65 (50 - 80)
21-30	267 (250 - 285)	175 (127 - 223)	149 - -	182 (158 - 206)
31-40	281 (246 - 316)	231 (54 - 408)	314 - -	243 (218 - 269)
41-50	376 (330 - 423)	504 (466 - 542)	93 (3 - 183)	301 (230 - 373)
51+	410 (114 - 707)	424 (354 - 494)	380 (294 - 466)	296 (0 - 725)
All	193 (182 - 205)	207 (0 - 739)	233 (75 - 392)	146 (126 - 165)

Age class (yrs)	Species group / Growing stock volume			
	Douglas fir	larch spp.	other conifers	ses. & ped. oak
	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)
1-10	- - -	24 (17 - 32)	- - -	3 (1 - 5)
11-20	158 (85 - 232)	181 (165 - 197)	9 - -	45 (41 - 48)
21-30	220 (189 - 251)	219 (189 - 250)	181 (140 - 221)	115 (97 - 133)
31-40	211 - -	209 (171 - 248)	233 (0 - 474)	125 (104 - 146)
41-50	443 (155 - 732)	477 - -	382 (0 - 1,853)	277 (171 - 384)
51+	491 (0 - 1,335)	408 (67 - 749)	367 (298 - 437)	436 (379 - 493)
All	329 (269 - 389)	174 (153 - 195)	294 (144 - 443)	222 (180 - 264)

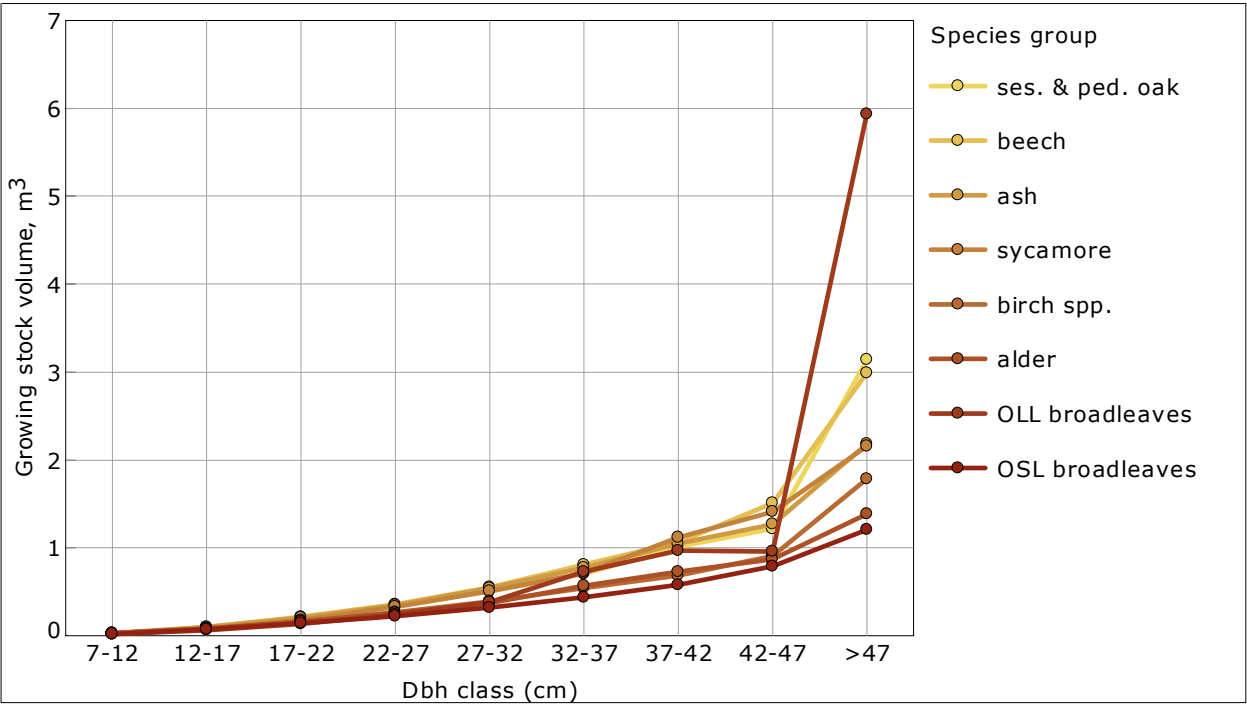
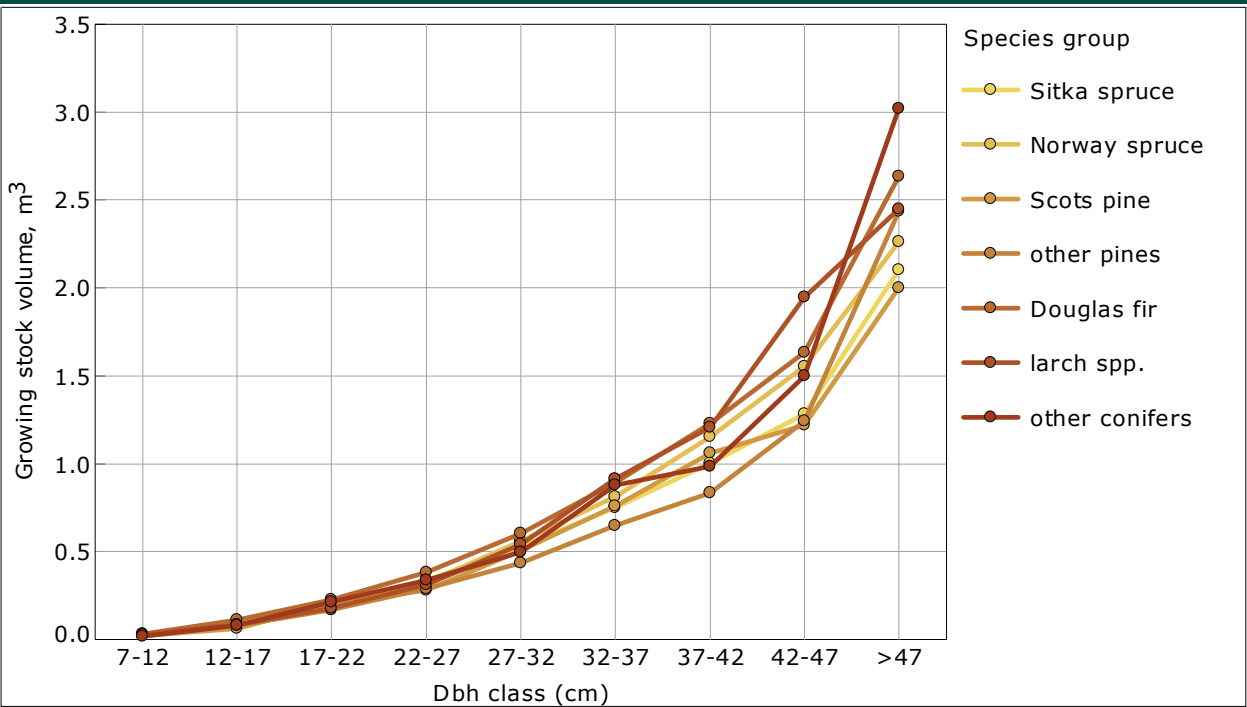
Age class (yrs)	Species group / Growing stock volume			
	beech	ash	sycamore	birch spp.
	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)
1-10	- - -	5 (3 - 7)	4 (0 - 34)	1 (0 - 2)
11-20	35 (0 - 134)	56 (41 - 71)	83 (67 - 99)	47 (40 - 55)
21-30	131 (0 - 279)	159 (143 - 176)	144 (113 - 176)	119 (103 - 135)
31-40	211 (171 - 251)	224 (202 - 245)	299 (286 - 311)	141 (127 - 156)
41-50	279 (208 - 349)	259 (224 - 295)	252 (180 - 324)	206 (183 - 229)
51+	409 (366 - 451)	344 (307 - 382)	370 (277 - 462)	224 (206 - 242)
All	275 (243 - 308)	138 (119 - 157)	173 (140 - 207)	98 (85 - 112)

Age class (yrs)	Species group / Growing stock volume			
	alder	OLL broadleaves	OSL broadleaves	All
	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)
1-10	12 (7 - 16)	2 (0 - 4)	2 (0 - 3)	6 (5 - 7)
11-20	65 (38 - 91)	25 (17 - 33)	34 (29 - 40)	122 (114 - 131)
21-30	137 (125 - 150)	100 (82 - 118)	73 (63 - 83)	227 (214 - 240)
31-40	242 (191 - 294)	135 (104 - 167)	97 (84 - 111)	224 (207 - 241)
41-50	206 (71 - 341)	191 (141 - 242)	140 (125 - 154)	305 (279 - 332)
51+	277 (236 - 319)	399 (364 - 434)	201 (173 - 228)	332 (305 - 358)
All	104 (87 - 120)	122 (96 - 148)	61 (55 - 66)	173 (165 - 182)



7.4.4 Mean tree volume by species group and diameter class (5 cm)

Methodology				
The weighted mean tree volume is classified by species group and diameter class (5 cm). Each tree volume is weighted by the representative number of trees, which is determined by the concentric circle where the tree is located.				
Dbh class (cm)	Species group / Growing stock volume			
	Sitka spruce	Norway spruce	Scots pine	other pines
	m ³ (α = 0.05)	m ³ (α = 0.05)	m ³ (α = 0.05)	m ³ (α = 0.05)
7-12	0.026 (0.025 – 0.027)	0.028 (0.026 – 0.031)	0.022 (0.008 – 0.036)	0.024 (0.017 – 0.031)
12-17	0.089 (0.087 – 0.091)	0.081 (0.075 – 0.086)	0.060 (0.046 – 0.075)	0.079 (0.075 – 0.083)
17-22	0.193 (0.189 – 0.197)	0.170 (0.143 – 0.197)	0.204 (0.150 – 0.257)	0.169 (0.163 – 0.176)
22-27	0.338 (0.332 – 0.345)	0.322 (0.023 – 0.620)	0.280 (0.264 – 0.297)	0.291 (0.282 – 0.299)
27-32	0.527 (0.516 – 0.537)	0.557 (0.478 – 0.635)	0.504 (0.393 – 0.615)	0.435 (0.416 – 0.455)
32-37	0.751 (0.729 – 0.773)	0.813 (0.492 – 1.133)	0.758 (0.676 – 0.841)	0.649 (0.522 – 0.777)
37-42	1.004 (0.963 – 1.044)	1.153 (0.956 – 1.350)	1.060 (1.044 – 1.077)	0.833 (0.764 – 0.901)
42-47	1.284 (1.206 – 1.362)	1.551 (1.221 – 1.880)	1.220 (1.117 – 1.323)	1.241 (1.104 – 1.377)
>47	2.104 (1.920 – 2.287)	2.264 (2.188 – 2.339)	2.002 (1.872 – 2.132)	2.438 (1.749 – 3.126)
All	0.218 (0.195 – 0.241)	0.251 (0.103 – 0.398)	0.712 (0.562 – 0.862)	0.221 (0.165 – 0.277)
Dbh class (cm)	Species group / Growing stock volume			
	Douglas fir	larch spp.	other conifers	ses. & ped. oak
	m ³ (α = 0.05)	m ³ (α = 0.05)	m ³ (α = 0.05)	m ³ (α = 0.05)
7-12	0.032 (0.026 – 0.037)	0.027 (0.024 – 0.031)	0.018 – –	0.023 (0.019 – 0.027)
12-17	0.110 (0.095 – 0.124)	0.084 (0.080 – 0.088)	0.081 (0.071 – 0.091)	0.074 (0.069 – 0.079)
17-22	0.224 (0.216 – 0.232)	0.177 (0.171 – 0.183)	0.211 (0.181 – 0.241)	0.198 (0.177 – 0.218)
22-27	0.382 (0.367 – 0.396)	0.312 (0.298 – 0.326)	0.338 (0.237 – 0.438)	0.341 (0.329 – 0.354)
27-32	0.601 (0.577 – 0.625)	0.542 (0.513 – 0.571)	0.495 (0.321 – 0.669)	0.504 (0.479 – 0.530)
32-37	0.892 (0.858 – 0.926)	0.912 (0.546 – 1.278)	0.880 – –	0.704 (0.662 – 0.745)
37-42	1.229 (1.131 – 1.326)	1.207 (1.002 – 1.412)	0.984 (0.571 – 1.397)	1.009 (0.958 – 1.060)
42-47	1.633 (1.624 – 1.642)	1.947 – –	1.498 (1.495 – 1.502)	1.213 (1.126 – 1.300)
>47	2.634 (2.369 – 2.900)	2.451 – –	3.022 (2.189 – 3.856)	3.143 (2.517 – 3.769)
All	0.598 (0.485 – 0.712)	0.172 (0.134 – 0.210)	1.197 (0.969 – 1.425)	1.299 (0.975 – 1.622)
Dbh class (cm)	Species group / Growing stock volume			
	beech	ash	sycamore	birch spp.
	m ³ (α = 0.05)	m ³ (α = 0.05)	m ³ (α = 0.05)	m ³ (α = 0.05)
7-12	0.020 (0.003 – 0.037)	0.028 (0.024 – 0.031)	0.026 (0.019 – 0.032)	0.026 (0.023 – 0.029)
12-17	0.102 (0.087 – 0.116)	0.096 (0.090 – 0.101)	0.082 (0.071 – 0.093)	0.082 (0.079 – 0.086)
17-22	0.209 (0.193 – 0.225)	0.207 (0.199 – 0.215)	0.176 (0.160 – 0.191)	0.161 (0.155 – 0.166)
22-27	0.352 (0.335 – 0.368)	0.347 (0.334 – 0.360)	0.326 (0.299 – 0.353)	0.267 (0.256 – 0.277)
27-32	0.548 (0.530 – 0.566)	0.545 (0.492 – 0.597)	0.510 (0.489 – 0.531)	0.395 (0.375 – 0.414)
32-37	0.811 (0.749 – 0.873)	0.769 (0.737 – 0.801)	0.708 (0.078 – 1.338)	0.543 (0.507 – 0.579)
37-42	1.064 (1.001 – 1.127)	1.048 (0.762 – 1.333)	1.119 (0.000 – 2.443)	0.685 (0.648 – 0.722)
42-47	1.505 (1.347 – 1.664)	1.269 (1.128 – 1.410)	1.411 – –	0.905 (0.870 – 0.939)
>47	2.993 (2.705 – 3.281)	2.183 (1.916 – 2.450)	2.156 (2.103 – 2.209)	1.780 (1.635 – 1.925)
All	1.067 (0.735 – 1.399)	0.278 (0.223 – 0.333)	0.507 (0.393 – 0.622)	0.148 (0.126 – 0.171)
Dbh class (cm)	Species group / Growing stock volume			
	alder	OLL broadleaves	OSL broadleaves	All
	m ³ (α = 0.05)	m ³ (α = 0.05)	m ³ (α = 0.05)	m ³ (α = 0.05)
7-12	0.026 (0.021 – 0.031)	0.022 (0.020 – 0.024)	0.021 (0.020 – 0.023)	0.024 (0.024 – 0.025)
12-17	0.082 (0.077 – 0.086)	0.064 (0.060 – 0.068)	0.071 (0.068 – 0.073)	0.085 (0.084 – 0.086)
17-22	0.162 (0.154 – 0.170)	0.132 (0.122 – 0.142)	0.146 (0.137 – 0.155)	0.184 (0.181 – 0.187)
22-27	0.259 (0.242 – 0.275)	0.238 (0.217 – 0.259)	0.222 (0.215 – 0.229)	0.326 (0.321 – 0.331)
27-32	0.375 (0.353 – 0.398)	0.385 (0.338 – 0.431)	0.316 (0.307 – 0.326)	0.506 (0.498 – 0.515)
32-37	0.567 (0.548 – 0.587)	0.730 (0.675 – 0.786)	0.437 (0.400 – 0.474)	0.723 (0.707 – 0.739)
37-42	0.729 (0.683 – 0.774)	0.970 (0.949 – 0.990)	0.574 (0.526 – 0.621)	0.988 (0.960 – 1.015)
42-47	0.865 (0.739 – 0.991)	0.962 – –	0.787 (0.683 – 0.891)	1.277 (1.229 – 1.326)
>47	1.387 – –	5.939 (4.618 – 7.261)	1.211 (1.097 – 1.325)	2.730 (2.545 – 2.915)
All	0.123 (0.099 – 0.147)	0.717 (0.000 – 1.781)	0.084 (0.073 – 0.095)	0.242 (0.218 – 0.266)



CHAPTER 8

FELLING

Thin status describes the progression of thinning operations or absence of thinning operations in the national forest estate. In terms of the area of thinnings, 16.4% of forests have been thinned or re-spaced at least once. Almost half (45.8%) of all forests are juvenile (i.e. at a maturity stage where they could not be thinned) and a further 12.7% were also deemed not suitable for thinning as it was classified as semi-natural or low stocking. A quarter (25.1%) of forests were categorised as “no thin”, which in theory is defined by the forest maturity stage where it could be thinned but had not been thinned due to a variety of factors such as high windthrow risk, economic factors, owner intentions or thinning may be imminent. Apart from the limiting factors described, these “no thin”, forests generally offer the best existing potential for thinning.

No felling intervention had taken place in 84.8% of forests between the second and third inventory cycles. However a picture emerges of much greater utilisation of the forest resource in the third NFI with nearly 63,000 ha of forests thinned since 2013, of which 36,450 ha were thinned for the first time. Substantial mobilisation has arisen in Private (grant aided) forests, with 25,000 ha of thinning interventions occurring in this cohort since 2013. The area of thinned forests in the Private (grant aided) forests was 16,410ha in 2012; while in 2017 the thinned area was 33,610ha.

The mean annual standing volume felled between 2013 and 2017 was 4.9 million m³. The volume felled between 2013-2017 showed an increase of 1.28 million m³ over the period 2006-2012, which is a positive indicator of wood mobilisation. Harvest volumes are still primarily concentrated, in Public forests, accounting for 77% of mean annual harvest volumes between the second and third NFIs. However the share of timber coming onstream from private forests has increased from 13% to nearly 23% when looking at the trend between NFI1-NFI2 and NFI2-NFI3, with production nearly quadrupling from Private (grant aided) forests. Clearfelling, the felling of a continuous block of trees, is the dominant harvest type, accounting for 75.8% of the timber felled.

The estimate of mean annual standing volume felled between 2013 and 2017 from the NFI is significantly higher when compared to other published estimates. For the period 2013-2016, the annual average roundwood harvest is estimated to be 3.189 million m³ by COFORD². The primary difference between these two estimates is the NFI volume estimate is standing in the forest, whereas the COFORD estimate represents the roundwood available for processing or in other words what crosses the sawmill weighbridge. This difference is represented by the losses associated with harvesting, which could range from 5 to 25% depending on the type of forest being harvested. Further analyses will be required to get a full understanding of the reasons for the differential between the NFI and COFORD estimates.

In terms of broad species categories, 96.5% of the mean annual felling volume comes from coniferous species. Sitka spruce accounted for 81.2 % of the share of the mean annual felling volume, followed by other pines at 5% and Norway spruce comprising 3.1%.

The mean tree volume felled in Irish forests is 0.37m³. The mean tree felled according to harvest type ranges from 0.20m³ in first thinning operations to 0.47m³ in final clearfell. The mean tree harvest volume associated with first thinning operations is higher than expected due to the incidence of first thinnings in older crops (30+ years of age).

² Knaggs, G. and O'Driscoll. 2016. Woodflow and forest-based biomass energy use on the island of Ireland (2016). Coford Connects Note Processing/Products No. 48. COFORD Dublin.

8.1 THIN STATUS

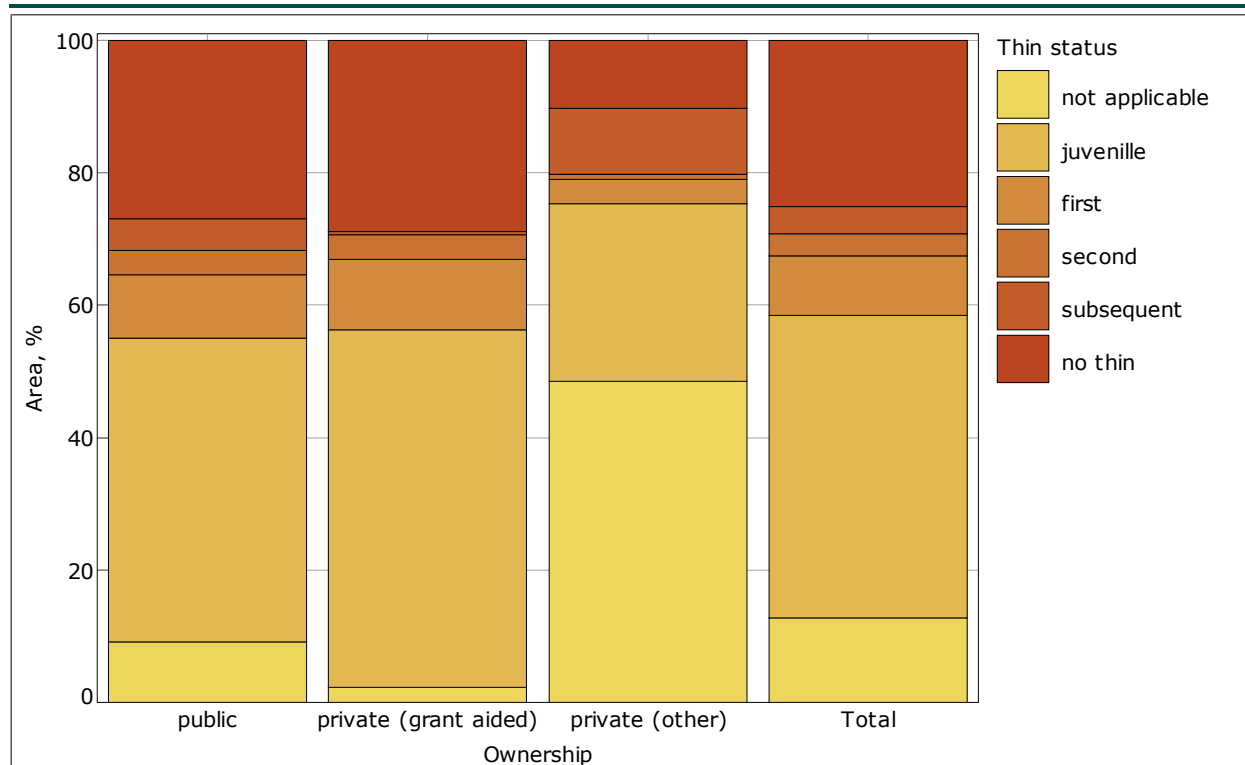
Definition
Thin status Describes the progression of thinning operations. Juvenile forest: This is a forest that has not reached the development stage for first thinning. Respacing/pre-commercial thinning: The spacing of the forest has been altered prior to the first thin stage. Mainly associated with overstocked naturally regenerated forest. First thinning: The forest 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. Second thinning: The forest 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. Subsequent thinning: Any thinning post second thinning. Generally the forest is well opened up and the decomposition of the stumps is grouped into a number of different stages. No thin: No thinning has taken place. These areas are in theory at a maturity stage where they could be thinned but remain unthinned due to numerous reasons such as; high windthrow risk, economic considerations, owner intentions or thinning may be imminent. Not applicable: Not suitable for thinning/undeveloped due to low stocking or semi-natural species predominating.

8.1.1 Stocked forest area by ownership and thin status

Methodology
The stocked forest area is classified by ownership and thin status.

Thin status	Ownership / Area					
	public			private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
not applicable	31.68	(24.92 - 38.44)	9.2	5.19	(2.39 - 7.99)	2.3
juvenile	158.60	(145.08 - 172.13)	45.8	122.10	(109.82 - 134.38)	54.1
first	33.25	(26.30 - 40.20)	9.6	24.00	(18.04 - 29.96)	10.6
second	12.83	(8.42 - 17.24)	3.7	8.42	(4.84 - 11.99)	3.7
subsequent	16.40	(11.46 - 21.33)	4.7	1.19	(0.00 - 2.54)	0.5
no thin	93.33	(82.25 - 104.41)	27.0	65.19	(55.69 - 74.69)	28.8
Total	346.09	(330.30 - 361.87)	100.0	226.09	(211.18 - 241.00)	100.0

Thin status	Ownership / Area					
	private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
not applicable	48.92	(40.64 - 57.20)	48.5	85.79	(75.25 - 96.33)	12.7
juvenile	27.16	(20.92 - 33.41)	26.9	307.87	(291.95 - 323.78)	45.8
first	3.61	(1.27 - 5.95)	3.6	60.86	(51.66 - 70.06)	9.0
second	0.80	(0.00 - 1.92)	0.8	22.05	(16.33 - 27.77)	3.3
subsequent	10.03	(6.13 - 13.93)	9.9	27.62	(21.28 - 33.96)	4.1
no thin	10.41	(6.44 - 14.38)	10.3	168.93	(155.03 - 182.82)	25.1
Total	100.94	(89.48 - 112.39)	100.0	673.11		100.0



8.1.2 Stocked forest area by ownership and thin status (excl. Juvenile and Not applicable)

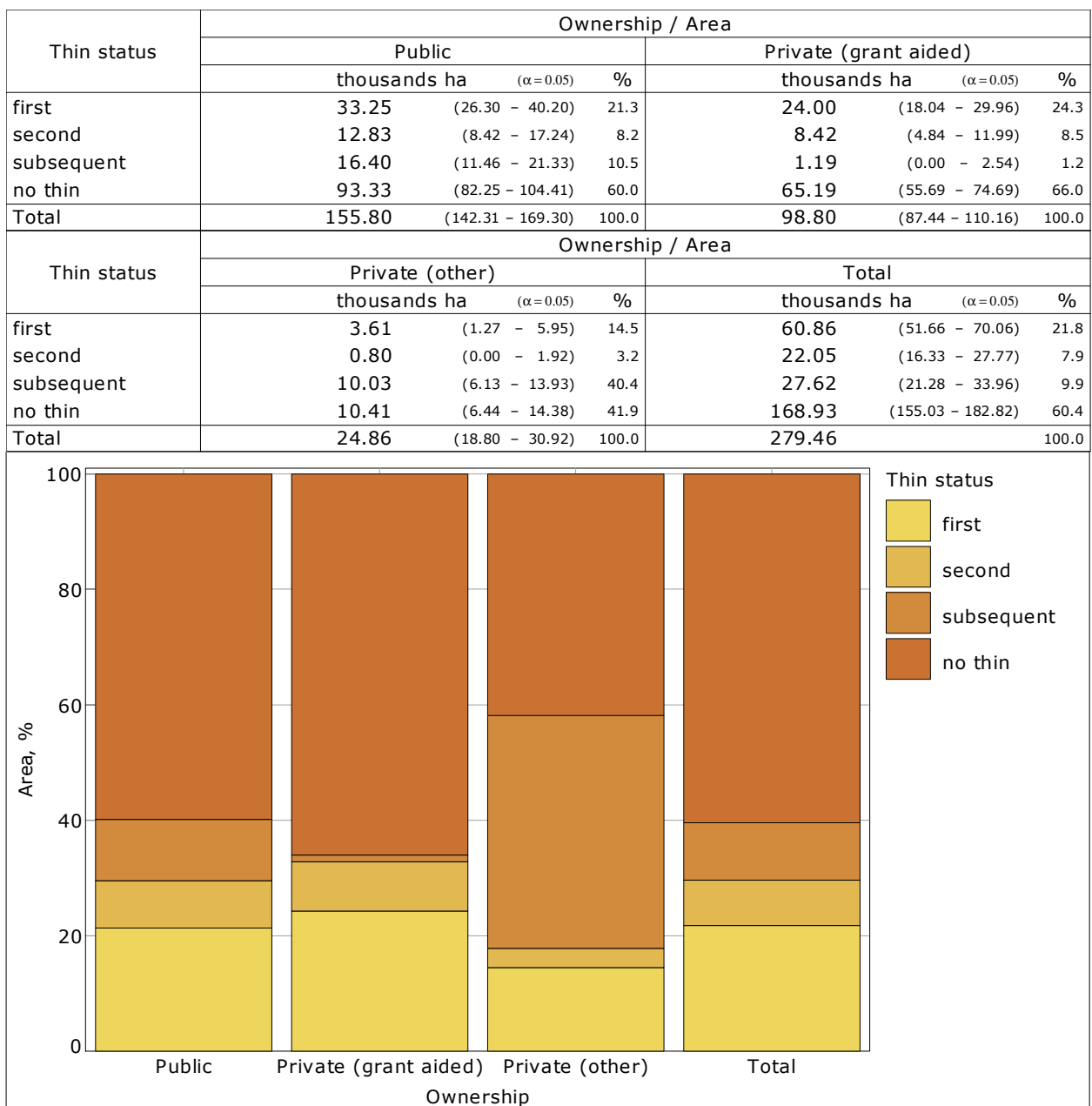
Definition

Thin status (excl. Juvenile and Not applicable)

The difference between this sub-section and the previous is that the 'Juvenile forest' and 'not applicable' categories have been removed from the analysis, thereby concentrating on the portion of the estate that is at a development stage where thinning could have taken place. The development stage is assessed using threshold basal area.

Methodology

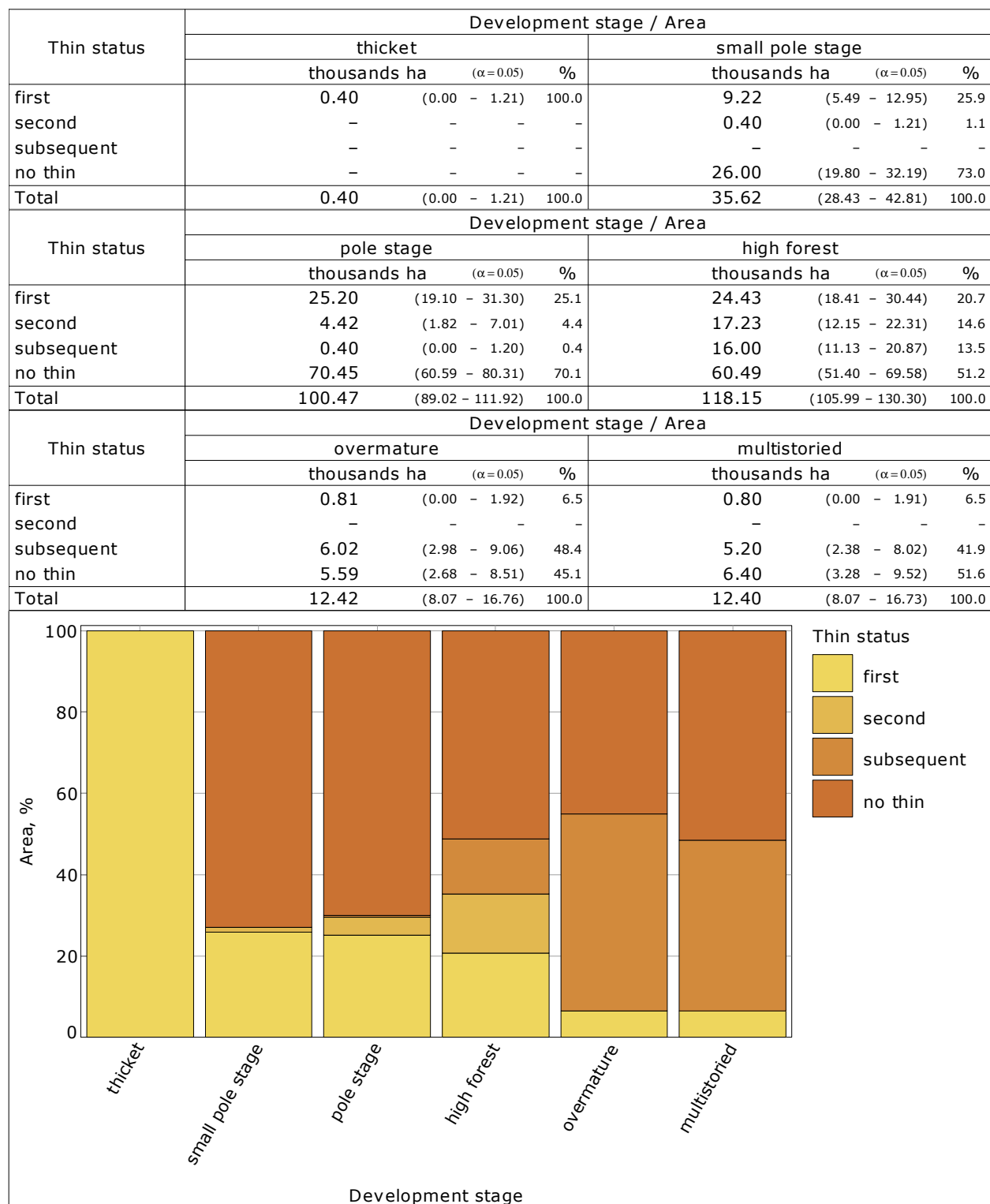
The stocked forest area is classified by ownership and thin status (excl. Juvenile and not applicable).



8.1.3 Stocked forest area by development stage and thin status (excl. Juvenile and not applicable)

Methodology

The stocked forest area is classified by development stage and thin status (excl. Juvenile and not applicable).



8.2 FELLING INTERVENTION

Definition

Felling Intervention

Occurrence of felling operation such as first, second, subsequent thinning or clearfell between inventory cycles.

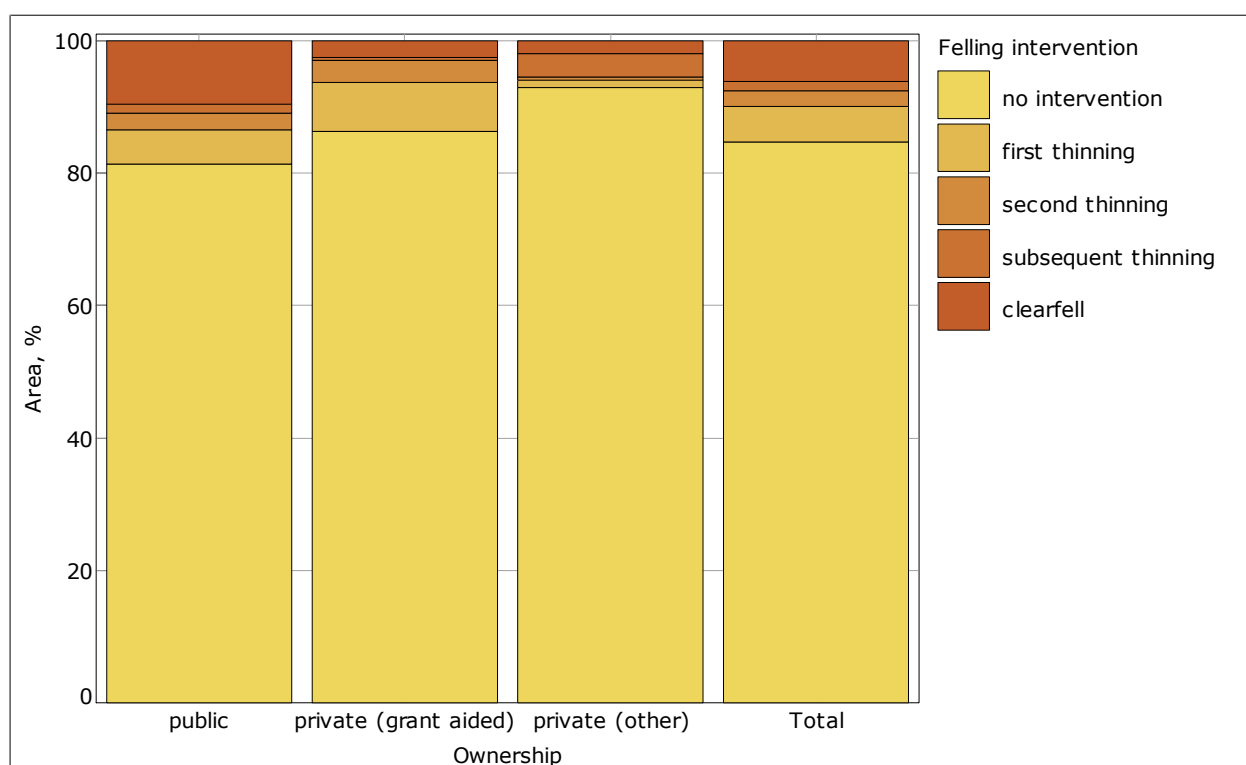
8.2.1 Stocked forest area by ownership and felling intervention

Methodology

The stocked forest area by ownership and felling intervention that occurred between the second and third inventory cycles (i.e. 2013-2017).

Felling intervention	Ownership / Area					
	public			private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
no intervention	290.79	(274.98 - 306.59)	81.4	197.28	(182.84 - 211.73)	86.4
first thinning	18.45	(13.20 - 23.70)	5.2	16.80	(11.79 - 21.81)	7.4
second thinning	8.81	(5.14 - 12.48)	2.5	7.63	(4.23 - 11.02)	3.3
subsequent thinning	4.82	(2.10 - 7.53)	1.3	1.19	(0.00 - 2.53)	0.5
clearfell	34.43	(27.33 - 41.53)	9.6	5.60	(2.68 - 8.52)	2.4
Total	357.29	(341.32 - 373.26)	100.0	228.49	(213.45 - 243.54)	100.0

Felling intervention	Ownership / Area					
	private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
no intervention	94.53	(83.35 - 105.70)	92.9	582.60	(570.95 - 594.25)	84.8
first thinning	1.20	(0.00 - 2.57)	1.2	36.45	(29.17 - 43.72)	5.3
second thinning	0.40	(0.00 - 1.21)	0.4	16.84	(11.83 - 21.85)	2.4
subsequent thinning	3.61	(1.26 - 5.95)	3.5	9.62	(5.80 - 13.43)	1.4
clearfell	2.00	(0.25 - 3.75)	2.0	42.02	(34.23 - 49.81)	6.1
Total	101.74	(90.23 - 113.25)	100.0	687.52		100.0



8.3 FELL VOLUME (2013-2017)

Definition

Mean Annual Volume Felled

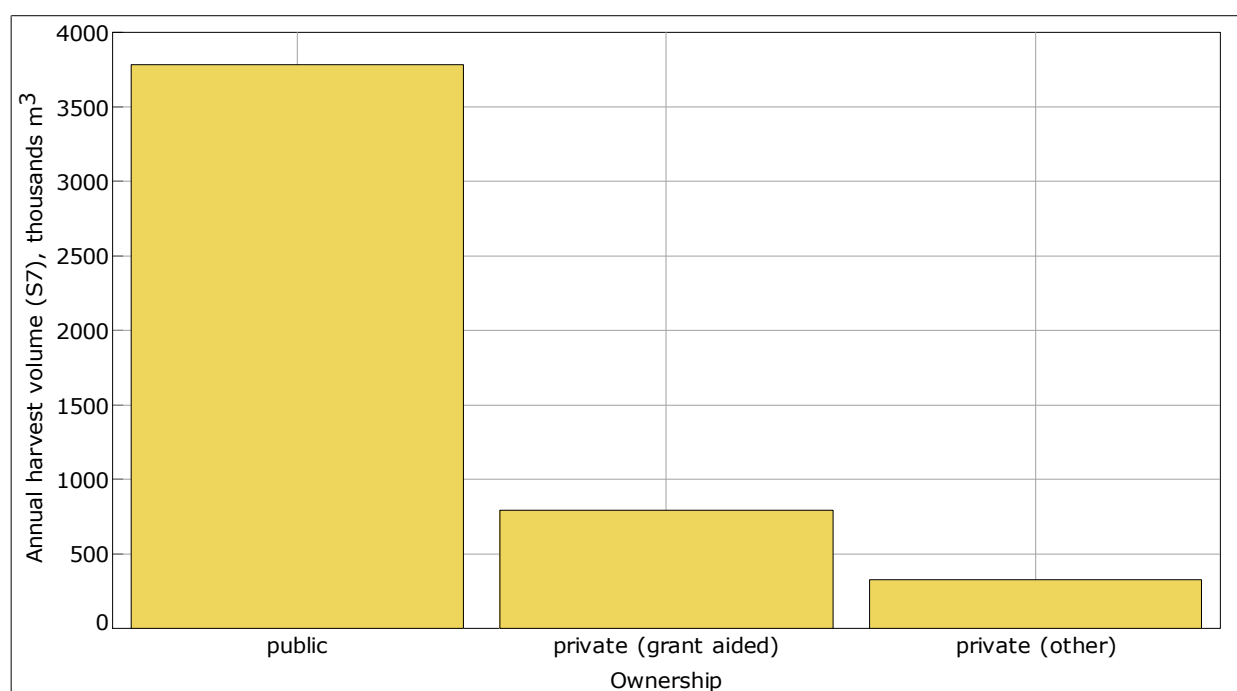
Mean annual overbark volume felled from stump to 7cm top diameter (S7), of living trees with Dbh greater than 7 cm during the reference period, 2013-2017.

8.3.1 Mean annual volume felled by ownership

Methodology

The mean annual fell volume is classified by ownership.

Ownership	Annual harvest volume (S7)		
	thousands m ³	($\alpha = 0.05$)	%
public	3,779.5	(3,293.9 – 4,265.1)	77.2
private (grant aided)	791.6	(582.1 – 1,001.1)	16.2
private (other)	324.4	(194.4 – 454.4)	6.6
Total	4,895.5	(4,335.6 – 5,455.3)	100.0

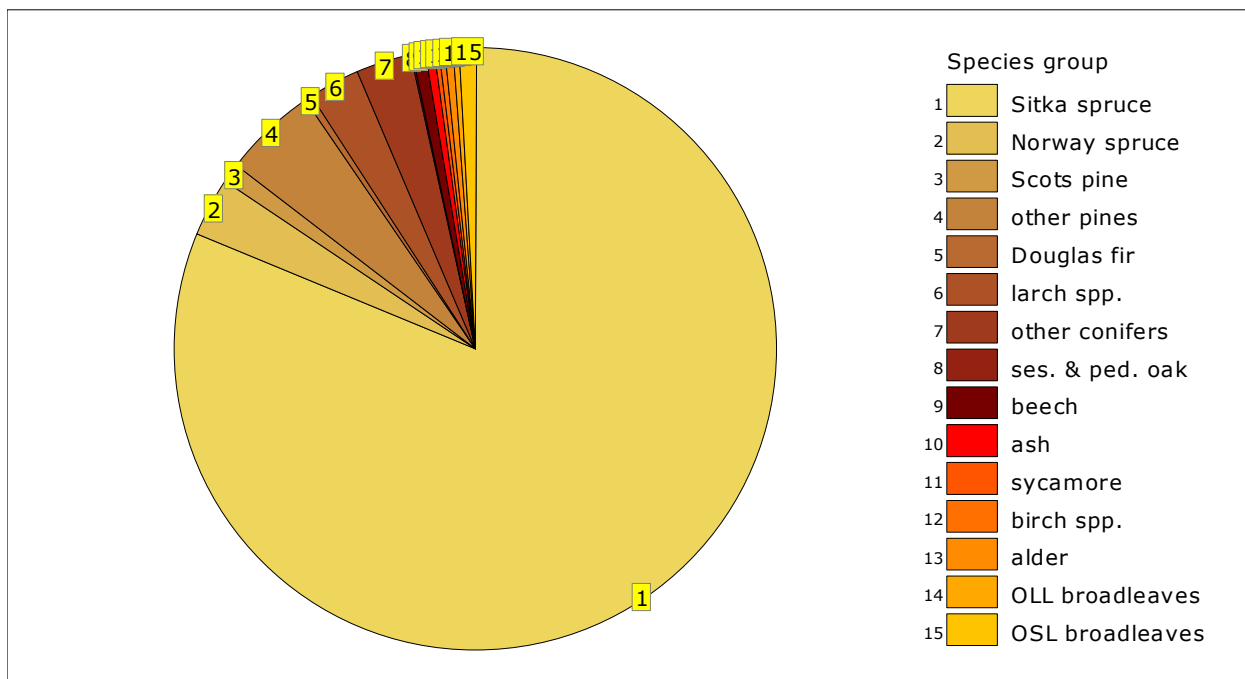


8.3.2 Mean annual standing volume felled by species group

Methodology

The mean annual fell volume is classified by species group.

Species group	Annual harvest volume (S7)		
	thousands m ³	($\alpha = 0.05$)	%
Sitka spruce	3,978.4	(3,493.0 – 4,463.7)	81.2
Norway spruce	153.0	(62.8 – 243.2)	3.1
Scots pine	52.1	– –	1.1
other pines	243.7	(88.7 – 398.7)	5.0
Douglas fir	19.2	(0.7 – 37.7)	0.4
larch spp.	133.5	(0.0 – 276.6)	2.7
other conifers	145.2	– –	3.0
ses. & ped. oak	3.5	– –	0.07
beech	33.5	(0.0 – 87.7)	0.7
ash	23.9	(0.0 – 57.5)	0.5
sycamore	11.0	– –	0.2
birch spp.	17.3	(11.0 – 23.6)	0.4
alder	20.4	– –	0.4
OLL broadleaves	15.8	– –	0.3
OSL broadleaves	45.0	(0.0 – 98.4)	0.9
Total	4,895.5	(4,335.6 – 5,455.3)	100.0



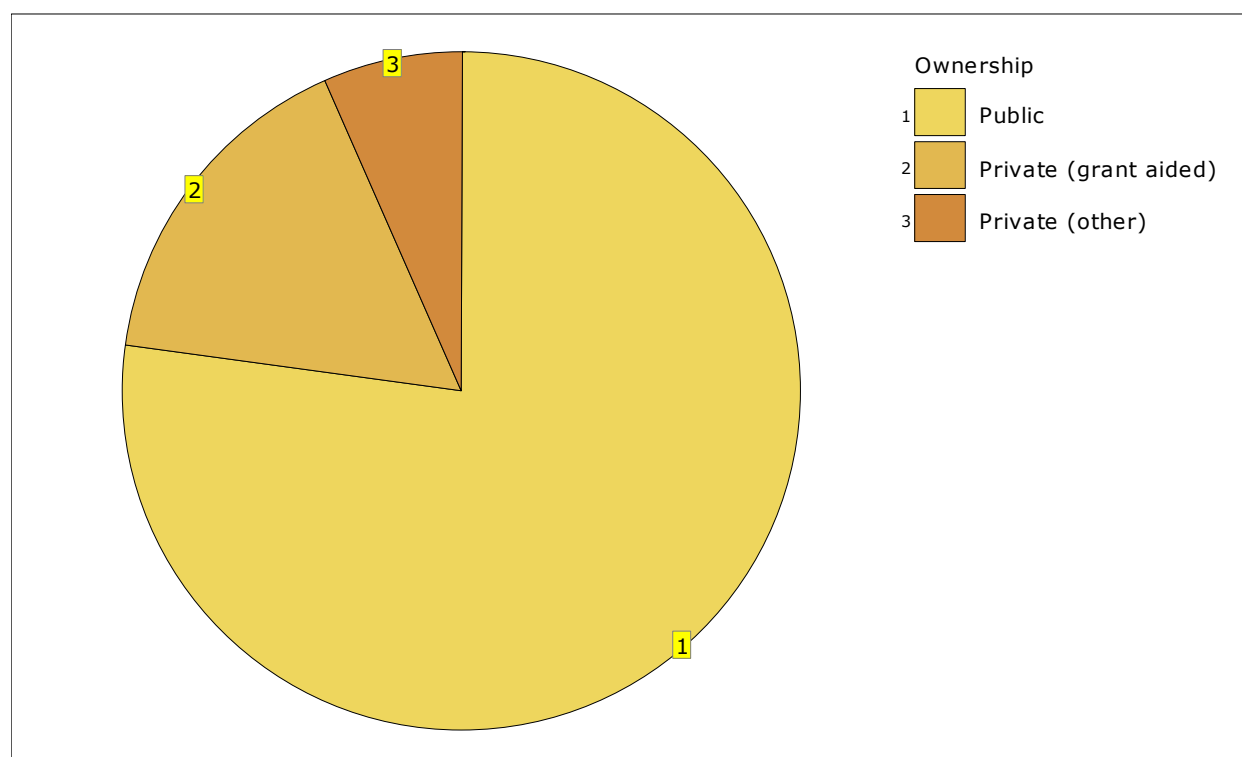
8.3.3 Mean annual standing volume felled by ownership and harvest type

Methodology

The mean annual fell volume classified by ownership and harvest type.

Harvest type	Ownership / Annual harvest volume (£7)					
	Public			Private (grant aided)		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
1st thin	406.7	(349.4 – 463.9)	10.8	231.5	(176.1 – 287.0)	29.3
2nd thin	182.4	(124.1 – 240.8)	4.8	115.1	(77.1 – 153.0)	14.5
clearfell	3,099.8	(2,766.3 – 3,433.4)	82.0	419.8	(309.9 – 529.7)	53.0
subsequent thin	90.6	(44.2 – 137.0)	2.4	25.2	(0.0 – 94.6)	3.2
Total	3,779.5	(3,293.9 – 4,265.1)	100.0	791.6	(582.1 – 1,001.1)	100.0

Harvest type	Ownership / Annual harvest volume (£7)					
	Private (other)			Total		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
1st thin	6.5	– –	2.0	644.7	(554.0 – 735.4)	13.2
2nd thin	15.7	– –	4.9	313.2	(233.7 – 392.8)	6.4
clearfell	191.5	(18.7 – 364.4)	59.0	3,711.2	(3,341.7 – 4,080.7)	75.8
subsequent thin	110.6	(30.8 – 190.4)	34.1	226.3	(123.1 – 329.6)	4.6
Total	324.4	(194.4 – 454.4)	100.0	4,895.5	(4,335.6 – 5,455.3)	100.0



8.3.4 Mean annual standing volume felled by harvest type and age class (10yr)

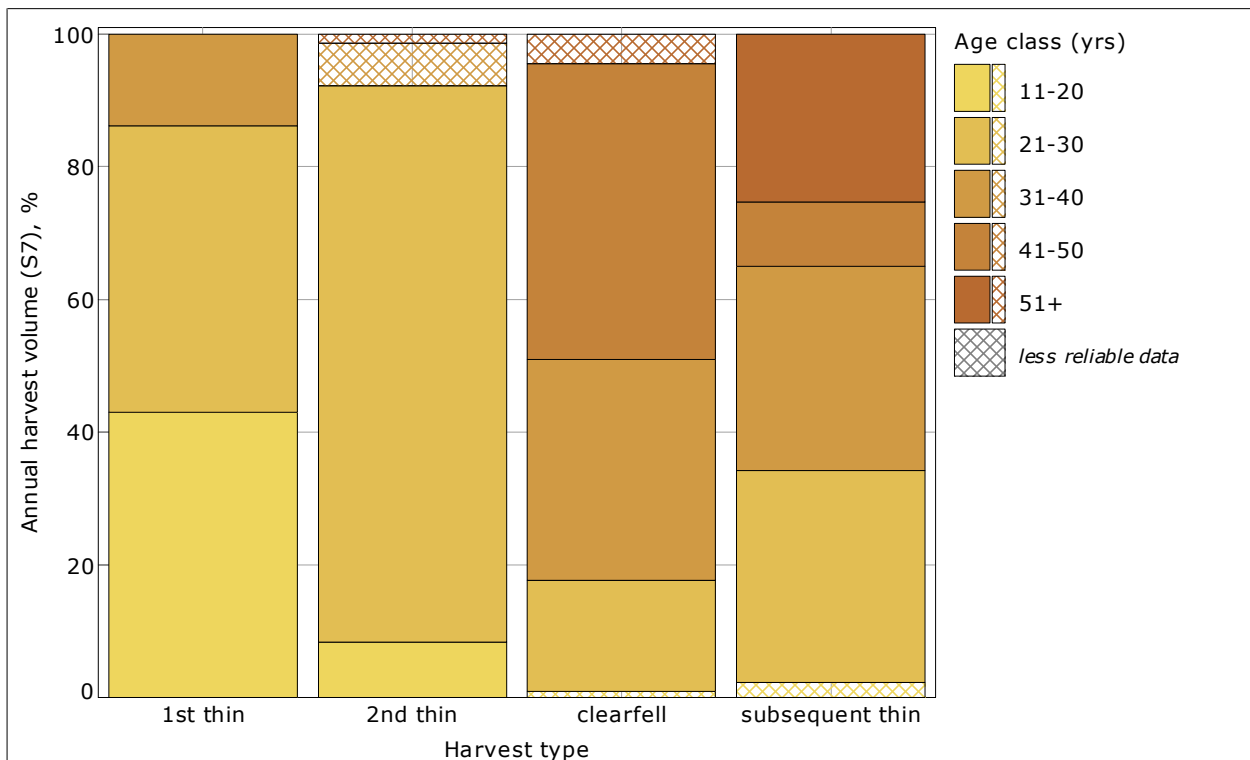
Methodology

The mean annual fell volume is classified by harvest type and age class (10yrs).

Age class (yrs)	Harvest type / Annual harvest volume (S7)					
	1st thin			2nd thin		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
11-20	277.0	(221.2 - 332.8)	43.0	26.0	(0.0 - 65.8)	8.3
21-30	279.1	(225.6 - 332.6)	43.3	263.1	(181.9 - 344.2)	84.0
31-40	88.6	(0.0 - 205.6)	13.7	19.8	-	6.3
41-50	-	-	-	-	-	-
51+	-	-	-	4.4	-	1.4
Total	644.7	(554.0 - 735.4)	100.0	313.2	(233.7 - 392.8)	100.0

Age class (yrs)	Harvest type / Annual harvest volume (S7)					
	clearfell			subsequent thin		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
11-20	35.6	-	1.0	5.1	-	2.2
21-30	619.6	(442.2 - 797.1)	16.7	72.3	(26.8 - 117.8)	32.0
31-40	1,236.3	(986.3 - 1,486.2)	33.3	69.9	(0.0 - 397.6)	30.9
41-50	1,655.3	(1,398.8 - 1,911.8)	44.6	21.7	(0.0 - 126.3)	9.6
51+	164.4	-	4.4	57.3	(13.2 - 101.5)	25.3
Total	3,711.2	(3,341.7 - 4,080.7)	100.0	226.3	(123.1 - 329.6)	100.0

Age class (yrs)	Harvest type / Annual harvest volume (S7)		
	Total		
	thousands m ³	($\alpha = 0.05$)	%
11-20	343.6	(263.8 - 423.5)	7.0
21-30	1,234.1	(985.6 - 1,482.7)	25.2
31-40	1,414.6	(1,147.1 - 1,682.0)	28.9
41-50	1,677.0	(1,372.3 - 1,981.7)	34.3
51+	226.1	(0.0 - 452.4)	4.6
Total	4,895.5	(4,335.6 - 5,455.3)	100.0



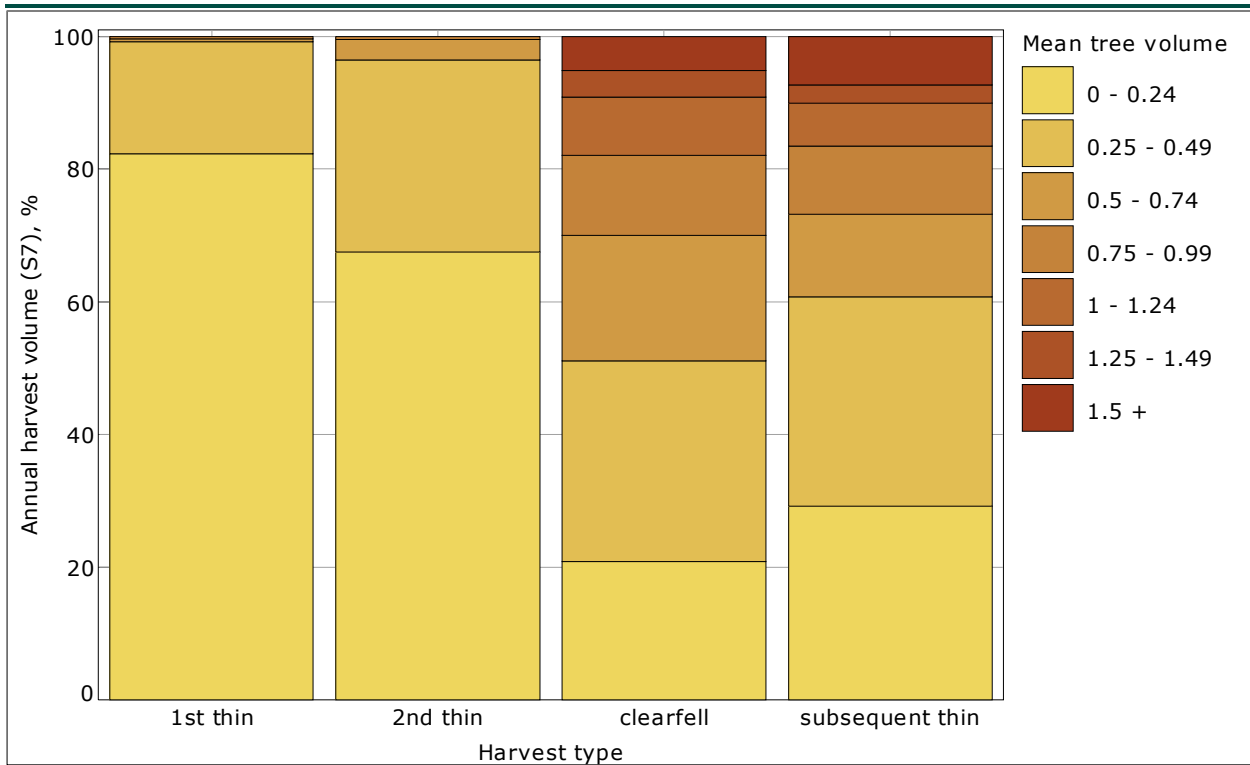
8.4 MEAN TREE SIZE

Definition
Mean tree volume
The mean standing overbark volume of living trees felled from stump to 7cm top diameter which.

8.4.1 Mean annual standing volume felled by harvest type and mean tree volume

Methodology
The mean standing volume of felled trees is classified by harvest type and mean tree volume class.

Mean tree volume	Harvest type / Annual harvest volume (S7)					
	1st thin			2nd thin		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
0 - 0.24	531.2	(395.1 - 667.3)	82.4	211.5	(132.6 - 290.5)	67.5
0.25 - 0.49	108.2	(62.6 - 153.7)	16.8	90.6	(41.9 - 139.3)	28.9
0.5 - 0.74	3.2	(0.0 - 6.9)	0.5	9.6	(2.3 - 16.9)	3.1
0.75 - 0.99	2.2	(0.0 - 6.4)	0.3	1.6	(0.0 - 4.7)	0.5
1 - 1.24	-	-	-	-	-	-
1.25 - 1.49	-	-	-	-	-	-
1.5 +	-	-	-	-	-	-
Total	644.7	(477.8 - 811.7)	100.0	313.2	(199.6 - 426.9)	100.0
Mean tree volume	Harvest type / Annual harvest volume (S7)					
	clearfell			subsequent thin		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
0 - 0.24	774.6	(566.0 - 983.3)	20.9	66.1	(29.7 - 102.5)	29.2
0.25 - 0.49	1,122.8	(846.3 - 1,399.3)	30.1	71.4	(35.1 - 107.6)	31.5
0.5 - 0.74	700.5	(515.3 - 885.6)	18.9	28.2	(2.9 - 53.6)	12.5
0.75 - 0.99	447.4	(309.8 - 585.0)	12.1	23.3	(0.0 - 47.6)	10.3
1 - 1.24	328.5	(207.6 - 449.5)	8.9	14.6	(0.8 - 28.5)	6.5
1.25 - 1.49	146.8	(80.9 - 212.7)	4.0	6.0	(0.0 - 14.4)	2.7
1.5 +	190.6	(76.6 - 304.5)	5.1	16.6	(0.0 - 38.8)	7.3
Total	3,711.2	(2,946.8 - 4,475.6)	100.0	226.3	(121.2 - 331.5)	100.0
Mean tree volume	Harvest type / Annual harvest volume (S7)					
	Total					
	thousands m ³	($\alpha = 0.05$)	%			
0 - 0.24	1,583.5	(1,324.0 - 1,842.9)	32.4			
0.25 - 0.49	1,392.9	(1,108.2 - 1,677.6)	28.5			
0.5 - 0.74	741.5	(554.7 - 928.2)	15.1			
0.75 - 0.99	474.4	(334.7 - 614.2)	9.7			
1 - 1.24	343.2	(221.5 - 464.9)	7.0			
1.25 - 1.49	152.8	(86.4 - 219.3)	3.1			
1.5 +	207.2	(91.5 - 322.8)	4.2			
Total	4,895.5	(4,108.9 - 5,682.0)	100.0			



8.4.2 Mean tree volume felled by species group

Methodology
The mean standing volume of felled trees is classified by species group.

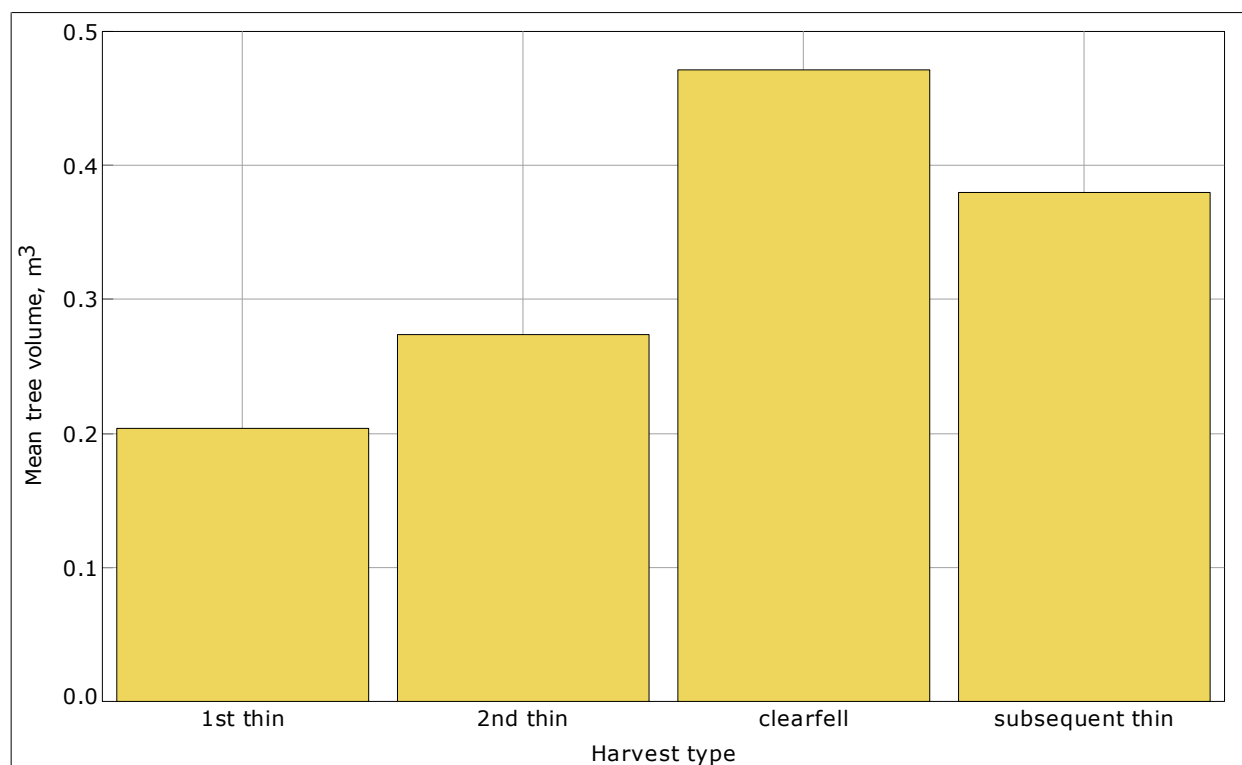
Species group	Mean tree volume	
	m ³	($\alpha = 0.05$)
Sitka spruce	0.36	(0.32 - 0.40)
Norway spruce	0.48	(0.28 - 0.67)
Scots pine	0.35	- -
other pines	0.31	(0.18 - 0.44)
Douglas fir	0.35	(0.00 - 1.59)
larch spp.	0.30	(0.17 - 0.43)
other conifers	0.77	- -
ses. & ped. oak	0.43	- -
beech	0.48	(0.00 - 2.52)
ash	0.25	(0.01 - 0.49)
sycamore	0.14	- -
birch spp.	0.18	(0.07 - 0.30)
alder	0.22	- -
OLL broadleaves	0.61	- -
OSL broadleaves	0.11	(0.00 - 0.42)
All	0.37	(0.33 - 0.40)

8.4.3 Mean tree volume felled by harvest type

Methodology

The mean standing volume of felled trees is classified by harvest type.

Harvest type	Mean tree volume	
	m ³	($\alpha = 0.05$)
1st thin	0.20	(0.18 – 0.23)
2nd thin	0.27	(0.00 – 0.55)
clearfell	0.47	(0.42 – 0.53)
subsequent thin	0.38	(0.32 – 0.44)
All	0.37	(0.33 – 0.40)

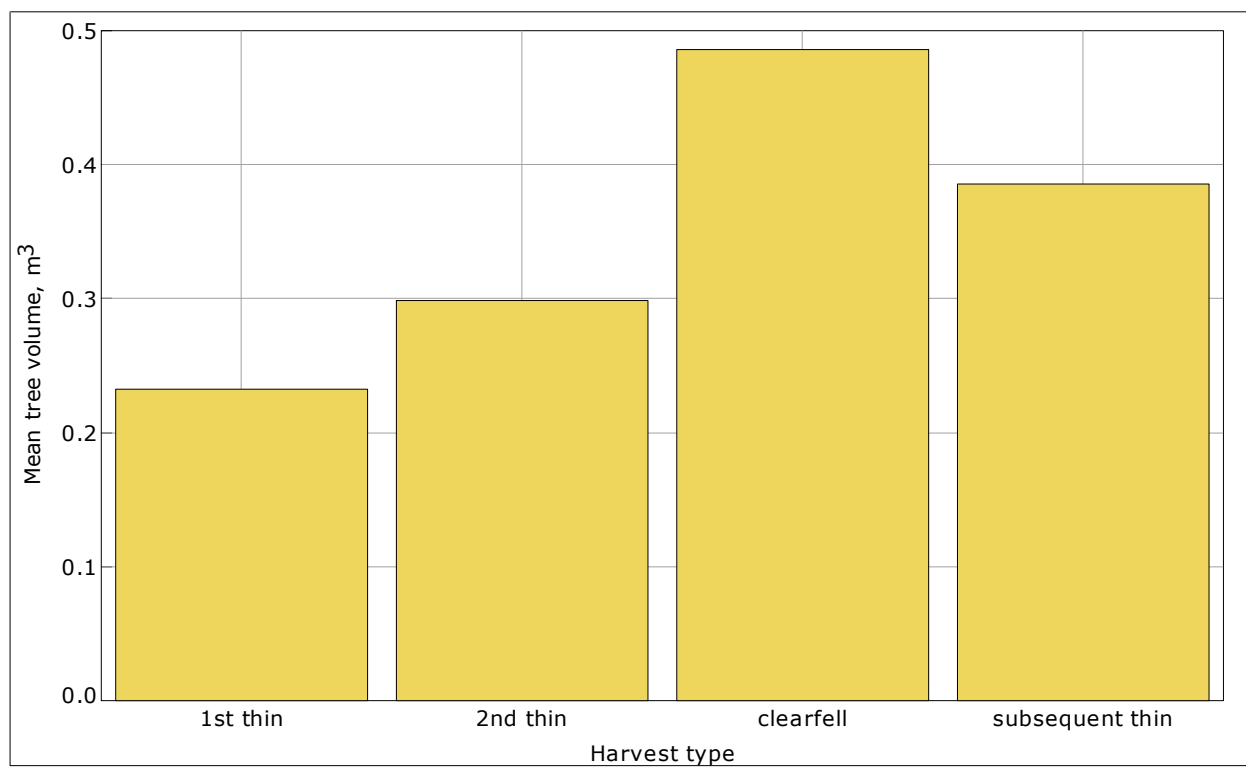


8.4.4 Mean Sitka spruce tree volume felled by harvest type

Methodology

The mean standing volume of Sitka spruce felled trees is classified by harvest type.

Harvest type	Mean tree volume	
	m ³	($\alpha = 0.05$)
1st thin	0.23	(0.21 – 0.25)
2nd thin	0.30	(0.28 – 0.32)
clearfell	0.49	(0.42 – 0.55)
subsequent thin	0.39	(0.00 – 0.94)
All	0.36	(0.32 – 0.40)



CHAPTER 9

INCREMENT (2013-2017)

The balance between increment and fellings is an important indicator of SFM in a country as it describes the sustainability of wood production over time, the current availability of wood and the potential for the future. Completing both the 2012 and 2017 NFI's allows a field-based assessment of forest increment in Ireland for the entire forest estate. Overall between 2013-2017, 58% of the gross annual increment was felled, showing an increase of 1.28 million over the period 2006-2012. Gross annual volume increment between 2013 and 2017 inclusive was 8.53 million m³. Over half (54.6%) of the increment occurred in the Public forest estate, while the share of Private (grant aided) increment has increased from 31.1% to 39.5%.

Sitka spruce dominates the volume increment in terms of species groups comprising 71.8% of the annual volume increment followed by other pines at 7.6%. The counties with most significant growing stock increment are distributed on the western and south western seaboard.

Overall, the mean annual increment is 12.1 m³ per ha per year. Public forests average 12.5 m³ per ha per year and Private (grant aided) are gaining increment at a faster rate of 14.8 m³ per ha per year, with Private (other) significantly lower at 4.5 m³ per ha per year. The differences are due to a combination of age, species composition and soil type.

9.1 DIAMETER AT BREAST HEIGHT

Definition

Dbh increment

The mean annual tree diameter growth of a stem at 1.3 m from ground level between NFI cycles.

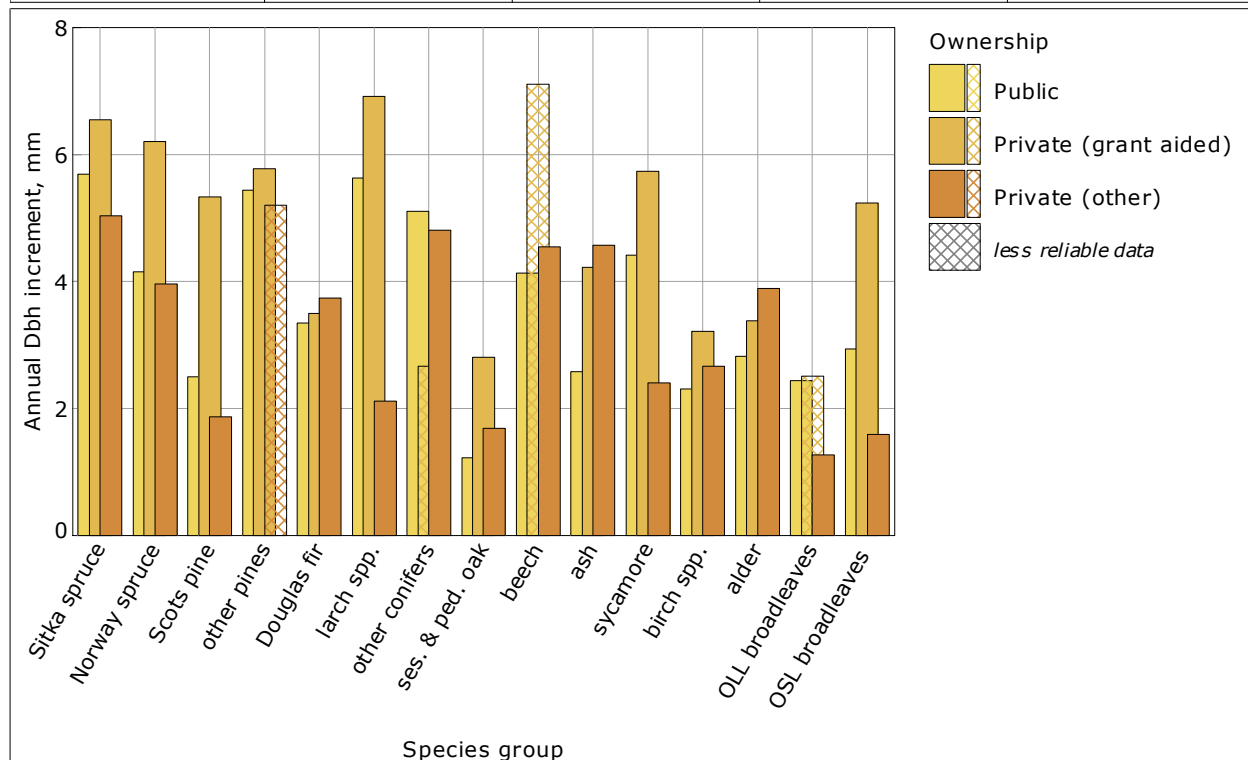
9.1.1 Weighted mean tree Dbh increment by species group and ownership

Methodology

Mean annual Dbh increment is classified by species group and ownership.

The evaluated variable, Dbh, is weighted by representative tree number. Weighting by the representative tree number removes the effect of the concentric circles.

Species group	Ownership / Annual Dbh increment			
	Public	Private (grant aided)	Private (other)	All
	mm ($\alpha=0.05$)	mm ($\alpha=0.05$)	mm ($\alpha=0.05$)	mm ($\alpha=0.05$)
Sitka spruce	5.7 (5.3 – 6.1)	6.6 (6.2 – 7.0)	5.0 (2.7 – 7.4)	6.0 (5.7 – 6.2)
Norway spruce	4.2 (3.7 – 4.6)	6.2 (5.5 – 6.9)	4.0 (0.0 – 8.9)	5.4 (4.4 – 6.4)
Scots pine	2.5 (0.2 – 4.8)	5.3 (0.2 – 10.5)	1.9 (0.7 – 3.0)	2.9 (2.2 – 3.5)
other pines	5.4 (4.5 – 6.3)	5.8 (5.3 – 6.2)	5.2 – –	5.6 (4.7 – 6.5)
Douglas fir	3.3 (2.7 – 4.0)	3.5 (0.0 – 14.2)	3.7 (0.0 – 14.3)	3.6 (3.0 – 4.2)
larch spp.	5.6 (4.6 – 6.6)	6.9 (6.2 – 7.6)	2.1 (1.0 – 3.2)	6.1 (5.4 – 6.8)
other conifers	5.1 (3.6 – 6.6)	2.7 – –	4.8 (0.0 – 20.1)	4.6 (3.2 – 5.9)
ses. & ped. oak	1.2 (0.7 – 1.8)	2.8 (0.0 – 7.1)	1.7 (1.1 – 2.3)	1.8 (1.3 – 2.4)
beech	4.1 (2.3 – 5.9)	7.1 – –	4.5 (1.8 – 7.3)	4.1 (3.1 – 5.2)
ash	2.6 (1.4 – 3.7)	4.2 (0.0 – 16.9)	4.6 (3.7 – 5.5)	4.0 (3.3 – 4.7)
sycamore	4.4 (0.0 – 16.8)	5.7 (5.0 – 6.4)	2.4 (1.8 – 3.0)	3.4 (2.4 – 4.5)
birch spp.	2.3 (1.8 – 2.8)	3.2 (0.0 – 6.5)	2.7 (2.2 – 3.2)	2.4 (2.1 – 2.8)
alder	2.8 (2.0 – 3.7)	3.4 (2.8 – 4.0)	3.9 (0.0 – 20.2)	3.3 (2.3 – 4.4)
OLL broadleaves	2.4 (1.5 – 3.4)	2.5 – –	1.3 (0.0 – 3.0)	1.9 (0.6 – 3.3)
OSL broadleaves	2.9 (1.4 – 4.4)	5.2 (2.6 – 7.9)	1.6 (1.1 – 2.1)	2.6 (2.1 – 3.0)
All	4.7 (4.4 – 4.9)	6.1 (5.8 – 6.4)	2.6 (2.2 – 3.1)	4.9 (4.7 – 5.1)



9.1.2 Weighted mean tree Dbh increment by species group and age class (10yr)

Methodology

Mean annual Dbh increment is classified by species group and age class.

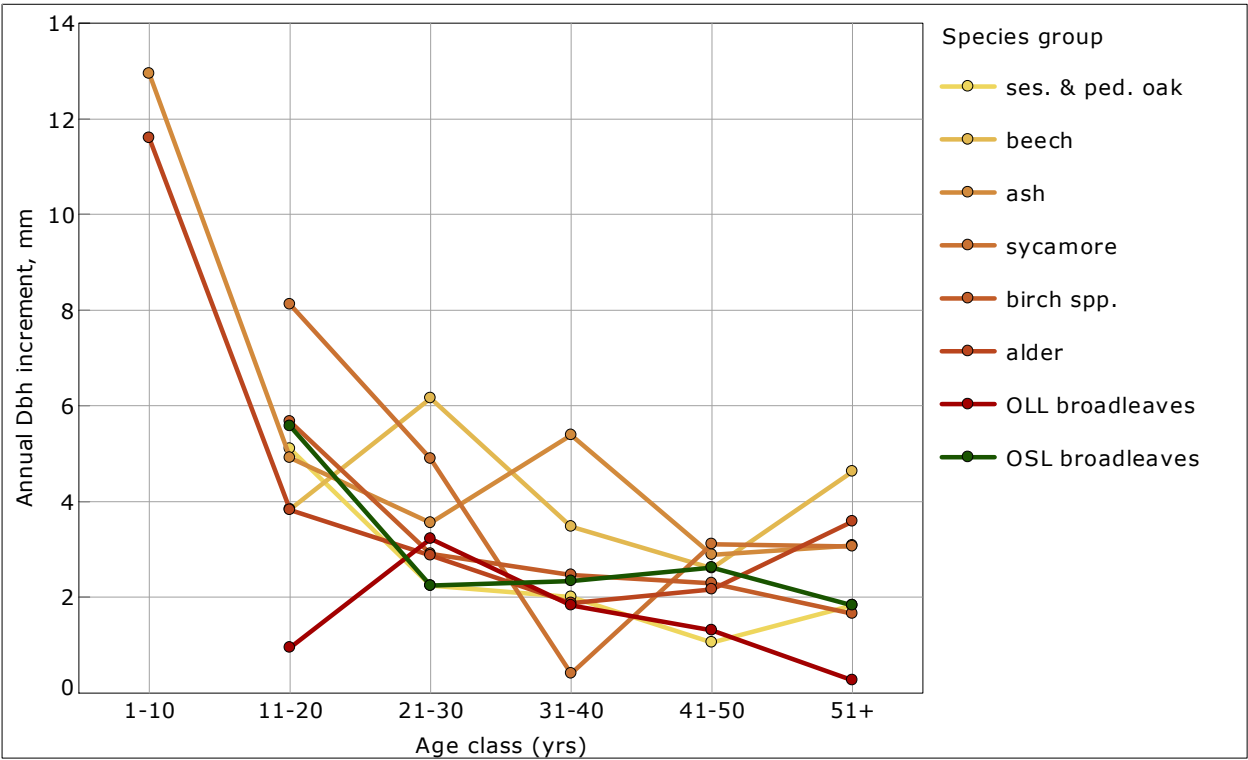
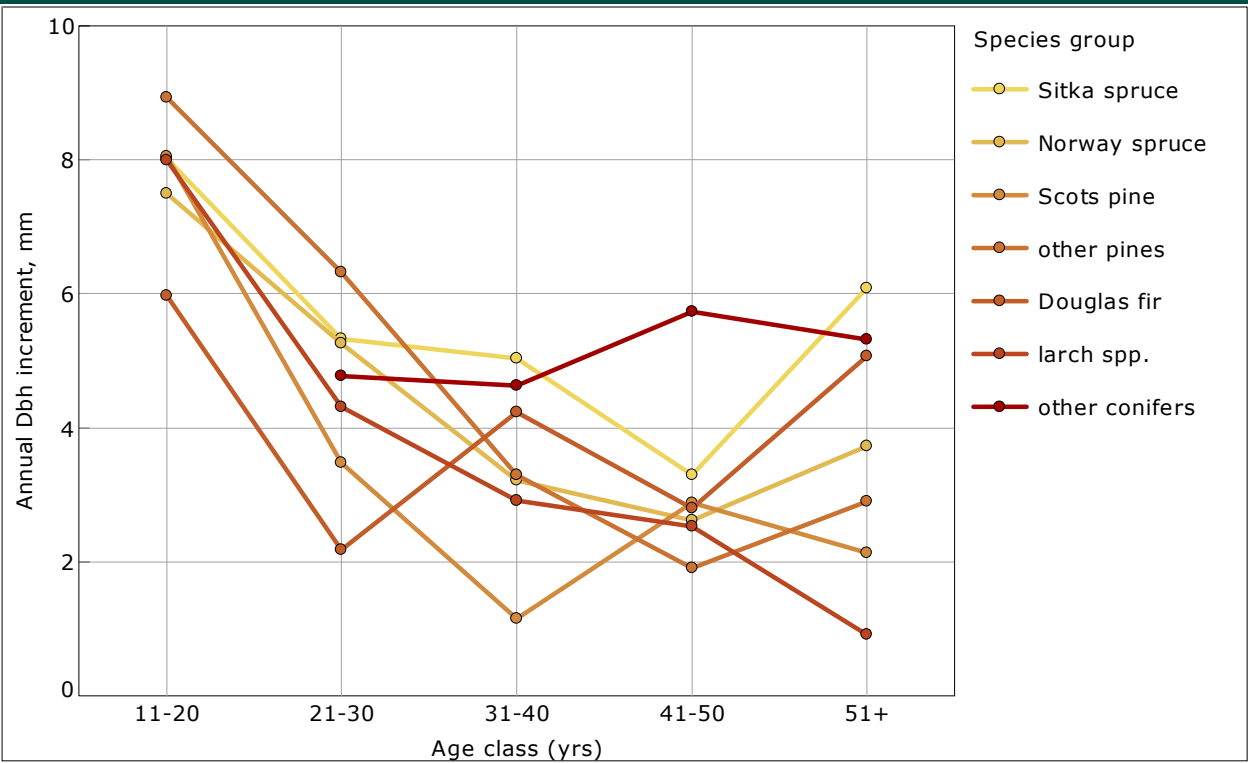
The evaluated variable, Dbh, is weighted by representative tree number. Weighting by the representative tree number removes the effect of the concentric circles.

Age class (yrs)	Species group / Annual Dbh increment			
	Sitka spruce	Norway spruce	Scots pine	other pines
	mm ($\alpha=0.05$)	mm ($\alpha=0.05$)	mm ($\alpha=0.05$)	mm ($\alpha=0.05$)
1-10	- - -	- - -	- - -	- - -
11-20	8.0 (7.5 - 8.5)	7.5 (6.9 - 8.1)	8.1 - -	8.9 (8.3 - 9.5)
21-30	5.3 (5.0 - 5.6)	5.3 (1.5 - 9.0)	3.5 - -	6.3 (5.2 - 7.5)
31-40	5.0 (4.5 - 5.5)	3.2 - -	1.1 - -	3.3 (2.6 - 4.0)
41-50	3.3 (2.6 - 4.0)	2.6 (0.0 - 8.5)	2.9 (2.5 - 3.3)	1.9 (0.0 - 17.3)
51+	6.1 (1.8 - 10.4)	3.7 (0.0 - 8.1)	2.1 (1.4 - 2.8)	2.9 (0.0 - 6.0)
All	6.0 (5.7 - 6.2)	5.4 (4.4 - 6.4)	2.9 (2.2 - 3.5)	5.6 (4.7 - 6.5)

Age class (yrs)	Species group / Annual Dbh increment			
	Douglas fir	larch spp.	other conifers	ses. & ped. oak
	mm ($\alpha=0.05$)	mm ($\alpha=0.05$)	mm ($\alpha=0.05$)	mm ($\alpha=0.05$)
1-10	- - -	- - -	- - -	- - -
11-20	6.0 (5.6 - 6.4)	8.0 (7.3 - 8.7)	- - -	5.1 - -
21-30	2.2 (1.6 - 2.8)	4.3 (3.5 - 5.1)	4.8 (0.0 - 9.5)	2.2 (0.1 - 4.4)
31-40	4.2 - -	2.9 (0.6 - 5.2)	4.6 (2.8 - 6.4)	2.0 (0.0 - 6.3)
41-50	2.8 (0.0 - 6.4)	2.5 - -	5.7 (4.5 - 6.9)	1.1 (0.0 - 2.9)
51+	5.1 (0.0 - 10.8)	0.9 (0.0 - 7.1)	5.3 (2.3 - 8.4)	1.8 (1.3 - 2.3)
All	3.6 (3.0 - 4.2)	6.1 (5.4 - 6.8)	4.6 (3.2 - 5.9)	1.8 (1.3 - 2.4)

Age class (yrs)	Species group / Annual Dbh increment			
	beech	ash	sycamore	birch spp.
	mm ($\alpha=0.05$)	mm ($\alpha=0.05$)	mm ($\alpha=0.05$)	mm ($\alpha=0.05$)
1-10	- - -	12.9 - -	- - -	- - -
11-20	3.8 - -	4.9 (3.1 - 6.7)	8.1 (7.2 - 9.0)	5.7 (4.6 - 6.8)
21-30	6.2 - -	3.6 (3.1 - 4.0)	4.9 (2.5 - 7.3)	2.9 (2.0 - 3.9)
31-40	3.5 (2.9 - 4.1)	5.4 (0.0 - 22.2)	0.4 - -	2.5 (2.0 - 2.9)
41-50	2.6 (1.1 - 4.1)	2.9 (2.0 - 3.8)	3.1 - -	2.3 (1.7 - 2.9)
51+	4.6 (3.3 - 6.0)	3.1 (2.2 - 3.9)	3.1 (0.5 - 5.6)	1.7 (1.2 - 2.1)
All	4.1 (3.1 - 5.2)	4.0 (3.3 - 4.7)	3.4 (2.4 - 4.5)	2.4 (2.1 - 2.8)

Age class (yrs)	Species group / Annual Dbh increment			
	alder	OLL broadleaves	OSL broadleaves	All
	mm ($\alpha=0.05$)	mm ($\alpha=0.05$)	mm ($\alpha=0.05$)	mm ($\alpha=0.05$)
1-10	11.6 - -	- - -	- - -	12.2 - -
11-20	3.8 (2.9 - 4.8)	0.9 - -	5.6 (4.2 - 7.0)	7.7 (7.3 - 8.1)
21-30	2.9 (1.9 - 3.8)	3.2 (1.1 - 5.3)	2.2 (1.6 - 2.9)	4.6 (4.4 - 4.8)
31-40	1.9 (0.8 - 3.0)	1.8 (0.4 - 3.2)	2.3 (1.7 - 2.9)	3.3 (3.0 - 3.6)
41-50	2.2 (0.1 - 4.2)	1.3 (1.0 - 1.6)	2.6 (1.1 - 4.1)	2.7 (2.3 - 3.0)
51+	3.6 (0.0 - 23.7)	0.3 (0.0 - 1.6)	1.8 (0.7 - 3.0)	2.7 (2.2 - 3.2)
All	3.3 (2.3 - 4.4)	1.9 (0.6 - 3.3)	2.6 (2.1 - 3.0)	4.9 (4.7 - 5.1)



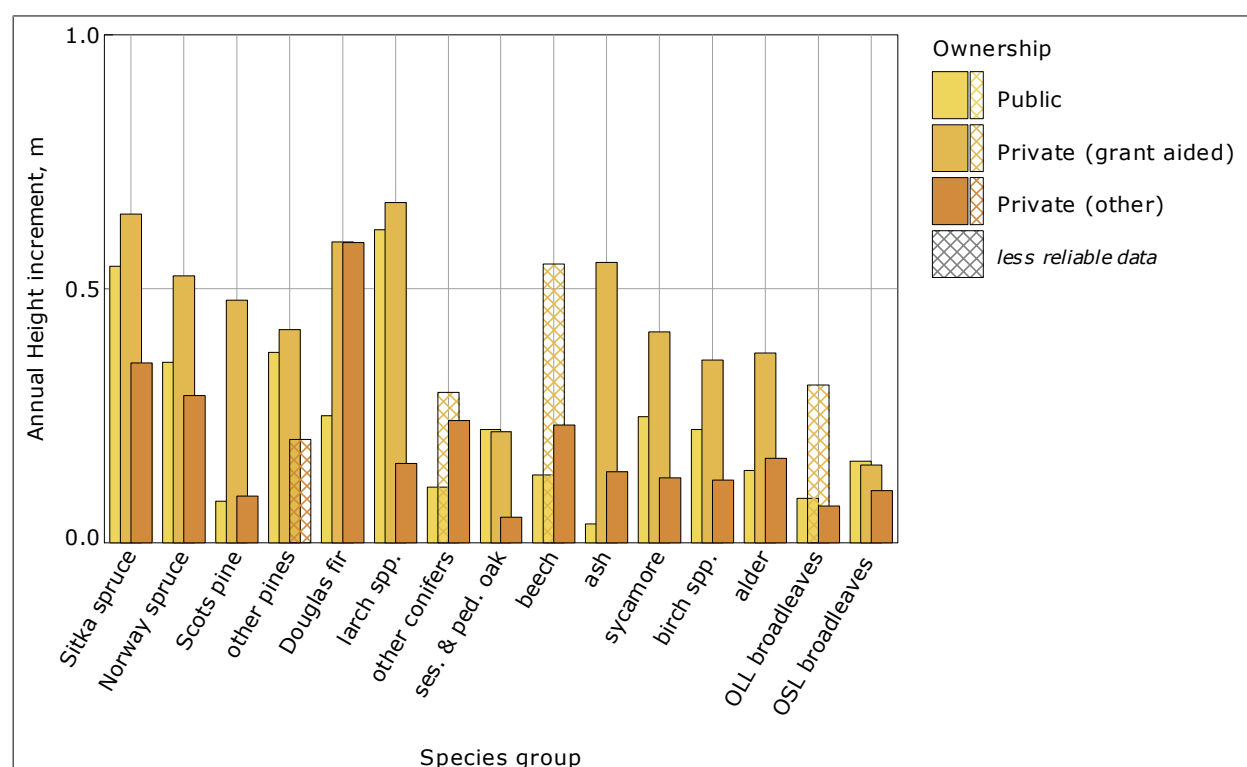
9.2 HEIGHT

Definition
Height increment
The mean annual tree height growth.

9.2.1 Weighted mean tree height increment by species group and ownership

Methodology
Mean annual height increment is classified by species group and ownership.
The evaluated variable, height, is weighted by representative tree number. Weighting by the representative tree number removes the effect of the concentric circles.

Species group	Ownership / Annual Height increment			
	Public	Private (grant aided)	Private (other)	All
	m (α = 0.05)	m (α = 0.05)	m (α = 0.05)	m (α = 0.05)
Sitka spruce	0.55 (0.52 – 0.57)	0.65 (0.62 – 0.68)	0.35 (0.25 – 0.46)	0.57 (0.55 – 0.59)
Norway spruce	0.36 (0.27 – 0.44)	0.53 (0.49 – 0.56)	0.29 (0.14 – 0.44)	0.44 (0.39 – 0.50)
Scots pine	0.08 (0.01 – 0.15)	0.48 (0.04 – 0.92)	0.09 (0.07 – 0.11)	0.16 (0.11 – 0.22)
other pines	0.38 (0.31 – 0.44)	0.42 (0.38 – 0.46)	0.20 – –	0.36 (0.30 – 0.42)
Douglas fir	0.25 (0.17 – 0.33)	0.59 (0.04 – 1.14)	0.59 (0.37 – 0.81)	0.36 (0.27 – 0.45)
larch spp.	0.62 (0.56 – 0.68)	0.67 (0.61 – 0.73)	0.16 (0.06 – 0.25)	0.60 (0.54 – 0.66)
other conifers	0.11 (0.00 – 0.29)	0.30 – –	0.24 (0.00 – 0.49)	0.12 (0.05 – 0.19)
ses. & ped. oak	0.22 (0.15 – 0.30)	0.22 (0.00 – 1.12)	0.05 (0.00 – 0.18)	0.13 (0.04 – 0.22)
beech	0.13 (0.02 – 0.25)	0.55 – –	0.23 (0.13 – 0.33)	0.17 (0.07 – 0.26)
ash	0.04 (0.00 – 1.24)	0.55 (0.46 – 0.65)	0.14 (0.00 – 1.15)	0.24 (0.15 – 0.33)
sycamore	0.25 (0.22 – 0.27)	0.42 (0.10 – 0.73)	0.13 (0.00 – 1.65)	0.24 (0.16 – 0.31)
birch spp.	0.22 (0.15 – 0.30)	0.36 (0.00 – 0.88)	0.12 (0.06 – 0.19)	0.20 (0.15 – 0.25)
alder	0.14 (0.06 – 0.22)	0.37 (0.26 – 0.48)	0.17 (0.00 – 0.34)	0.21 (0.13 – 0.30)
OLL broadleaves	0.09 (0.00 – 0.50)	0.31 – –	0.07 (0.00 – 0.18)	0.10 (0.02 – 0.17)
OSL broadleaves	0.16 (0.09 – 0.23)	0.15 (0.00 – 0.55)	0.10 (0.05 – 0.16)	0.15 (0.11 – 0.20)
All	0.43 (0.40 – 0.45)	0.59 (0.56 – 0.61)	0.16 (0.13 – 0.19)	0.44 (0.42 – 0.46)



9.2.2 Weighted mean tree height increment by species group and age class (10yr)

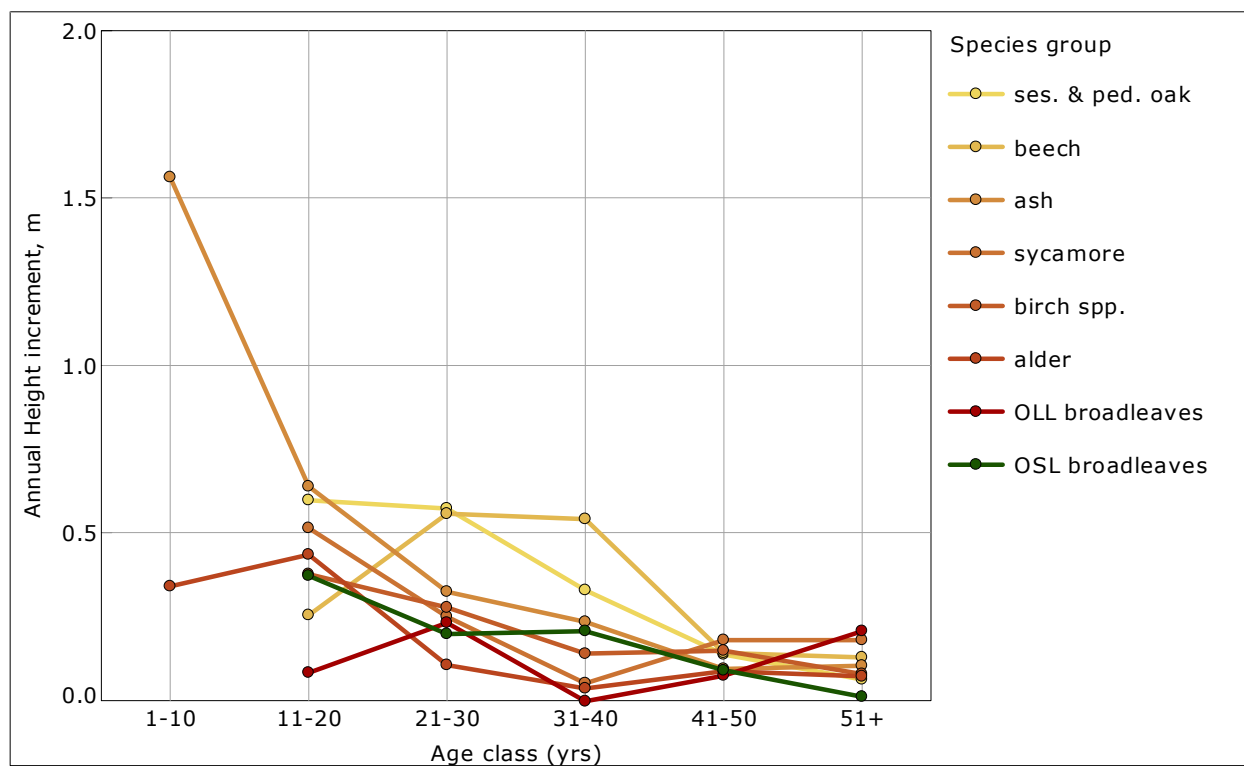
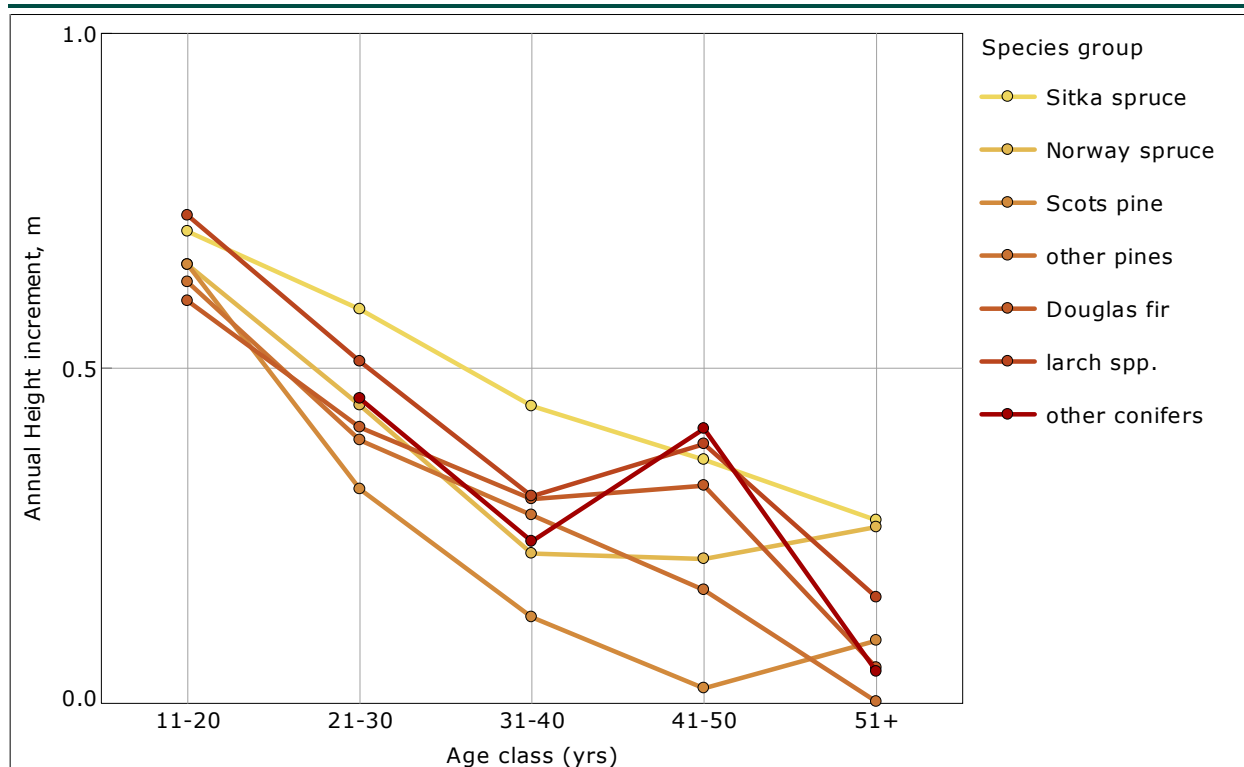
Methodology	
Mean annual height increment is classified by species group and age class.	
The evaluated variable, height, is weighted by representative tree number. Weighting by the representative tree number removes the effect of the concentric circles.	

Age class (yrs)	Species group / Annual Height increment				
	Sitka spruce	Norway spruce	Scots pine	other pines	Douglas fir
	m (α = 0.05)	m (α = 0.05)	m (α = 0.05)	m (α = 0.05)	m (α = 0.05)
1-10	- - -	- - -	- - -	- - -	- - -
11-20	0.70 (0.67 - 0.74)	0.65 (0.61 - 0.70)	0.65 - -	0.63 (0.54 - 0.71)	0.60 (0.43 - 0.77)
21-30	0.59 (0.56 - 0.61)	0.44 (0.37 - 0.52)	0.32 - -	0.39 (0.34 - 0.45)	0.41 (0.30 - 0.52)
31-40	0.44 (0.40 - 0.48)	0.22 - -	0.13 - -	0.28 (0.19 - 0.37)	0.30 - -
41-50	0.36 (0.31 - 0.42)	0.22 (0.19 - 0.24)	0.02 (0.00 - 0.68)	0.17 (0.00 - 0.39)	0.33 (0.16 - 0.49)
51+	0.27 (0.03 - 0.52)	0.26 (0.00 - 1.27)	0.09 (0.01 - 0.18)	0.00 (0.00 - 0.47)	0.05 (0.00 - 1.43)
All	0.57 (0.55 - 0.59)	0.44 (0.39 - 0.50)	0.16 (0.11 - 0.22)	0.36 (0.30 - 0.42)	0.36 (0.27 - 0.45)

Age class (yrs)	Species group / Annual Height increment				
	larch spp.	other conifers	ses. & ped. oak	beech	ash
	m (α = 0.05)	m (α = 0.05)	m (α = 0.05)	m (α = 0.05)	m (α = 0.05)
1-10	- - -	- - -	- - -	- - -	1.56 - -
11-20	0.73 (0.67 - 0.78)	- - -	0.60 - -	0.25 - -	0.64 (0.00 - 1.45)
21-30	0.51 (0.46 - 0.56)	0.46 (0.30 - 0.61)	0.57 (0.41 - 0.74)	0.56 - -	0.32 (0.24 - 0.41)
31-40	0.31 (0.20 - 0.42)	0.24 (0.14 - 0.35)	0.33 (0.00 - 1.04)	0.54 (0.46 - 0.62)	0.24 (0.10 - 0.37)
41-50	0.39 - -	0.41 (0.00 - 1.46)	0.14 (0.00 - 0.37)	0.14 (0.00 - 0.39)	0.10 (0.00 - 0.19)
51+	0.16 (0.00 - 1.07)	0.05 (0.00 - 0.15)	0.06 (0.00 - 0.15)	0.13 (0.05 - 0.20)	0.10 (0.00 - 0.24)
All	0.60 (0.54 - 0.66)	0.12 (0.05 - 0.19)	0.13 (0.04 - 0.22)	0.17 (0.07 - 0.26)	0.24 (0.15 - 0.33)

Age class (yrs)	Species group / Annual Height increment				
	sycamore	birch spp.	alder	OLL broadleaves	OSL broadleaves
	m (α = 0.05)	m (α = 0.05)	m (α = 0.05)	m (α = 0.05)	m (α = 0.05)
1-10	- - -	- - -	0.34 - -	- - -	- - -
11-20	0.52 (0.48 - 0.55)	0.38 (0.26 - 0.50)	0.44 (0.33 - 0.54)	0.08 - -	0.37 (0.00 - 0.86)
21-30	0.25 (0.00 - 1.74)	0.28 (0.17 - 0.38)	0.11 (0.00 - 0.22)	0.23 (0.17 - 0.29)	0.20 (0.00 - 0.40)
31-40	0.05 - -	0.14 (0.06 - 0.22)	0.04 (0.01 - 0.07)	0.00 (0.00 - 0.59)	0.21 (0.11 - 0.31)
41-50	0.18 - -	0.15 (0.07 - 0.23)	0.09 (0.00 - 0.44)	0.07 (0.00 - 0.25)	0.09 (0.00 - 0.18)
51+	0.18 (0.00 - 0.61)	0.08 (0.00 - 0.18)	0.07 (0.00 - 0.33)	0.21 (0.09 - 0.32)	0.01 (0.00 - 0.06)
All	0.24 (0.16 - 0.31)	0.20 (0.15 - 0.25)	0.21 (0.13 - 0.30)	0.10 (0.02 - 0.17)	0.15 (0.11 - 0.20)

Age class (yrs)	Species group / Annual Height increment	
	All	
	m (α = 0.05)	
1-10	0.91 - -	
11-20	0.64 (0.61 - 0.66)	
21-30	0.46 (0.44 - 0.49)	
31-40	0.26 (0.23 - 0.29)	
41-50	0.21 (0.17 - 0.25)	
51+	0.10 (0.06 - 0.14)	
All	0.44 (0.42 - 0.46)	



9.3 GROSS VOLUME INCREMENT

Definition

Gross Annual Volume Increment

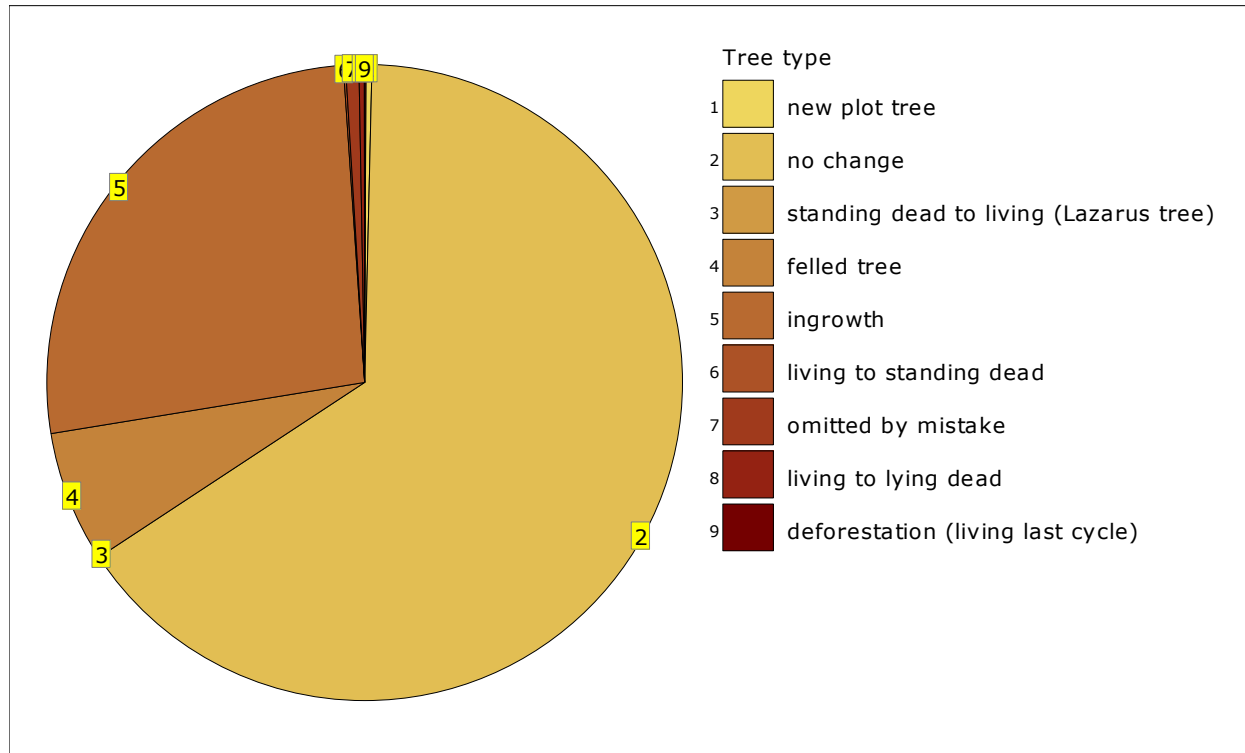
Mean annual overbark volume increment from stump to 7cm top diameter, of all living trees with Dbh greater than 7cm, during the reference period 2013-2017. Includes the increment of trees which have been felled or have died during the reference period.

9.3.1 Gross annual volume increment by increment components

Methodology

Gross annual volume increment is classified into components to facilitate the calculation of net annual increment.

Tree type	Annual volume increment (S7)		
	thousands m ³	($\alpha = 0.05$)	%
new plot tree	24.9	(0.0 - 55.5)	0.3
no change	5,592.8	(5,323.2 - 5,862.5)	65.4
standing dead to living (Lazarus tree)	0.1	(0.0 - 3.2)	0.002
felled tree	567.9	(510.2 - 625.6)	6.7
ingrowth	2,250.5	(2,144.1 - 2,356.8)	26.4
living to standing dead	8.4	(0.0 - 18.7)	0.1
omitted by mistake	59.3	(39.4 - 79.2)	0.7
living to lying dead	21.4	(15.1 - 27.7)	0.3
deforestation (living last cycle)	6.6	(6.1 - 7.2)	0.08
Total	8,532.0	(8,185.4 - 8,878.6)	100.0

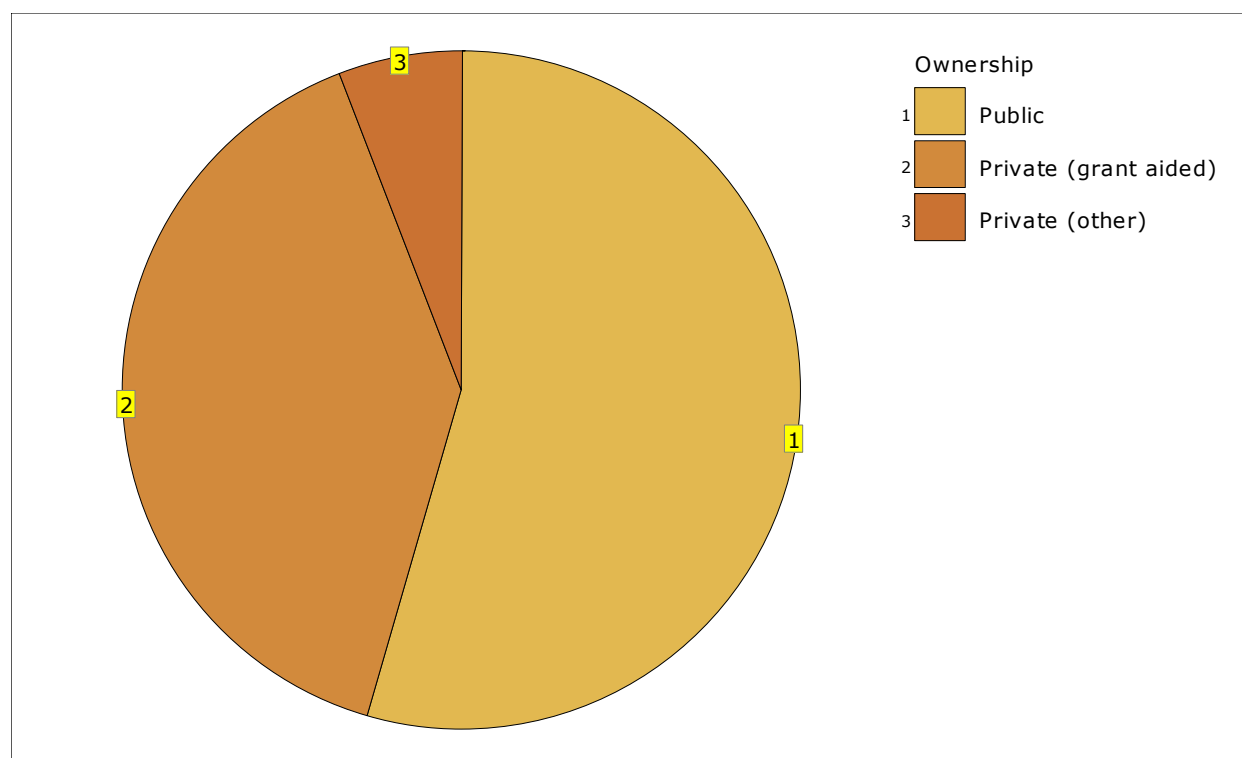


9.3.2 Gross annual volume increment by ownership

Methodology

Gross annual volume increment is classified by ownership.

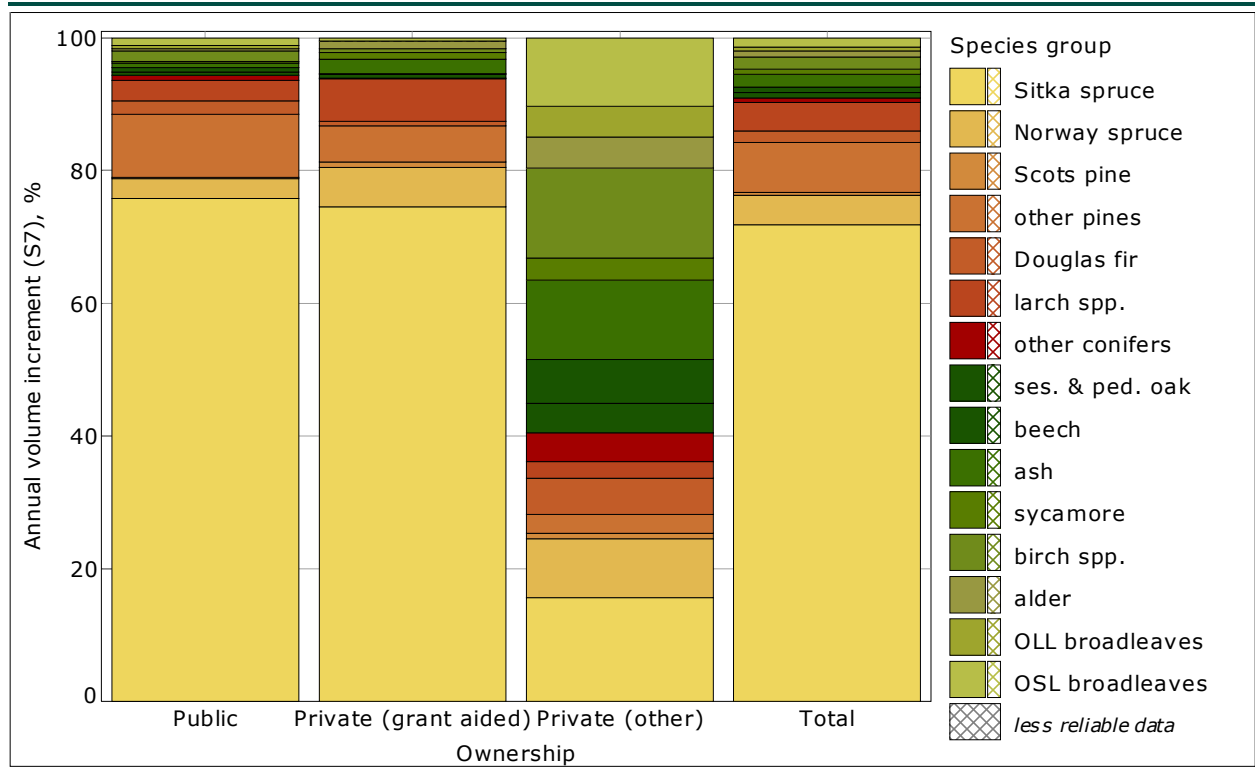
Ownership	Annual volume increment (S7)		
	thousands m ³	($\alpha = 0.05$)	%
Public	4,656.0	(4,405.7 – 4,906.2)	54.6
Private (grant aided)	3,373.4	(3,177.5 – 3,569.2)	39.5
Private (other)	502.6	(426.5 – 578.8)	5.9
Total	8,532.0	(8,185.4 – 8,878.6)	100.0



9.3.3 Gross annual volume increment by species group and ownership

Methodology
Gross annual volume increment is classified by species group and ownership.

Species group	Ownership / Annual volume increment (S7)					
	Public			Private (grant aided)		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
Sitka spruce	3,532.1	(3,304.1 – 3,760.1)	76.0	2,514.6	(2,339.9 – 2,689.3)	74.5
Norway spruce	138.1	(97.3 – 178.9)	3.0	202.0	(169.0 – 234.9)	6.0
Scots pine	11.5	(2.6 – 20.4)	0.2	27.3	(19.2 – 35.5)	0.8
other pines	439.1	(382.0 – 496.2)	9.4	185.3	(149.9 – 220.7)	5.5
Douglas fir	92.6	(68.8 – 116.4)	2.0	23.3	(0.0 – 48.0)	0.7
larch spp.	146.2	(106.8 – 185.6)	3.1	215.5	(183.7 – 247.4)	6.4
other conifers	36.2	(8.5 – 63.8)	0.8	1.7	–	0.05
ses. & ped. oak	20.5	(13.0 – 28.0)	0.4	19.4	(0.0 – 42.8)	0.6
beech	34.9	(20.7 – 49.1)	0.7	3.2	–	0.1
ash	28.2	(13.8 – 42.5)	0.6	73.9	(58.1 – 89.8)	2.2
sycamore	15.1	(0.0 – 38.8)	0.3	36.4	(19.9 – 52.9)	1.1
birch spp.	70.5	(59.4 – 81.6)	1.5	16.1	(7.5 – 24.7)	0.5
alder	17.6	(10.7 – 24.5)	0.4	38.5	(26.9 – 50.1)	1.1
OLL broadleaves	21.5	(0.0 – 55.4)	0.5	2.6	–	0.08
OSL broadleaves	51.9	(38.3 – 65.5)	1.1	13.6	(0.0 – 32.0)	0.4
Total	4,656.0	(4,405.7 – 4,906.2)	100.0	3,373.4	(3,177.5 – 3,569.2)	100.0
Species group	Ownership / Annual volume increment (S7)					
	Private (other)			Total		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
Sitka spruce	78.6	(17.7 – 139.4)	15.6	6,125.2	(5,829.8 – 6,420.6)	71.8
Norway spruce	44.4	(0.0 – 158.2)	8.8	384.5	(333.0 – 436.1)	4.5
Scots pine	4.4	(2.0 – 6.8)	0.9	43.2	(27.8 – 58.6)	0.5
other pines	14.0	(13.6 – 14.4)	2.8	638.4	(570.9 – 705.8)	7.5
Douglas fir	27.7	(24.5 – 31.0)	5.5	143.6	(108.9 – 178.3)	1.7
larch spp.	12.5	(0.0 – 31.6)	2.5	374.3	(326.6 – 422.0)	4.4
other conifers	21.7	(0.2 – 43.2)	4.3	59.6	(29.7 – 89.5)	0.7
ses. & ped. oak	22.3	(10.6 – 33.9)	4.4	62.2	(43.7 – 80.6)	0.7
beech	33.5	(20.2 – 46.9)	6.7	71.7	(52.5 – 90.8)	0.8
ash	60.0	(46.3 – 73.7)	11.9	162.1	(128.8 – 195.4)	1.9
sycamore	16.9	(0.0 – 43.5)	3.4	68.4	(38.8 – 98.0)	0.8
birch spp.	67.9	(53.9 – 81.9)	13.5	154.5	(135.8 – 173.2)	1.8
alder	23.4	(14.2 – 32.6)	4.7	79.5	(62.1 – 96.9)	0.9
OLL broadleaves	24.1	(0.0 – 60.1)	4.8	48.2	(21.2 – 75.1)	0.6
OSL broadleaves	51.3	(34.8 – 67.7)	10.2	116.7	(93.9 – 139.6)	1.4
Total	502.6	(426.5 – 578.8)	100.0	8,532.0	(8,185.4 – 8,878.6)	100.0



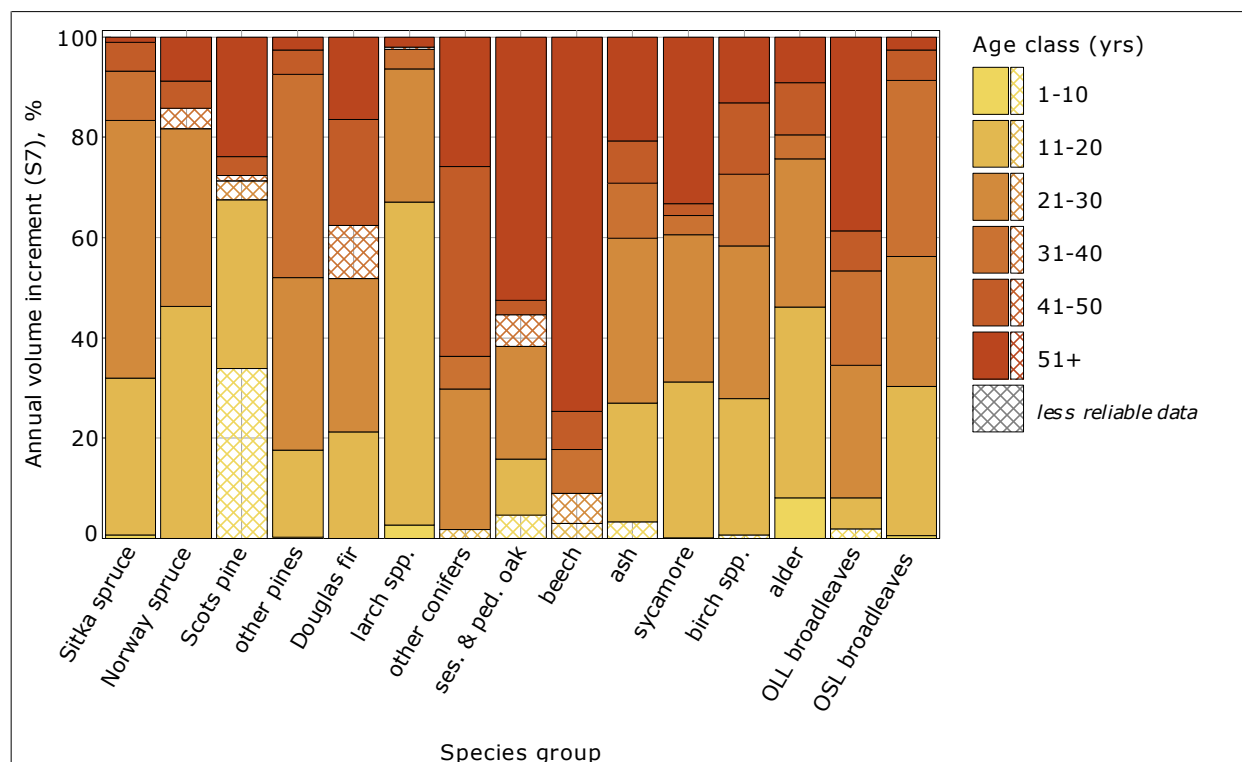
9.3.4 Gross annual volume increment by species group and age class (10yr)

Methodology						
Gross annual volume increment is classified by species group and age class (10yr).						
Age class (yrs)	Species group / Annual volume increment (S7)					
	Sitka spruce			Norway spruce		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
1-10	50.1	(0.0 - 101.9)	0.8	-	-	-
11-20	1,912.0	(1,766.5 - 2,057.5)	31.2	178.3	(143.0 - 213.6)	46.4
21-30	3,142.1	(2,931.5 - 3,352.6)	51.3	136.1	(107.7 - 164.6)	35.4
31-40	599.8	(500.2 - 699.4)	9.8	15.7	-	4.1
41-50	353.5	(284.2 - 422.8)	5.8	20.9	(9.3 - 32.6)	5.4
51+	67.7	(20.5 - 115.0)	1.1	33.4	(25.5 - 41.4)	8.7
Total	6,125.2	(5,829.8 - 6,420.6)	100.0	384.5	(333.0 - 436.1)	100.0
Age class (yrs)	Species group / Annual volume increment (S7)					
	Scots pine			other pines		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
1-10	14.6	-	33.8	2.1	-	0.3
11-20	14.5	(4.7 - 24.3)	33.6	110.7	(87.1 - 134.3)	17.3
21-30	1.6	-	3.8	219.6	(174.2 - 264.9)	34.4
31-40	0.5	-	1.2	258.4	(220.3 - 296.5)	40.5
41-50	1.6	(0.0 - 4.5)	3.7	31.4	(13.7 - 49.1)	4.9
51+	10.3	(3.4 - 17.2)	23.9	16.3	(0.0 - 61.7)	2.6
Total	43.2	(27.8 - 58.6)	100.0	638.4	(570.9 - 705.8)	100.0
Age class (yrs)	Species group / Annual volume increment (S7)					
	Douglas fir			larch spp.		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
1-10	-	-	-	10.2	(5.3 - 15.0)	2.7
11-20	30.5	(9.6 - 51.3)	21.2	241.0	(202.7 - 279.2)	64.4
21-30	44.0	(26.8 - 61.2)	30.7	99.1	(71.8 - 126.4)	26.5
31-40	15.1	-	10.5	14.9	(8.4 - 21.3)	4.0
41-50	30.4	(15.7 - 45.1)	21.2	2.0	-	0.5
51+	23.6	(13.6 - 33.6)	16.4	7.2	(0.0 - 48.8)	1.9
Total	143.6	(108.9 - 178.3)	100.0	374.3	(326.6 - 422.0)	100.0
Age class (yrs)	Species group / Annual volume increment (S7)					
	other conifers			ses. & ped. oak		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
1-10	-	-	-	2.9	-	4.6
11-20	1.1	-	1.8	7.0	(0.0 - 21.2)	11.2
21-30	16.7	(0.0 - 113.4)	28.0	14.0	(2.6 - 25.3)	22.5
31-40	3.9	(0.0 - 11.4)	6.5	3.9	-	6.4
41-50	22.6	(0.0 - 51.1)	37.9	1.8	(0.0 - 4.5)	2.9
51+	15.4	(0.0 - 51.7)	25.8	32.6	(18.8 - 46.4)	52.4
Total	59.6	(29.7 - 89.5)	100.0	62.2	(43.7 - 80.6)	100.0
Age class (yrs)	Species group / Annual volume increment (S7)					
	beech			ash		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
1-10	-	-	-	5.3	-	3.3
11-20	2.2	-	3.0	38.5	(26.1 - 51.0)	23.8
21-30	4.3	-	6.0	53.2	(23.7 - 82.7)	32.8
31-40	6.3	(0.6 - 12.1)	8.8	17.8	(12.3 - 23.3)	11.0
41-50	5.3	(4.2 - 6.5)	7.4	13.8	(0.0 - 29.0)	8.5
51+	53.5	(36.8 - 70.3)	74.8	33.4	(22.7 - 44.2)	20.6
Total	71.7	(52.5 - 90.8)	100.0	162.1	(128.8 - 195.4)	100.0

Age class (yrs)	Species group / Annual volume increment (S7)					
	sycamore			birch spp.		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
1-10	0.1	-	-	0.2	-	-
11-20	21.2	(1.3 - 41.1)	31.0	41.9	(31.6 - 52.2)	27.1
21-30	20.1	(0.0 - 48.7)	29.4	47.1	(35.8 - 58.3)	30.6
31-40	2.5	(0.0 - 19.6)	3.7	22.0	(14.9 - 29.1)	14.2
41-50	1.6	(0.8 - 2.5)	2.4	22.0	(11.9 - 32.2)	14.2
51+	22.7	(0.0 - 130.4)	33.3	20.2	(11.4 - 29.0)	13.1
Total	68.4	(38.8 - 98.0)	100.0	154.5	(135.8 - 173.2)	100.0

Age class (yrs)	Species group / Annual volume increment (S7)					
	alder			OLL broadleaves		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
1-10	6.4	(2.7 - 10.2)	8.1	0.9	-	-
11-20	30.3	(23.4 - 37.3)	38.1	3.0	(0.9 - 5.1)	6.3
21-30	23.4	(0.0 - 51.2)	29.5	12.6	(0.0 - 48.5)	26.3
31-40	3.9	(0.0 - 9.4)	4.9	9.1	(5.3 - 12.8)	18.9
41-50	8.2	(0.0 - 24.1)	10.3	3.9	(0.0 - 10.6)	8.1
51+	7.3	(0.7 - 13.8)	9.1	18.6	(0.0 - 109.4)	38.5
Total	79.5	(62.1 - 96.9)	100.0	48.2	(21.2 - 75.1)	100.0

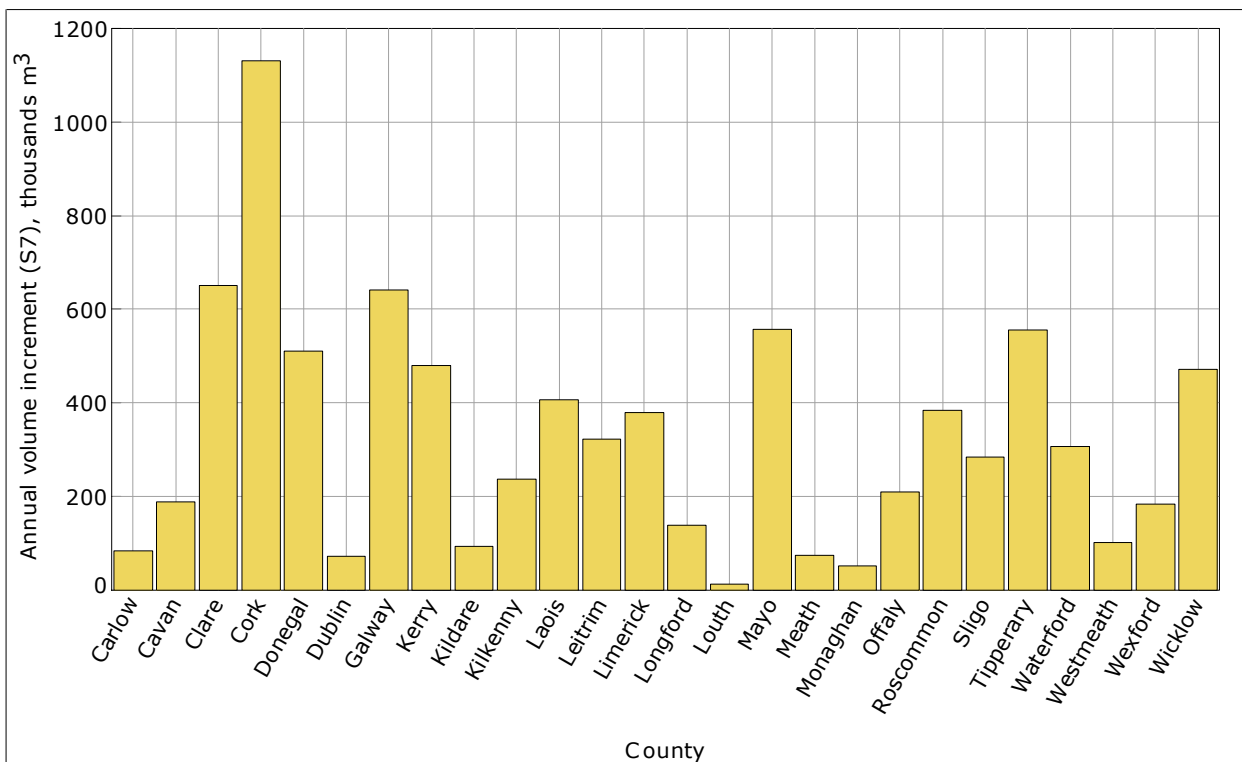
Age class (yrs)	Species group / Annual volume increment (S7)					
	OSL broadleaves			Total		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
1-10	0.8	(0.2 - 1.3)	0.7	94.8	(73.6 - 115.9)	1.1
11-20	34.5	(22.8 - 46.3)	29.6	2,666.7	(2,495.8 - 2,837.6)	31.3
21-30	30.3	(22.3 - 38.4)	26.0	3,864.3	(3,622.9 - 4,105.7)	45.2
31-40	41.0	(20.3 - 61.7)	35.1	1,014.9	(892.8 - 1,137.0)	11.9
41-50	7.0	(2.1 - 11.8)	6.0	525.9	(435.8 - 616.1)	6.2
51+	3.1	(0.0 - 11.2)	2.6	365.4	(299.8 - 431.0)	4.3
Total	116.7	(93.9 - 139.6)	100.0	8,532.0	(8,185.4 - 8,878.6)	100.0



9.3.5 Gross annual volume increment by county

Methodology
Gross annual volume increment is classified by county.

County	Annual volume increment (S7)		
	thousands m ³	($\alpha = 0.05$)	%
Carlow	84.5	(60.2 - 108.8)	1.0
Cavan	188.6	(134.5 - 242.7)	2.2
Clare	651.4	(542.8 - 760.1)	7.6
Cork	1,130.7	(988.3 - 1,273.0)	13.3
Donegal	510.0	(428.3 - 591.8)	6.0
Dublin	72.5	(35.4 - 109.5)	0.8
Galway	641.5	(558.6 - 724.5)	7.5
Kerry	480.4	(390.0 - 570.8)	5.6
Kildare	93.8	(69.7 - 117.8)	1.1
Kilkenny	237.7	(180.8 - 294.6)	2.8
Laois	406.5	(325.9 - 487.2)	4.8
Leitrim	322.9	(253.7 - 392.1)	3.8
Limerick	379.7	(299.7 - 459.7)	4.5
Longford	138.7	(100.6 - 176.8)	1.6
Louth	12.6	(2.5 - 22.6)	0.1
Mayo	557.6	(476.6 - 638.6)	6.5
Meath	74.5	(52.0 - 96.9)	0.9
Monaghan	51.8	(22.2 - 81.4)	0.6
Offaly	209.7	(151.4 - 268.0)	2.5
Roscommon	383.9	(309.9 - 457.8)	4.5
Sligo	283.8	(205.3 - 362.3)	3.3
Tipperary	555.5	(465.0 - 646.0)	6.5
Waterford	306.4	(247.3 - 365.6)	3.6
Westmeath	101.3	(71.0 - 131.5)	1.2
Wexford	183.9	(139.3 - 228.5)	2.2
Wicklow	472.1	(392.0 - 552.1)	5.5
Total	8,532.0	(8,185.4 - 8,878.6)	100.0



9.4 NET ANNUAL VOLUME INCREMENT PER HECTARE IN THE STOCKED FOREST

Definition

Net annual volume increment per hectare

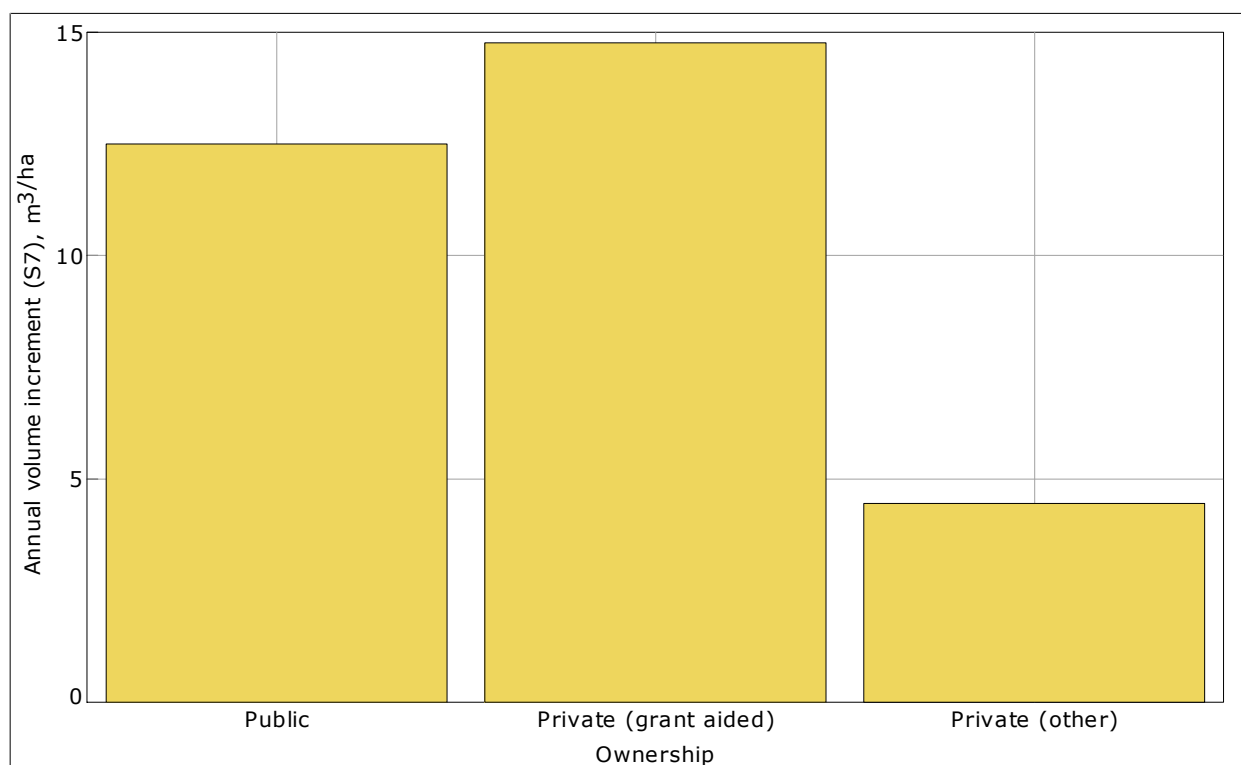
Average annual volume increment per hectare over the period 2012-2017 of trees ≥ 7 cm Dbh, including the increment of all living trees and trees that were felled during the reference period. The increment during the reference period from the following trees is excluded; living to standing dead, living to lying dead and trees that were deforested.

9.4.1 Weighted net annual volume increment per hectare by ownership

Methodology

Net annual volume increment per hectare is classified by ownership.

Ownership	Annual volume increment (S7)	
	m ³ /ha	($\alpha = 0.05$)
Public	12.5	(11.6 – 13.4)
Private (grant aided)	14.8	(13.6 – 15.9)
Private (other)	4.5	(3.7 – 5.2)
All	12.1	(11.5 – 12.8)



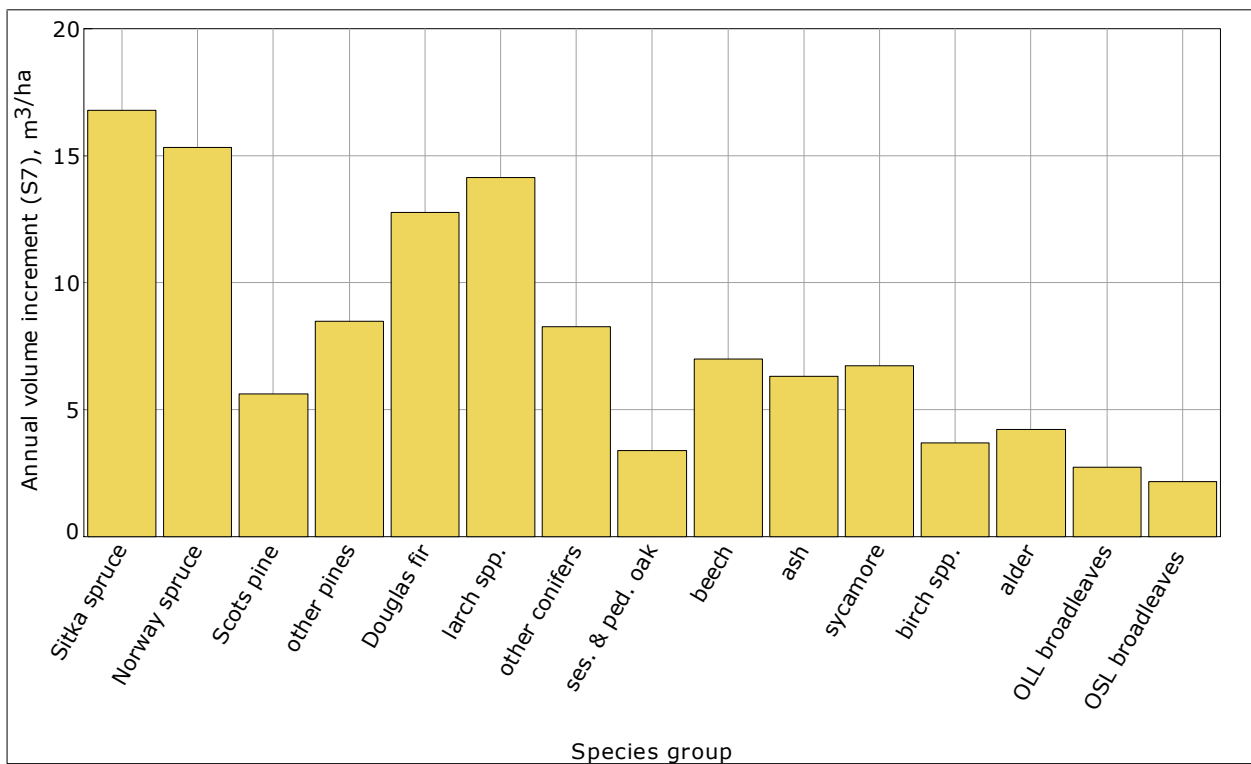
9.4.2 Normalised mean net annual volume increment per hectare by species group

Methodology

The normalised net annual volume increment per hectare is classified by species group.

The calculated value of the variable under consideration for a plot (i.e. volume increment) is divided not by the whole plot area, but by the area of the part of the plot where the given variable is present. Therefore the sum of volume increment for a plot is related only to the area occupied by those trees, not to the whole plot.

Species group	Annual volume increment (S7)	
	m ³ /ha	($\alpha = 0.05$)
Sitka spruce	16.8	(15.9 – 17.7)
Norway spruce	15.3	(9.9 – 20.8)
Scots pine	5.6	(4.5 – 6.7)
other pines	8.5	(7.5 – 9.5)
Douglas fir	12.8	(10.8 – 14.7)
larch spp.	14.1	(12.8 – 15.5)
other conifers	8.3	(5.8 – 10.8)
ses. & ped. oak	3.4	(1.7 – 5.1)
beech	7.0	(5.6 – 8.4)
ash	6.3	(5.5 – 7.2)
sycamore	6.7	(5.1 – 8.4)
birch spp.	3.7	(3.2 – 4.2)
alder	4.2	(3.3 – 5.2)
OLL broadleaves	2.7	(2.0 – 3.5)
OSL broadleaves	2.2	(1.8 – 2.5)



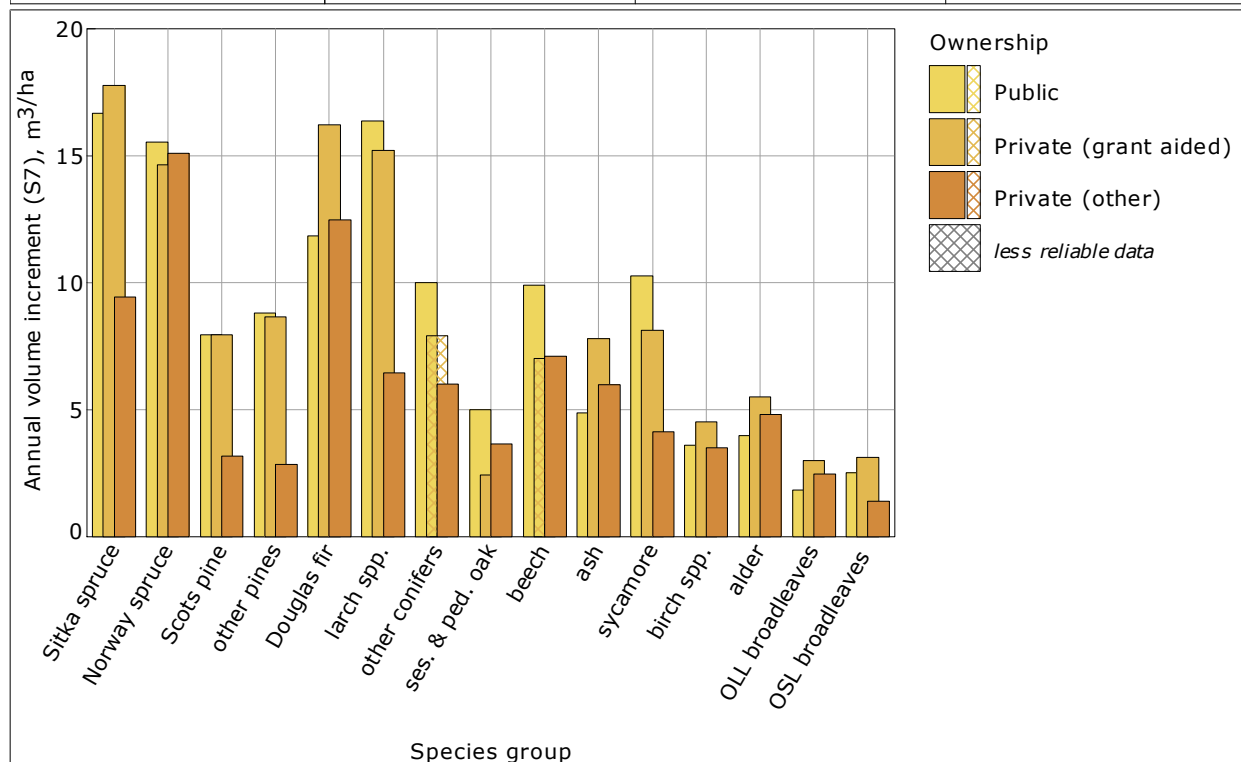
9.4.3 Normalised mean net annual volume increment per hectare by species group and ownership

Methodology

The normalised net annual volume increment per hectare is classified by species group and ownership.

The calculated value of the variable under consideration for a plot (i.e. volume increment) is divided not by the whole plot area, but by the area of the part of the plot where the given variable is present. Therefore the sum of volume increment for a plot is related only to the area occupied by those trees, not to the whole plot.

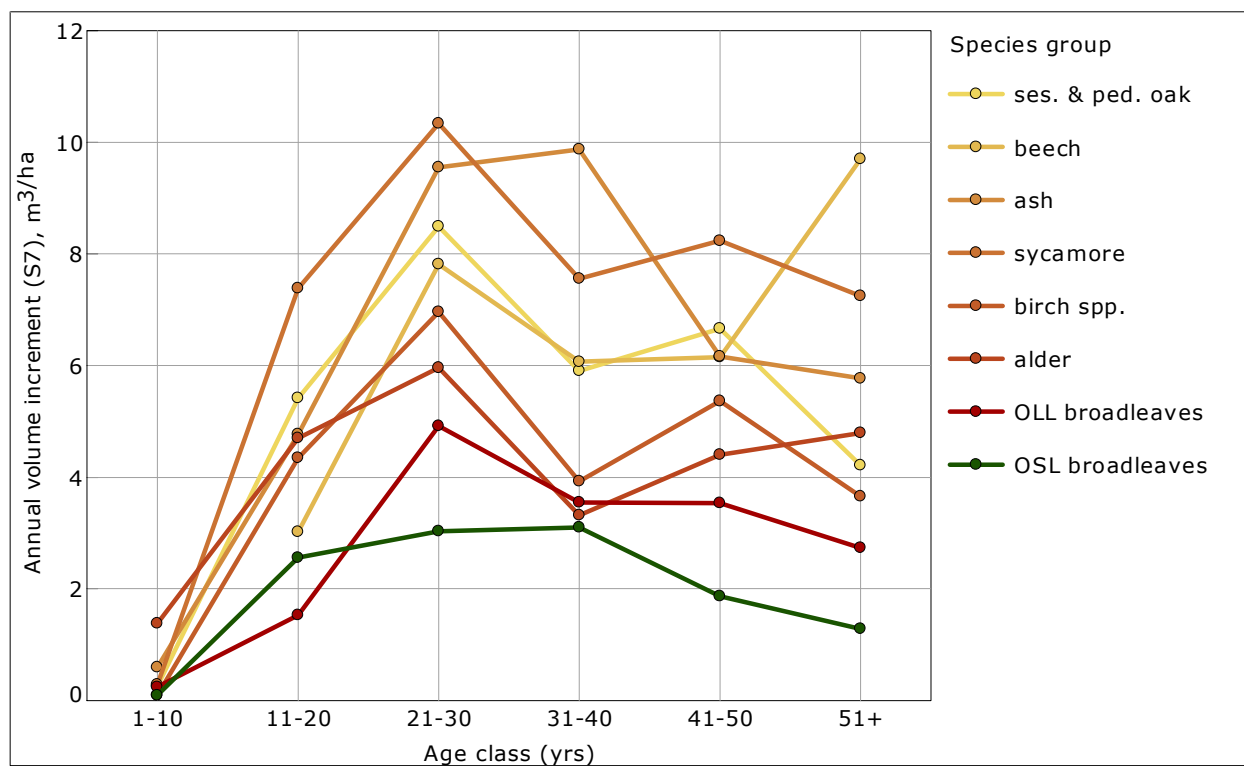
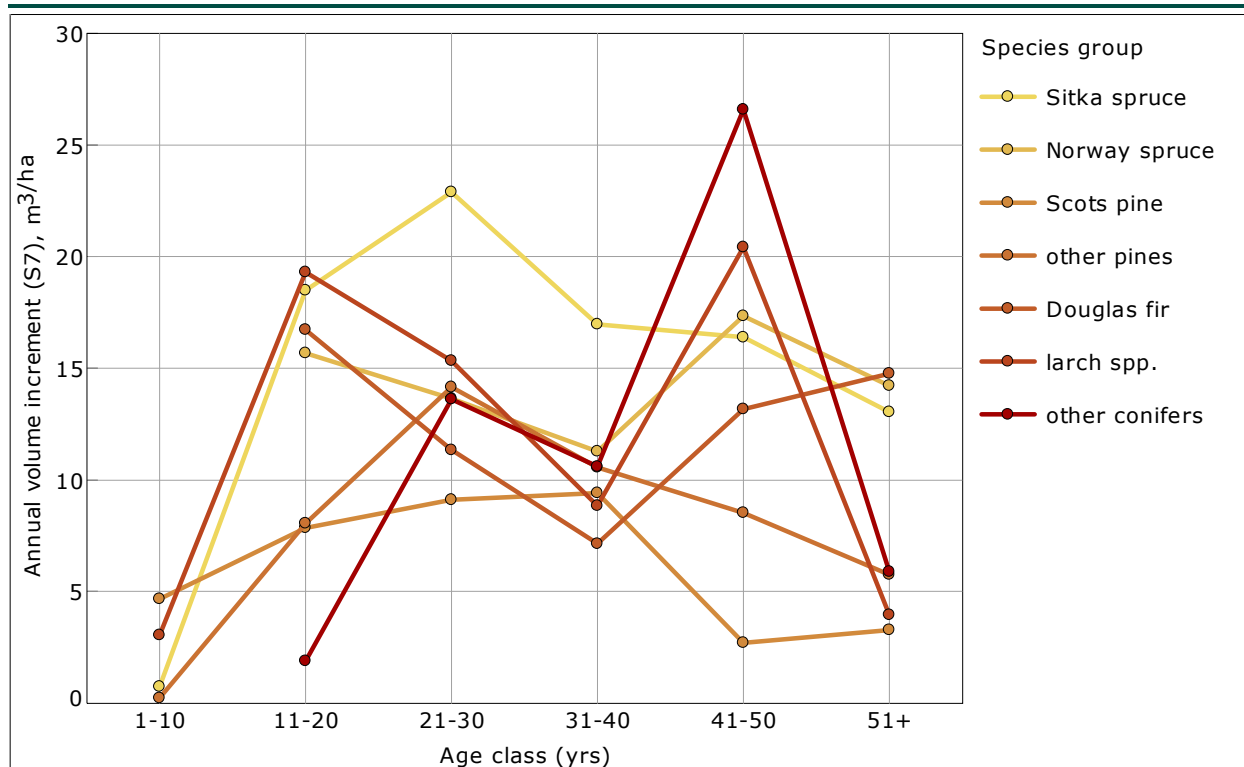
Species group	Ownership / Annual volume increment (S7)					
	Public		Private (grant aided)		Private (other)	
	m ³ /ha	($\alpha = 0.05$)	m ³ /ha	($\alpha = 0.05$)	m ³ /ha	($\alpha = 0.05$)
Sitka spruce	16.7	(15.4 – 17.9)	17.8	(16.2 – 19.3)	9.4	(5.9 – 12.9)
Norway spruce	15.5	(13.4 – 17.7)	14.7	(13.4 – 15.9)	15.1	(5.3 – 24.9)
Scots pine	7.9	(6.8 – 9.0)	7.9	(0.0 – 26.3)	3.2	(0.0 – 8.7)
other pines	8.8	(6.3 – 11.3)	8.6	(6.7 – 10.6)	2.8	(0.0 – 6.4)
Douglas fir	11.8	(10.0 – 13.7)	16.2	(0.0 – 48.7)	12.5	(0.0 – 39.4)
larch spp.	16.4	(14.4 – 18.4)	15.2	(13.2 – 17.2)	6.4	(4.4 – 8.5)
other conifers	10.0	(6.3 – 13.7)	7.9	– –	6.0	(3.4 – 8.6)
ses. & ped. oak	5.0	(4.0 – 6.0)	2.4	(0.0 – 6.1)	3.7	(1.2 – 6.1)
beech	9.9	(6.0 – 13.9)	7.0	– –	7.1	(5.1 – 9.2)
ash	4.9	(2.6 – 7.2)	7.8	(6.5 – 9.0)	6.0	(4.2 – 7.7)
sycamore	10.3	(0.0 – 20.8)	8.1	(5.3 – 11.0)	4.1	(2.5 – 5.7)
birch spp.	3.6	(3.1 – 4.2)	4.5	(3.1 – 6.0)	3.5	(2.9 – 4.1)
alder	4.0	(2.9 – 5.1)	5.5	(4.0 – 7.0)	4.8	(2.9 – 6.8)
OLL broadleaves	1.8	(0.6 – 3.0)	3.0	(0.0 – 6.6)	2.5	(1.4 – 3.6)
OSL broadleaves	2.5	(2.0 – 3.1)	3.1	(1.9 – 4.3)	1.4	(1.1 – 1.7)



9.4.4 Normalised mean net annual volume increment per hectare by species group and age class

Methodology	
The normalised net annual volume increment per hectare is classified by ownership and age class (10 yrs).	
The calculated value of the variable under consideration for a plot (i.e. volume increment) is divided not by the whole plot area, but by the area of the part of the plot where the given variable is present. Therefore the sum of volume increment for a plot is related only to the area occupied by those trees, not to the whole plot.	

Age class (yrs)	Species group / Annual volume increment (S7)			
	Sitka spruce	Norway spruce	Scots pine	other pines
	m ³ /ha (α=0.05)	m ³ /ha (α=0.05)	m ³ /ha (α=0.05)	m ³ /ha (α=0.05)
1-10	0.7 (0.4 - 1.0)	- - -	4.7 (2.1 - 7.3)	0.2 (0.0 - 0.5)
11-20	18.5 (16.9 - 20.0)	15.7 (14.2 - 17.2)	7.9 (5.3 - 10.4)	8.0 (6.3 - 9.8)
21-30	22.9 (21.4 - 24.3)	13.6 (13.0 - 14.3)	9.1 - -	14.2 (12.4 - 15.9)
31-40	17.0 (14.7 - 19.3)	11.3 (4.4 - 18.2)	9.4 - -	10.6 (8.5 - 12.6)
41-50	16.4 (13.8 - 18.9)	17.3 (13.7 - 21.0)	2.7 (0.1 - 5.4)	8.5 (0.0 - 84.2)
51+	13.0 (9.3 - 16.8)	14.2 (4.9 - 23.5)	3.3 (1.6 - 5.0)	5.8 (1.1 - 10.4)
Age class (yrs)	Species group / Annual volume increment (S7)			
	Douglas fir	larch spp.	other conifers	ses. & ped. oak
	m ³ /ha (α=0.05)	m ³ /ha (α=0.05)	m ³ /ha (α=0.05)	m ³ /ha (α=0.05)
1-10	- - -	3.1 (2.0 - 4.1)	- - -	0.3 (0.0 - 0.5)
11-20	16.7 (10.7 - 22.7)	19.3 (17.7 - 20.9)	1.9 - -	5.4 (4.8 - 6.0)
21-30	11.3 (7.8 - 14.9)	15.3 (13.2 - 17.5)	13.6 (10.6 - 16.6)	8.5 (7.7 - 9.3)
31-40	7.1 - -	8.8 (8.8 - 8.9)	10.6 (0.0 - 22.8)	5.9 (3.5 - 8.3)
41-50	13.2 (7.5 - 18.8)	20.4 - -	26.6 (0.0 - 79.0)	6.7 (3.5 - 9.8)
51+	14.7 (9.4 - 20.1)	4.0 (3.6 - 4.3)	5.9 (4.1 - 7.7)	4.2 (1.7 - 6.7)
Age class (yrs)	Species group / Annual volume increment (S7)			
	beech	ash	sycamore	birch spp.
	m ³ /ha (α=0.05)	m ³ /ha (α=0.05)	m ³ /ha (α=0.05)	m ³ /ha (α=0.05)
1-10	- - -	0.6 (0.3 - 0.9)	0.3 (0.0 - 2.6)	0.1 (0.0 - 0.2)
11-20	3.0 (1.1 - 4.9)	4.8 (3.3 - 6.3)	7.4 (6.4 - 8.4)	4.4 (3.5 - 5.2)
21-30	7.8 (5.3 - 10.3)	9.5 (8.2 - 10.9)	10.3 (0.0 - 26.2)	7.0 (6.0 - 7.9)
31-40	6.1 (5.0 - 7.1)	9.9 (7.9 - 11.9)	7.6 (6.3 - 8.8)	3.9 (2.8 - 5.0)
41-50	6.1 (3.6 - 8.7)	6.2 (3.8 - 8.5)	8.2 (6.5 - 10.0)	5.4 (3.8 - 6.9)
51+	9.7 (7.4 - 12.0)	5.8 (3.5 - 8.0)	7.3 (3.9 - 10.6)	3.7 (2.9 - 4.4)
Age class (yrs)	Species group / Annual volume increment (S7)			
	alder	OLL broadleaves	OSL broadleaves	All
	m ³ /ha (α=0.05)	m ³ /ha (α=0.05)	m ³ /ha (α=0.05)	m ³ /ha (α=0.05)
1-10	1.4 (0.4 - 2.4)	0.2 (0.0 - 0.8)	0.1 (0.0 - 0.3)	0.7 (0.6 - 0.9)
11-20	4.7 (2.8 - 6.6)	1.5 (0.6 - 2.5)	2.6 (2.0 - 3.1)	14.2 (13.3 - 15.2)
21-30	6.0 (4.5 - 7.4)	4.9 (3.6 - 6.2)	3.0 (2.3 - 3.7)	18.5 (17.4 - 19.6)
31-40	3.3 (0.0 - 6.7)	3.5 (2.5 - 4.6)	3.1 (2.1 - 4.1)	10.8 (9.6 - 11.9)
41-50	4.4 (1.9 - 6.9)	3.5 (0.0 - 7.1)	1.9 (0.6 - 3.1)	11.1 (9.9 - 12.2)
51+	4.8 (0.0 - 34.6)	2.7 (0.8 - 4.7)	1.3 (0.3 - 2.3)	6.0 (5.1 - 7.0)



CHAPTER 10

DEADWOOD

The NFI provides a comprehensive assessment of deadwood in the Irish forest estate. The total deadwood is broken down into three primary categories: stumps, standing deadwood and lying deadwood.

Overall, deadwood is present in over half (60.9%) of the forest estate. The absence of deadwood in the remainder of the estate is due to the young age structure and the absence of harvesting. Considerable amounts of deadwood are present in Public and Private (other) forests, while not surprisingly, considerably less deadwood is found in the younger Private (grant aided) forests.

The total deadwood volume, at over 10.5 million m³, represents an important resource for biodiversity. The greatest volumes of lying deadwood are found in counties Cork, Kerry, Galway, Donegal and Leitrim, making up 4.408 million m³ or 42.2 % of the total deadwood volume in Ireland.

The greatest proportion of the total deadwood volume is lying deadwood (48.9%), with 25.5 % present as standing deadwood and the remainder (25.6 %) in the form of stump deadwood.

The mean deadwood volume per hectare is 16.2m³ for the entire forest estate, with the Public, Private (grant aided) and Private (other) forest estates having a mean of 23.3m³, 2.9m³ and 17.9m³, respectively. When the area of the forest with no deadwood is excluded, the mean deadwood volume per hectare is 26.2m³, with the Public, Private (grant aided) and private (other) forest estates having a mean of 29.7m³, 11.3m³ and 22.2m³, respectively.

In terms of species group, the majority of deadwood comes from conifer tree species; including 80.4% of the lying deadwood, 73.2% of standing deadwood and 93.3% of stump deadwood.

10.1 SUMMARY

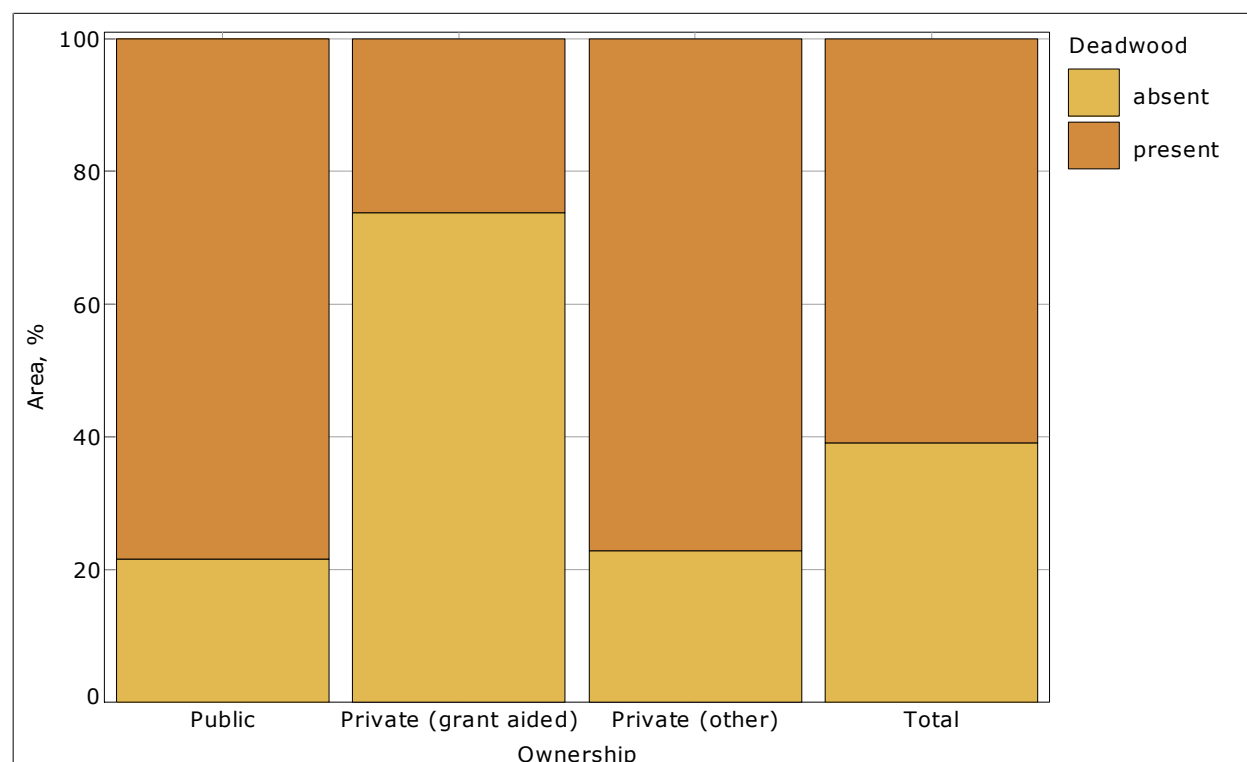
Definition
Deadwood Solid or rotting standing dead trees, logs, stumps, and branches.

10.1.1 Forest area by ownership and deadwood presence

Methodology
The total forest area with deadwood present or absent is classified by ownership.

Deadwood	Ownership / Area				
	Public			Private (grant aided)	
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$) %
absent	76.99	(66.86 – 87.11)	21.5	168.50	(154.70 – 182.30) 73.7
present	280.30	(264.65 – 295.96)	78.5	60.00	(50.83 – 69.16) 26.3
Total	357.29	(341.32 – 373.26)	100.0	228.49	(213.45 – 243.54) 100.0

Deadwood	Ownership / Area				
	Private (other)			Total	
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$) %
absent	23.24	(17.36 – 29.12)	22.8	268.73	(253.18 – 284.28) 39.1
present	78.50	(68.18 – 88.82)	77.2	418.80	(403.25 – 434.35) 60.9
Total	101.74	(90.23 – 113.25)	100.0	687.52	100.0



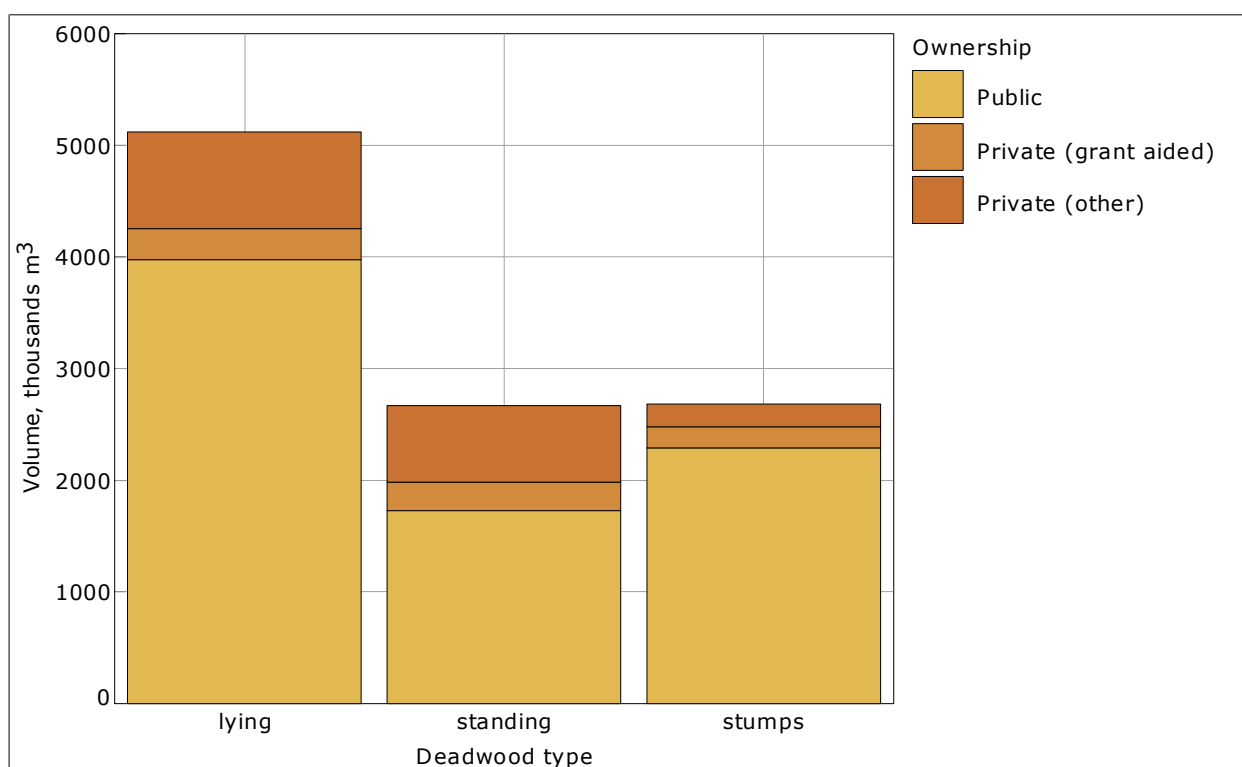
10.1.2 Total deadwood volume by ownership and deadwood type

Methodology

The total deadwood volume is classified by ownership and deadwood type.

Deadwood type	Ownership / Volume					
	Public			Private (grant aided)		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
lying	3,972.2	(3,412.1 - 4,532.4)	49.7	280.5	(218.5 - 342.4)	38.6
standing	1,723.9	(1,382.5 - 2,065.3)	21.6	258.9	(198.6 - 319.2)	35.7
stumps	2,289.2	(2,082.5 - 2,495.9)	28.7	186.9	(138.7 - 235.0)	25.7
Total	7,985.3	(7,135.2 - 8,835.5)	100.0	726.2	(604.7 - 847.7)	100.0

Deadwood type	Ownership / Volume					
	Private (other)			Total		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
lying	868.9	(609.7 - 1,128.1)	49.3	5,121.6	(4,502.6 - 5,740.6)	48.9
standing	682.7	(555.9 - 809.5)	38.8	2,665.5	(2,275.7 - 3,055.3)	25.5
stumps	208.8	(116.5 - 301.1)	11.9	2,684.8	(2,451.1 - 2,918.6)	25.6
Total	1,760.4	(1,223.5 - 2,297.2)	100.0	10,471.9	(9,520.7 - 11,423.1)	100.0



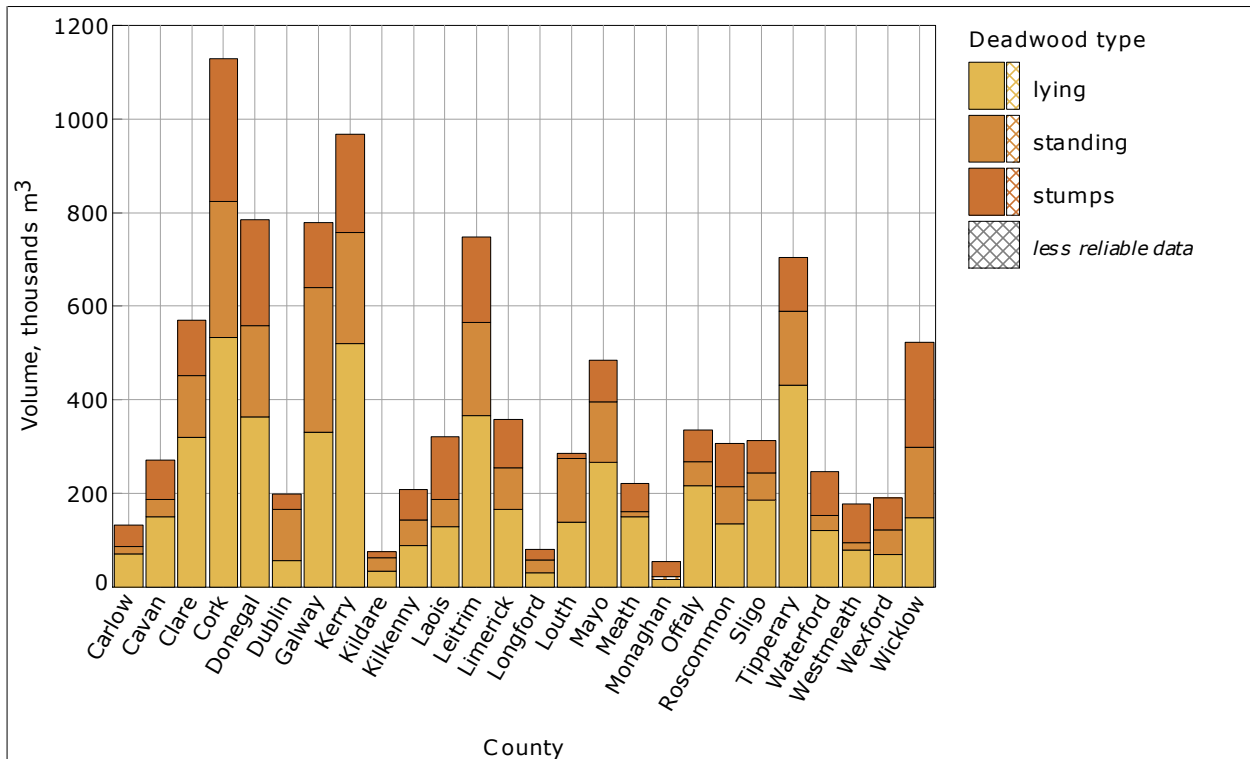
10.1.3 Total deadwood volume by deadwood type and county

Methodology

The total deadwood volume includes: standing, lying and stump deadwood. The total deadwood volume is classified by deadwood type and county.

County	Deadwood type / Volume					
	lying			standing		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
Carlow	71.1	(21.1 – 121.1)	1.4	16.4	(0.0 – 122.3)	0.6
Cavan	149.5	(40.0 – 259.1)	2.9	38.6	(10.1 – 67.0)	1.4
Clare	320.4	(181.4 – 459.4)	6.3	131.9	(94.4 – 169.5)	4.9
Cork	533.5	(344.4 – 722.6)	10.6	289.6	(205.6 – 373.7)	10.9
Donegal	364.1	(174.5 – 553.7)	7.1	194.7	(0.0 – 389.6)	7.3
Dublin	56.6	(0.0 – 125.0)	1.1	110.4	(0.0 – 252.9)	4.1
Galway	331.4	(213.1 – 449.7)	6.5	308.7	(204.3 – 413.2)	11.8
Kerry	519.6	(351.0 – 688.3)	10.1	238.3	(142.2 – 334.5)	8.9
Kildare	33.1	(6.2 – 60.1)	0.6	30.1	(0.0 – 66.4)	1.1
Kilkenny	89.0	(33.0 – 144.9)	1.7	54.9	(10.1 – 99.7)	2.1
Laois	128.5	(82.2 – 174.7)	2.5	58.2	(8.4 – 108.0)	2.2
Leitrim	366.1	(102.5 – 629.8)	7.1	199.0	(0.0 – 401.7)	7.5
Limerick	167.0	(90.0 – 243.9)	3.3	88.2	(44.1 – 132.4)	3.3
Longford	30.2	(18.7 – 41.7)	0.6	27.4	(0.0 – 75.5)	1.0
Louth	139.2	(0.0 – 335.9)	2.7	134.6	(0.0 – 896.7)	5.0
Mayo	266.7	(171.7 – 361.7)	5.2	128.5	(91.5 – 165.4)	4.8
Meath	150.9	(0.0 – 315.8)	2.9	10.6	(0.0 – 79.0)	0.4
Monaghan	16.2	(3.4 – 29.1)	0.3	5.9	–	0.2
Offaly	216.8	(42.5 – 391.1)	4.2	51.1	(27.1 – 75.2)	1.9
Roscommon	136.3	(25.9 – 246.7)	2.7	78.9	(21.6 – 136.2)	3.0
Sligo	185.1	(90.4 – 279.8)	3.6	59.2	(39.6 – 78.8)	2.2
Tipperary	430.7	(202.8 – 658.6)	8.4	159.4	(100.3 – 218.5)	6.0
Waterford	121.6	(46.1 – 197.1)	2.4	32.4	(12.3 – 52.5)	1.2
Westmeath	79.6	(46.2 – 113.0)	1.6	15.6	(0.0 – 32.9)	0.6
Wexford	69.0	(0.0 – 154.1)	1.3	53.4	(11.8 – 95.0)	2.0
Wicklow	149.2	(106.6 – 191.7)	2.9	149.3	(55.2 – 243.3)	5.6
Total	5,121.6	(4,502.6 – 5,740.6)	100.0	2,665.5	(2,275.7 – 3,055.3)	100.0

County	Deadwood type / Volume					
	stumps			Total		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
Carlow	44.7	(14.7 - 74.8)	1.7	132.3	(53.2 - 211.3)	1.3
Cavan	83.3	(38.8 - 127.8)	3.1	271.4	(138.7 - 404.2)	2.6
Clare	117.8	(77.2 - 158.5)	4.4	570.2	(411.6 - 728.8)	5.4
Cork	305.5	(229.4 - 381.6)	11.3	1,128.6	(863.0 - 1,394.2)	11.0
Donegal	226.2	(165.6 - 286.8)	8.4	785.1	(404.9 - 1,165.3)	7.5
Dublin	32.1	(0.0 - 74.5)	1.2	199.1	(42.9 - 355.3)	1.9
Galway	138.6	(103.4 - 173.7)	5.2	778.7	(588.6 - 968.8)	7.4
Kerry	209.4	(120.7 - 298.2)	7.8	967.4	(697.3 - 1,237.5)	9.2
Kildare	12.8	(1.6 - 23.9)	0.5	76.0	(22.1 - 130.0)	0.7
Kilkenny	63.7	(25.2 - 102.2)	2.4	207.6	(116.8 - 298.4)	2.0
Laois	134.3	(83.2 - 185.4)	5.0	321.0	(236.7 - 405.2)	3.1
Leitrim	182.5	(123.4 - 241.6)	6.8	747.7	(298.2 - 1,197.2)	7.1
Limerick	102.7	(42.7 - 162.7)	3.8	357.9	(231.7 - 484.1)	3.4
Longford	23.6	(1.5 - 45.6)	0.9	81.1	(37.4 - 124.9)	0.8
Louth	12.6	(0.0 - 36.0)	0.5	286.4	(0.0 - 694.8)	2.7
Mayo	89.8	(59.3 - 120.3)	3.3	485.0	(365.2 - 604.9)	4.6
Meath	60.2	(14.6 - 105.9)	2.2	221.7	(61.2 - 382.2)	2.1
Monaghan	33.2	(0.0 - 76.4)	1.2	55.4	(6.5 - 104.3)	0.5
Offaly	67.7	(33.5 - 102.0)	2.5	335.7	(147.7 - 523.7)	3.2
Roscommon	91.9	(31.6 - 152.2)	3.4	307.1	(149.7 - 464.6)	2.9
Sligo	68.5	(43.2 - 93.9)	2.6	312.9	(201.4 - 424.3)	3.0
Tipperary	114.8	(82.7 - 146.8)	4.3	704.9	(427.1 - 982.7)	6.7
Waterford	93.7	(43.9 - 143.4)	3.5	247.6	(150.3 - 345.0)	2.4
Westmeath	81.7	(34.2 - 129.3)	3.0	176.9	(113.3 - 240.6)	1.7
Wexford	68.7	(26.7 - 110.7)	2.6	191.1	(93.3 - 288.9)	1.8
Wicklow	224.6	(152.0 - 297.3)	8.4	523.0	(385.8 - 660.3)	5.0
Total	2,684.8	(2,451.1 - 2,918.6)	100.0	10,471.9	(9,520.7 - 11,423.1)	100.0

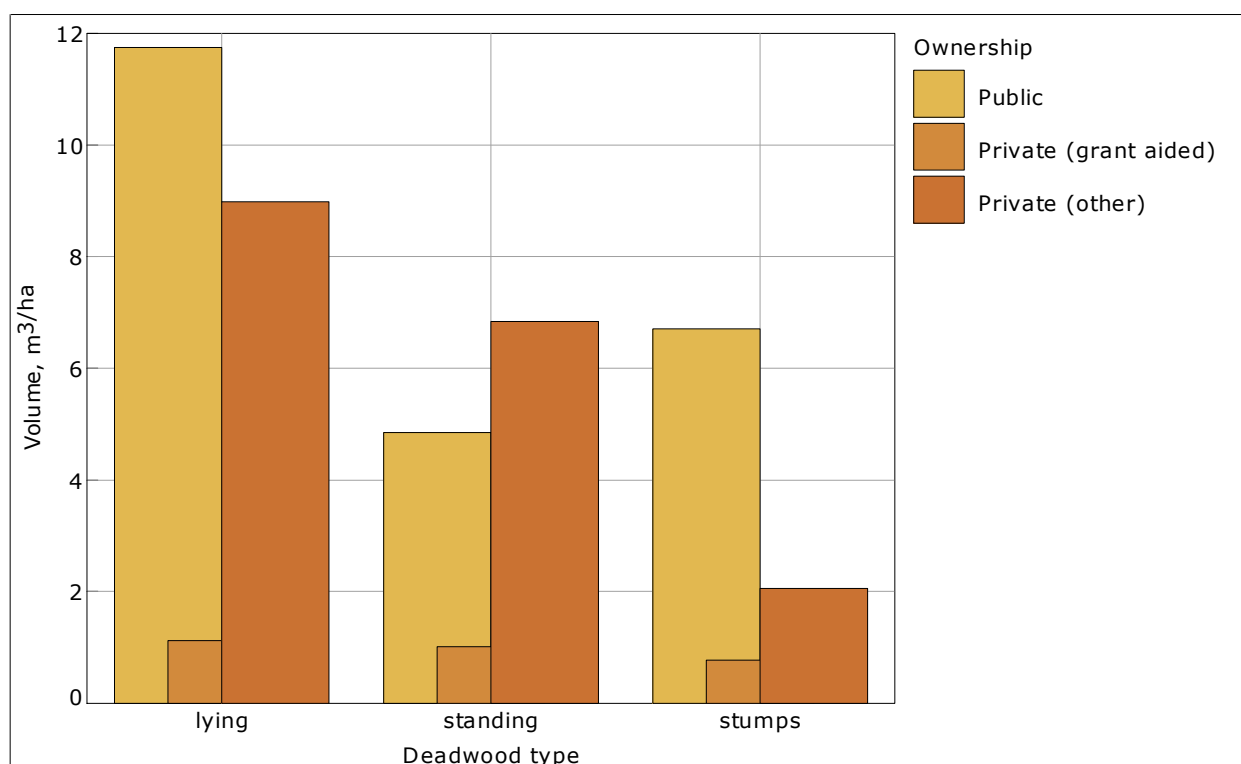


10.1.4 Mean deadwood volume stock per hectare by ownership and deadwood type

Methodology

The mean volume of deadwood per hectare is classified by ownership and deadwood type. This mean is calculated using the forest area, i.e. stocked and unstocked.

Deadwood type	Ownership / Volume			
	Public	Private (grant aided)	Private (other)	All
	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)
lying	11.7 (10.1 – 13.4)	1.1 (0.8 – 1.5)	9.0 (6.4 – 11.6)	7.9 (7.0 – 8.9)
standing	4.8 (3.7 – 5.9)	1.0 (0.6 – 1.4)	6.8 (2.9 – 10.8)	4.4 (3.7 – 5.1)
stumps	6.7 (6.1 – 7.4)	0.8 (0.5 – 1.0)	2.1 (1.1 – 3.0)	3.9 (3.5 – 4.3)
All	23.3 (20.8 – 25.8)	2.9 (2.2 – 3.6)	17.9 (12.7 – 23.1)	16.2 (14.7 – 17.7)

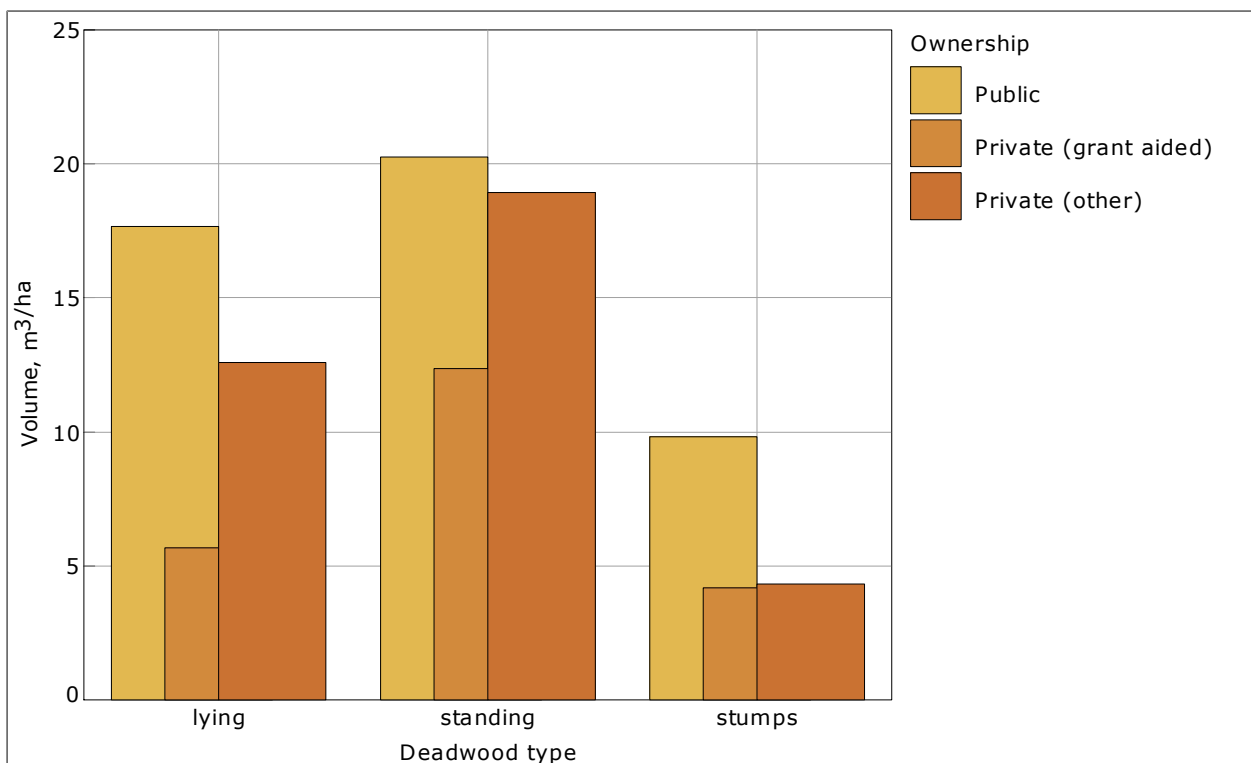


10.1.5 Mean deadwood volume per hectare by ownership and deadwood type, excluding areas with no deadwood

Methodology

The mean volume of deadwood per hectare is classified by ownership and deadwood type. This mean is calculated by excluding areas that have no deadwood present.

Deadwood type	Ownership / Volume			
	Public	Private (grant aided)	Private (other)	All
	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)	m ³ /ha ($\alpha=0.05$)
lying	17.7 (15.3 – 20.0)	5.7 (4.4 – 6.9)	12.6 (8.8 – 16.3)	15.2 (13.5 – 16.9)
standing	20.3 (16.2 – 24.4)	12.4 (9.2 – 15.5)	18.9 (15.3 – 22.5)	19.6 (16.8 – 22.5)
stumps	9.8 (9.0 – 10.7)	4.2 (3.0 – 5.3)	4.3 (2.3 – 6.3)	8.3 (7.6 – 9.0)
All	29.7 (26.7 – 32.7)	11.3 (9.3 – 13.4)	22.2 (15.3 – 29.0)	26.2 (24.0 – 28.5)



10.2 LYING DEADWOOD

Definition

Lying deadwood

Lying dead logs (or parts thereof) with a minimum mid-diameter of 7 cm and minimum length of 1 m.

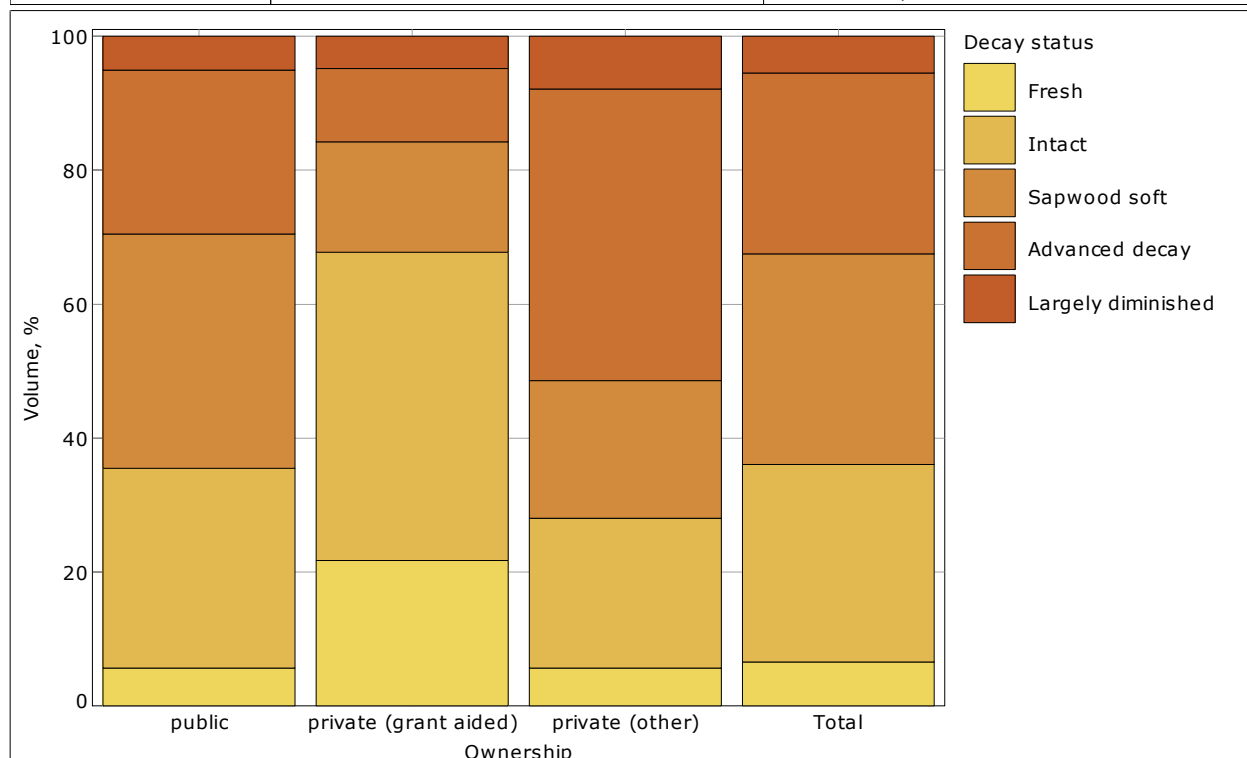
10.2.1 Total volume of lying deadwood by ownership and decay status

Definition	
Decay status	
Decay status describes the level of decomposition of the dead wood.	
1. Fresh:	Freshly felled logs;
2. Intact:	Log whole and hard, with bark intact ($\pm 100\%$), some signs of decay in places;
3. Sapwood soft:	Sapwood soft in patches, fragmentation evident, bark $\geq 50\%$, all branch knots flush with log surface or can be seen;
4. Advanced decay:	Large blocky pieces missing. Log frame is deformed. Portions of sapwood missing. Branch knots prominent. Little bark present;
5. Largely diminished:	Well decayed and deformed. Humification is advanced. Collapses when moved.

Methodology
The total volume of lying deadwood is classified by ownership and decay status.

Decay status	Ownership / Volume					
	public			private (grant aided)		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
Fresh	228.0	(172.1 – 283.8)	5.7	60.8	(10.8 – 110.7)	21.7
Intact	1,191.6	(965.7 – 1,417.4)	29.8	129.3	(95.8 – 162.9)	46.1
Sapwood soft	1,400.6	(1,060.3 – 1,740.9)	35.0	45.9	(23.9 – 68.0)	16.4
Advanced decay	976.5	(745.0 – 1,208.1)	24.4	30.9	(9.2 – 52.6)	11.0
Largely diminished	203.7	(157.6 – 249.7)	5.1	13.5	(11.6 – 15.5)	4.8
Total	4,000.3	(3,439.1 – 4,561.5)	100.0	280.5	(218.5 – 342.4)	100.0

Decay status	Ownership / Volume					
	private (other)			Total		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
Fresh	48.8	(31.9 – 65.6)	5.6	337.5	(248.1 – 426.9)	6.6
Intact	194.7	(105.4 – 284.0)	22.4	1,515.6	(1,273.4 – 1,757.8)	29.4
Sapwood soft	178.7	(90.8 – 266.6)	20.6	1,625.2	(1,258.2 – 1,992.2)	31.5
Advanced decay	378.1	(180.4 – 575.7)	43.5	1,385.5	(1,101.7 – 1,669.3)	26.9
Largely diminished	68.7	(44.7 – 92.6)	7.9	285.8	(233.5 – 338.2)	5.6
Total	868.9	(609.7 – 1,128.1)	100.0	5,149.6	(4,529.8 – 5,769.5)	100.0



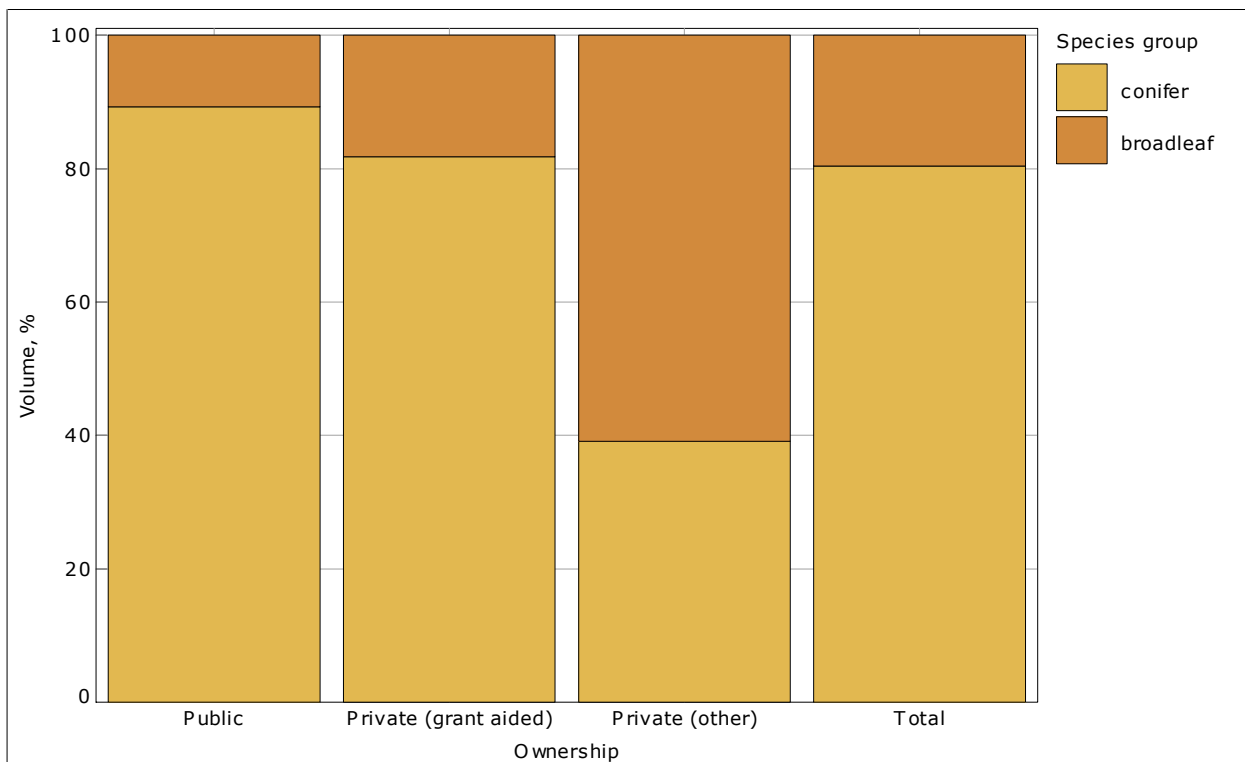
10.2.2 Total volume of lying deadwood by ownership and species group

Methodology

The total volume of lying deadwood is classified by ownership and species group (broadleaf/conifer).

Species group	Ownership / Volume					
	public			private (grant aided)		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
conifer	3,568.6	(3,021.9 - 4,115.3)	89.2	229.4	(170.4 - 288.4)	81.8
broadleaf	431.7	(274.9 - 588.5)	10.8	51.1	(27.4 - 74.8)	18.2
Total	4,000.3	(3,439.1 - 4,561.5)	100.0	280.5	(218.5 - 342.4)	100.0

Species group	Ownership / Volume					
	private (other)			Total		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
conifer	339.9	(167.0 - 512.7)	39.1	4,137.9	(3,565.5 - 4,710.2)	80.4
broadleaf	529.0	(312.1 - 746.0)	60.9	1,011.8	(756.7 - 1,266.9)	19.6
Total	868.9	(609.7 - 1,128.1)	100.0	5,149.6	(4,529.8 - 5,769.5)	100.0



10.3 STANDING DEADWOOD

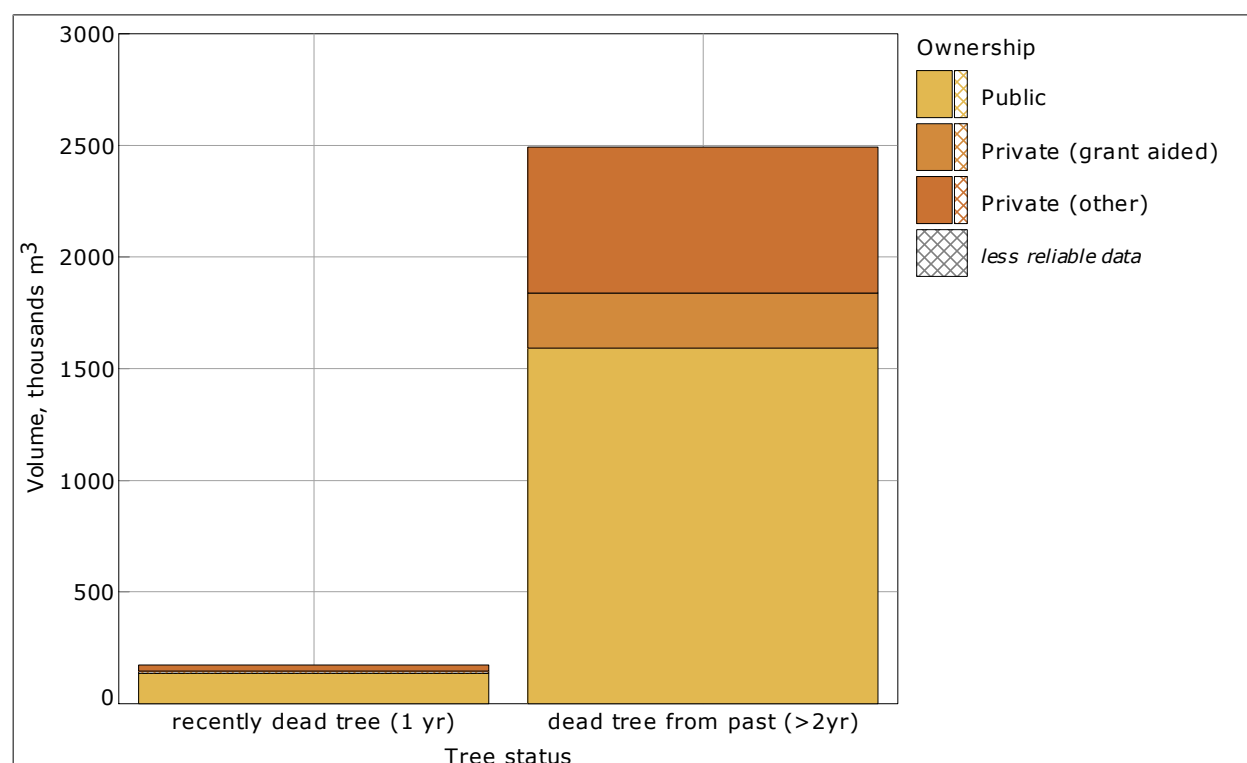
10.3.1 Total standing deadwood volume by ownership and tree status

Definition
Standing deadwood Standing dead trees with a minimum Dbh of 7cm and minimum height of 1.3m. Recently dead tree: Tree has died in current or previous growing season. Dead tree from the past: The tree has been dead for more than 2 years.

Methodology
The total volume of standing deadwood is classified by ownership and tree status.

Tree status	Ownership / Volume					
	Public			Private (grant aided)		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
recently dead tree (1 yr)	134.0	(83.2 – 184.8)	7.8	10.6	–	4.1
dead tree from past (>2yr)	1,589.9	(1,264.0 – 1,915.8)	92.2	248.3	(188.1 – 308.4)	95.9
Total	1,723.9	(1,382.5 – 2,065.3)	100.0	258.9	(198.6 – 319.2)	100.0

Tree status	Ownership / Volume					
	Private (other)			Total		
	thousands m ³	($\alpha=0.05$)	%	thousands m ³	($\alpha=0.05$)	%
recently dead tree (1 yr)	27.6	(16.1 – 39.1)	4.0	172.2	(119.8 – 224.5)	6.5
dead tree from past (>2yr)	655.2	(538.6 – 771.7)	96.0	2,493.3	(2,119.3 – 2,867.4)	93.5
Total	682.7	(555.9 – 809.5)	100.0	2,665.5	(2,275.7 – 3,055.3)	100.0



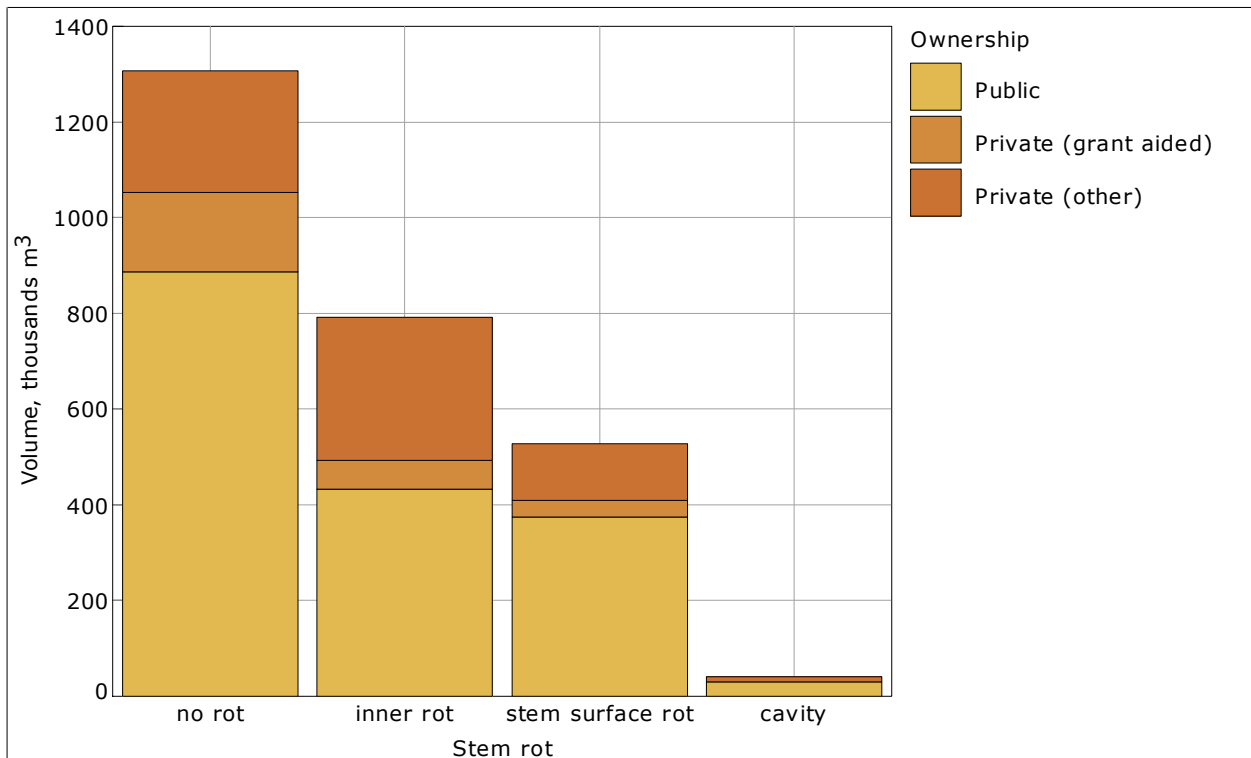
10.3.2 Total standing deadwood volume by ownership and stem rot

Definition	
Stem rot	Stem rot is the softening, discoloration, and often disintegration of plant tissue as a result of fungal or bacterial infection.
1. No rot:	There are no signs of rot on the stem.
2. Inner rot:	An inner section of the stem has suffered rot, which may be identified by butt-swelling and resin exudation.
3. Stem surface rot:	Rot is present at the stem surface.
4. Cavity:	The rot has created a stem cavity.

Methodology
The total volume of standing deadwood is classified by ownership and stem rot type.

Stem rot	Ownership / Volume					
	Public			Private (grant aided)		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
no rot	886.8	(730.9 – 1,042.6)	51.5	165.5	(124.5 – 206.4)	64.0
inner rot	433.0	(230.2 – 635.7)	25.1	59.4	(8.1 – 110.7)	22.9
stem surface rot	374.7	(266.0 – 483.5)	21.7	34.0	(0.0 – 113.8)	13.1
cavity	29.4	(0.0 – 106.6)	1.7	–	–	–
Total	1,723.9	(1,382.5 – 2,065.3)	100.0	258.9	(198.6 – 319.2)	100.0

Stem rot	Ownership / Volume					
	Private (other)			Total		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
no rot	253.8	(157.4 – 350.3)	37.2	1,306.1	(1,116.7 – 1,495.4)	49.0
inner rot	298.9	(255.4 – 342.3)	43.7	791.3	(440.7 – 1,141.8)	29.7
stem surface rot	118.7	(68.1 – 169.2)	17.4	527.4	(415.0 – 639.9)	19.8
cavity	11.3	(0.0 – 34.7)	1.7	40.8	(13.5 – 68.0)	1.5
Total	682.7	(555.9 – 809.5)	100.0	2,665.5	(2,275.7 – 3,055.3)	100.0



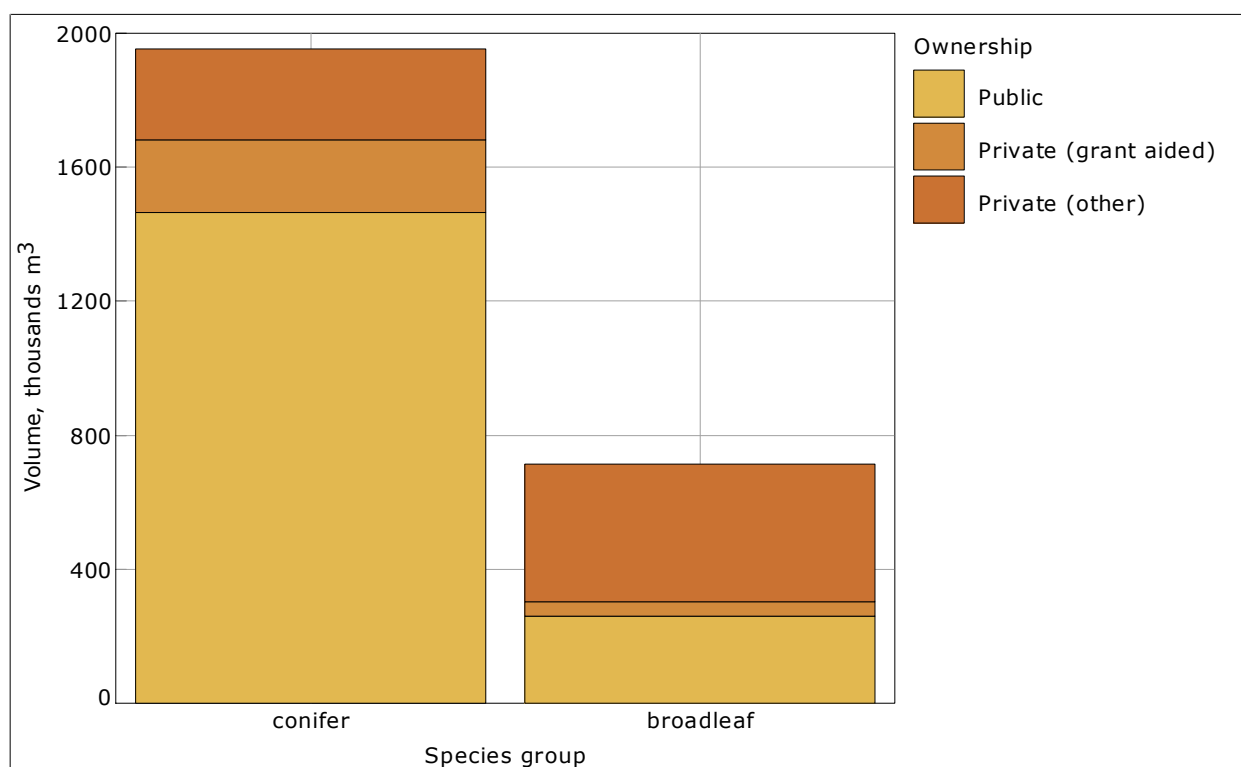
10.3.3 Total standing deadwood volume by ownership and species group

Methodology

The total volume of standing deadwood is classified by ownership and species group.

Species group	Ownership / Volume					
	Public			Private (grant aided)		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
conifer	1,464.9	(1,125.3 – 1,804.5)	85.0	215.7	(154.2 – 277.3)	83.3
broadleaf	259.0	(186.8 – 331.1)	15.0	43.2	(37.6 – 48.7)	16.7
Total	1,723.9	(1,382.5 – 2,065.3)	100.0	258.9	(198.6 – 319.2)	100.0

Species group	Ownership / Volume					
	Private (other)			Total		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
conifer	271.7	(145.5 – 397.8)	39.8	1,952.4	(1,594.8 – 2,309.9)	73.2
broadleaf	411.0	(341.9 – 480.2)	60.2	713.2	(624.7 – 801.6)	26.8
Total	682.7	(555.9 – 809.5)	100.0	2,665.5	(2,275.7 – 3,055.3)	100.0

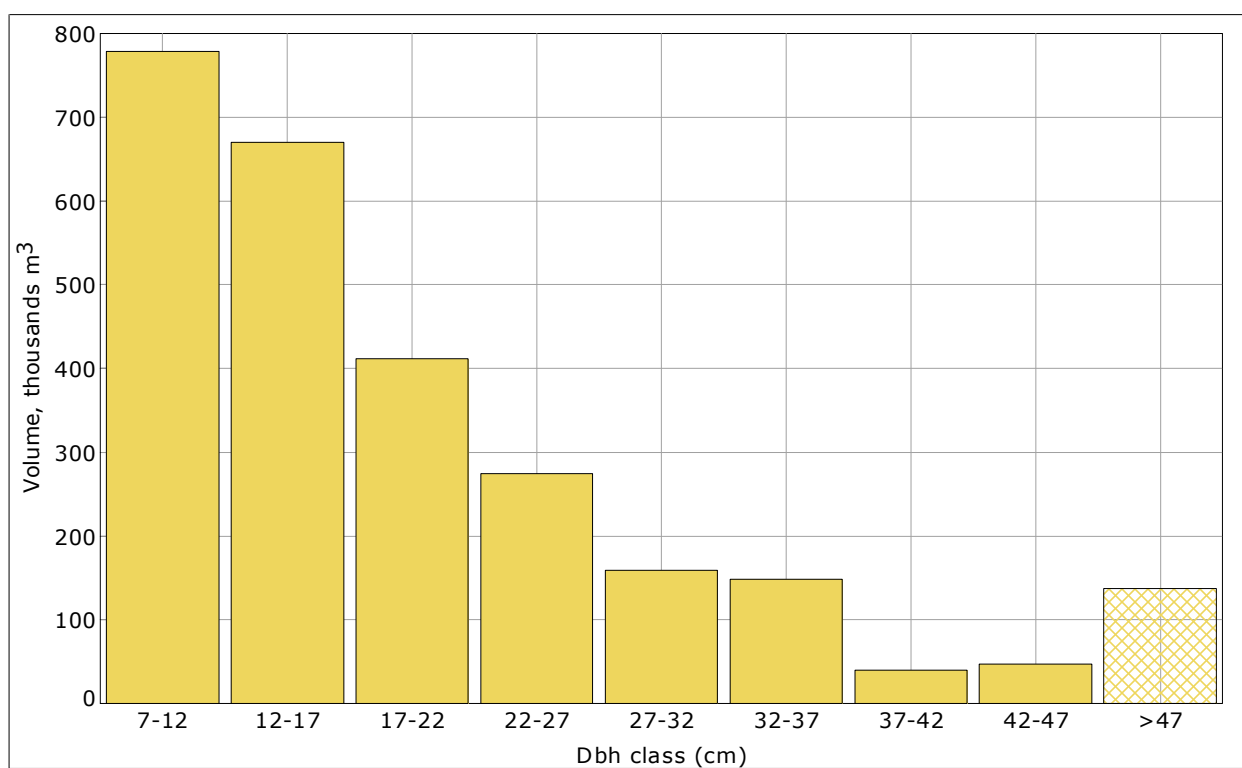


10.3.4 Total standing deadwood volume by Dbh class

Methodology

The total volume of standing deadwood is classified by Dbh class (5cm).

Dbh class (cm)	Volume		
	thousands m ³	($\alpha = 0.05$)	%
7-12	778.64	(668.00 – 889.27)	29.1
12-17	669.89	(535.07 – 804.70)	25.1
17-22	412.00	(327.17 – 496.84)	15.5
22-27	274.35	(168.04 – 380.66)	10.3
27-32	159.25	(125.35 – 193.15)	6.0
32-37	148.08	(137.72 – 158.44)	5.6
37-42	39.81	(6.71 – 72.92)	1.5
42-47	46.66	(0.00 – 117.95)	1.8
>47	136.84	– –	5.1
Total	2,665.52	(2,275.73 – 3,055.31)	100.0

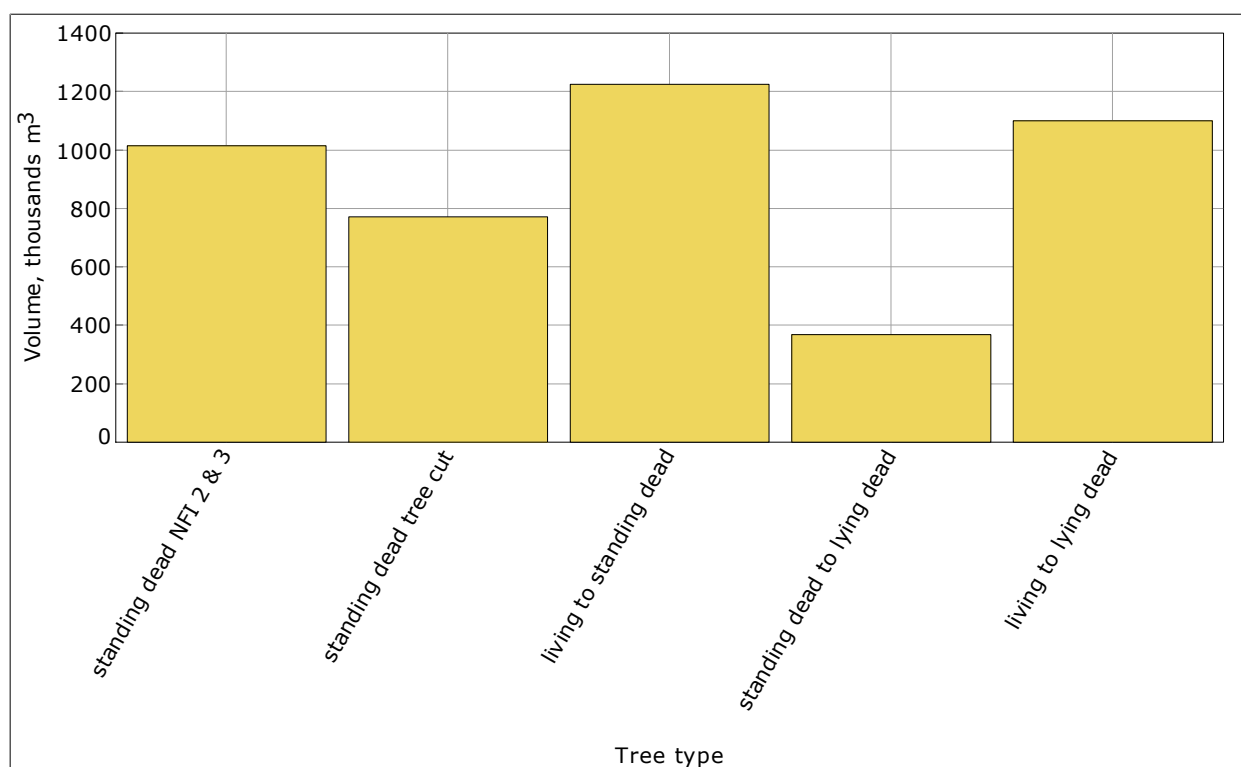


10.3.5 Total standing volume that is still present, that went from living to dead and that is no longer present (2013-2017)

Methodology

The total volume that went from living to dead and standing dead to lying dead, between 2013-2017, is classified by tree type.

Tree type	Volume		
	thousands m ³	($\alpha = 0.05$)	%
standing dead NFI 2 & 3	1,014.3	(770.0 – 1,258.6)	22.7
standing dead tree cut	771.7	(571.4 – 972.1)	17.2
living to standing dead	1,223.5	(818.8 – 1,628.2)	27.3
standing dead to lying dead	367.1	(288.4 – 445.8)	8.2
living to lying dead	1,099.9	(841.9 – 1,357.9)	24.6
Total	4,476.5	(3,832.6 – 5,120.4)	100.0



10.4 STUMP DEADWOOD

Definition

Stump

The base of a tree remaining in the ground after most of the stem has been felled. Stumps need to have a minimum top diameter of 10cm and a height less than 1.3m to be included. Stumps with a height greater than 1.3m are recorded as standing dead trees. Only the above ground section of the stump is included.

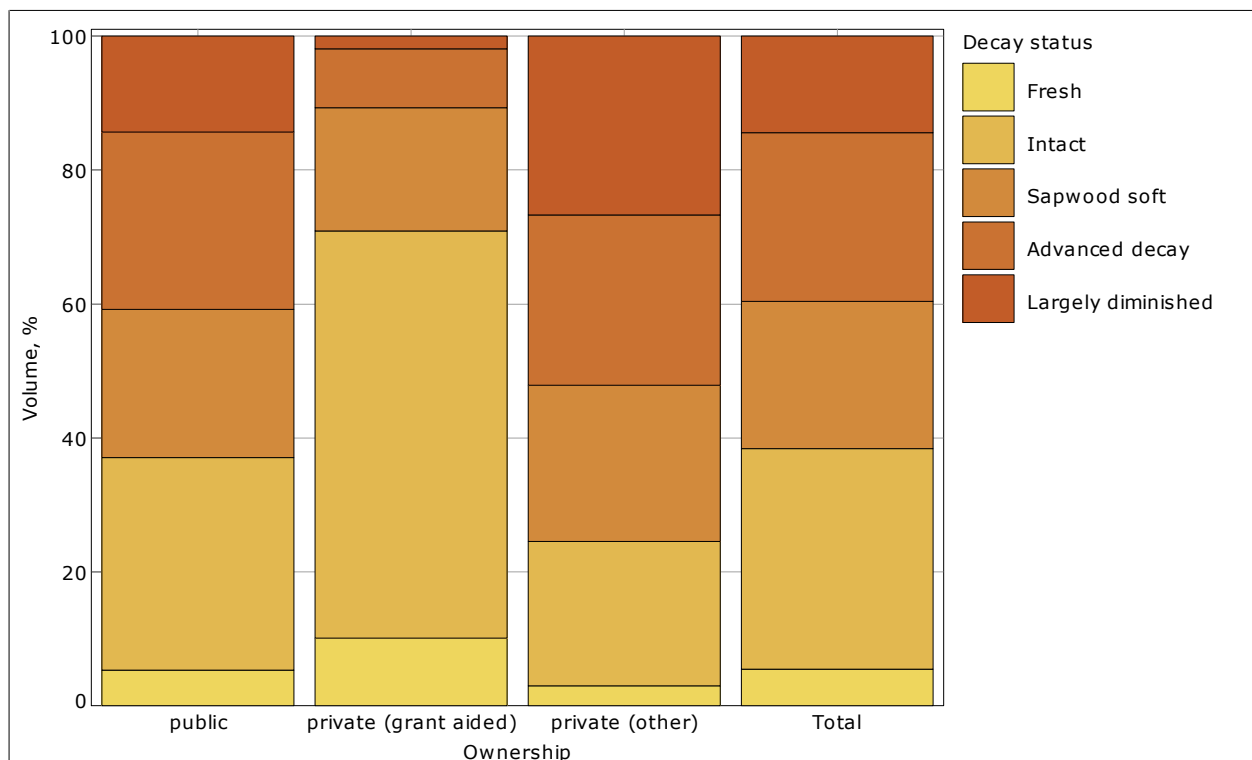
10.4.1 Total volume of stump deadwood by ownership and decay status

Methodology

The total volume of stump deadwood is classified by ownership and decay status.

Decay status	Ownership / Volume					
	public			private (grant aided)		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
Fresh	122.5	(56.3 - 188.7)	5.3	18.8	(0.0 - 41.4)	10.1
Intact	738.6	(620.2 - 856.9)	31.8	113.7	(73.9 - 153.5)	60.8
Sapwood soft	514.6	(428.2 - 601.0)	22.1	34.3	(14.8 - 53.8)	18.4
Advanced decay	615.8	(514.1 - 717.5)	26.5	16.4	(0.0 - 42.1)	8.8
Largely diminished	333.2	(266.9 - 399.4)	14.3	3.6	(1.0 - 6.2)	1.9
Total	2,324.6	(2,116.7 - 2,532.5)	100.0	186.9	(138.7 - 235.0)	100.0

Decay status	Ownership / Volume					
	private (other)			Total		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
Fresh	6.2	(5.1 - 7.3)	3.0	147.5	(82.8 - 212.3)	5.4
Intact	44.9	(0.0 - 108.8)	21.5	897.2	(766.6 - 1,027.8)	33.0
Sapwood soft	48.8	(0.0 - 114.7)	23.4	597.7	(504.2 - 691.1)	22.0
Advanced decay	53.2	(0.0 - 107.1)	25.5	685.4	(576.6 - 794.2)	25.2
Largely diminished	55.7	(17.2 - 94.2)	26.6	392.5	(320.0 - 465.0)	14.4
Total	208.8	(116.5 - 301.1)	100.0	2,720.2	(2,484.9 - 2,955.6)	100.0



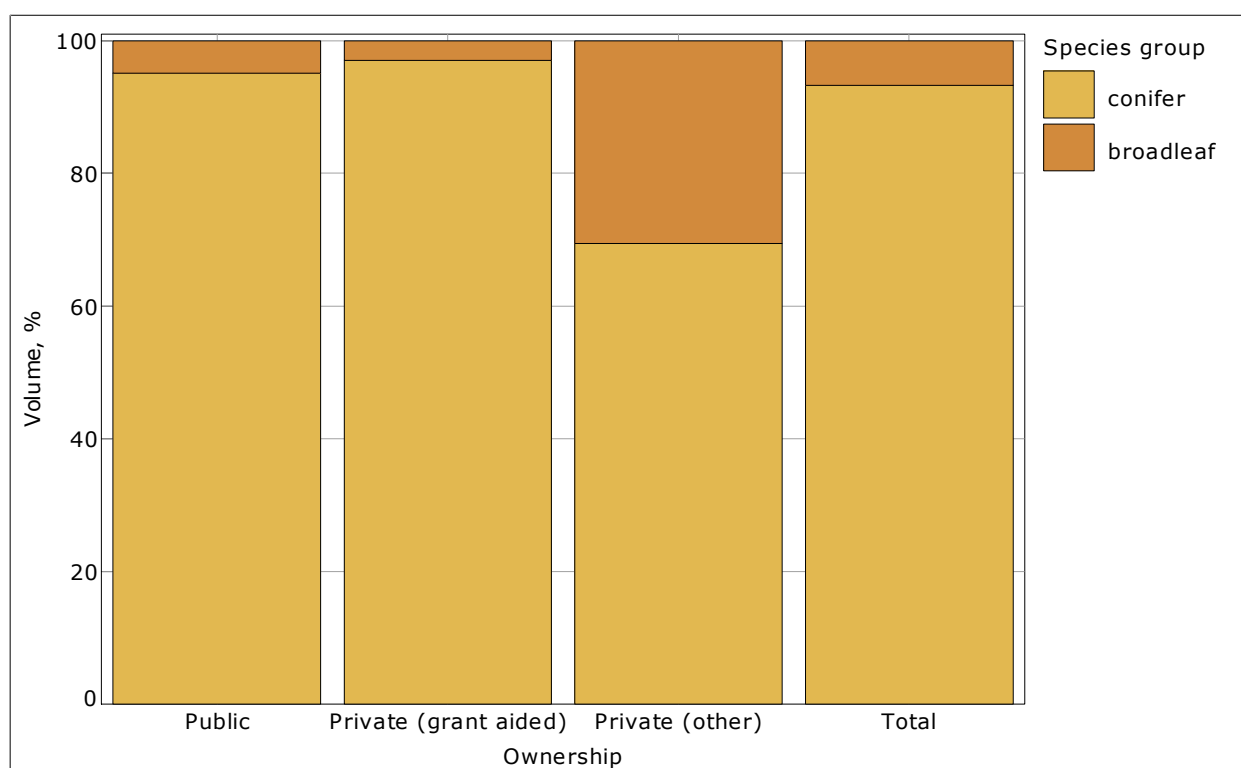
10.4.2 Total volume of stump deadwood by ownership and species group

Methodology

The total volume of stump deadwood is classified by ownership and species group (conifer/broadleaf).

Species group	Ownership / Volume					
	public			private (grant aided)		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
conifer	2,211.0	(2,009.2 – 2,412.7)	95.1	181.4	(134.7 – 228.1)	97.1
broadleaf	113.7	(58.1 – 169.2)	4.9	5.5	(0.0 – 31.9)	2.9
Total	2,324.6	(2,116.7 – 2,532.5)	100.0	186.9	(138.7 – 235.0)	100.0

Species group	Ownership / Volume					
	private (other)			Total		
	thousands m ³	($\alpha = 0.05$)	%	thousands m ³	($\alpha = 0.05$)	%
conifer	145.0	(59.3 – 230.7)	69.5	2,537.3	(2,314.3 – 2,760.4)	93.3
broadleaf	63.8	(32.6 – 94.9)	30.5	182.9	(123.8 – 242.0)	6.7
Total	208.8	(116.5 – 301.1)	100.0	2,720.2	(2,484.9 – 2,955.6)	100.0



CHAPTER 11

CARBON

In this chapter, the analysis of the carbon pools in the forest estate is presented. Forests play an important role in mitigating climate change by sequestering and storing atmospheric carbon dioxide (CO₂). Sequestration is the net removal of CO₂ from the atmosphere, and storage in plant biomass, deadwood and harvested wood product pools. CO₂ is taken up during photosynthesis and stored as biomass accumulates. Some carbon is released back into the atmosphere due to autotrophic respiration and from the forest deadwood, litter and soils pool due to decomposition. Sustainably managed forests are a net absorber of carbon. However, unmanaged and degrading forests eventually become a net emitter of carbon back into the atmosphere. Large emissions can also occur during catastrophic disturbance events, such as fires and windthrow. About half of carbon in harvested timber is stored in wood products (HWPs) but these carbon stores are eventually released back into the atmosphere unless it is recycled or used for bioenergy. Use of wood for bioenergy replaces fossil fuel use and reduces overall emissions. Fossil fuel emissions can also be reduced by substituting energy intensive materials with wood products (i.e. product substitution)

In 1997, Ireland committed to reduce the national emissions of greenhouse gases by 13% above the 1990 level, in an effort to combat climate change under the Kyoto Protocol. Over the five years of the first commitment period of the Kyoto Agreement (i.e. 2008 to 2012), Ireland met its Kyoto obligations when the impact of approved *Forest Sinks* associated with afforestation, reforestation and deforestation *activities since 1990*, under article 3.3 were taken into account. The NFI has been instrumental in estimating the carbon stock in Irish forests and their contribution to national climate change mitigation. NFI data is a crucial component of the national forest reporting system (CARBWARE), which is used to estimate annual greenhouse gas emissions and removals as submitted to the United Nation Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. Reporting under Article 3.3 forests represented a net removal of over 16 Mt of CO₂ equivalents from the atmosphere between 2008 and 2012, offsetting circa. 5% of all national emissions.

The NFI results indicate that the national estate is an important sink for carbon, at 311.7 million tonnes. The carbon stock in forest soils and litter is the dominant component, accounting for 79.1% of the carbon stock in the forest estate. Total living tree biomass represents 17.9% of the total carbon stock, while deadwood, including logs, stumps and standing dead trees and litter constitutes the remaining 2.9%. The Public forest estate contains 52.7% of the carbon stock in the total forest estate, the Private (grant aided) estate 34% and the Private (other) forests 13.3%.

The carbon stock in the living tree biomass is 55.9 million tonnes, with Sitka spruce and 'other pine' species the predominant contributors (60.4%). From an ownership perspective, the Public, Private (other) and Private (grant aided) forest estates account for 51.6%, 29.4% and 19% respectively of the carbon stock in the living tree biomass.

11.1 CARBON

Definition

Carbon stock

Carbon estimation for the forest estate was completed for five stocks:

1. Tree aboveground
2. Tree belowground
3. Deadwood (lying, standing and stump)
4. Litter
5. Soil

The estimates of C stock for each plot were calculated using Ireland's carbon reporting system, CARBWARE. This system was developed to meet reporting requirements to the United Nations Framework Convention on Climate Change (UNFCCC). Carbware uses the NFI data as input variables. For further information on this please see the NFI Field Procedures and Methodology publication.

Note:

Since 2012 changes have arisen in the NFI methodology and, biomass estimation techniques. More accurate biomass equations, new classification systems and associated C stock values were introduced for soil and deadwood . Therefore the 2017 data are not comparable with the C stock estimates from 2006 and 2012.

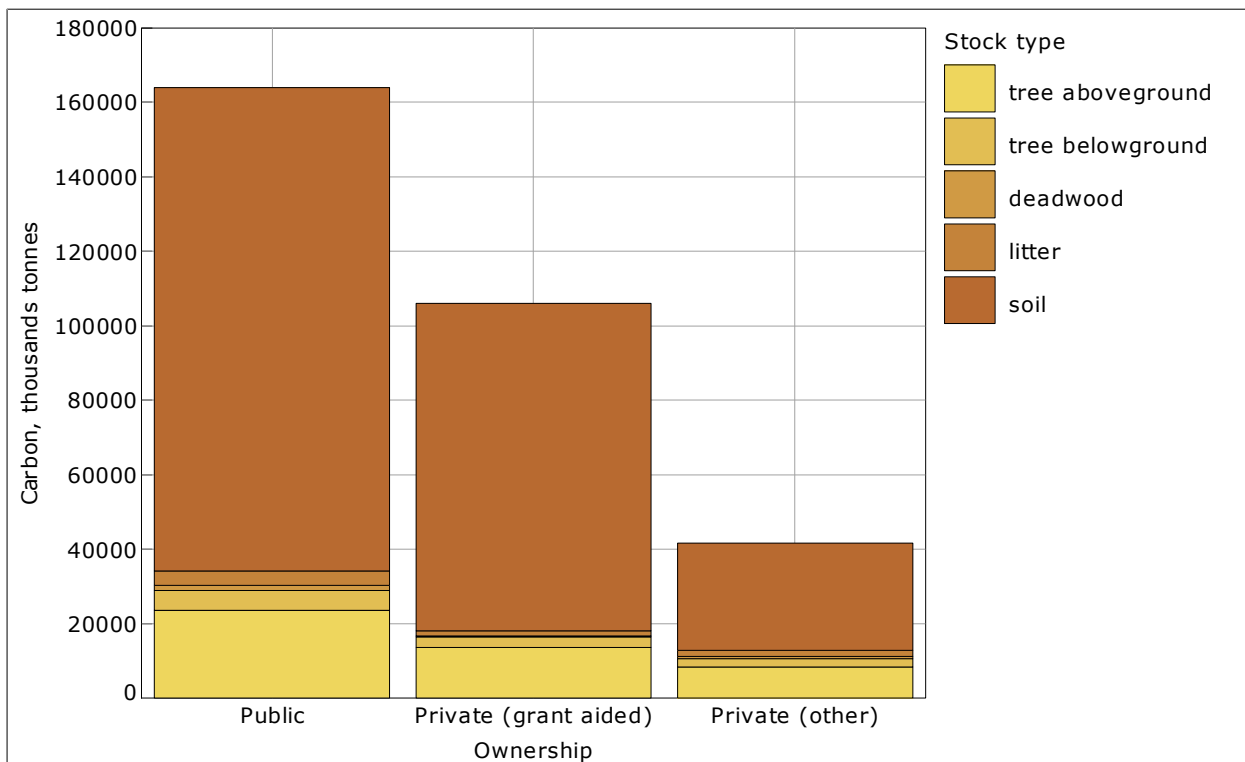
11.1.1 Total carbon stock by ownership and carbon stock

Methodology

Total carbon stock (tonnes) is classified by ownership and carbon stock.

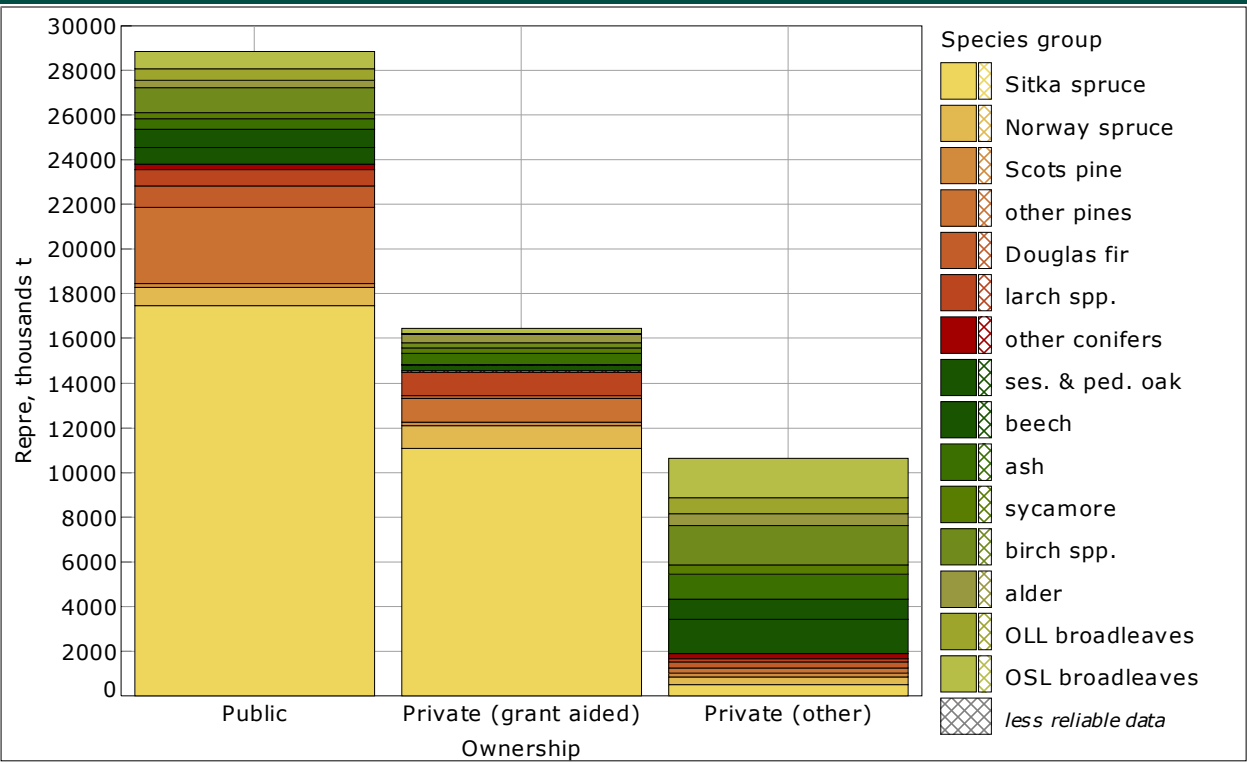
Stock type	Ownership / Carbon				
	Public			Private (grant aided)	
	thousands tonnes	($\alpha = 0.05$)	%	thousands tonnes	($\alpha = 0.05$) %
tree aboveground	23,640	(22,451 - 24,830)	14.4	13,689	(12,826 - 14,551) 12.9
tree belowground	5,194	(4,898 - 5,490)	3.2	2,764	(2,579 - 2,949) 2.6
deadwood	1,419	(1,242 - 1,597)	0.9	174	(138 - 210) 0.2
litter	3,799	(3,570 - 4,028)	2.3	1,543	(1,377 - 1,708) 1.5
soil	129,967	(126,873 - 133,061)	79.2	87,940	(85,582 - 90,298) 82.8
Total	164,019	(160,646 - 167,393)	100.0	106,109	(103,483 - 108,736) 100.0

Stock type	Ownership / Carbon				
	Private (other)			Total	
	thousands tonnes	($\alpha = 0.05$)	%	thousands tonnes	($\alpha = 0.05$) %
tree aboveground	8,261	(7,556 - 8,966)	19.9	45,590	(43,932 - 47,248) 14.6
tree belowground	2,380	(2,174 - 2,585)	5.7	10,338	(9,911 - 10,764) 3.3
deadwood	474	(164 - 785)	1.1	2,068	(1,838 - 2,297) 0.7
litter	1,781	(1,603 - 1,959)	4.3	7,122	(6,767 - 7,477) 2.3
soil	28,685	(27,106 - 30,265)	69.0	246,592	(242,262 - 250,922) 79.1
Total	41,581	(39,806 - 43,357)	100.0	311,710	(306,977 - 316,443) 100.0



11.1.2 Total tree carbon stock by ownership and species group

Methodology						
Total carbon stock (tonnes) above and below ground is classified by ownership and species group.						
Species group	Ownership / Repre					
	Public			Private (grant aided)		
	thousands t	($\alpha=0.05$)	%	thousands t	($\alpha=0.05$)	%
Sitka spruce	17,478	(16,232 – 18,725)	60.4	11,063	(10,166 – 11,961)	67.1
Norway spruce	795	(623 – 968)	2.8	1,038	(846 – 1,230)	6.3
Scots pine	165	(0 – 360)	0.6	153	(119 – 187)	0.9
other pines	3,427	(2,862 – 3,992)	11.9	1,049	(785 – 1,312)	6.4
Douglas fir	948	(739 – 1,156)	3.3	145	(115 – 175)	0.9
larch spp.	766	(482 – 1,049)	2.7	1,058	(829 – 1,286)	6.4
other conifers	227	(106 – 347)	0.8	46	– –	0.3
ses. & ped. oak	758	(479 – 1,037)	2.6	257	(133 – 380)	1.6
beech	809	(493 – 1,124)	2.8	19	– –	0.1
ash	451	(279 – 622)	1.6	504	(292 – 717)	3.1
sycamore	284	(99 – 468)	1.0	244	(105 – 382)	1.5
birch spp.	1,114	(891 – 1,337)	3.9	242	(112 – 373)	1.5
alder	337	(161 – 513)	1.2	373	(251 – 495)	2.3
OLL broadleaves	502	(0 – 1,062)	1.7	42	(11 – 72)	0.3
OSL broadleaves	773	(606 – 941)	2.7	220	(139 – 300)	1.3
Total	28,834	(27,362 – 30,307)	100.0	16,453	(15,413 – 17,492)	100.0
Species group	Ownership / Repre					
	Private (other)			Total		
	thousands t	($\alpha=0.05$)	%	thousands t	($\alpha=0.05$)	%
Sitka spruce	499	(176 – 822)	4.7	29,041	(27,479 – 30,602)	52.0
Norway spruce	347	(22 – 672)	3.3	2,181	(1,872 – 2,490)	3.9
Scots pine	161	(120 – 203)	1.5	480	(347 – 612)	0.9
other pines	240	(0 – 2,010)	2.3	4,715	(4,036 – 5,394)	8.4
Douglas fir	269	(177 – 362)	2.5	1,362	(1,114 – 1,610)	2.4
larch spp.	151	(40 – 262)	1.4	1,974	(1,633 – 2,316)	3.5
other conifers	245	(0 – 856)	2.3	518	(334 – 702)	0.9
ses. & ped. oak	1,493	(1,057 – 1,930)	14.0	2,508	(1,962 – 3,055)	4.5
beech	939	(576 – 1,302)	8.8	1,767	(1,322 – 2,212)	3.2
ash	1,114	(873 – 1,355)	10.5	2,069	(1,728 – 2,410)	3.7
sycamore	410	(173 – 647)	3.9	938	(666 – 1,209)	1.7
birch spp.	1,743	(1,447 – 2,038)	16.4	3,099	(2,676 – 3,523)	5.5
alder	547	(369 – 725)	5.1	1,257	(966 – 1,548)	2.2
OLL broadleaves	698	(381 – 1,015)	6.6	1,242	(773 – 1,711)	2.2
OSL broadleaves	1,784	(1,489 – 2,080)	16.7	2,777	(2,364 – 3,190)	5.0
Total	10,641	(9,731 – 11,550)	100.0	55,928	(53,863 – 57,992)	100.0



CHAPTER 12

FOREST HEALTH AND VITALITY

The NFI is the only systematic national assessment of forest damage in Irish forests. Information is collected on forest damage at both plot and individual tree level. Forest health and vitality is affected by both abiotic (e.g. wind) and biotic (e.g. deer) factors. The types of forest damage recorded are those which are most common or cause most damage to Ireland's forests. In the NFI, damage to forest health is considered to be an alteration of the normal growth pattern of the trees. This definition therefore encompasses a wide range of factors, some of which would not have been traditionally considered as damage agents (e.g. nutrition).

Overall, the forest estate appears healthy. While 44.1% of stocked forest areas displayed signs of forest damage present, the severity of the damage was low. Purely abiotic damage was recorded on 19.9% of the forest area and purely biotic damage was recorded on 16.1% of the forest area. A mixture of both abiotic damage and biotic damage was recorded on 8.1% of the forest area.

Damage caused by animals (e.g. browsing by deer) was the most common type of biotic damage, followed by vegetation and harvesting operations. In terms of abiotic damage, climatic factors (e.g. windthrow) were the most common type of damage, followed by nutrient deficiency and anthropogenic factors.

With regard to biotic damage, *Phytophthora ramorum* was first detected in Japanese larch in 2010 and at the end of 2016 was confirmed present in this tree species at a total of 48 locations. The first detection of *Hymenoscyphus fraxineus* (previously referred to as *Chalara fraxinea*) in Ireland was in October 2012. At the end of 2016 the disease had been confirmed present on ash at a total of 322 plantations, distributed over 24 counties. Despite the widespread nature of these diseases, the total area affected is small and only one forest plot was classified as having a disease present. The systematic nature of NFI sampling grid is not conducive to accurately report on such small areas statistics.

In terms of biotic damage severity, 6,410ha or 3.3% of the areas with biotic damage present display critical levels of damage; this severity class means tree growth has been critically impacted and the damage agent is expected to kill trees in the future. Deer are the main causative agent for biotic damage, accounting for 37% of all biotic damage, harvesting machine damage figured highly as well at 16% followed by heather competition at 13.7%.

Looking at abiotic damage severity, some 25.7% of the areas with abiotic damage present display critical damage levels. Nutrient deficiency, endemic windthrow and exposure accounted for nearly 84.6% of the abiotic damage causal agents.

In general the main coniferous tree species are very healthy, displaying low levels of defoliation. Overall 41% of trees displayed some levels of defoliation, mainly low levels in the 1-20% range. The broadleaf species oak and beech were assessed for vitality and 92.4% were undamaged trees.

12.1 FOREST DAMAGE PRESENCE

12.1.1 Forest area by forest damage presence

Definition

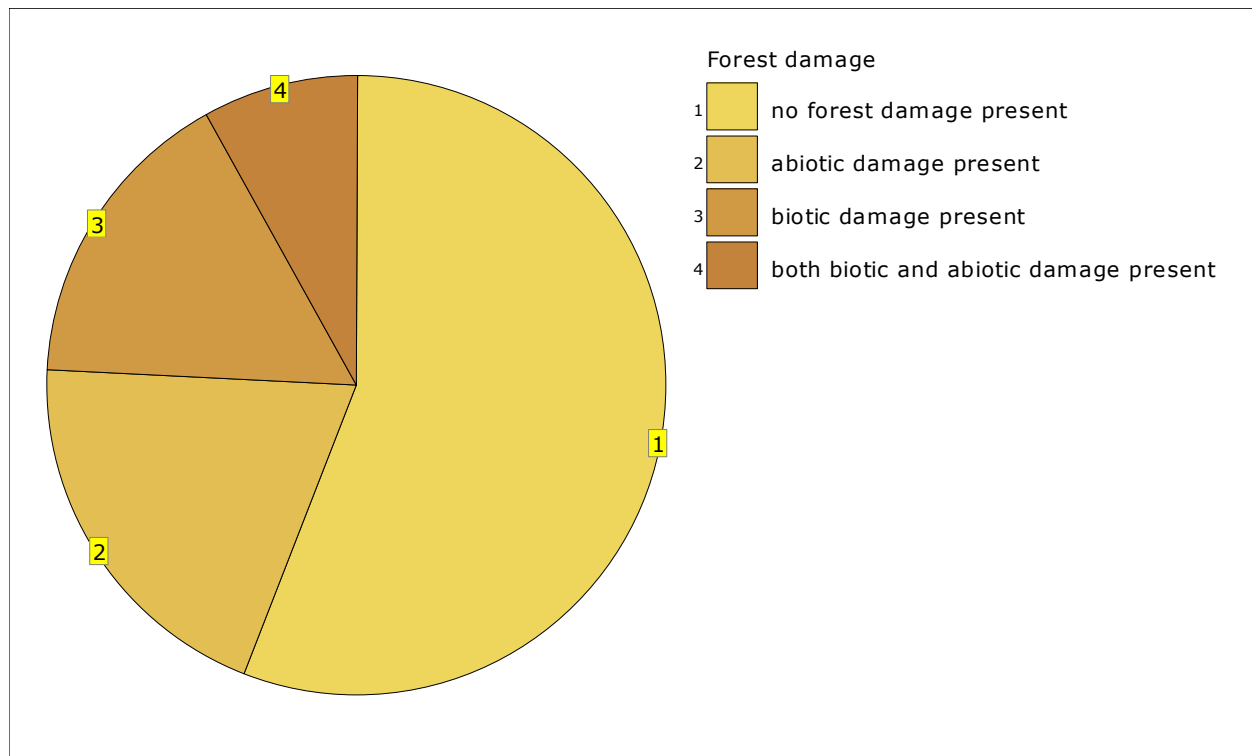
Damage presence

Describes the health and vitality of the national forest estate by the occurrence of damage from biotic (living) and abiotic (non-living) causal factors.

Methodology

The forest area is classified by the occurrence of biotic and abiotic damage.

Forest damage	Area		
	thousands ha	($\alpha=0.05$)	%
no forest damage present	384.83	(369.34 – 400.31)	55.9
abiotic damage present	136.55	(123.78 – 149.32)	19.9
biotic damage present	110.45	(98.72 – 122.17)	16.1
both biotic and abiotic damage present	55.70	(47.01 – 64.40)	8.1
Total	687.52		100.0



12.2 ABIOTIC DAMAGE

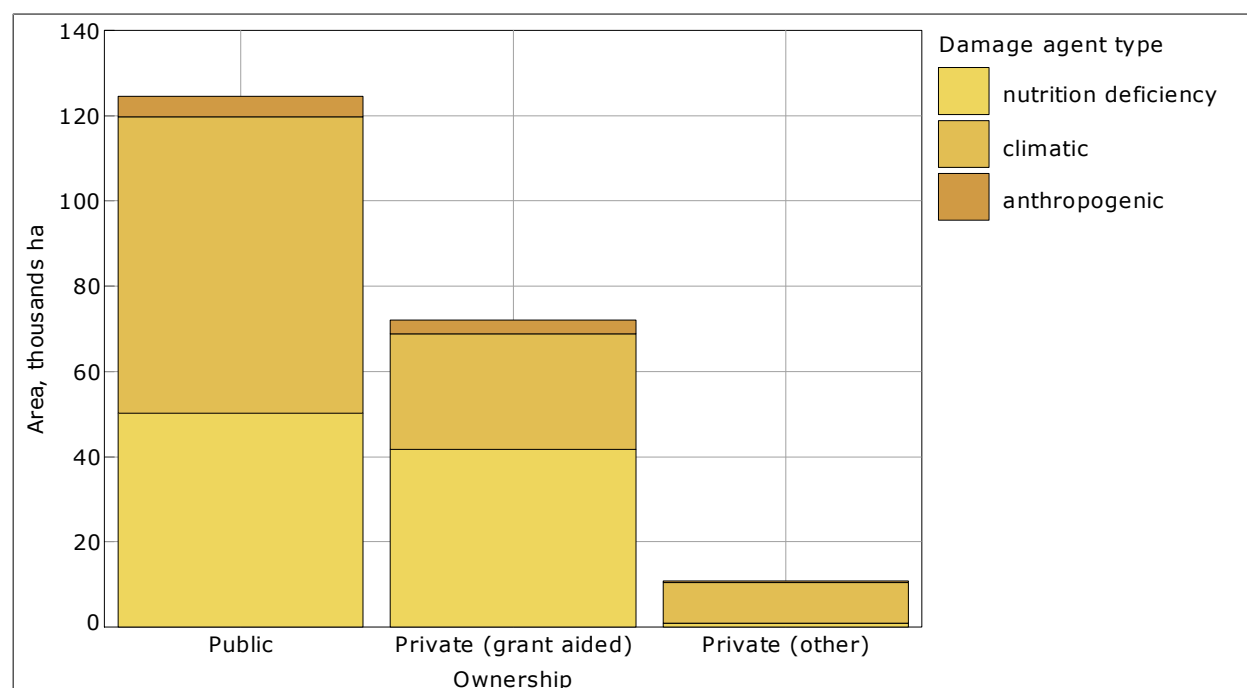
12.2.1 Total forest area by ownership and abiotic damage agent type

Definition	
Abiotic damage agent type	
Classifies abiotic damage into three broad categories:	
1.	Climate: Damage caused by climatic variables.
2.	Nutrient Deficiency: Damage caused by nutrient deficiency.
3.	Anthropogenic: Damage as a result of human activity.

Methodology	
The forest area with abiotic damage present is classified by ownership and damage agent type.	

Damage agent type	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
nutrition deficiency	50.17	(41.89 - 58.45)	40.3	41.65	(34.05 - 49.24)	57.8
climatic	69.65	(59.23 - 80.07)	55.8	27.20	(20.87 - 33.53)	37.8
anthropogenic	4.81	(2.11 - 7.51)	3.9	3.19	(0.99 - 5.38)	4.4

Damage agent type	Ownership / Area					
	Private (other)			Total		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
nutrition deficiency	0.80	(0.00 - 1.92)	7.4	92.62	(81.95 - 103.29)	44.6
climatic	9.61	(5.79 - 13.43)	88.9	106.46	(94.24 - 118.68)	51.4
anthropogenic	0.40	(0.00 - 1.20)	3.7	8.40	(4.84 - 11.96)	4.0



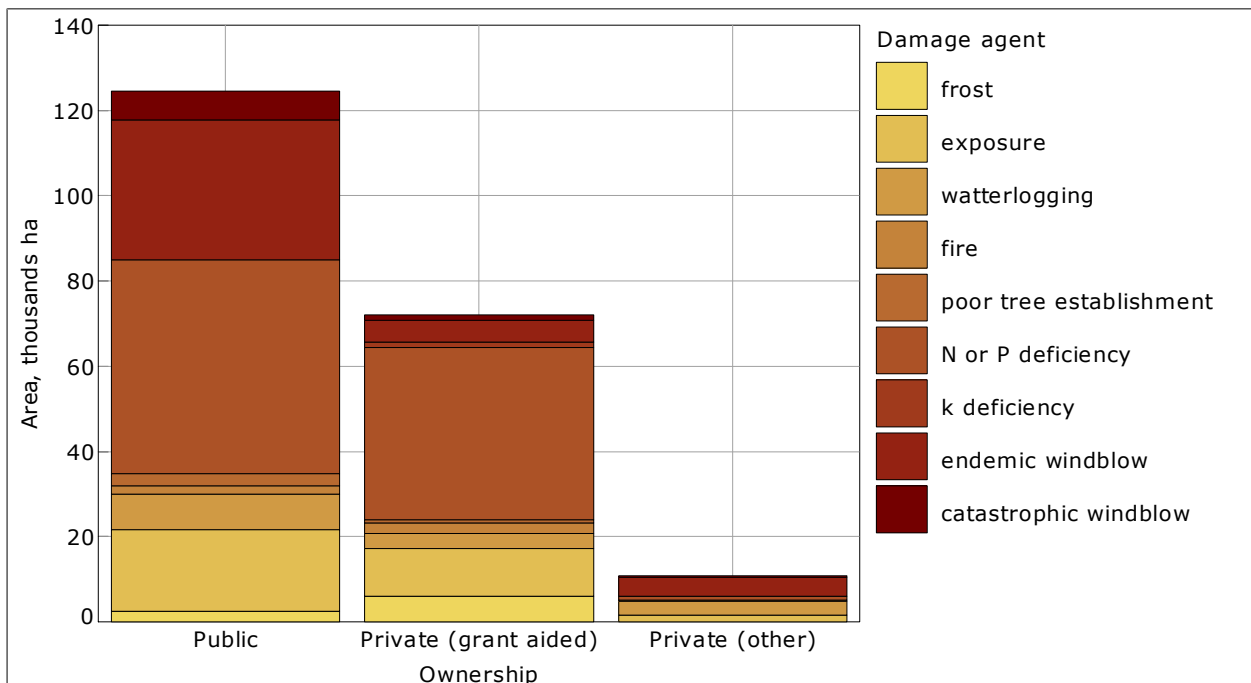
12.2.2 Total forest area by ownership and abiotic damage agent

Methodology

The forest area with abiotic damage present is classified by ownership and damage agent.

Damage agent	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
frost	2.40	(0.49 - 4.31)	1.9	6.01	(2.99 - 9.03)	8.3
exposure	19.22	(13.97 - 24.46)	15.4	11.19	(7.09 - 15.30)	15.5
watterlogging	8.40	(4.85 - 11.95)	6.7	3.60	(1.26 - 5.94)	5.0
fire	2.00	(0.25 - 3.75)	1.6	2.39	(0.49 - 4.29)	3.3
poor tree establishment	2.81	(0.75 - 4.87)	2.3	0.80	(0.00 - 1.90)	1.1
N or P deficiency	50.17	(41.89 - 58.45)	40.3	40.44	(32.95 - 47.94)	56.2
k deficiency	-	-	-	1.21	(0.00 - 2.57)	1.7
endemic windblow	32.83	(25.93 - 39.74)	26.3	5.19	(2.39 - 8.00)	7.2
catastrophic windblow	6.80	(3.58 - 10.02)	5.5	1.21	(0.00 - 2.57)	1.7

Damage agent	Ownership / Area					
	Private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
frost	-	-	-	8.41	(4.86 - 11.96)	4.1
exposure	1.60	(0.04 - 3.16)	14.8	32.01	(25.33 - 38.69)	15.4
watterlogging	3.20	(0.98 - 5.42)	29.6	15.19	(10.44 - 19.95)	7.3
fire	0.40	(0.00 - 1.20)	3.7	4.79	(2.10 - 7.49)	2.3
poor tree establishment	-	-	-	3.61	(1.28 - 5.94)	1.7
N or P deficiency	0.80	(0.00 - 1.92)	7.4	91.42	(80.79 - 102.04)	44.0
k deficiency	-	-	-	1.21	(0.00 - 2.57)	0.6
endemic windblow	4.41	(1.82 - 7.00)	40.8	42.44	(34.63 - 50.24)	20.5
catastrophic windblow	0.40	(0.00 - 1.21)	3.7	8.41	(4.83 - 11.99)	4.1

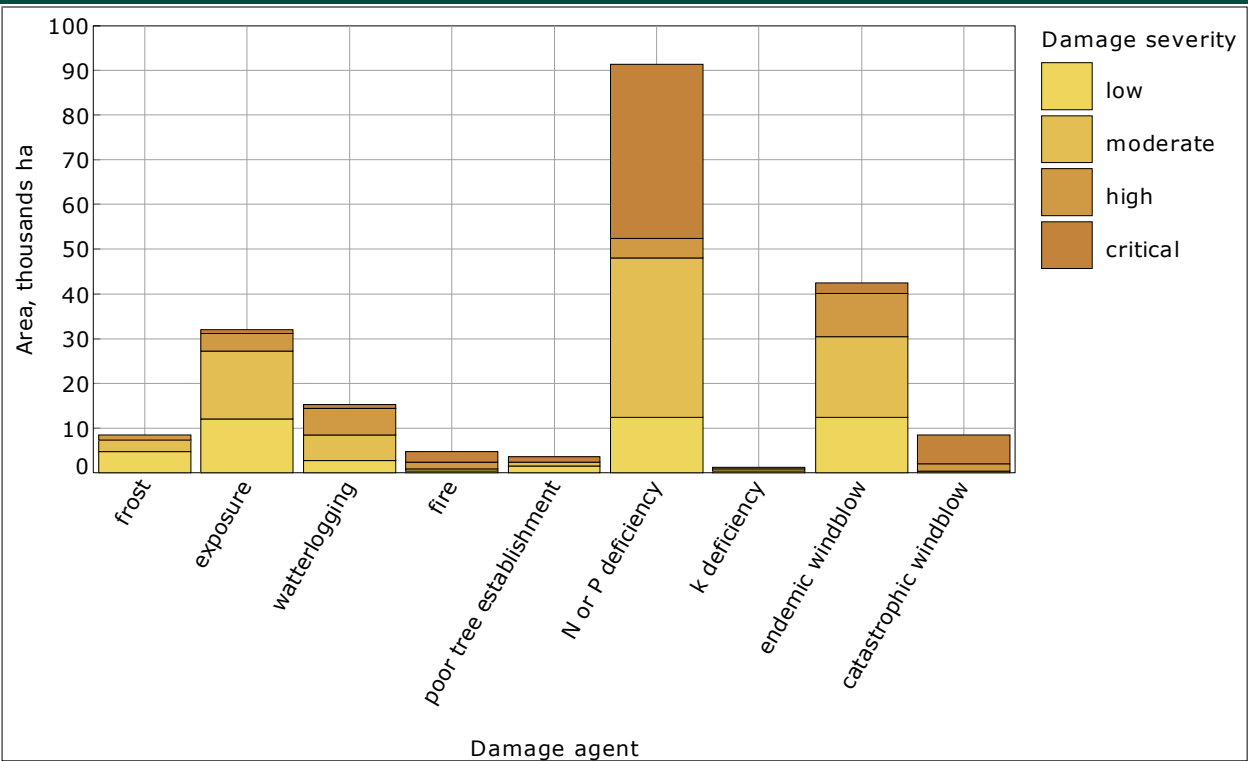


12.2.3 Forest area by ownership and abiotic damage severity

Definition
Damage severity The extent of abiotic damage is assessed in terms of tree mortality and the severity of the damage. Damage Severity has four categories namely: 1. Low: damage agent appears to have minimal impact on tree growth or vitality. 2. Moderate: damage agent has some obvious impact on tree growth or vitality, but the impact is limited. 3. High: damage agent has an obvious impact on tree growth or with evidence of decay or suppression of tree growth evident. 4. Critical: damage agent has critically impacted and killed trees or the damage agent is expected to kill trees in the near future.

Methodology
The forest area with abiotic damage present is classified by damage agent and damage severity.

Damage severity	Damage agent / Area					
	frost			exposure		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
low	4.80	(2.11 – 7.50)	57.1	11.98	(7.75 – 16.22)	37.4
moderate	2.40	(0.48 – 4.32)	28.6	15.21	(10.52 – 19.89)	47.6
high	1.21	(0.00 – 2.59)	14.3	4.01	(1.54 – 6.48)	12.5
critical	–	–	–	0.81	(0.00 – 1.93)	2.5
Total	8.41	(4.86 – 11.96)	100.0	32.01	(25.33 – 38.69)	100.0
Damage severity	Damage agent / Area					
	waterlogging			fire		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
low	2.79	(0.73 – 4.84)	18.3	0.40	(0.00 – 1.18)	8.3
moderate	5.59	(2.67 – 8.51)	36.8	0.40	(0.00 – 1.18)	8.3
high	6.01	(2.98 – 9.04)	39.6	1.60	(0.03 – 3.16)	33.3
critical	0.81	(0.00 – 1.92)	5.3	2.40	(0.48 – 4.31)	50.1
Total	15.19	(10.44 – 19.95)	100.0	4.79	(2.10 – 7.49)	100.0
Damage severity	Damage agent / Area					
	poor tree establishment			N or P deficiency		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
low	1.60	(0.04 – 3.16)	44.4	12.41	(8.11 – 16.71)	13.6
moderate	0.80	(0.00 – 1.91)	22.2	35.70	(28.60 – 42.79)	39.0
high	–	–	–	4.39	(1.82 – 6.95)	4.8
critical	1.21	(0.00 – 2.57)	33.4	38.92	(31.53 – 46.31)	42.6
Total	3.61	(1.28 – 5.94)	100.0	91.42	(80.79 – 102.04)	100.0
Damage severity	Damage agent / Area					
	k deficiency			endemic windblow		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
low	0.40	(0.00 – 1.18)	33.1	12.42	(8.11 – 16.73)	29.3
moderate	0.40	(0.00 – 1.20)	33.3	18.02	(12.83 – 23.21)	42.4
high	–	–	–	9.59	(5.78 – 13.40)	22.6
critical	0.41	(0.00 – 1.20)	33.6	2.40	(0.48 – 4.32)	5.7
Total	1.21	(0.00 – 2.57)	100.0	42.44	(34.63 – 50.24)	100.0
Damage severity	Damage agent / Area					
	catastrophic windblow					
	thousands ha	($\alpha=0.05$)	%			
low	0.40	(0.00 – 1.20)	4.7			
moderate	–	–	–			
high	1.61	(0.03 – 3.19)	19.1			
critical	6.40	(3.27 – 9.53)	76.2			
Total	8.41	(4.83 – 11.99)	100.0			



12.3 BIOTIC DAMAGE

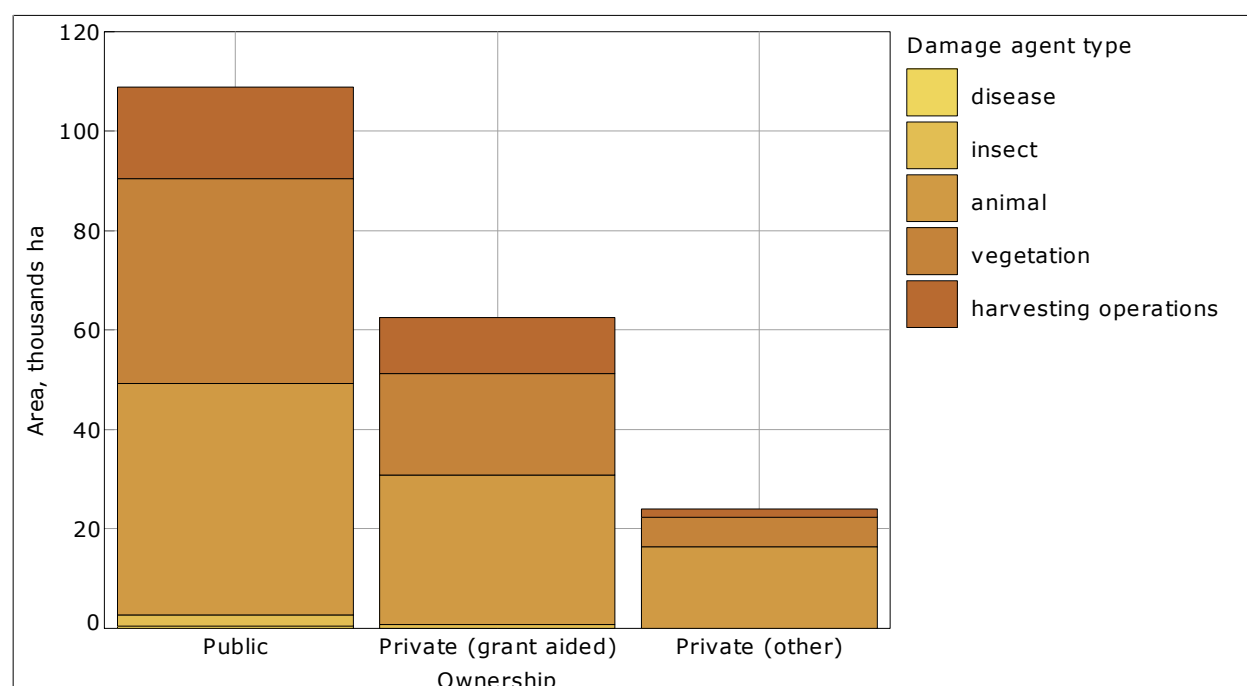
12.3.1 Forest area by ownership and biotic damage agent type

Definition
Biotic damage agent type Describes any living agents which cause damage to trees. Damage agent types are classified into five broad categories as follows: 1. Disease: Damage as a result of disease infection. 2. Insect: Damage as a result of insect attack. 3. Animal: Damage as a result of animal. 4. Vegetation: Damage as a result of competing vegetation. 5. Harvesting Operations: Damage as a result of harvesting operations.

Methodology
The forest area with biotic damage present is classified by damage agent type and ownership.

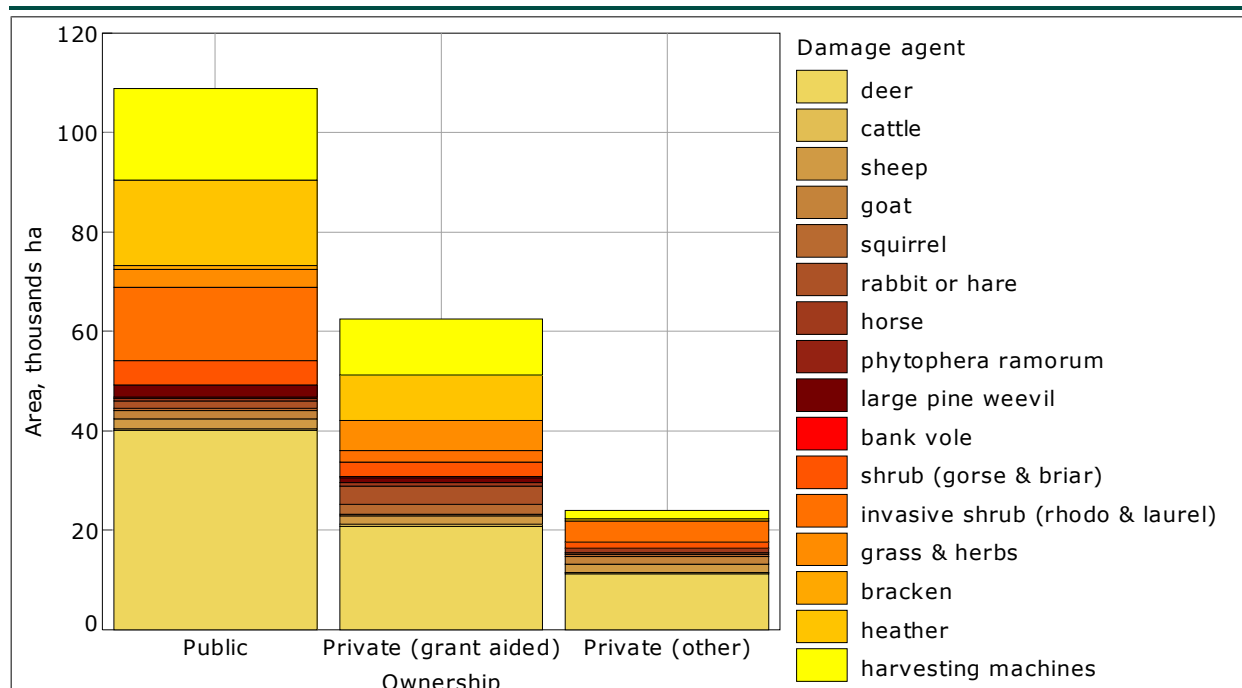
Damage agent type	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
disease	0.40	(0.00 - 1.21)	0.4	-	-	-
insect	2.41	(0.49 - 4.32)	2.2	0.80	(0.00 - 1.92)	1.3
animal	46.51	(37.49 - 55.53)	42.7	30.09	(22.95 - 37.24)	48.1
vegetation	41.22	(32.72 - 49.72)	37.8	20.41	(14.58 - 26.24)	32.7
harvesting operations	18.40	(12.73 - 24.06)	16.9	11.17	(6.83 - 15.51)	17.9

Damage agent type	Ownership / Area					
	Private (other)			Total		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
disease	-	-	-	0.40	(0.00 - 1.21)	0.2
insect	-	-	-	3.21	(1.00 - 5.42)	1.6
animal	16.37	(10.43 - 22.31)	68.3	92.98	(80.64 - 105.31)	47.6
vegetation	6.00	(2.79 - 9.21)	25.0	67.62	(57.16 - 78.09)	34.6
harvesting operations	1.60	(0.00 - 3.52)	6.7	31.16	(23.88 - 38.45)	16.0



12.3.2 Forest area by ownership and biotic damage agent

Methodology						
The forest area with biotic damage present is classified by damage agent and ownership.						
Damage agent	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha ($\alpha=0.05$)	%		thousands ha ($\alpha=0.05$)	%	
deer	40.12	(31.80 – 48.44)	36.7	20.91	(14.76 – 27.06)	33.5
cattle	0.40	(0.00 – 1.19)	0.4	0.40	(0.00 – 1.18)	0.6
sheep	1.99	(0.00 – 4.31)	1.8	1.60	(0.04 – 3.16)	2.6
goat	1.60	(0.03 – 3.17)	1.5	0.40	(0.00 – 1.20)	0.6
squirrel	0.40	(0.00 – 1.20)	0.4	1.99	(0.25 – 3.74)	3.2
rabbit or hare	1.60	(0.03 – 3.17)	1.5	3.60	(1.25 – 5.94)	5.8
horse	0.40	(0.00 – 1.19)	0.4	0.80	(0.00 – 1.90)	1.3
phytophthora ramorum	0.40	(0.00 – 1.21)	0.4	–	–	–
large pine weevil	2.41	(0.49 – 4.32)	2.2	0.80	(0.00 – 1.92)	1.3
bank vole	–	–	–	0.40	(0.00 – 1.18)	0.6
shrub (gorse & briar)	4.80	(2.10 – 7.51)	4.4	2.80	(0.73 – 4.88)	4.5
invasive shrub (rhodo & laurel)	14.81	(10.17 – 19.45)	13.6	2.40	(0.48 – 4.32)	3.8
grass & herbs	3.59	(1.25 – 5.93)	3.3	6.01	(2.99 – 9.04)	9.6
bracken	0.80	(0.00 – 1.93)	0.7	–	–	–
heather	17.21	(12.15 – 22.27)	15.8	9.19	(5.31 – 13.07)	14.7
harvesting machines	18.40	(12.73 – 24.06)	16.9	11.17	(6.83 – 15.51)	17.9
Damage agent	Ownership / Area					
	Private (other)			Total		
	thousands ha ($\alpha=0.05$)	%		thousands ha ($\alpha=0.05$)	%	
deer	11.18	(6.28 – 16.09)	46.4	72.22	(61.22 – 83.21)	37.0
cattle	0.40	(0.00 – 1.18)	1.7	1.19	(0.00 – 2.54)	0.6
sheep	1.60	(0.04 – 3.16)	6.7	5.18	(2.00 – 8.36)	2.7
goat	1.60	(0.03 – 3.17)	6.7	3.61	(1.26 – 5.95)	1.8
squirrel	0.40	(0.00 – 1.23)	1.7	2.80	(0.73 – 4.87)	1.4
rabbit or hare	0.40	(0.00 – 1.19)	1.7	5.60	(2.68 – 8.51)	2.9
horse	0.79	(0.00 – 1.89)	3.3	1.99	(0.25 – 3.73)	1.0
phytophthora ramorum	–	–	–	0.40	(0.00 – 1.21)	0.2
large pine weevil	–	–	–	3.21	(1.00 – 5.42)	1.6
bank vole	–	–	–	0.40	(0.00 – 1.18)	0.2
shrub (gorse & briar)	1.20	(0.00 – 2.56)	5.0	8.81	(5.16 – 12.45)	4.5
invasive shrub (rhodo & laurel)	4.40	(1.82 – 6.98)	18.4	21.61	(16.06 – 27.17)	11.1
grass & herbs	–	–	–	9.60	(5.79 – 13.42)	4.9
bracken	–	–	–	0.80	(0.00 – 1.93)	0.4
heather	0.40	(0.00 – 1.19)	1.7	26.80	(20.45 – 33.15)	13.7
harvesting machines	1.60	(0.00 – 3.52)	6.7	31.16	(23.88 – 38.45)	16.0



12.3.3 Forest area by biotic damage agent and severity of damage

Definition

Damage severity

The extent of biotic damage is assessed in terms of tree mortality and the severity of the damage. Damage Severity has four categories namely:

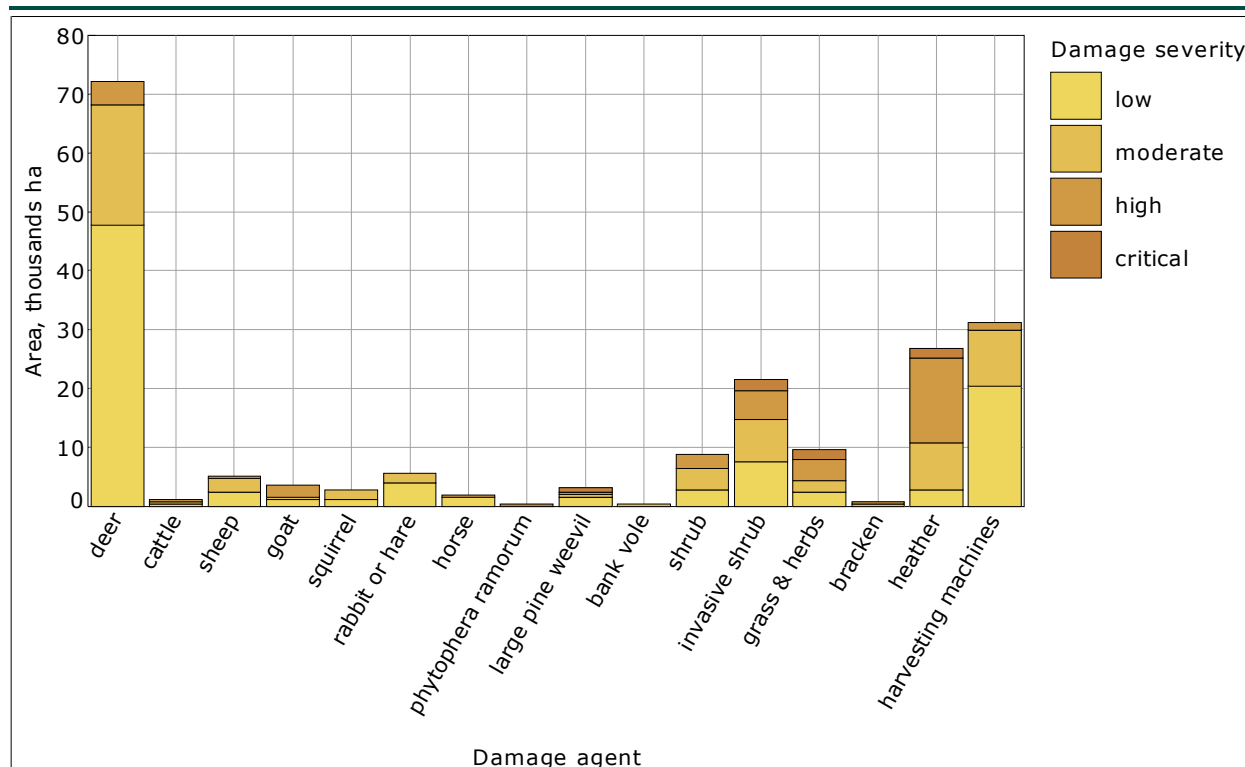
1. **Low:** damage agent appears to have minimal impact on tree growth or vitality.
2. **Moderate:** damage agent has some obvious impact on tree growth or vitality, but the impact is limited.
3. **High:** damage agent has an obvious impact on tree growth or with evidence of decay or suppression of tree growth evident.
4. **Critical:** damage agent has critically impacted and killed trees or the damage agent is expected to kill trees in the near future.

Methodology

The forest area with biotic damage present is classified by damage agent and severity.

Damage severity	Damage agent / Area					
	deer			cattle		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
low	47.75	(39.02 – 56.47)	66.1	0.40	(0.00 – 1.18)	33.5
moderate	20.45	(14.64 – 26.26)	28.3	0.40	(0.00 – 1.19)	33.2
high	4.02	(1.54 – 6.50)	5.6	0.40	(0.00 – 1.18)	33.3
critical	–	–	–	–	–	–
Total	72.22	(61.22 – 83.21)	100.0	1.19	(0.00 – 2.54)	100.0
Damage severity	Damage agent / Area					
	sheep			goat		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
low	2.39	(0.19 – 4.59)	46.1	1.20	(0.00 – 2.55)	33.2
moderate	2.39	(0.20 – 4.58)	46.1	0.40	(0.00 – 1.18)	11.1
high	0.40	(0.00 – 1.20)	7.8	2.01	(0.25 – 3.77)	55.7
critical	–	–	–	–	–	–
Total	5.18	(2.00 – 8.36)	100.0	3.61	(1.26 – 5.95)	100.0

Damage severity	Damage agent / Area					
	squirrel			rabbit or hare		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
low	1.20	(0.00 – 2.55)	42.8	3.99	(1.53 – 6.45)	71.3
moderate	1.60	(0.01 – 3.19)	57.2	1.60	(0.03 – 3.17)	28.7
high	–	–	–	–	–	–
critical	–	–	–	–	–	–
Total	2.80	(0.73 – 4.87)	100.0	5.60	(2.68 – 8.51)	100.0
Damage severity	Damage agent / Area					
	horse			phytophthora ramorum		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
low	1.59	(0.04 – 3.14)	79.9	–	–	–
moderate	–	–	–	–	–	–
high	0.40	(0.00 – 1.18)	20.1	–	–	–
critical	–	–	–	0.40	(0.00 – 1.21)	100.0
Total	1.99	(0.25 – 3.73)	100.0	0.40	(0.00 – 1.21)	100.0
Damage severity	Damage agent / Area					
	large pine weevil			bank vole		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
low	1.60	(0.03 – 3.18)	50.0	–	–	–
moderate	0.40	(0.00 – 1.21)	12.5	0.40	(0.00 – 1.18)	100.0
high	0.40	(0.00 – 1.20)	12.5	–	–	–
critical	0.80	(0.00 – 1.93)	25.0	–	–	–
Total	3.21	(1.00 – 5.42)	100.0	0.40	(0.00 – 1.18)	100.0
Damage severity	Damage agent / Area					
	shrub			invasive shrub		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
low	2.80	(0.74 – 4.87)	31.8	7.62	(4.23 – 11.00)	35.2
moderate	3.60	(1.26 – 5.95)	41.0	7.21	(3.93 – 10.49)	33.4
high	2.40	(0.48 – 4.31)	27.2	4.79	(2.10 – 7.49)	22.2
critical	–	–	–	2.00	(0.25 – 3.74)	9.2
Total	8.81	(5.16 – 12.45)	100.0	21.61	(16.06 – 27.17)	100.0
Damage severity	Damage agent / Area					
	grass & herbs			bracken		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
low	2.40	(0.48 – 4.33)	25.0	–	–	–
moderate	2.00	(0.25 – 3.76)	20.9	0.40	(0.00 – 1.21)	49.8
high	3.59	(1.26 – 5.92)	37.4	0.40	(0.00 – 1.21)	50.2
critical	1.60	(0.04 – 3.17)	16.7	–	–	–
Total	9.60	(5.79 – 13.42)	100.0	0.80	(0.00 – 1.93)	100.0
Damage severity	Damage agent / Area					
	heather			harvesting machines		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
low	2.79	(0.75 – 4.83)	10.4	20.36	(14.71 – 26.01)	65.4
moderate	8.00	(4.53 – 11.46)	29.8	9.61	(5.33 – 13.89)	30.8
high	14.41	(9.77 – 19.04)	53.8	1.20	(0.00 – 2.55)	3.8
critical	1.61	(0.04 – 3.17)	6.0	–	–	–
Total	26.80	(20.45 – 33.15)	100.0	31.16	(23.88 – 38.45)	100.0



12.4 DEFOLIATION

Definition

Defoliation

Tree defoliation is the abnormal loss of tree foliage.

Methodology

Defoliation is assessed on spruce and pine species that have a minimum Dbh of 7cm and have been sampled for height measurement. Therefore, the total number of trees for each species group is reduced when compared to previous analyses.

Defoliation is firstly assessed on the whole tree and the top one-third of the crown. Assessments are made on spruce and pine trees that were sampled for height.

12.4.1 Total number of conifer trees by species group and degree of defoliation

Definition

Degree of defoliation

The percentage of needles or leaves lost.

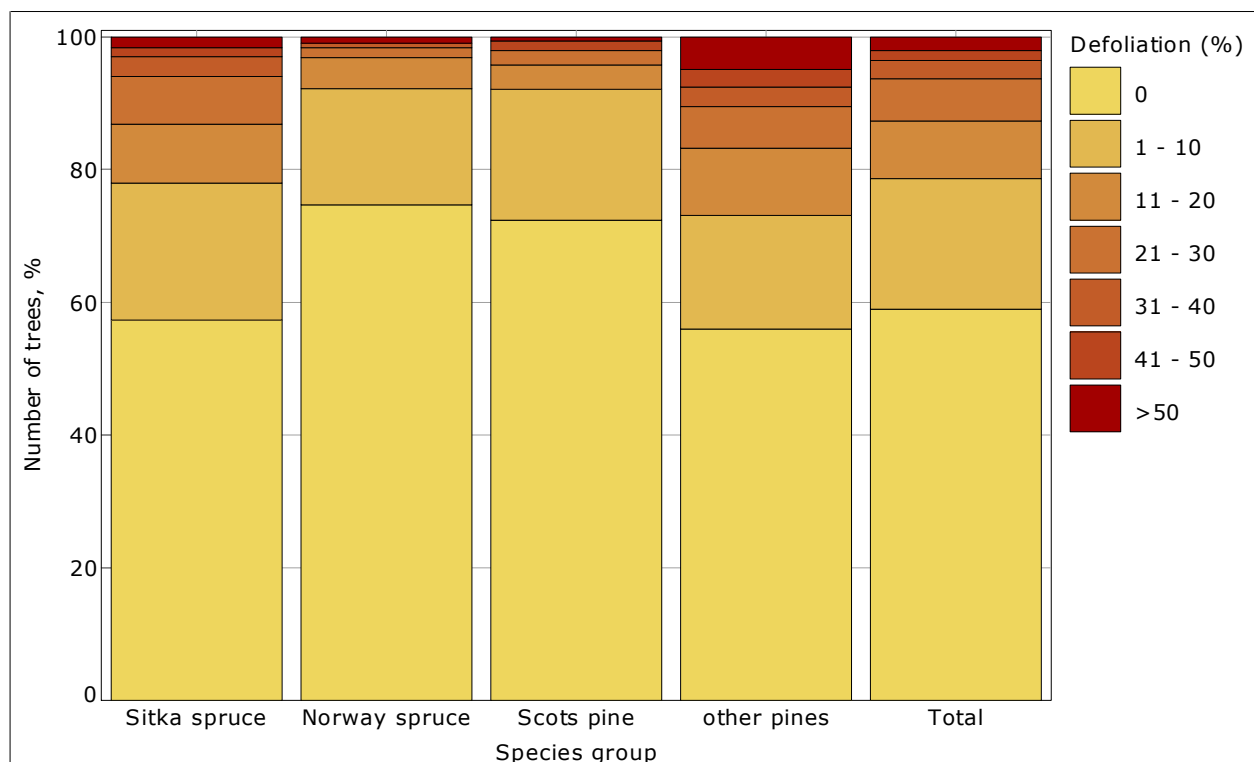
Methodology

The total number of trees that were assessed for height is classified by species group and the defoliation percentage of the whole crown.

Defoliation (%)	Species group / Number of trees				
	Sitka spruce			Norway spruce	
	thousands	($\alpha = 0.05$)	%	thousands	($\alpha = 0.05$) %
0	24,413	(22,742 - 26,085)	57.4	3,380	(2,614 - 4,146) 74.7
1 - 10	8,743	(7,708 - 9,778)	20.6	790	(467 - 1,113) 17.5
11 - 20	3,809	(3,199 - 4,420)	9.0	216	(94 - 338) 4.8
21 - 30	3,027	(2,464 - 3,591)	7.1	64	(15 - 114) 1.4
31 - 40	1,272	(924 - 1,620)	3.0	32	(0 - 64) 0.7
41 - 50	569	(345 - 793)	1.3	-	- - -
>50	698	(495 - 900)	1.6	40	(0 - 82) 0.9
Total	42,532	(40,410 - 44,653)	100.0	4,523	(3,621 - 5,424) 100.0

Defoliation (%)	Species group / Number of trees				
	Scots pine			other pines	
	thousands	($\alpha = 0.05$)	%	thousands	($\alpha = 0.05$) %
0	1,112	(694 - 1,530)	72.4	5,108	(4,292 - 5,925) 56.1
1 - 10	303	(84 - 523)	19.8	1,561	(1,156 - 1,966) 17.1
11 - 20	56	(14 - 97)	3.6	922	(635 - 1,208) 10.1
21 - 30	32	(1 - 63)	2.1	577	(350 - 804) 6.3
31 - 40	-	- - -	-	273	(134 - 411) 3.0
41 - 50	24	(0 - 60)	1.6	240	(140 - 341) 2.6
>50	8	(0 - 24)	0.5	441	(270 - 613) 4.8
Total	1,536	(1,034 - 2,037)	100.0	9,122	(7,953 - 10,291) 100.0

Defoliation (%)	Species group / Number of trees		
	Total		
	thousands	($\alpha = 0.05$)	%
0	34,014	(32,100 - 35,928)	59.0
1 - 10	11,398	(10,212 - 12,584)	19.7
11 - 20	5,003	(4,297 - 5,708)	8.7
21 - 30	3,700	(3,068 - 4,333)	6.4
31 - 40	1,577	(1,184 - 1,970)	2.7
41 - 50	833	(587 - 1,080)	1.4
>50	1,187	(924 - 1,450)	2.1
Total	57,712	(55,265 - 60,159)	100.0



12.4.2 Total number of trees by species group and degree of defoliation in the top third of the crown

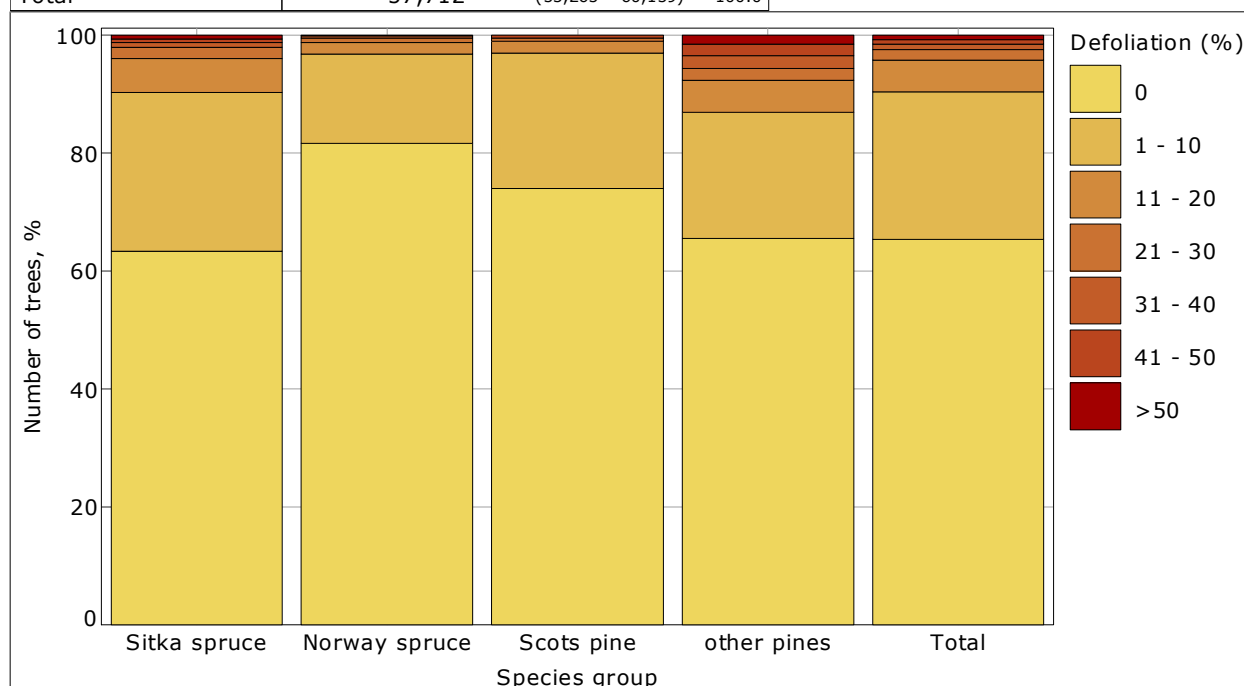
Methodology

Spruce and pine trees assessed for height are classified by defoliation in the top one third of the crown.

Defoliation (%)	Species group / Number of trees				
	Sitka spruce			Norway spruce	
	thousands	($\alpha = 0.05$)	%	thousands	($\alpha = 0.05$) %
0	26,950	(25,190 – 28,710)	63.2	3,692	(2,880 – 4,504) 81.6
1 - 10	11,424	(10,290 – 12,557)	26.9	687	(385 – 989) 15.2
11 - 20	2,458	(1,974 – 2,942)	5.8	88	(0 – 196) 1.9
21 - 30	819	(586 – 1,052)	1.9	32	(1 – 64) 0.7
31 - 40	320	(188 – 452)	0.8	16	(0 – 38) 0.4
41 - 50	280	(168 – 393)	0.7	8	(0 – 24) 0.2
>50	280	(155 – 406)	0.7	–	– – –
Total	42,532	(40,410 – 44,653)	100.0	4,523	(3,621 – 5,424) 100.0

Defoliation (%)	Species group / Number of trees				
	Scots pine			other pines	
	thousands	($\alpha = 0.05$)	%	thousands	($\alpha = 0.05$) %
0	1,136	(714 – 1,558)	74.0	5,973	(5,077 – 6,870) 65.5
1 - 10	352	(131 – 572)	22.9	1,962	(1,473 – 2,451) 21.5
11 - 20	32	(0 – 71)	2.1	489	(296 – 683) 5.4
21 - 30	8	(0 – 24)	0.5	184	(99 – 270) 2.0
31 - 40	–	– – –	–	192	(94 – 291) 2.1
41 - 50	8	(0 – 24)	0.5	177	(90 – 263) 1.9
>50	–	– – –	–	144	(61 – 228) 1.6
Total	1,536	(1,034 – 2,037)	100.0	9,122	(7,953 – 10,291) 100.0

Defoliation (%)	Species group / Number of trees		
	Total		
	thousands	($\alpha = 0.05$)	%
0	37,751	(35,733 – 39,769)	65.5
1 - 10	14,424	(13,113 – 15,735)	25.0
11 - 20	3,068	(2,498 – 3,638)	5.3
21 - 30	1,044	(793 – 1,295)	1.8
31 - 40	528	(360 – 697)	0.9
41 - 50	473	(332 – 614)	0.8
>50	425	(275 – 574)	0.7
Total	57,712	(55,265 – 60,159)	100.0



12.5 DISCOLOURATION

Definition

Discolouration

Discolouration is a deviation from the usual colour of the living foliage for that species; dead or dying needles are excluded.

Methodology

Discolouration is assessed on spruce and pine species that have a minimum Dbh of 7 cm and have been sampled for height measurement.

12.5.1 Total number of conifer trees by species group and discolouration type

Definition

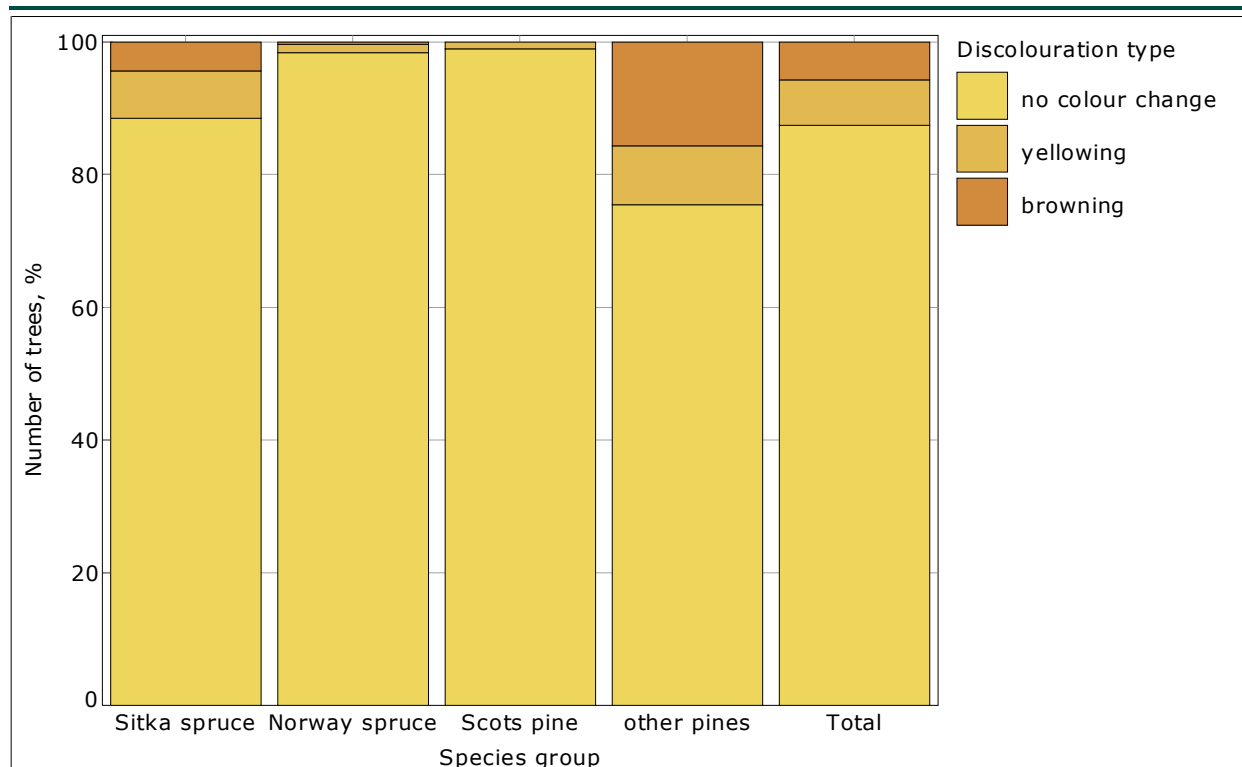
Discolouration type

The colour change is recorded as yellowing or browning.

Methodology

The total number of trees that were assessed for height is classified by species group and discolouration type.

Discolouration type	Species group / Number of trees					
	Sitka spruce			Norway spruce		
	thousands	($\alpha = 0.05$)	%	thousands	($\alpha = 0.05$)	%
no colour change	37,636	(35,556 – 39,716)	88.5	4,450	(3,560 – 5,341)	98.4
yellowing	3,076	(2,437 – 3,715)	7.2	56	(0 – 115)	1.2
browning	1,820	(1,276 – 2,364)	4.3	16	(0 – 39)	0.4
Total	42,532	(40,410 – 44,653)	100.0	4,523	(3,621 – 5,424)	100.0
Discolouration type	Species group / Number of trees					
	Scots pine			other pines		
	thousands	($\alpha = 0.05$)	%	thousands	($\alpha = 0.05$)	%
no colour change	1,520	(1,018 – 2,021)	99.0	6,892	(5,885 – 7,898)	75.6
yellowing	16	(0 – 38)	1.0	803	(497 – 1,110)	8.8
browning	–	–	–	1,427	(978 – 1,876)	15.6
Total	1,536	(1,034 – 2,037)	100.0	9,122	(7,953 – 10,291)	100.0
Discolouration type	Species group / Number of trees					
	Total					
	thousands	($\alpha = 0.05$)	%			
no colour change	50,498	(48,123 – 52,873)	87.5			
yellowing	3,952	(3,205 – 4,698)	6.8			
browning	3,263	(2,553 – 3,973)	5.7			
Total	57,712	(55,265 – 60,159)	100.0			



12.5.2 Total number of trees by species group and discolouration trend

Definition

Discolouration trend

The colour change is recorded as one of the following:

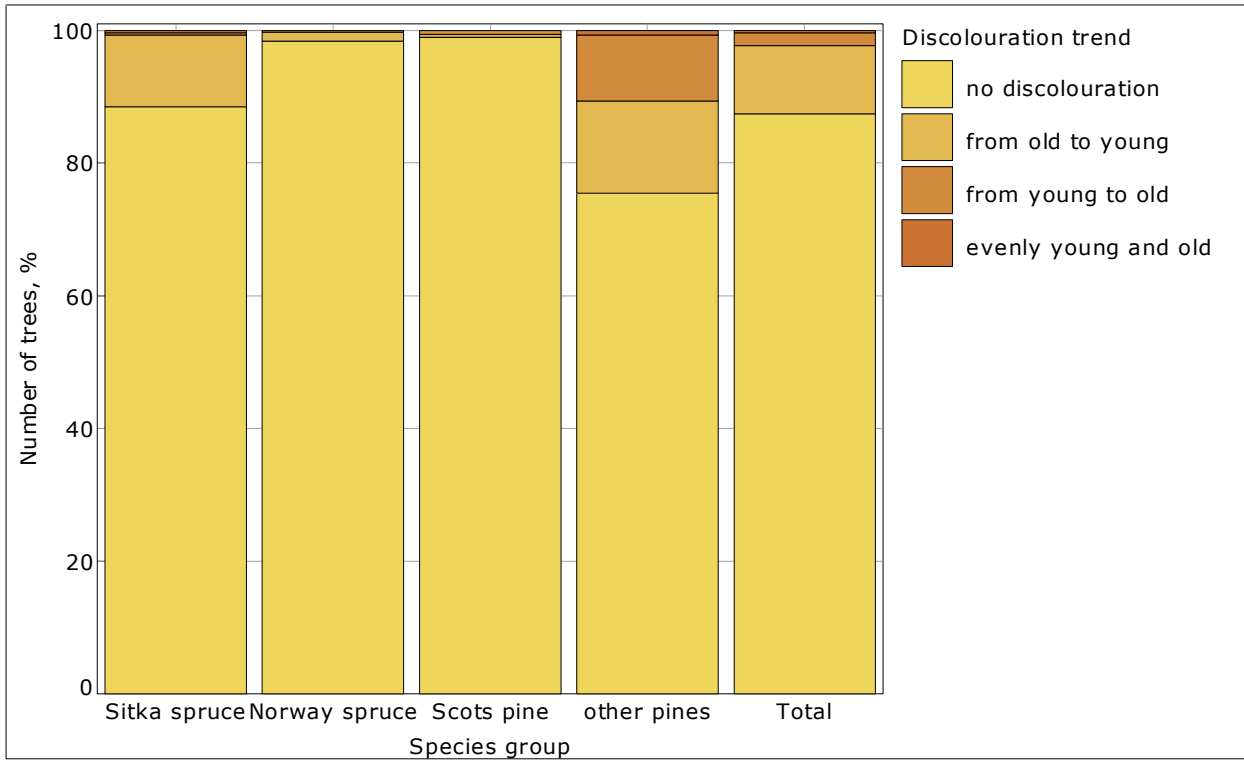
1. **From old to young:** The intensity of discolouration is more extreme in the old foliage
2. **From young to old:** The intensity of discolouration is more extreme in the young foliage.
3. **Evenly young and old:** Foliage age has no impact on the discolouration trend.

Methodology

The total number of spruce and pine trees that were assessed for height is classified by species group by species group and discolouration trend.

Discolouration trend	Species group / Number of trees					
	Sitka spruce			Norway spruce		
	thousands	($\alpha=0.05$)	%	thousands	($\alpha=0.05$)	%
no discolouration	37,636	(35,556 – 39,716)	88.5	4,450	(3,560 – 5,341)	98.4
from old to young	4,600	(3,800 – 5,400)	10.8	64	(0 – 137)	1.4
from young to old	160	(31 – 288)	0.4	8	(0 – 24)	0.2
evenly young and old	136	(47 – 225)	0.3	–	–	–
Total	42,532	(40,410 – 44,653)	100.0	4,523	(3,621 – 5,424)	100.0
Discolouration trend	Species group / Number of trees					
	Scots pine			other pines		
	thousands	($\alpha=0.05$)	%	thousands	($\alpha=0.05$)	%
no discolouration	1,520	(1,018 – 2,021)	99.0	6,892	(5,885 – 7,898)	75.6
from old to young	8	(0 – 25)	0.5	1,261	(841 – 1,682)	13.8
from young to old	8	(0 – 24)	0.5	905	(562 – 1,248)	9.9
evenly young and old	–	–	–	65	(10 – 119)	0.7
Total	1,536	(1,034 – 2,037)	100.0	9,122	(7,953 – 10,291)	100.0

Discolouration trend	Species group / Number of trees		
	Total		
	thousands	($\alpha = 0.05$)	%
no discolouration	50,498	(48,123 – 52,873)	87.5
from old to young	5,934	(5,009 – 6,859)	10.3
from young to old	1,080	(714 – 1,447)	1.9
evenly young and old	200	(96 – 305)	0.3
Total	57,712	(55,265 – 60,159)	100.0



12.5.3 Total number of trees by species group and degree of discolouration

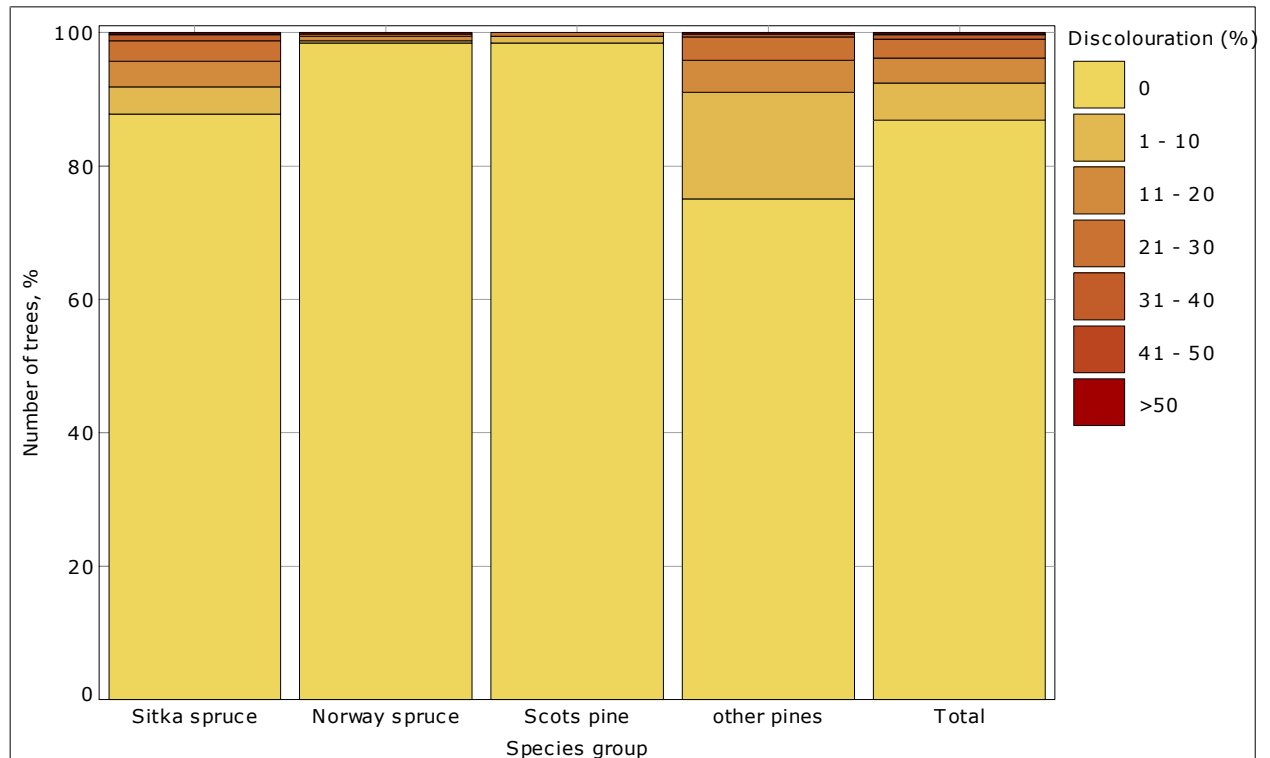
Definition
Discolouration intensity
Describes the depth of the discolouration from a healthy colour for that species, with 0% indicative of healthy needles showing no discoloration.

Methodology
The total number of spruce and pine trees that were assessed for height is classified by species group and intensity of discolouration.

Discolouration (%)	Species group / Number of trees					
	Sitka spruce			Norway spruce		
	thousands	($\alpha = 0.05$)	%	thousands	($\alpha = 0.05$)	%
0	37,348	(35,278 – 39,419)	87.8	4,450	(3,560 – 5,341)	98.3
1 - 10	1,709	(1,266 – 2,151)	4.0	16	(0 – 39)	0.4
11 - 20	1,656	(1,227 – 2,085)	3.9	32	(0 – 72)	0.7
21 - 30	1,281	(891 – 1,672)	3.0	16	(0 – 39)	0.4
31 - 40	409	(196 – 622)	1.0	–	–	–
41 - 50	56	(0 – 113)	0.1	–	–	–
>50	72	(0 – 144)	0.2	8	(0 – 24)	0.2
Total	42,532	(40,410 – 44,653)	100.0	4,523	(3,621 – 5,424)	100.0

Discolouration (%)	Species group / Number of trees					
	Scots pine			other pines		
	thousands	($\alpha = 0.05$)	%	thousands	($\alpha = 0.05$)	%
0	1,512	(1,012 - 2,011)	98.5	6,844	(5,842 - 7,846)	75.1
1 - 10	16	(0 - 39)	1.0	1,460	(1,044 - 1,876)	16.0
11 - 20	–	–	–	441	(257 - 624)	4.8
21 - 30	8	(0 - 24)	0.5	313	(96 - 530)	3.4
31 - 40	–	–	–	40	(0 - 82)	0.4
41 - 50	–	–	–	8	(0 - 24)	0.09
>50	–	–	–	16	(0 - 38)	0.2
Total	1,536	(1,034 - 2,037)	100.0	9,122	(7,953 - 10,291)	100.0

Discolouration (%)	Species group / Number of trees		
	Total		
	thousands	($\alpha = 0.05$)	%
0	50,154	(47,791 - 52,517)	86.9
1 - 10	3,201	(2,590 - 3,812)	5.5
11 - 20	2,129	(1,646 - 2,613)	3.7
21 - 30	1,618	(1,151 - 2,086)	2.8
31 - 40	449	(222 - 676)	0.8
41 - 50	64	(5 - 123)	0.1
>50	96	(19 - 173)	0.2
Total	57,712	(55,265 - 60,159)	100.0



12.6 BROADLEAF VITALITY

12.6.1 Total number of oak and beech trees assessed for height by broadleaf vitality

Definition

Broadleaf vitality

Broadleaf vitality describes the capacity of a broadleaf tree species to continue to grow in a healthy condition:

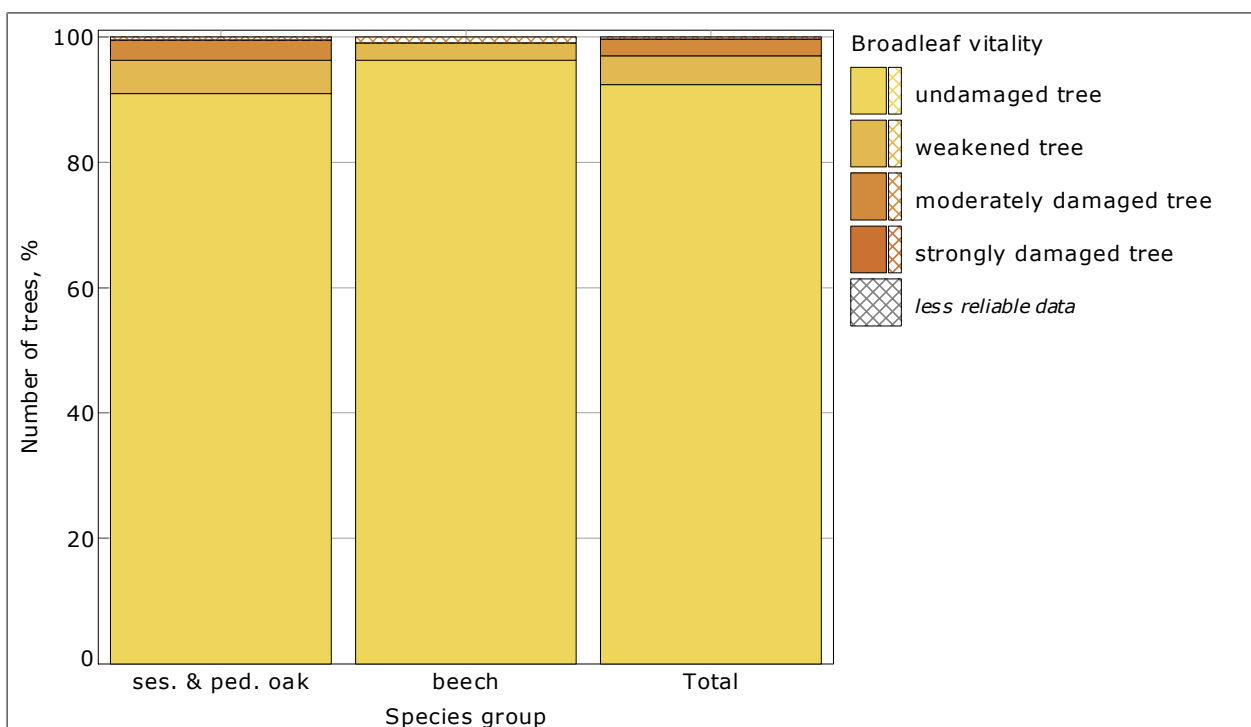
1. **Undamaged:** Tree is growing healthily.
2. **Weakened:** Tree growth is slightly affected due to minor stress, such as minimal stem damage.
3. **Moderately damaged:** Tree growth is moderately affected due to considerable stress, such as prolonged periods of drought or defoliation.
4. **Strongly damaged:** Tree is under severe stress, significantly affecting tree growth/survival. High levels of defoliation and/or dieback.

Methodology

Assessment is made on oak and beech trees that have been sampled for height measurement. The total numbers of these oak and beech are classified by vitality type. All trees with a minimum Dbh of 7cm and assessed for height were included in the analysis.

Broadleaf vitality	Species group / Number of trees					
	ses. & ped. oak			beech		
	thousands	($\alpha = 0.05$)	%	thousands	($\alpha = 0.05$)	%
undamaged tree	6,598	(4,235 - 8,962)	91.0	2,542	(1,592 - 3,493)	96.2
weakened tree	382	(346 - 418)	5.3	74	(0 - 151)	2.8
moderately damaged tree	241	(190 - 292)	3.3	26	-	1.0
strongly damaged tree	32	-	0.4	-	-	-
Total	7,253	(4,902 - 9,603)	100.0	2,642	(1,691 - 3,592)	100.0

Broadleaf vitality	Species group / Number of trees		
	Total		
	thousands	($\alpha = 0.05$)	%
undamaged tree	9,141	(6,710 - 11,571)	92.4
weakened tree	455	(379 - 532)	4.6
moderately damaged tree	266	(216 - 317)	2.7
strongly damaged tree	32	-	0.3
Total	9,895	(7,420 - 12,369)	100.0



12.7 SOCIAL STATUS AND COMPETITION

12.7.1 Total number of trees by social status (Kraft) and species group (Dbh>7cm)

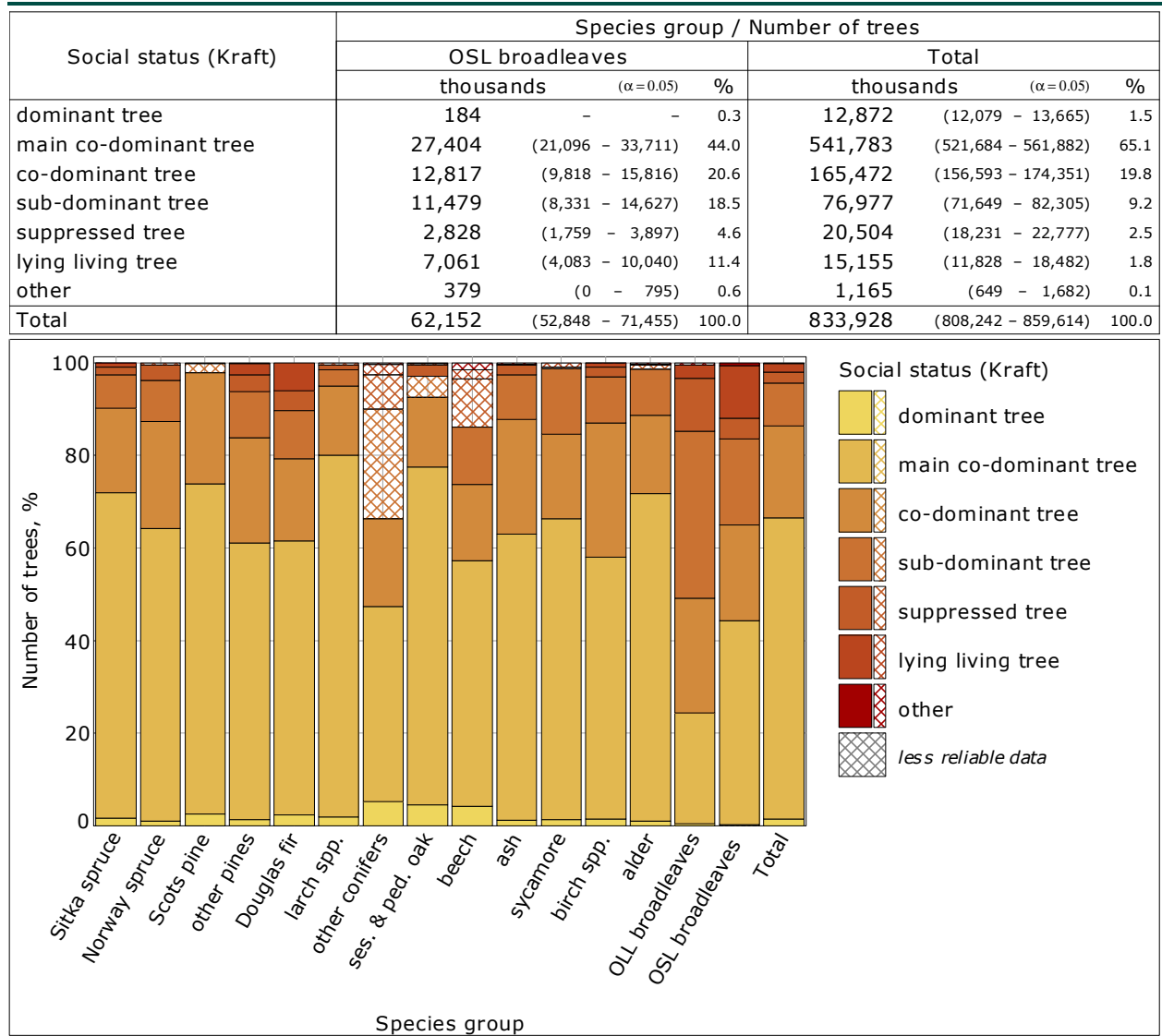
Definition	
Social status (Kraft)	
Social status (Kraft) describes the relative position of the trees in terms of their vertical distribution and their inter-relationships.	
1.	Dominant trees: Trees with crowns extending above the general level of the crown cover and receiving full light from above and partly from the sides; larger than the average trees in the stand and with well-developed crowns.
2.	Main co-dominant: Trees with crowns present in the general level of the crown cover and receiving full light from above and partly from the sides; larger than the average trees in the stand and with crowns well developed but possibly somewhat crowded on the sides.
3.	Co-dominant trees: Trees with crowns forming the general level of the crown cover and receiving full light from above but comparatively little from the sides; usually with medium-sized crowns more or less crowded on the sides.
4.	Sub-dominant trees: Trees shorter than those in the three preceding classes but with crowns extending into the crown cover formed by co-dominant and main co-dominant trees; receiving a little direct light from above but none from the sides; usually with small crowns considerably crowded on the sides.
5.	Suppressed trees: Trees with crowns entirely below the general level of the crown cover, receiving no direct light either from above or from the sides.
6.	Other: Trees that cannot be accurately described by the above categories e.g. windthrown trees.

Methodology
The total number of trees (Dbh $\geq$ 7 cm) are classified by species group and social status.

Social status (Kraft)	Species group / Number of trees					
	Sitka spruce			Norway spruce		
	thousands	($\alpha=0.05$)	%	thousands	($\alpha=0.05$)	%
dominant tree	7,587	(6,962 - 8,212)	1.7	428	(134 - 722)	1.1
main co-dominant tree	319,010	(303,896 - 334,125)	70.2	24,271	(20,009 - 28,532)	63.1
co-dominant tree	82,626	(77,252 - 88,000)	18.2	8,879	(7,150 - 10,607)	23.1
sub-dominant tree	32,649	(29,988 - 35,311)	7.2	3,422	(2,634 - 4,210)	8.9
suppressed tree	8,079	(6,998 - 9,159)	1.8	1,259	(650 - 1,868)	3.3
lying living tree	3,671	(2,360 - 4,982)	0.8	210	-	0.5
other	307	(0 - 1,064)	0.07	-	-	-
Total	453,930	(434,539 - 473,320)	100.0	38,468	(32,221 - 44,715)	100.0

Social status (Kraft)	Species group / Number of trees					
	Scots pine			other pines		
	thousands	($\alpha=0.05$)	%	thousands	($\alpha=0.05$)	%
dominant tree	204	(0 - 470)	2.6	1,097	(910 - 1,285)	1.4
main co-dominant tree	5,695	(3,384 - 8,005)	71.3	45,798	(40,705 - 50,891)	59.7
co-dominant tree	1,912	(409 - 3,416)	23.9	17,406	(15,153 - 19,658)	22.7
sub-dominant tree	168	-	2.1	7,678	(6,153 - 9,204)	10.0
suppressed tree	-	-	-	2,740	(2,222 - 3,257)	3.6
lying living tree	8	-	0.1	1,894	(1,080 - 2,709)	2.5
other	-	-	-	86	-	0.1
Total	7,986	(4,844 - 11,129)	100.0	76,699	(68,563 - 84,835)	100.0

Social status (Kraft)	Species group / Number of trees					
	Douglas fir			larch spp.		
	thousands	($\alpha=0.05$)	%	thousands	($\alpha=0.05$)	%
dominant tree	357	(277 - 436)	2.5	629	(462 - 797)	1.9
main co-dominant tree	8,576	(5,638 - 11,514)	59.0	25,999	(21,951 - 30,047)	78.1
co-dominant tree	2,587	(1,742 - 3,432)	17.8	4,989	(3,724 - 6,255)	15.0
sub-dominant tree	1,517	(954 - 2,081)	10.4	1,130	(835 - 1,425)	3.4
suppressed tree	611	(0 - 1,290)	4.2	368	(0 - 1,050)	1.1
lying living tree	883	(0 - 2,249)	6.1	154	-	0.5
other	-	-	-	-	-	-
Total	14,532	(11,019 - 18,045)	100.0	33,270	(28,018 - 38,521)	100.0
Social status (Kraft)	Species group / Number of trees					
	other conifers			ses. & ped. oak		
	thousands	($\alpha=0.05$)	%	thousands	($\alpha=0.05$)	%
dominant tree	112	(10 - 214)	5.3	494	(429 - 560)	4.5
main co-dominant tree	900	(485 - 1,315)	42.0	7,974	(5,056 - 10,892)	73.0
co-dominant tree	408	(0 - 1,455)	19.1	1,646	(693 - 2,599)	15.1
sub-dominant tree	506	-	23.7	495	-	4.5
suppressed tree	156	-	7.3	269	(191 - 347)	2.5
lying living tree	48	-	2.2	24	-	0.2
other	8	-	0.4	24	-	0.2
Total	2,138	(1,189 - 3,088)	100.0	10,926	(7,087 - 14,765)	100.0
Social status (Kraft)	Species group / Number of trees					
	beech			ash		
	thousands	($\alpha=0.05$)	%	thousands	($\alpha=0.05$)	%
dominant tree	232	(146 - 318)	4.3	320	(265 - 375)	1.2
main co-dominant tree	2,893	(1,714 - 4,072)	53.2	16,765	(11,950 - 21,581)	61.9
co-dominant tree	896	(659 - 1,134)	16.4	6,688	(3,924 - 9,451)	24.7
sub-dominant tree	668	(0 - 3,359)	12.2	2,603	(1,876 - 3,330)	9.6
suppressed tree	573	-	10.5	556	(0 - 1,235)	2.1
lying living tree	100	-	1.8	66	-	0.2
other	87	-	1.6	80	-	0.3
Total	5,450	(3,663 - 7,237)	100.0	27,078	(21,138 - 33,019)	100.0
Social status (Kraft)	Species group / Number of trees					
	sycamore			birch spp.		
	thousands	($\alpha=0.05$)	%	thousands	($\alpha=0.05$)	%
dominant tree	148	(123 - 173)	1.3	758	(621 - 896)	1.5
main co-dominant tree	7,343	(4,042 - 10,645)	65.1	28,978	(24,822 - 33,135)	56.5
co-dominant tree	2,049	(1,012 - 3,086)	18.2	14,817	(11,771 - 17,862)	29.0
sub-dominant tree	1,616	(102 - 3,129)	14.3	5,075	(4,402 - 5,749)	9.9
suppressed tree	26	-	0.2	1,058	(679 - 1,437)	2.1
lying living tree	104	-	0.9	451	(0 - 969)	0.9
other	-	-	-	34	-	0.07
Total	11,287	(7,057 - 15,516)	100.0	51,173	(44,819 - 57,526)	100.0
Social status (Kraft)	Species group / Number of trees					
	alder			OLL broadleaves		
	thousands	($\alpha=0.05$)	%	thousands	($\alpha=0.05$)	%
dominant tree	248	(183 - 313)	1.1	72	(0 - 173)	0.5
main co-dominant tree	16,443	(12,297 - 20,588)	70.7	3,734	(2,190 - 5,278)	23.9
co-dominant tree	3,898	(2,915 - 4,881)	16.8	3,854	(1,416 - 6,293)	24.7
sub-dominant tree	2,347	(740 - 3,954)	10.1	5,625	(4,198 - 7,051)	36.1
suppressed tree	184	-	0.8	1,797	(1,281 - 2,312)	11.5
lying living tree	40	-	0.2	439	(267 - 610)	2.8
other	80	-	0.3	80	-	0.5
Total	23,240	(18,240 - 28,239)	100.0	15,600	(11,546 - 19,654)	100.0



12.7.2 Total number of trees by slenderness ratio and species group (Dbh>7cm)

Definition

Slenderness ratio

Ratio of tree height (m) to its Dbh (mm). The higher the ratio the lower the taper on the tree

Methodology

The total number of trees is classified by species group and slenderness ratio.

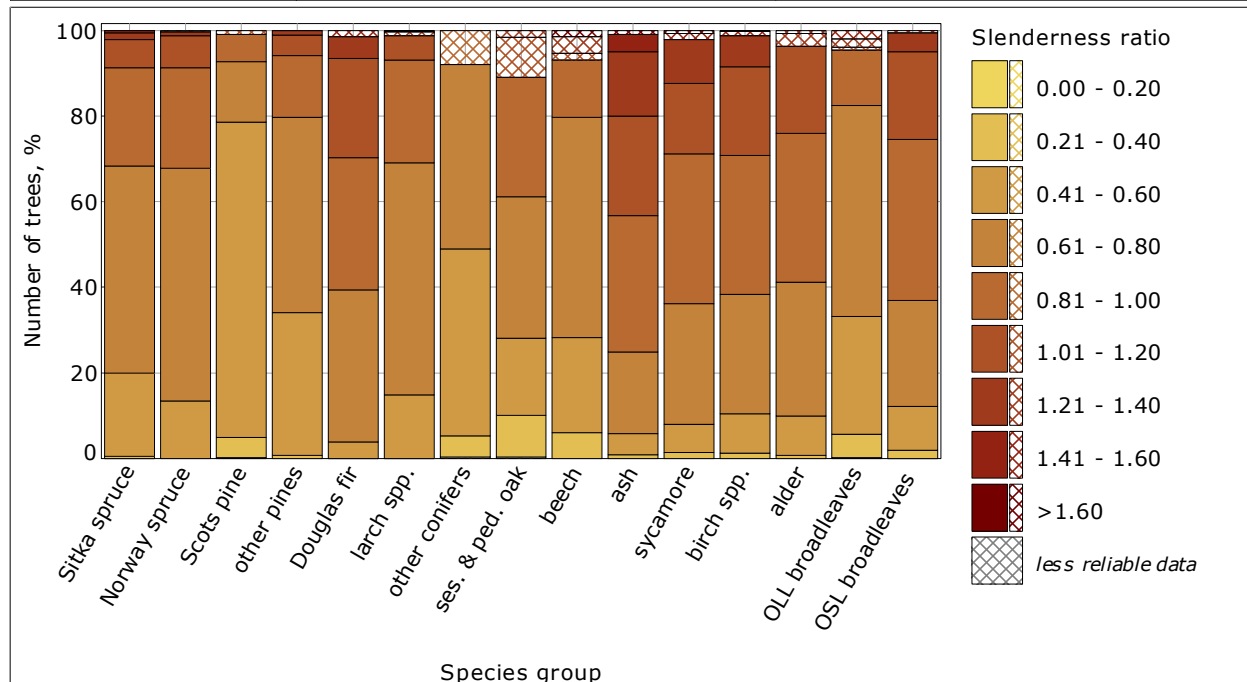
Slenderness ratio	Species group / Number of trees					
	Sitka spruce			Norway spruce		
	thousands	($\alpha=0.05$)	%	thousands	($\alpha=0.05$)	%
0.00 - 0.20	26	-	-	0.006	-	-
0.21 - 0.40	2,139	(1,178 - 3,099)	0.5	-	-	-
0.41 - 0.60	88,574	(80,269 - 96,879)	19.5	5,138	(3,884 - 6,392)	13.4
0.61 - 0.80	219,769	(207,904 - 231,634)	48.4	20,963	(17,076 - 24,850)	54.5
0.81 - 1.00	103,640	(96,160 - 111,120)	22.8	9,006	(6,566 - 11,446)	23.4
1.01 - 1.20	29,555	(26,473 - 32,636)	6.5	2,859	(1,527 - 4,191)	7.4
1.21 - 1.40	7,844	(6,769 - 8,918)	1.7	343	(0 - 2,357)	0.9
1.41 - 1.60	2,118	(1,715 - 2,522)	0.5	158	-	0.4
>1.60	266	-	0.06	-	-	-
Total	453,930	(434,539 - 473,320)	100.0	38,468	(32,221 - 44,715)	100.0

Slenderness ratio	Species group / Number of trees					
	Scots pine			other pines		
	thousands	($\alpha = 0.05$)	%	thousands	($\alpha = 0.05$)	%
0.00 - 0.20	8	-	-	-	-	-
0.21 - 0.40	381	(87 - 675)	4.8	503	(407 - 600)	0.7
0.41 - 0.60	5,881	(3,425 - 8,336)	73.6	25,667	(22,085 - 29,249)	33.5
0.61 - 0.80	1,133	(0 - 6,035)	14.2	34,949	(30,966 - 38,932)	45.6
0.81 - 1.00	503	(0 - 4,704)	6.3	11,073	(8,660 - 13,486)	14.4
1.01 - 1.20	80	-	-	3,708	(2,839 - 4,576)	4.8
1.21 - 1.40	-	-	-	720	(33 - 1,406)	0.9
1.41 - 1.60	-	-	-	79	-	0.1
>1.60	-	-	-	-	-	-
Total	7,986	(4,844 - 11,129)	100.0	76,699	(68,563 - 84,835)	100.0
Slenderness ratio	Species group / Number of trees					
	Douglas fir			larch spp.		
	thousands	($\alpha = 0.05$)	%	thousands	($\alpha = 0.05$)	%
0.00 - 0.20	-	-	-	-	-	-
0.21 - 0.40	8	-	0.05	26	-	0.08
0.41 - 0.60	556	(270 - 842)	3.8	4,934	(3,948 - 5,919)	14.8
0.61 - 0.80	5,170	(2,880 - 7,461)	35.6	18,006	(14,994 - 21,019)	54.2
0.81 - 1.00	4,490	(2,815 - 6,166)	30.9	7,982	(6,205 - 9,759)	24.0
1.01 - 1.20	3,353	(1,430 - 5,277)	23.1	1,897	(1,447 - 2,348)	5.7
1.21 - 1.40	741	(58 - 1,424)	5.1	265	-	0.8
1.41 - 1.60	213	-	1.5	80	-	0.2
>1.60	-	-	-	80	-	0.2
Total	14,532	(11,019 - 18,045)	100.0	33,270	(28,018 - 38,521)	100.0
Slenderness ratio	Species group / Number of trees					
	other conifers			ses. & ped. oak		
	thousands	($\alpha = 0.05$)	%	thousands	($\alpha = 0.05$)	%
0.00 - 0.20	8	-	0.4	32	-	0.3
0.21 - 0.40	105	(2 - 207)	4.9	1,065	(821 - 1,309)	9.7
0.41 - 0.60	932	(0 - 2,326)	43.5	1,966	(755 - 3,177)	18.0
0.61 - 0.80	923	(603 - 1,243)	43.2	3,610	(1,922 - 5,298)	33.1
0.81 - 1.00	170	-	8.0	3,053	(1,738 - 4,368)	27.9
1.01 - 1.20	-	-	-	1,012	-	9.3
1.21 - 1.40	-	-	-	187	-	1.7
1.41 - 1.60	-	-	-	-	-	-
>1.60	-	-	-	-	-	-
Total	2,138	(1,189 - 3,088)	100.0	10,926	(7,087 - 14,765)	100.0
Slenderness ratio	Species group / Number of trees					
	beech			ash		
	thousands	($\alpha = 0.05$)	%	thousands	($\alpha = 0.05$)	%
0.00 - 0.20	-	-	-	-	-	-
0.21 - 0.40	329	(254 - 404)	6.0	217	(178 - 255)	0.8
0.41 - 0.60	1,214	(918 - 1,509)	22.3	1,352	(964 - 1,739)	5.0
0.61 - 0.80	2,800	(1,629 - 3,971)	51.3	5,152	(3,986 - 6,319)	19.0
0.81 - 1.00	729	(0 - 4,745)	13.4	8,632	(5,620 - 11,643)	31.9
1.01 - 1.20	86	-	1.6	6,310	(4,646 - 7,974)	23.3
1.21 - 1.40	212	-	3.9	4,059	(2,855 - 5,263)	15.0
1.41 - 1.60	-	-	-	1,118	(772 - 1,463)	4.1
>1.60	80	-	1.5	240	-	0.9
Total	5,450	(3,663 - 7,237)	100.0	27,078	(21,138 - 33,019)	100.0

Slenderness ratio	Species group / Number of trees					
	sycamore			birch spp.		
	thousands	($\alpha = 0.05$)	%	thousands	($\alpha = 0.05$)	%
0.00 - 0.20	–	–	–	–	–	–
0.21 - 0.40	160	(111 - 209)	1.4	631	(374 - 888)	1.2
0.41 - 0.60	731	(415 - 1,046)	6.5	4,691	(4,080 - 5,302)	9.2
0.61 - 0.80	3,202	(1,647 - 4,758)	28.4	14,251	(11,773 - 16,730)	27.8
0.81 - 1.00	3,944	(1,524 - 6,365)	34.9	16,669	(14,261 - 19,078)	32.5
1.01 - 1.20	1,845	(0 - 4,060)	16.4	10,531	(8,411 - 12,650)	20.6
1.21 - 1.40	1,164	(0 - 6,207)	10.3	3,762	(2,672 - 4,852)	7.4
1.41 - 1.60	159	–	1.4	559	–	1.1
>1.60	80	–	0.7	79	–	0.2
Total	11,287	(7,057 - 15,516)	100.0	51,173	(44,819 - 57,526)	100.0

Slenderness ratio	Species group / Number of trees					
	alder			OLL broadleaves		
	thousands	($\alpha = 0.05$)	%	thousands	($\alpha = 0.05$)	%
0.00 - 0.20	–	–	–	32	–	0.2
0.21 - 0.40	160	(60 - 259)	0.7	859	(520 - 1,197)	5.5
0.41 - 0.60	2,121	(1,277 - 2,966)	9.1	4,287	(2,652 - 5,923)	27.5
0.61 - 0.80	7,287	(5,415 - 9,159)	31.4	7,681	(4,722 - 10,640)	49.2
0.81 - 1.00	8,076	(5,547 - 10,604)	34.7	2,029	(1,389 - 2,669)	13.0
1.01 - 1.20	4,718	(3,455 - 5,981)	20.3	104	–	0.7
1.21 - 1.40	718	–	3.1	289	–	1.9
1.41 - 1.60	159	–	0.7	319	–	2.0
>1.60	–	–	–	–	–	–
Total	23,240	(18,240 - 28,239)	100.0	15,600	(11,546 - 19,654)	100.0

Slenderness ratio	Species group / Number of trees					
	OSL broadleaves			Total		
	thousands	($\alpha = 0.05$)	%	thousands	($\alpha = 0.05$)	%
0.00 - 0.20	40	–	0.06	146	(84 - 209)	0.02
0.21 - 0.40	1,199	(738 - 1,659)	1.9	7,781	(6,624 - 8,938)	0.9
0.41 - 0.60	6,351	(4,423 - 8,279)	10.2	154,394	(144,063 - 164,724)	18.5
0.61 - 0.80	15,342	(11,364 - 19,320)	24.7	360,240	(344,789 - 375,691)	43.3
0.81 - 1.00	23,371	(19,585 - 27,156)	37.6	203,366	(192,967 - 213,766)	24.4
1.01 - 1.20	12,716	(10,036 - 15,395)	20.5	78,775	(72,959 - 84,590)	9.4
1.21 - 1.40	2,737	(2,054 - 3,419)	4.4	23,042	(20,098 - 25,985)	2.8
1.41 - 1.60	397	–	0.6	5,360	(3,671 - 7,049)	0.6
>1.60	–	–	–	824	(0 - 2,855)	0.1
Total	62,152	(52,848 - 71,455)	100.0	833,928	(808,242 - 859,614)	100.0



CHAPTER 13

VEGETATION AND LICHENS

The assessment of plant diversity is an important indicator which can be used in the monitoring of SFM. The structure and range of vegetation present will also be indicative of wider ecological diversity. In this chapter, the distribution of non-tree vegetation in the national forest estate is evaluated. The quantity and distribution of non-tree plant species in the national forest estate varies greatly.

A primary factor influencing the non-tree vegetation is the stage of development of a forest, as it impacts on the growing space by regulating light. The soil, through factors such as fertility, moisture and previous land-use, also impacts on non-tree vegetation.

In terms of the occurrence frequency of plant species in Irish forests, nearly two-thirds (53.8%) of forests have between 1 and 10 plant species present. A significant portion of the forest estate (21.5%) has 16 or more plants available.

Overall, over two-thirds (69.8%) of the stocked forest area has a vegetation cover of 76% or greater. In terms of vegetation cover on the forest floor; 75%, 57.4% and 80.1% of Private (other) forests, Public Forests and Private (grant aided) respectively contain between 76-100% vegetation cover.

Broadleaf forests tend to be the most diverse in terms of plant species. Both the early and late stages of development show higher numbers of plant species present compared to the mid development stages where canopy cover is dense. The removal of canopy cover in thinning increases the diversity of plants present by allowing more light to reach the forest floor.

Lichens, usually associated with a clean atmosphere, are present on 60.6% of the stocked forest estate. The age distribution and species structure in the private (grant aided) estate are less uniform than those in the private (other) forests, resulting in the lowest (55.2%) lichen occurrence in the private (grant aided) forests and the highest (72.6%) occurrence in the private (other) forest estate.

13.1 PLANT DIVERSITY

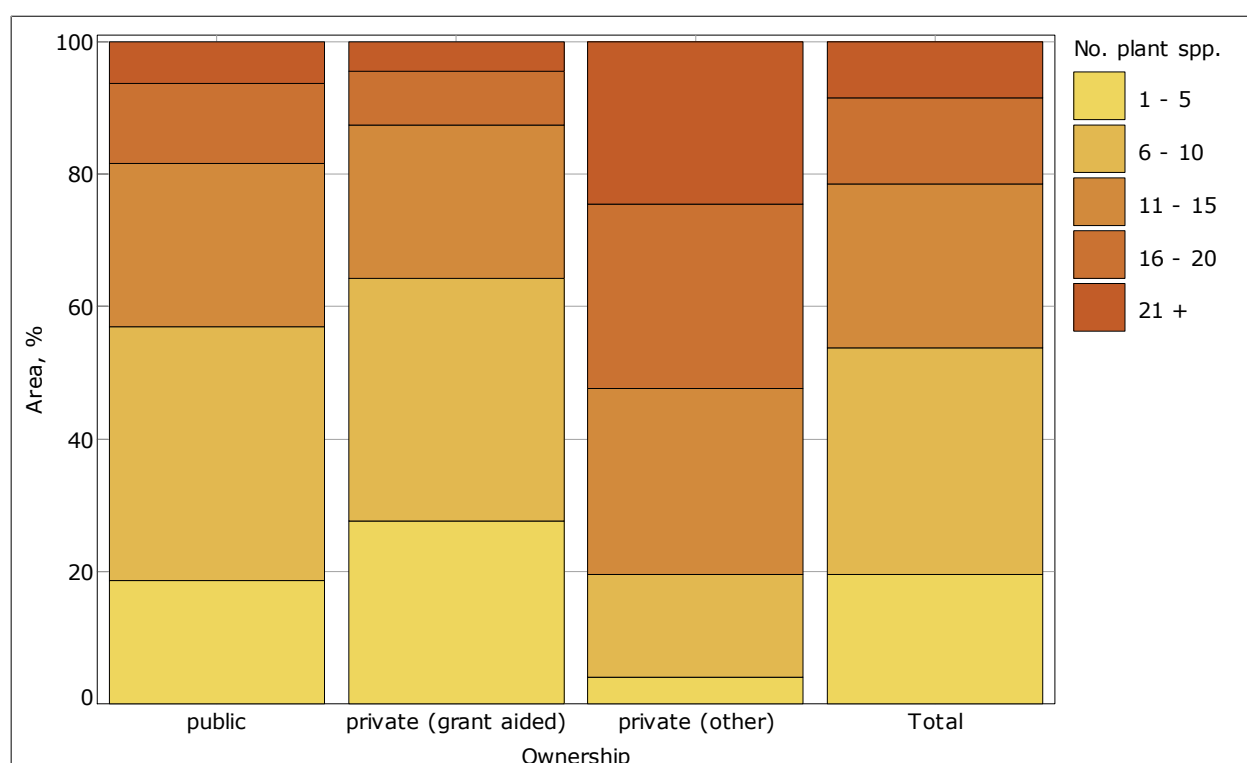
Definition
Vegetation
Describes the structure, cover and species composition of non-tree plant species.

13.1.1 Stocked forest area by total number of non-tree plant species and ownership

Methodology
The stocked forest area is classified by ownership and the number of non-tree plant species present.
Note: During the 3 rd NFI cycle the recording of bryophyte data to species level ceased, which means the total number of non-tree plant species excludes any bryophytes. This should be taken into consideration if comparing results with previous NFI cycles.

No. plant spp.	Ownership / Area					
	public			private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
1 - 5	64.58	(55.29 - 73.88)	18.7	62.46	(53.18 - 71.74)	27.6
6 - 10	132.67	(120.02 - 145.32)	38.4	82.86	(72.32 - 93.40)	36.7
11 - 15	85.27	(74.57 - 95.98)	24.6	52.41	(43.90 - 60.91)	23.2
16 - 20	41.94	(34.23 - 49.65)	12.1	18.37	(13.16 - 23.59)	8.1
21 +	21.62	(16.00 - 27.25)	6.2	9.99	(6.11 - 13.86)	4.4
Total	346.09	(330.30 - 361.87)	100.0	226.09	(211.18 - 241.00)	100.0

No. plant spp.	Ownership / Area					
	private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
1 - 5	4.00	(1.54 - 6.46)	4.0	131.04	(118.54 - 143.55)	19.5
6 - 10	15.66	(10.85 - 20.48)	15.5	231.19	(216.00 - 246.38)	34.3
11 - 15	28.43	(21.95 - 34.91)	28.1	166.11	(152.29 - 179.93)	24.7
16 - 20	28.04	(21.64 - 34.44)	27.8	88.36	(77.61 - 99.10)	13.1
21 +	24.80	(18.74 - 30.86)	24.6	56.41	(47.57 - 65.26)	8.4
Total	100.94	(89.48 - 112.39)	100.0	673.11		100.0



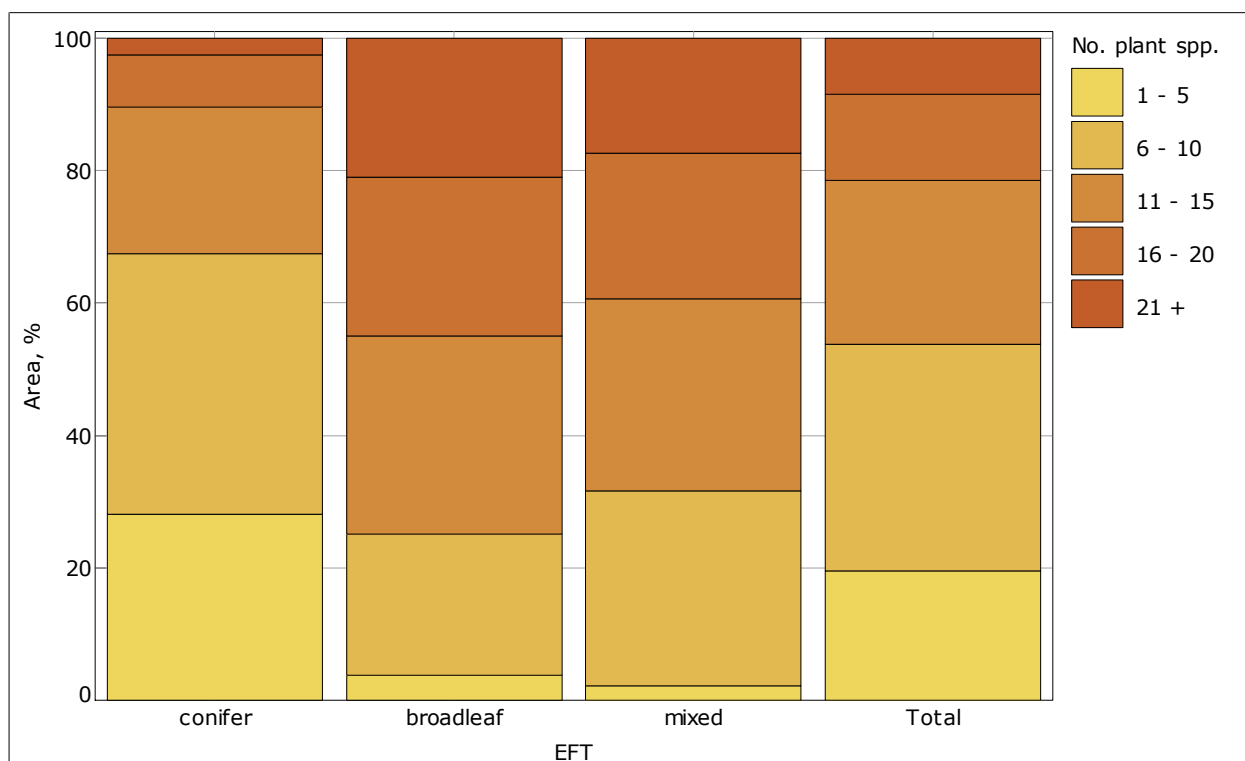
13.1.2 Stocked forest area by total number of non-tree plant species and European Forest Type

Methodology

The stocked forest area is classified by European Forest Type and the number of non-tree plant species present.

No. plant spp.	EFT / Area					
	conifer			broadleaf		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
1 - 5	123.84	(111.58 - 136.11)	28.0	5.20	(2.38 - 8.03)	3.7
6 - 10	174.29	(160.46 - 188.12)	39.5	29.68	(23.22 - 36.14)	21.4
11 - 15	97.62	(86.43 - 108.81)	22.1	41.65	(33.92 - 49.38)	30.0
16 - 20	34.77	(27.68 - 41.86)	7.9	33.23	(26.34 - 40.11)	23.9
21 +	11.20	(7.10 - 15.29)	2.5	29.19	(22.69 - 35.70)	21.0
Total	441.72	(426.90 - 456.54)	100.0	138.95	(126.22 - 151.69)	100.0

No. plant spp.	EFT / Area					
	mixed			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
1 - 5	1.99	(0.25 - 3.74)	2.2	131.04	(118.54 - 143.55)	19.5
6 - 10	27.23	(20.91 - 33.54)	29.5	231.19	(216.00 - 246.38)	34.3
11 - 15	26.84	(20.55 - 33.13)	29.0	166.11	(152.29 - 179.93)	24.7
16 - 20	20.36	(14.87 - 25.85)	22.0	88.36	(77.61 - 99.10)	13.1
21 +	16.02	(11.12 - 20.92)	17.3	56.41	(47.57 - 65.26)	8.4
Total	92.44	(81.47 - 103.41)	100.0	673.11		100.0



13.1.3 Stocked forest area by total number of non-tree plant species and thin status

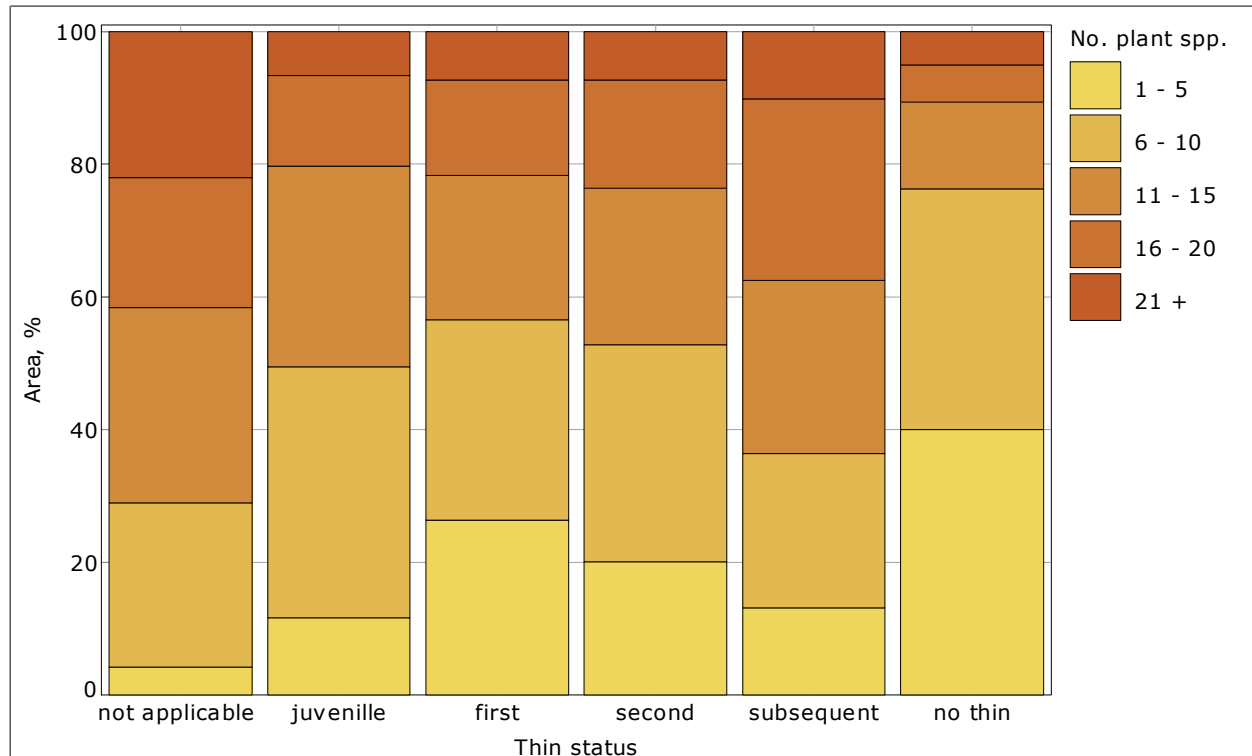
Methodology

The stocked forest area is classified by thin status and the number of non-tree plant species present.

No. plant spp.	Thin status / Area					
	not applicable			juvenile		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
1 - 5	3.60	(1.29 - 5.91)	4.2	35.68	(28.54 - 42.83)	11.6
6 - 10	21.28	(15.66 - 26.89)	24.8	116.66	(104.56 - 128.75)	37.9
11 - 15	25.25	(19.15 - 31.35)	29.4	93.20	(82.19 - 104.22)	30.3
16 - 20	16.83	(11.83 - 21.84)	19.6	41.95	(34.33 - 49.57)	13.6
21 +	18.83	(13.59 - 24.08)	22.0	20.37	(14.98 - 25.77)	6.6
Total	85.79	(75.25 - 96.33)	100.0	307.87	(291.95 - 323.78)	100.0

No. plant spp.	Thin status / Area					
	first			second		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
1 - 5	16.03	(11.14 - 20.92)	26.3	4.42	(1.84 - 7.00)	20.0
6 - 10	18.40	(13.15 - 23.64)	30.2	7.22	(3.91 - 10.53)	32.8
11 - 15	13.22	(8.75 - 17.69)	21.7	5.20	(2.40 - 8.00)	23.6
16 - 20	8.80	(5.14 - 12.46)	14.5	3.61	(1.26 - 5.96)	16.4
21 +	4.42	(1.82 - 7.01)	7.3	1.60	(0.03 - 3.17)	7.2
Total	60.86	(51.66 - 70.06)	100.0	22.05	(16.33 - 27.77)	100.0

No. plant spp.	Thin status / Area					
	subsequent			no thin		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
1 - 5	3.62	(1.26 - 5.97)	13.1	67.69	(58.05 - 77.34)	40.1
6 - 10	6.42	(3.30 - 9.53)	23.2	61.23	(52.02 - 70.44)	36.2
11 - 15	7.22	(3.91 - 10.53)	26.1	22.02	(16.29 - 27.74)	13.0
16 - 20	7.58	(4.22 - 10.94)	27.5	9.58	(5.77 - 13.39)	5.7
21 +	2.79	(0.72 - 4.85)	10.1	8.41	(4.82 - 11.99)	5.0
Total	27.62	(21.28 - 33.96)	100.0	168.93	(155.03 - 182.82)	100.0



13.1.4 Stocked forest area by total number of non-tree plant species and development stage

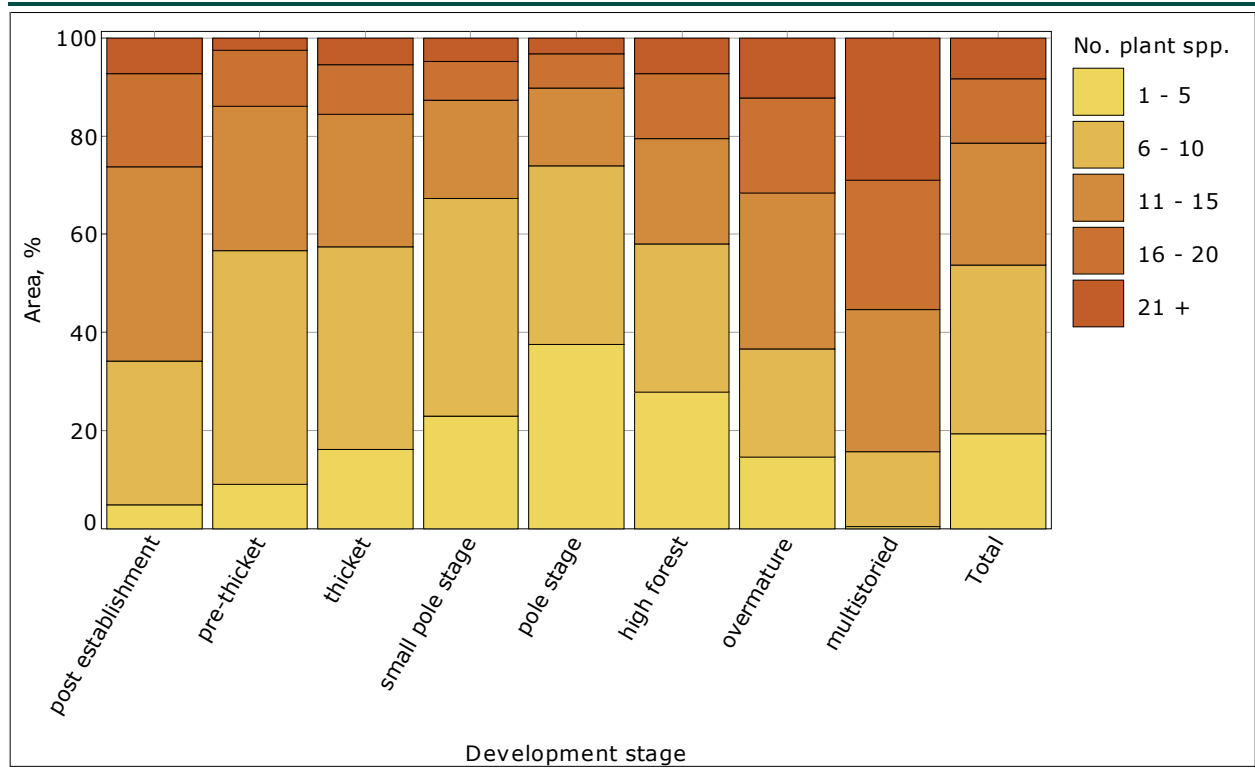
Methodology						
The stocked forest area is classified by development stage and the number of non-tree plant species present.						

No. plant spp.	Development stage / Area					
	post establishment			pre-thicket		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
1 - 5	3.21	(1.00 - 5.42)	4.9	6.00	(2.98 - 9.03)	9.0
6 - 10	19.21	(13.90 - 24.53)	29.3	31.68	(24.89 - 38.46)	47.7
11 - 15	26.00	(19.83 - 32.18)	39.6	19.61	(14.19 - 25.04)	29.5
16 - 20	12.39	(8.07 - 16.71)	18.9	7.59	(4.20 - 10.99)	11.4
21 +	4.79	(2.09 - 7.50)	7.3	1.60	(0.03 - 3.18)	2.4
Total	65.60	(56.08 - 75.13)	100.0	66.49	(56.89 - 76.09)	100.0

No. plant spp.	Development stage / Area					
	thicket			small pole stage		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
1 - 5	13.20	(8.76 - 17.64)	16.2	23.29	(17.42 - 29.16)	22.9
6 - 10	33.71	(26.76 - 40.67)	41.2	45.25	(37.19 - 53.32)	44.4
11 - 15	22.00	(16.31 - 27.70)	26.9	20.42	(14.91 - 25.93)	20.1
16 - 20	8.39	(4.82 - 11.95)	10.3	8.00	(4.53 - 11.47)	7.9
21 +	4.40	(1.82 - 6.99)	5.4	4.82	(2.11 - 7.54)	4.7
Total	81.71	(71.23 - 92.19)	100.0	101.79	(90.27 - 113.30)	100.0

No. plant spp.	Development stage / Area					
	pole stage			high forest		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
1 - 5	45.66	(37.56 - 53.76)	37.5	36.89	(29.62 - 44.16)	27.8
6 - 10	44.39	(36.41 - 52.37)	36.5	40.08	(32.50 - 47.66)	30.3
11 - 15	19.23	(13.89 - 24.57)	15.8	28.40	(21.94 - 34.86)	21.4
16 - 20	8.39	(4.81 - 11.98)	6.9	17.59	(12.47 - 22.72)	13.3
21 +	4.01	(1.55 - 6.47)	3.3	9.59	(5.77 - 13.41)	7.2
Total	121.68	(109.33 - 134.04)	100.0	132.56	(119.89 - 145.22)	100.0

No. plant spp.	Development stage / Area					
	overmature			multistoried		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
1 - 5	2.40	(0.48 - 4.31)	14.6	0.40	(0.00 - 1.20)	0.5
6 - 10	3.62	(1.27 - 5.96)	22.0	13.25	(8.81 - 17.69)	15.3
11 - 15	5.21	(2.38 - 8.04)	31.8	25.23	(19.12 - 31.33)	29.0
16 - 20	3.20	(0.98 - 5.42)	19.5	22.80	(17.02 - 28.58)	26.2
21 +	1.99	(0.25 - 3.74)	12.1	25.19	(19.13 - 31.25)	29.0
Total	16.42	(11.47 - 21.37)	100.0	86.86	(76.13 - 97.59)	100.0



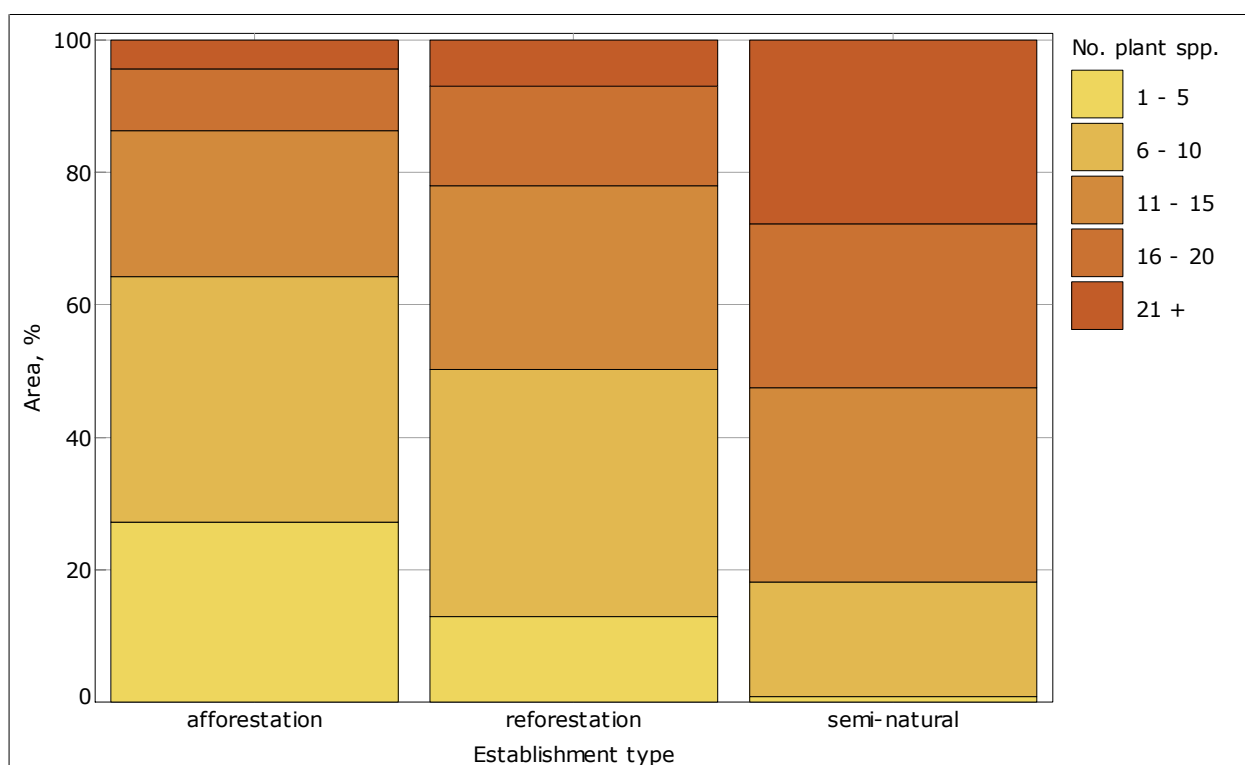
13.1.5 Stocked forest area by total number of plant species and establishment type

Methodology

The total stocked forest area is classified by forest establishment type and the number of non-tree plant species present.

No. plant spp.	Establishment type / Area					
	afforestation			reforestation		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
1 - 5	105.79	(94.17 - 117.42)	27.2	24.45	(18.65 - 30.26)	12.9
6 - 10	144.20	(131.14 - 157.27)	37.1	70.53	(60.94 - 80.12)	37.4
11 - 15	85.62	(75.04 - 96.21)	22.0	52.45	(43.80 - 61.09)	27.7
16 - 20	36.37	(29.14 - 43.60)	9.4	28.36	(21.93 - 34.79)	15.0
21 +	16.80	(11.79 - 21.80)	4.3	13.21	(8.77 - 17.65)	7.0
Total	388.79	(373.22 - 404.35)	100.0	189.00	(174.95 - 203.05)	100.0

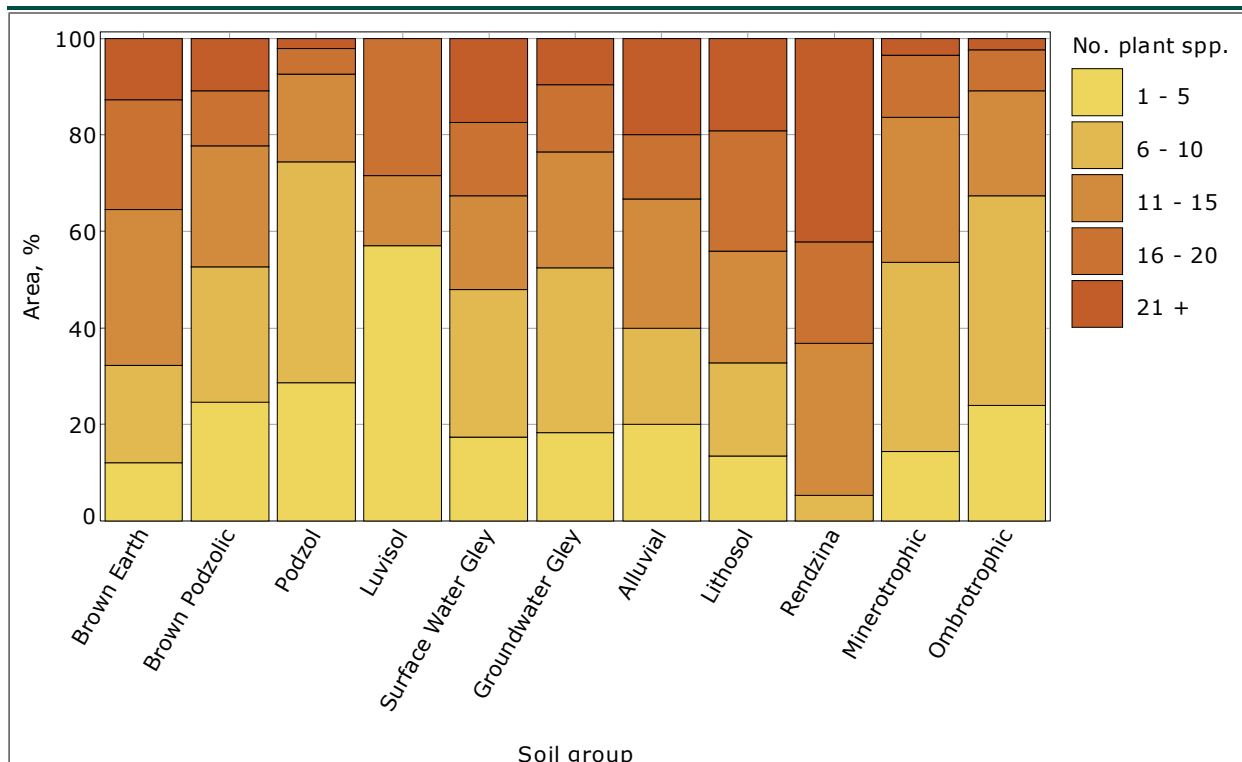
No. plant spp.	Establishment type / Area					
	semi-natural			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
1 - 5	0.79	(0.00 - 1.92)	0.8	131.04	(118.54 - 143.55)	19.5
6 - 10	16.46	(11.56 - 21.36)	17.3	231.19	(216.00 - 246.38)	34.3
11 - 15	28.04	(21.61 - 34.47)	29.4	166.11	(152.29 - 179.93)	24.7
16 - 20	23.62	(17.73 - 29.51)	24.8	88.36	(77.61 - 99.10)	13.1
21 +	26.40	(20.19 - 32.62)	27.7	56.41	(47.57 - 65.26)	8.4
Total	95.32	(84.18 - 106.47)	100.0	673.11		100.0



13.1.6 Stocked forest area by total number of non-tree plant species and soil group**Methodology**

The stocked forest area is classified by soil type and the number of non-tree plant species present.

No. plant spp.	Soil group / Area					
	Brown Earth			Brown Podzolic		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
1 - 5	7.22	(3.94 - 10.51)	12.1	17.23	(12.24 - 22.23)	24.6
6 - 10	12.02	(7.80 - 16.23)	20.1	19.64	(14.29 - 24.99)	28.0
11 - 15	19.24	(13.91 - 24.57)	32.3	17.62	(12.50 - 22.73)	25.1
16 - 20	13.61	(9.08 - 18.13)	22.8	8.00	(4.52 - 11.49)	11.4
21 +	7.59	(4.21 - 10.97)	12.7	7.62	(4.21 - 11.04)	10.9
Total	59.68	(50.76 - 68.60)	100.0	70.12	(60.50 - 79.75)	100.0
No. plant spp.	Soil group / Area					
	Podzol			Luvisol		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
1 - 5	10.81	(6.84 - 14.79)	28.7	1.60	(0.04 - 3.15)	57.0
6 - 10	17.22	(12.26 - 22.18)	45.8	-	-	-
11 - 15	6.81	(3.59 - 10.02)	18.1	0.40	(0.00 - 1.23)	14.5
16 - 20	2.00	(0.25 - 3.75)	5.3	0.80	(0.00 - 1.91)	28.5
21 +	0.80	(0.00 - 1.92)	2.1	-	-	-
Total	37.64	(30.52 - 44.76)	100.0	2.79	(0.74 - 4.85)	100.0
No. plant spp.	Soil group / Area					
	Surface Water Gley			Groundwater Gley		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
1 - 5	9.60	(5.79 - 13.40)	17.4	26.85	(20.56 - 33.15)	18.3
6 - 10	16.83	(11.86 - 21.80)	30.4	50.05	(41.65 - 58.46)	34.2
11 - 15	10.79	(6.79 - 14.79)	19.6	35.24	(28.15 - 42.32)	24.0
16 - 20	8.37	(4.85 - 11.89)	15.2	20.41	(14.95 - 25.87)	13.9
21 +	9.60	(5.80 - 13.40)	17.4	14.01	(9.42 - 18.60)	9.6
Total	55.19	(46.60 - 63.78)	100.0	146.56	(133.56 - 159.56)	100.0
No. plant spp.	Soil group / Area					
	Alluvial			Lithosol		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
1 - 5	2.40	(0.49 - 4.32)	20.0	2.80	(0.73 - 4.87)	13.5
6 - 10	2.40	(0.49 - 4.31)	20.0	3.99	(1.53 - 6.46)	19.2
11 - 15	3.21	(0.99 - 5.44)	26.7	4.81	(2.09 - 7.52)	23.2
16 - 20	1.61	(0.02 - 3.19)	13.4	5.17	(2.39 - 7.95)	24.9
21 +	2.40	(0.48 - 4.31)	19.9	3.98	(1.54 - 6.42)	19.2
Total	12.02	(7.78 - 16.27)	100.0	20.76	(15.30 - 26.21)	100.0
No. plant spp.	Soil group / Area					
	Rendzina			Minerotrophic		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
1 - 5	-	-	-	15.25	(10.51 - 19.99)	14.5
6 - 10	0.40	(0.00 - 1.18)	5.3	41.29	(33.89 - 48.68)	39.2
11 - 15	2.40	(0.49 - 4.32)	31.6	31.63	(25.06 - 38.20)	30.0
16 - 20	1.60	(0.03 - 3.17)	21.0	13.60	(9.15 - 18.05)	12.9
21 +	3.21	(1.01 - 5.40)	42.1	3.61	(1.26 - 5.95)	3.4
Total	7.61	(4.25 - 10.97)	100.0	105.37	(94.95 - 115.79)	100.0
No. plant spp.	Soil group / Area					
	Ombrotrophic			Total		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
1 - 5	37.27	(30.10 - 44.44)	24.0	131.04	(118.54 - 143.55)	19.5
6 - 10	67.35	(58.07 - 76.63)	43.3	231.19	(216.00 - 246.38)	34.3
11 - 15	33.96	(27.08 - 40.83)	21.9	166.11	(152.29 - 179.93)	24.7
16 - 20	13.19	(8.75 - 17.62)	8.5	88.36	(77.61 - 99.10)	13.1
21 +	3.60	(1.26 - 5.94)	2.3	56.41	(47.57 - 65.26)	8.4
Total	155.35	(143.14 - 167.57)	100.0	673.11		100.0



13.2 PLANT DIVERSITY

Definition
Vegetation cover Vegetation cover is classified as a percentage of the ground covered in non- tree plant species in a forest stand as follows: No presence: No vegetation cover on the plot. <4% few individuals: Total vegetation cover on the plot is less than <4% few individual plants present. <4% several individuals: Total vegetation cover on the plot is less than <4%few individual plants present. <4% many individuals: Total vegetation cover on the plot is less than <4%few individual plants present. 5-10%: Total vegetation cover on the plot is between 5 and 10% of the plot area. 11-25%: Total vegetation cover on the plot is between 11 and 25% of the plot area. 26-33%: Total vegetation cover on the plot is between 26 and 33% of the plot area. 34-50%: Total vegetation cover on the plot is between 34 and 50% of the plot area. 51-75%: Total vegetation cover on the plot is between 51 and 75% of the plot area. 76-90%: Total vegetation cover on the plot is between 76 and 90% of the plot area. 91-100%: Total vegetation cover on the plot is between 91 and 100% of the plot area.

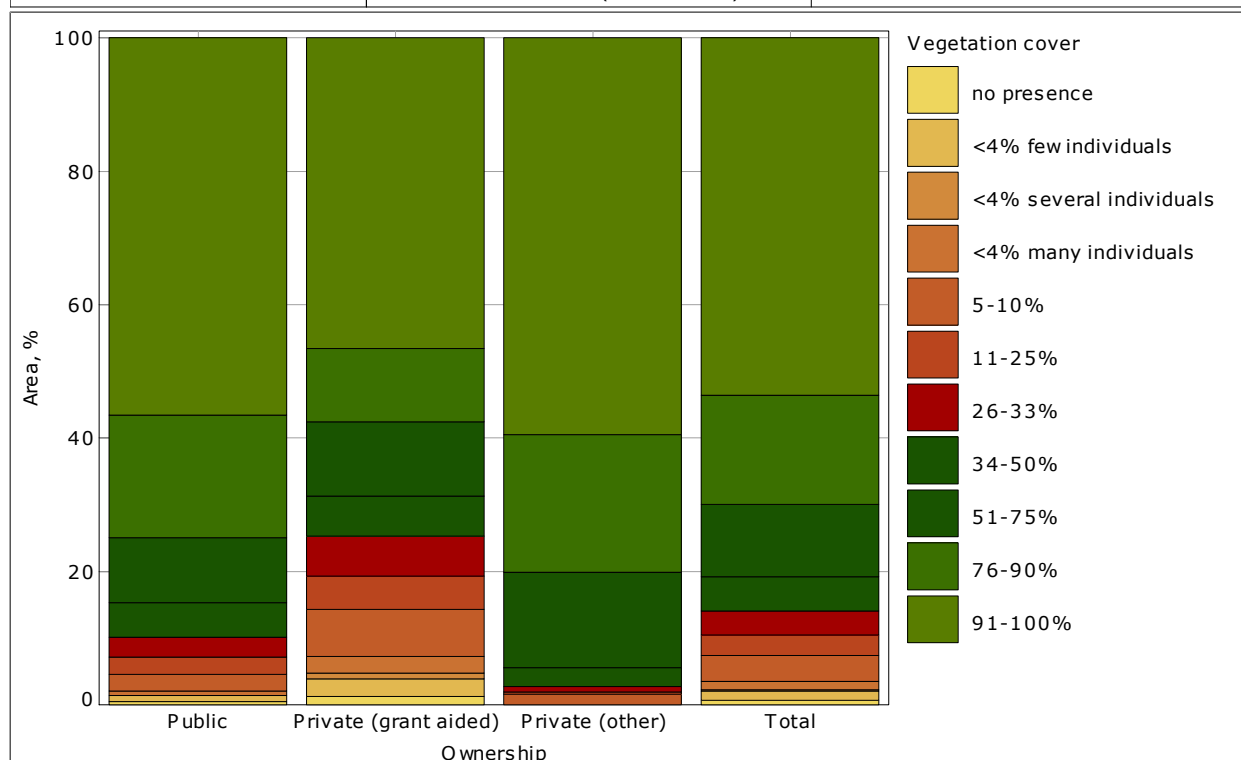
13.2.1 Stocked forest area by vegetation cover and ownership

Methodology

The stocked forest area is classified by ownership and the percentage vegetation cover.

Vegetation cover	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
no presence	1.60	(0.03 - 3.17)	0.5	2.79	(0.73 - 4.86)	1.2
<4% few individuals	3.21	(1.00 - 5.41)	0.9	5.99	(2.98 - 9.01)	2.7
<4% several individuals	-	-	-	2.00	(0.25 - 3.74)	0.9
<4% many individuals	2.40	(0.48 - 4.32)	0.7	5.59	(2.70 - 8.47)	2.5
5-10%	8.41	(4.84 - 11.99)	2.4	15.99	(11.12 - 20.86)	7.1
11-25%	9.22	(5.49 - 12.96)	2.7	11.20	(7.07 - 15.33)	5.0
26-33%	10.01	(6.13 - 13.89)	2.9	13.60	(9.08 - 18.12)	6.0
34-50%	18.04	(12.86 - 23.22)	5.2	13.58	(9.09 - 18.07)	6.0
51-75%	33.67	(26.64 - 40.70)	9.7	25.26	(19.16 - 31.37)	11.2
76-90%	63.68	(54.31 - 73.05)	18.4	24.83	(18.77 - 30.90)	11.0
91-100%	195.84	(181.46 - 210.23)	56.6	105.25	(93.70 - 116.81)	46.4
Total	346.09	(330.30 - 361.87)	100.0	226.09	(211.18 - 241.00)	100.0

Vegetation cover	Ownership / Area					
	Private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
no presence	-	-	-	4.40	(1.81 - 6.99)	0.7
<4% few individuals	-	-	-	9.20	(5.48 - 12.91)	1.4
<4% several individuals	-	-	-	2.00	(0.25 - 3.74)	0.3
<4% many individuals	-	-	-	7.99	(4.55 - 11.43)	1.2
5-10%	1.60	(0.03 - 3.17)	1.6	26.00	(19.83 - 32.18)	3.9
11-25%	0.40	(0.00 - 1.20)	0.4	20.82	(15.25 - 26.39)	3.1
26-33%	0.80	(0.00 - 1.91)	0.8	24.41	(18.42 - 30.39)	3.6
34-50%	2.81	(0.74 - 4.88)	2.8	34.43	(27.40 - 41.46)	5.1
51-75%	14.44	(9.77 - 19.11)	14.3	73.38	(63.39 - 83.37)	10.9
76-90%	20.83	(15.26 - 26.40)	20.6	109.34	(97.52 - 121.16)	16.2
91-100%	60.06	(50.90 - 69.22)	59.5	361.16	(345.33 - 376.98)	53.6
Total	100.94	(89.48 - 112.39)	100.0	673.11		100.0



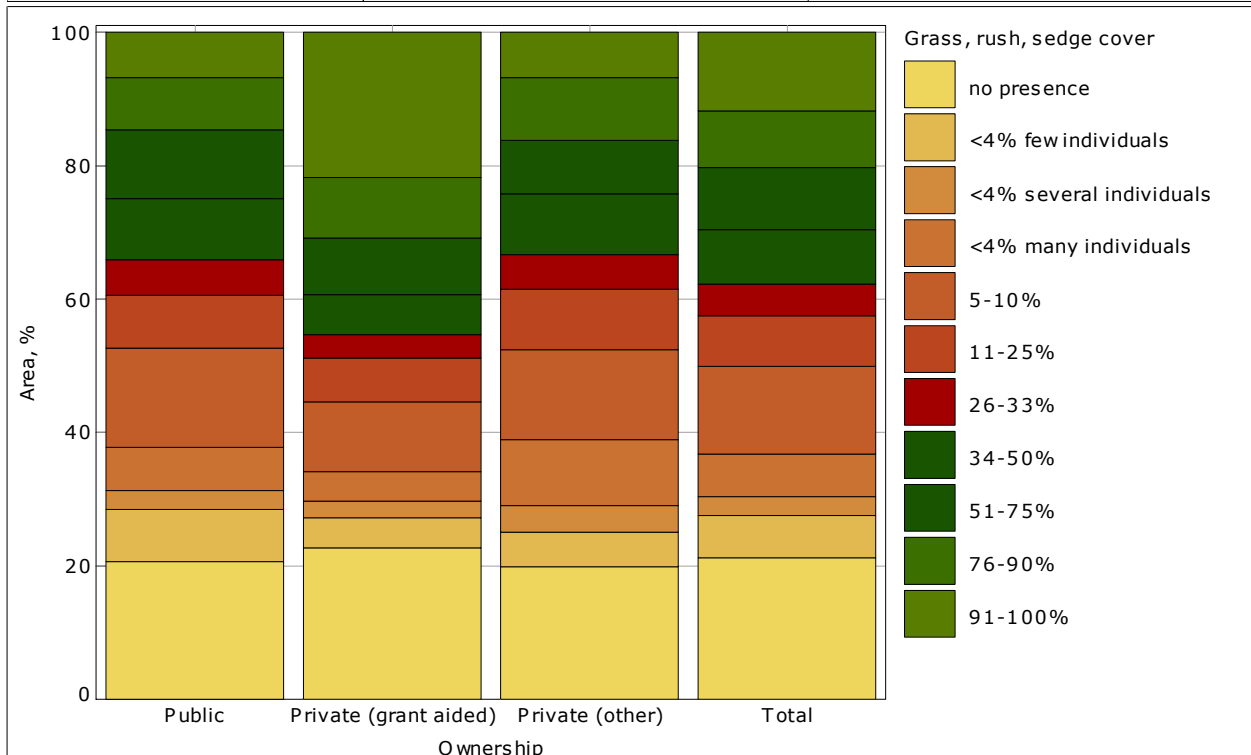
13.2.2 Stocked forest area by grass cover and ownership

Methodology

The stocked forest area is classified by ownership and grass cover.

Grass, rush, sedge cover	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
no presence	71.32	(61.51 – 81.14)	20.5	51.19	(42.69 – 59.70)	22.7
<4% few individuals	27.25	(20.93 – 33.57)	7.9	10.40	(6.44 – 14.35)	4.6
<4% several individuals	9.60	(5.80 – 13.39)	2.8	5.60	(2.68 – 8.52)	2.5
<4% many individuals	22.41	(16.65 – 28.18)	6.5	10.00	(6.11 – 13.90)	4.4
5-10%	51.71	(43.13 – 60.30)	14.9	23.60	(17.69 – 29.50)	10.4
11-25%	27.23	(20.88 – 33.59)	7.9	14.81	(10.10 – 19.53)	6.6
26-33%	18.41	(13.16 – 23.67)	5.3	8.02	(4.51 – 11.52)	3.5
34-50%	32.04	(25.18 – 38.89)	9.3	13.61	(9.09 – 18.14)	6.0
51-75%	35.59	(28.40 – 42.79)	10.3	19.22	(13.87 – 24.56)	8.5
76-90%	26.89	(20.61 – 33.17)	7.8	20.43	(14.92 – 25.94)	9.0
91-100%	23.62	(17.74 – 29.51)	6.8	49.21	(40.92 – 57.50)	21.8
Total	346.09	(330.30 – 361.87)	100.0	226.09	(211.18 – 241.00)	100.0

Grass, rush, sedge cover	Ownership / Area					
	Private (other)			Total		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
no presence	20.06	(14.66 – 25.46)	19.9	142.57	(129.60 – 155.55)	21.2
<4% few individuals	5.20	(2.39 – 8.02)	5.2	42.85	(35.04 – 50.66)	6.4
<4% several individuals	4.01	(1.53 – 6.50)	4.0	19.21	(13.87 – 24.54)	2.9
<4% many individuals	10.02	(6.11 – 13.93)	9.9	42.44	(34.61 – 50.26)	6.3
5-10%	13.61	(9.09 – 18.13)	13.5	88.92	(78.01 – 99.83)	13.2
11-25%	9.19	(5.45 – 12.93)	9.1	51.24	(42.69 – 59.78)	7.6
26-33%	5.22	(2.39 – 8.04)	5.2	31.65	(24.83 – 38.46)	4.7
34-50%	9.21	(5.47 – 12.94)	9.1	54.85	(46.02 – 63.69)	8.1
51-75%	8.02	(4.52 – 11.52)	7.9	62.83	(53.52 – 72.15)	9.3
76-90%	9.59	(5.78 – 13.40)	9.5	56.91	(47.97 – 65.86)	8.5
91-100%	6.81	(3.59 – 10.03)	6.7	79.64	(69.33 – 89.95)	11.8
Total	100.94	(89.48 – 112.39)	100.0	673.11		100.0



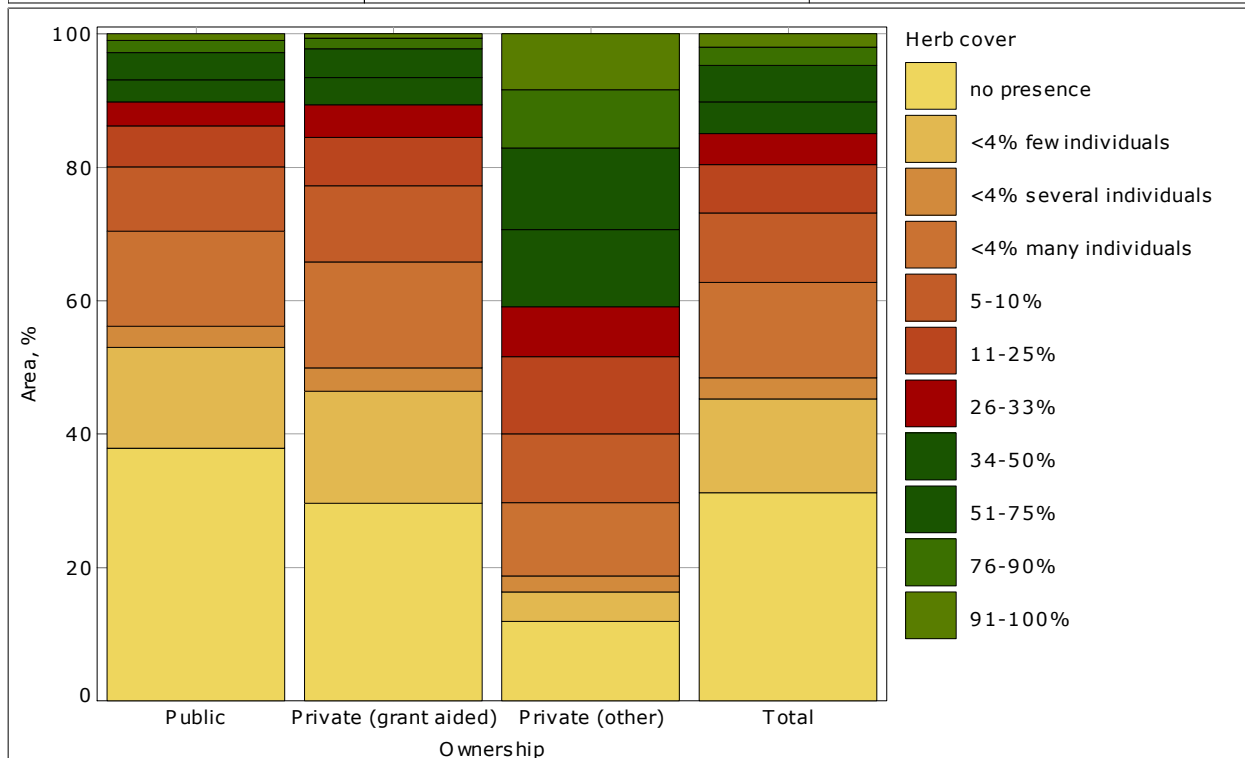
13.2.3 Stocked forest area by herb cover and ownership

Methodology

The stocked forest area is classified by ownership and the percentage herb cover.

Herb cover	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
no presence	131.00	(118.51 – 143.49)	37.9	66.86	(57.40 – 76.32)	29.6
<4% few individuals	52.10	(43.60 – 60.60)	15.1	37.98	(30.59 – 45.38)	16.8
<4% several individuals	11.20	(7.11 – 15.28)	3.2	8.01	(4.51 – 11.50)	3.5
<4% many individuals	49.24	(41.02 – 57.46)	14.2	35.97	(28.89 – 43.04)	15.9
5-10%	33.60	(26.64 – 40.56)	9.7	25.65	(19.51 – 31.79)	11.3
11-25%	21.24	(15.66 – 26.82)	6.1	16.42	(11.46 – 21.38)	7.3
26-33%	12.40	(8.09 – 16.71)	3.6	11.22	(7.11 – 15.33)	5.0
34-50%	11.27	(7.16 – 15.38)	3.3	9.22	(5.50 – 12.95)	4.1
51-75%	14.43	(9.77 – 19.09)	4.2	9.56	(5.78 – 13.35)	4.2
76-90%	6.02	(2.98 – 9.05)	1.7	3.59	(1.25 – 5.93)	1.6
91-100%	3.59	(1.26 – 5.93)	1.0	1.60	(0.03 – 3.17)	0.7
Total	346.09	(330.30 – 361.87)	100.0	226.09	(211.18 – 241.00)	100.0

Herb cover	Ownership / Area					
	Private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
no presence	12.02	(7.76 – 16.28)	11.9	209.88	(195.46 – 224.29)	31.3
<4% few individuals	4.42	(1.81 – 7.02)	4.4	94.50	(83.43 – 105.57)	14.0
<4% several individuals	2.40	(0.48 – 4.32)	2.4	21.60	(15.95 – 27.25)	3.2
<4% many individuals	11.18	(7.09 – 15.27)	11.1	96.39	(85.65 – 107.12)	14.3
5-10%	10.41	(6.45 – 14.38)	10.3	69.67	(59.89 – 79.45)	10.4
11-25%	11.60	(7.42 – 15.78)	11.5	49.26	(40.92 – 57.60)	7.3
26-33%	7.62	(4.20 – 11.04)	7.6	31.24	(24.53 – 37.96)	4.6
34-50%	11.63	(7.44 – 15.82)	11.5	32.12	(25.33 – 38.91)	4.8
51-75%	12.45	(8.10 – 16.79)	12.3	36.44	(29.19 – 43.69)	5.4
76-90%	8.81	(5.16 – 12.47)	8.7	18.42	(13.24 – 23.60)	2.7
91-100%	8.40	(4.82 – 11.97)	8.3	13.59	(9.09 – 18.10)	2.0
Total	100.94	(89.48 – 112.39)	100.0	673.11		100.0



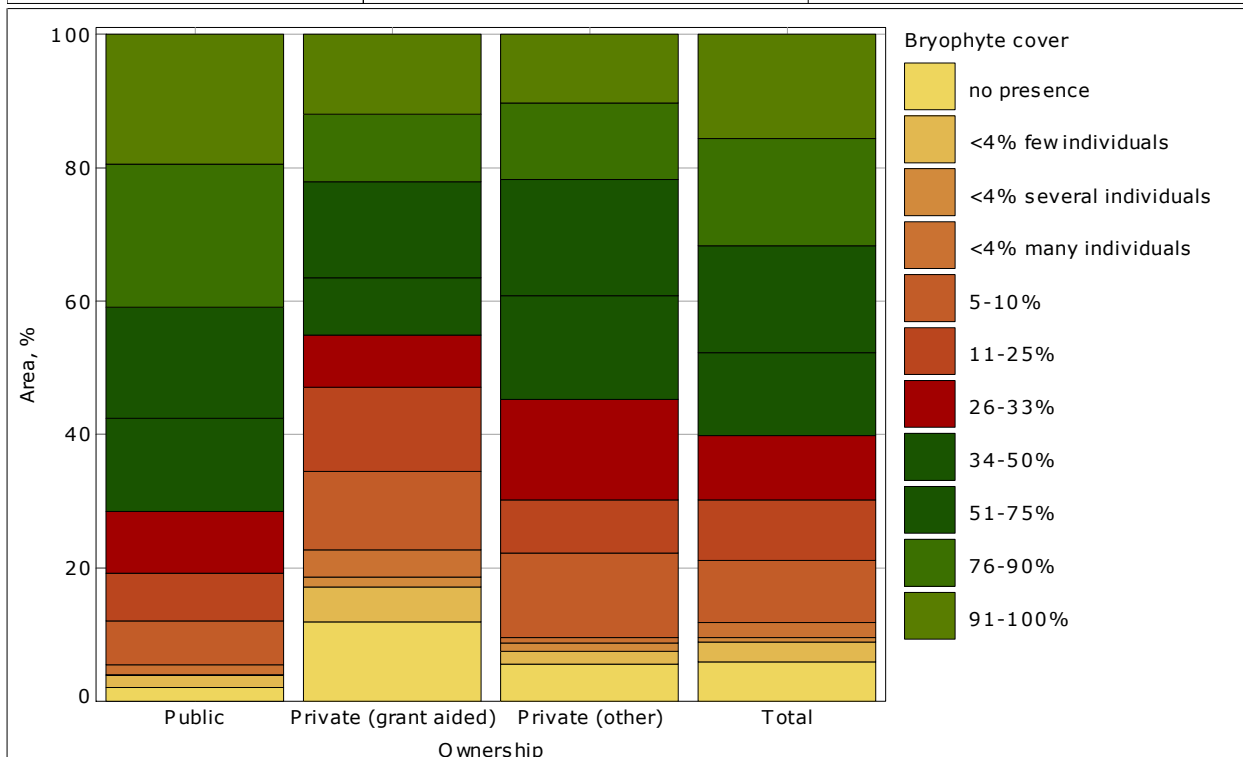
13.2.4 Stocked forest area by ownership and bryophyte cover

Methodology

The stocked forest area is classified by ownership and the percentage bryophyte cover.

Bryophyte cover	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
no presence	7.21	(3.94 – 10.48)	2.1	26.80	(20.55 – 33.05)	11.9
<4% few individuals	6.00	(2.98 – 9.02)	1.7	11.97	(7.75 – 16.19)	5.3
<4% several individuals	0.40	(0.00 – 1.18)	0.1	3.19	(0.99 – 5.39)	1.4
<4% many individuals	5.20	(2.38 – 8.03)	1.5	9.19	(5.48 – 12.91)	4.1
5-10%	22.83	(17.08 – 28.59)	6.6	26.78	(20.53 – 33.02)	11.8
11-25%	24.84	(18.85 – 30.84)	7.2	28.41	(21.95 – 34.86)	12.6
26-33%	32.04	(25.21 – 38.87)	9.3	17.63	(12.50 – 22.76)	7.8
34-50%	48.08	(39.75 – 56.41)	13.9	19.62	(14.21 – 25.02)	8.7
51-75%	57.71	(48.74 – 66.67)	16.7	32.48	(25.60 – 39.37)	14.3
76-90%	74.53	(64.52 – 84.53)	21.5	22.80	(17.00 – 28.60)	10.1
91-100%	67.25	(57.77 – 76.72)	19.4	27.21	(20.99 – 33.44)	12.0
Total	346.09	(330.30 – 361.87)	100.0	226.09	(211.18 – 241.00)	100.0

Bryophyte cover	Ownership / Area					
	Private (other)			Total		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
no presence	5.60	(2.70 – 8.50)	5.6	39.61	(32.19 – 47.04)	5.9
<4% few individuals	2.00	(0.25 – 3.76)	2.0	19.97	(14.57 – 25.37)	3.0
<4% several individuals	1.20	(0.00 – 2.58)	1.2	4.79	(2.10 – 7.48)	0.7
<4% many individuals	0.80	(0.00 – 1.91)	0.8	15.20	(10.44 – 19.96)	2.3
5-10%	12.82	(8.44 – 17.20)	12.7	62.43	(53.18 – 71.69)	9.3
11-25%	8.03	(4.54 – 11.53)	8.0	61.29	(52.14 – 70.43)	9.1
26-33%	15.23	(10.44 – 20.02)	15.1	64.90	(55.41 – 74.38)	9.6
34-50%	15.63	(10.80 – 20.47)	15.5	83.33	(72.75 – 93.90)	12.4
51-75%	17.62	(12.48 – 22.75)	17.3	107.81	(96.08 – 119.54)	16.0
76-90%	11.60	(7.40 – 15.80)	11.5	108.93	(97.17 – 120.69)	16.1
91-100%	10.39	(6.44 – 14.35)	10.3	104.85	(93.56 – 116.15)	15.6
Total	100.94	(89.48 – 112.39)	100.0	673.11		100.0



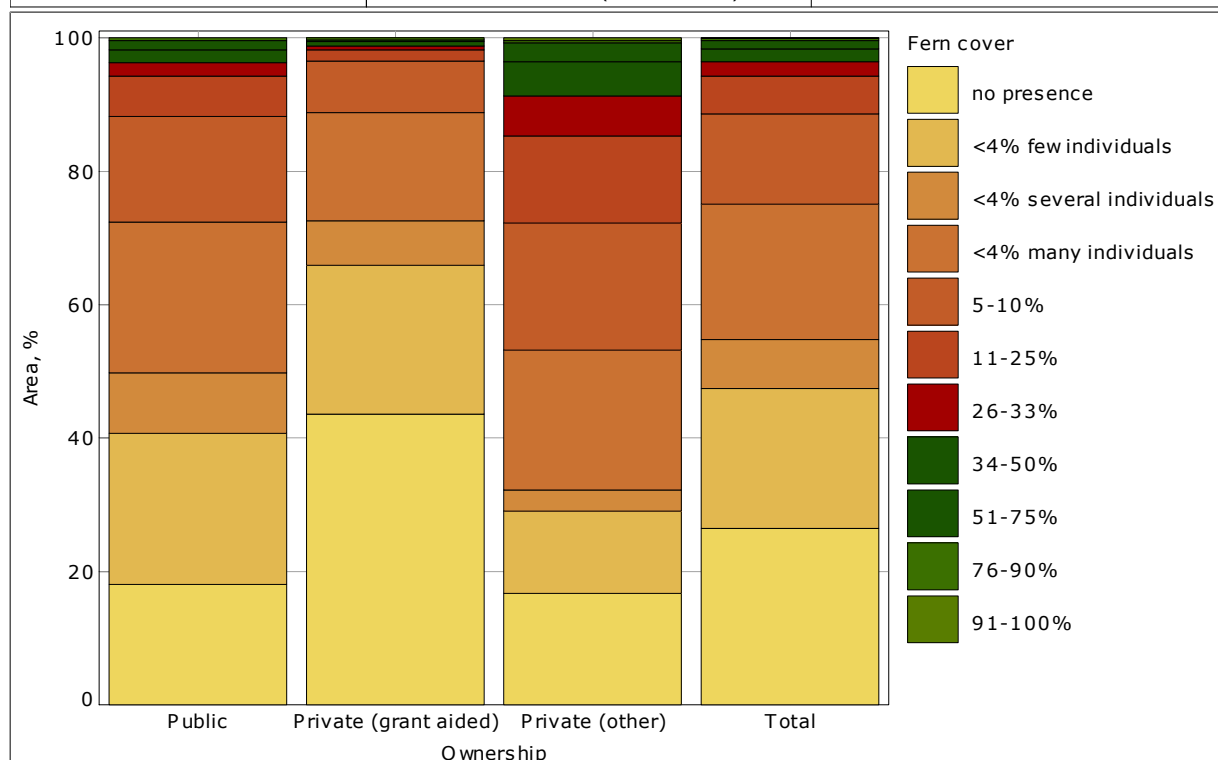
13.2.5 Stocked forest area by ownership and fern cover

Methodology

The stocked forest area is classified by ownership and the percentage fern cover.

Fern cover	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
no presence	62.27	(53.33 – 71.22)	18.0	98.53	(87.22 – 109.84)	43.5
<4% few individuals	78.52	(68.34 – 88.71)	22.7	50.37	(41.95 – 58.79)	22.3
<4% several individuals	31.58	(24.79 – 38.37)	9.1	15.17	(10.42 – 19.92)	6.7
<4% many individuals	78.03	(67.84 – 88.22)	22.5	36.77	(29.58 – 43.97)	16.3
5-10%	54.87	(46.11 – 63.63)	15.9	17.24	(12.18 – 22.30)	7.6
11-25%	20.81	(15.25 – 26.36)	6.0	4.00	(1.53 – 6.48)	1.8
26-33%	7.21	(3.91 – 10.51)	2.1	1.19	(0.00 – 2.54)	0.5
34-50%	6.40	(3.29 – 9.51)	1.8	1.60	(0.03 – 3.16)	0.7
51-75%	4.79	(2.09 – 7.49)	1.4	0.40	(0.00 – 1.20)	0.2
76-90%	1.60	(0.03 – 3.16)	0.5	0.80	(0.00 – 1.92)	0.4
91-100%	–	–	–	–	–	–
Total	346.09	(330.30 – 361.87)	100.0	226.09	(211.18 – 241.00)	100.0

Fern cover	Ownership / Area					
	Private (other)			Total		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
no presence	16.86	(11.88 – 21.84)	16.7	177.67	(163.97 – 191.36)	26.4
<4% few individuals	12.42	(8.09 – 16.76)	12.3	141.32	(128.36 – 154.28)	21.0
<4% several individuals	3.20	(0.98 – 5.42)	3.2	49.96	(41.55 – 58.37)	7.4
<4% many individuals	21.21	(15.61 – 26.82)	21.0	136.01	(123.53 – 148.50)	20.2
5-10%	19.22	(13.85 – 24.59)	19.0	91.33	(80.34 – 102.31)	13.6
11-25%	13.21	(8.76 – 17.66)	13.1	38.03	(30.62 – 45.43)	5.6
26-33%	5.98	(2.97 – 9.00)	5.9	14.39	(9.76 – 19.01)	2.1
34-50%	5.21	(2.39 – 8.03)	5.2	13.21	(8.74 – 17.67)	2.0
51-75%	2.81	(0.73 – 4.89)	2.8	8.00	(4.51 – 11.49)	1.2
76-90%	0.41	(0.00 – 1.20)	0.4	2.81	(0.73 – 4.89)	0.4
91-100%	0.40	(0.00 – 1.18)	0.4	0.40	(0.00 – 1.18)	0.06
Total	100.94	(89.48 – 112.39)	100.0	673.11		100.0



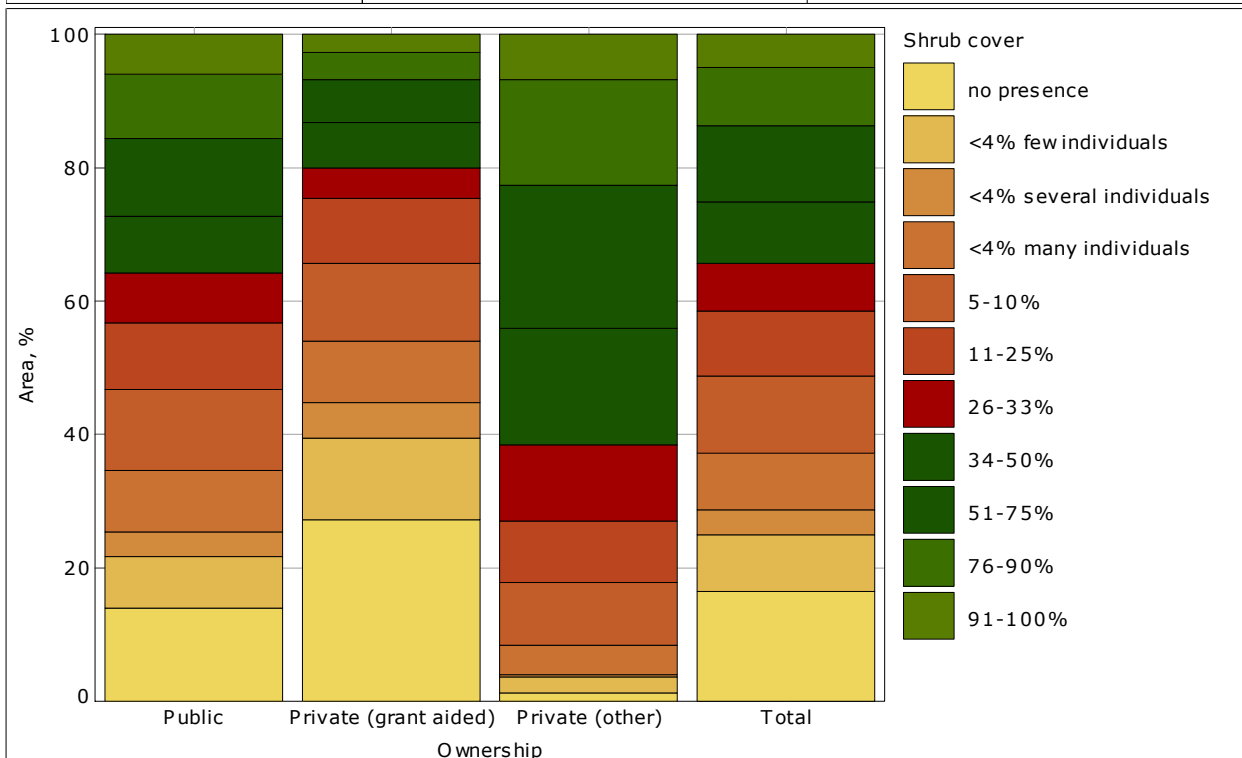
13.2.6 Stocked forest area by ownership and shrub cover

Methodology

The stocked forest area is classified by ownership and the percentage shrub cover.

Shrub cover	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
no presence	48.15	(40.00 – 56.31)	13.8	61.65	(52.43 – 70.86)	27.2
<4% few individuals	26.83	(20.53 – 33.13)	7.8	27.60	(21.22 – 33.99)	12.2
<4% several individuals	12.80	(8.41 – 17.19)	3.7	12.00	(7.76 – 16.24)	5.3
<4% many individuals	32.03	(25.20 – 38.86)	9.3	20.78	(15.26 – 26.31)	9.2
5-10%	42.06	(34.30 – 49.81)	12.2	26.40	(20.18 – 32.61)	11.7
11-25%	34.41	(27.32 – 41.50)	9.9	21.99	(16.27 – 27.71)	9.7
26-33%	26.03	(19.82 – 32.24)	7.5	10.39	(6.43 – 14.36)	4.6
34-50%	29.26	(22.70 – 35.81)	8.5	15.22	(10.44 – 19.99)	6.7
51-75%	40.42	(32.82 – 48.02)	11.7	14.82	(10.09 – 19.56)	6.6
76-90%	33.26	(26.29 – 40.23)	9.6	9.23	(5.48 – 12.98)	4.1
91-100%	20.83	(15.33 – 26.34)	6.0	6.01	(2.98 – 9.03)	2.7
Total	346.09	(330.30 – 361.87)	100.0	226.09	(211.18 – 241.00)	100.0

Shrub cover	Ownership / Area					
	Private (other)			Total		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
no presence	1.21	(0.00 – 2.58)	1.2	111.01	(99.20 – 122.81)	16.7
<4% few individuals	2.40	(0.48 – 4.33)	2.4	56.84	(47.87 – 65.81)	8.4
<4% several individuals	0.40	(0.00 – 1.18)	0.4	25.20	(19.10 – 31.29)	3.7
<4% many individuals	4.41	(1.82 – 7.00)	4.4	57.22	(48.29 – 66.15)	8.5
5-10%	9.60	(5.78 – 13.42)	9.5	78.05	(67.78 – 88.32)	11.6
11-25%	9.19	(5.47 – 12.92)	9.1	65.59	(56.06 – 75.12)	9.7
26-33%	11.63	(7.45 – 15.81)	11.5	48.05	(39.76 – 56.33)	7.1
34-50%	17.62	(12.46 – 22.79)	17.5	62.10	(52.79 – 71.40)	9.2
51-75%	21.64	(15.96 – 27.33)	21.4	76.89	(66.71 – 87.07)	11.4
76-90%	16.04	(11.15 – 20.93)	15.9	58.53	(49.52 – 67.54)	8.7
91-100%	6.80	(3.59 – 10.00)	6.7	33.64	(26.74 – 40.53)	5.0
Total	100.94	(89.48 – 112.39)	100.0	673.11		100.0



13.3 Lichen

Definition

Lichen

A lichen is an organism consisting of an outer fungal body enclosing photosynthetic algae. For the purpose of the NFI, lichens have been classified into three growth forms (Broad 1989). The type of trees on which the lichens occur and lichen coverage on the plot is recorded.

Lichen Type

1. **Crustose:** Encrusting forms that spread over and into the surface substrate on which they grow.
2. **Foliose:** Leafy forms that spread horizontally over the substrate. Attached by root-like threads called rhizinae.
3. **Fruticose:** Shrubby or beard-like forms that may be erect or pendulous.

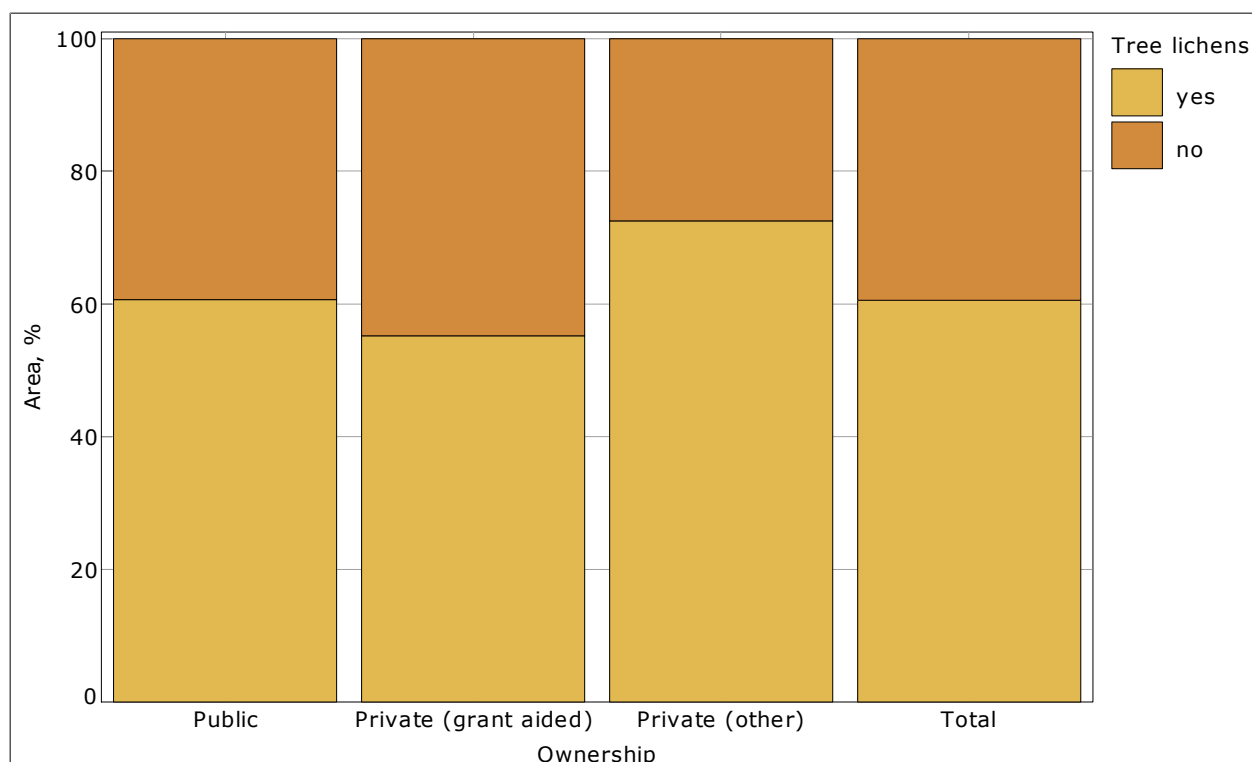
13.3.1 Stocked forest area by ownership and tree lichen occurrence

Methodology

The stocked forest area is classified by ownership and the presence of lichens.

Tree lichens	Ownership / Area					
	public			private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
yes	209.77	(195.42 – 224.11)	60.6	124.81	(112.61 – 137.01)	55.2
no	136.32	(123.94 – 148.70)	39.4	101.27	(90.04 – 112.51)	44.8
Total	346.09	(330.30 – 361.87)	100.0	226.09	(211.18 – 241.00)	100.0

Tree lichens	Ownership / Area					
	private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
yes	73.26	(63.28 – 83.25)	72.6	407.85	(393.52 – 422.18)	60.6
no	27.67	(21.35 – 34.00)	27.4	265.26	(250.93 – 279.60)	39.4
Total	100.94	(89.48 – 112.39)	100.0	673.11		100.0



13.3.2 Conifer forest area with lichens by lichen type and occurrence

Definition
Lichen type Lichens were classified into three groups: 1. Crustose: Encrusting forms that spread over and into the surface substrate on which they grow. 2. Foliose: Leafy forms that spread horizontally over the substrate. 3. Fruticose: Shrubby or beard-like forms that may be erect or pendulous.

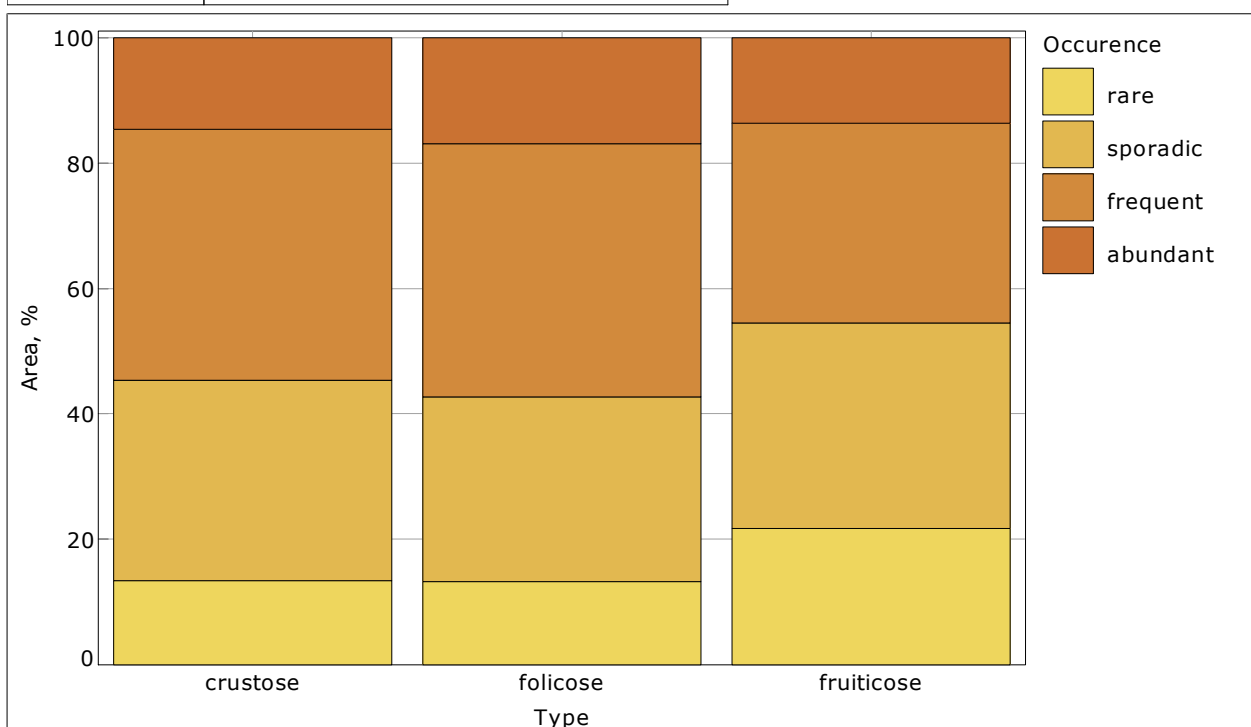
Definition
Lichen occurrence Lichen quantity is classified as one of the following: • Rare (up to-5%) • Frequent (51-75%) • Sporadic (6-25%) • Abundant (76-100%)

Methodology
Conifer stocked forest area on which lichens were found is classified by lichen type and occurrence.

SpeciesType: conifer

Occurrence	Type / Area					
	crustose			foliose		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
rare	34.09	(27.12 – 41.05)	13.4	24.86	(18.89 – 30.83)	13.3
sporadic	81.70	(71.53 – 91.87)	32.0	55.23	(46.53 – 63.93)	29.5
frequent	101.94	(90.69 – 113.20)	40.0	75.63	(65.62 – 85.63)	40.3
abundant	37.20	(30.03 – 44.37)	14.6	31.68	(24.92 – 38.43)	16.9
Total	254.93	(240.61 – 269.25)	100.0	187.39	(174.09 – 200.69)	100.0

Occurrence	Type / Area		
	fruticose		
	thousands ha	($\alpha = 0.05$)	%
rare	28.04	(21.78 – 34.30)	21.7
sporadic	42.39	(34.81 – 49.98)	32.8
frequent	41.22	(33.66 – 48.77)	31.9
abundant	17.64	(12.46 – 22.83)	13.6
Total	129.29	(117.53 – 141.05)	100.0



13.3.3 Smooth barked broadleaf forest area with lichens by lichen type and occurrence

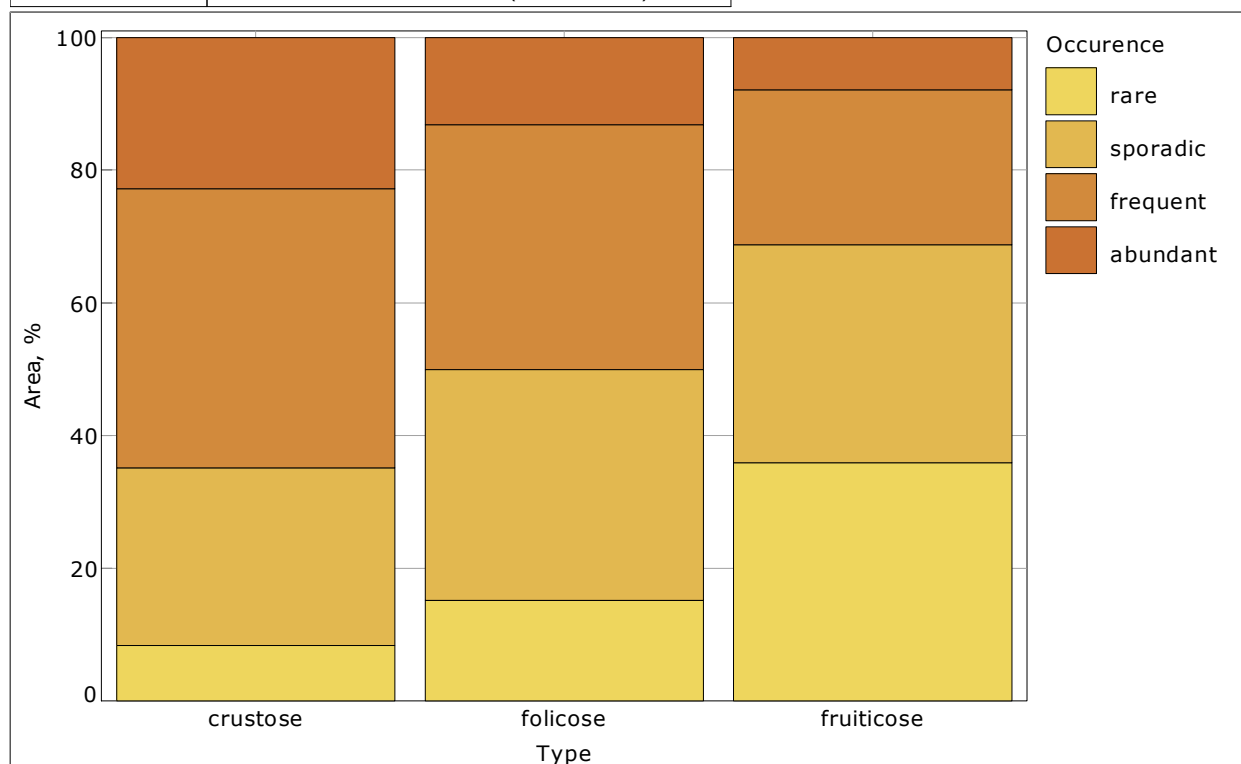
Methodology

The stocked forest area, on which lichens were found on smooth barked broadleaf tree species, is classified by lichen type and occurrence.

SpeciesType: broadleaf with smooth bark

Occurrence	Type / Area					
	crustose			folicose		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
rare	12.38	(8.10 – 16.67)	8.3	5.59	(2.69 – 8.49)	15.2
sporadic	39.96	(32.50 – 47.43)	26.8	12.80	(8.43 – 17.17)	34.8
frequent	62.76	(53.61 – 71.92)	42.1	13.59	(9.07 – 18.10)	36.9
abundant	33.99	(27.10 – 40.88)	22.8	4.81	(2.09 – 7.53)	13.1
Total	149.10	(136.68 – 161.51)	100.0	36.80	(29.54 – 44.05)	100.0

Occurrence	Type / Area		
	fruiticose		
	thousands ha	($\alpha = 0.05$)	%
rare	9.20	(5.49 – 12.90)	35.9
sporadic	8.39	(4.84 – 11.93)	32.8
frequent	6.00	(2.98 – 9.02)	23.5
abundant	2.00	(0.25 – 3.75)	7.8
Total	25.59	(19.48 – 31.70)	100.0



13.3.4 Rough barked broadleaf forest area with lichens by lichen type and occurrence

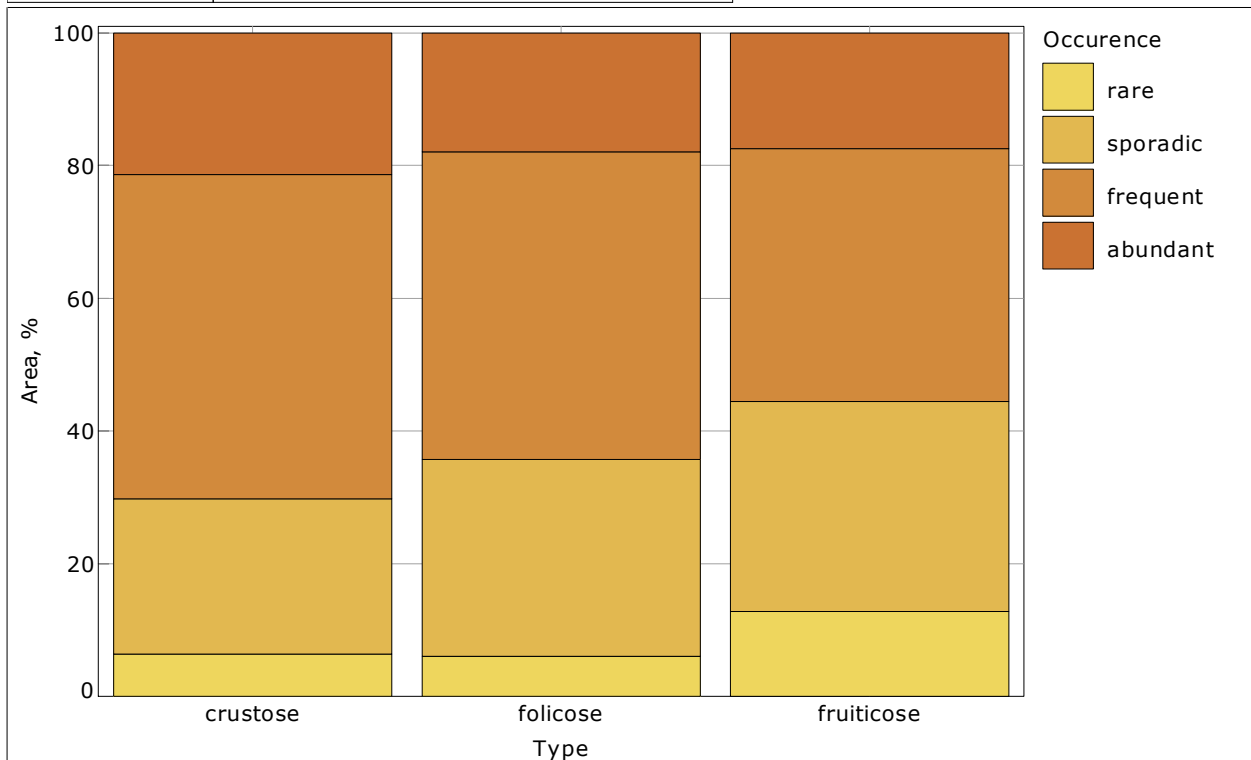
Methodology

The stocked forest area, on which lichens were found on rough barked broadleaf tree species, is classified by lichen type and occurrence.

SpeciesType: broadleaf with rough bark

Occurrence	Type / Area					
	crustose			folicose		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
rare	3.62	(1.27 - 5.96)	6.4	2.01	(0.25 - 3.78)	6.0
sporadic	13.19	(8.73 - 17.64)	23.4	9.99	(6.12 - 13.87)	29.8
frequent	27.59	(21.15 - 34.04)	48.9	15.57	(10.77 - 20.38)	46.3
abundant	12.00	(7.76 - 16.24)	21.3	6.01	(2.99 - 9.03)	17.9
Total	56.40	(47.38 - 65.42)	100.0	33.59	(26.60 - 40.57)	100.0

Occurrence	Type / Area		
	fruiticose		
	thousands ha	($\alpha = 0.05$)	%
rare	3.22	(1.00 - 5.44)	12.8
sporadic	8.01	(4.52 - 11.50)	31.7
frequent	9.59	(5.80 - 13.39)	38.1
abundant	4.40	(1.83 - 6.97)	17.4
Total	25.22	(19.04 - 31.40)	100.0



CHAPTER 14

SITE

This chapter describes the environment in which the plot occurs. Descriptive attributes relating to the terrain are also detailed in this chapter.

The majority of the forest estate is found at relatively low elevation, with 90.8% of the area occurring below 300 m. The proportion of afforestation area established at higher elevations has been steadily declining over the last 30 years.

Soil cultivation has been carried out on 88.8% of the Public forest estate area, while the area cultivated in the Private (grant aided) estate rises to 98.9%. Pit planting (24.9%) and mounding (40.2%) are the dominant cultivation types in the Public forest estate, while mounding dominates (79.2%) in the Private (grant aided) estate. Pit planting (11.1%) or no cultivation (80.5%) characterises the soil cultivation in the Private (other) forests.

Well over half (61.3%) of forests occur on mineral soils, with the remaining 38.7% on peats. Nearly one-third (30%) of all forests are growing on highly productive gley soils while 41.4% of Private (grant aided) forests occur on these soils, reflecting forestry's move onto more productive soils since the mid to late 1980's. Over the last 40 years, fewer forests are being afforested on peat. The proportion of basin peats being afforested has increased in the last ten years, largely as a result of the afforestation of land that was reclaimed for agriculture. Afforestation of blanket peat is declining, reflecting a shift away from the unenclosed land type.

In terms of soil drainage, Public and Private (grant aided) forests are distinctly different from Private (other) forest, with imperfectly to poorly drained soils predominating in the former and well drained soils in the latter. The national forest estate is located predominantly on terrain without major operational obstacles, particularly the Private (grant aided) forest estate

14.1 ALTITUDE

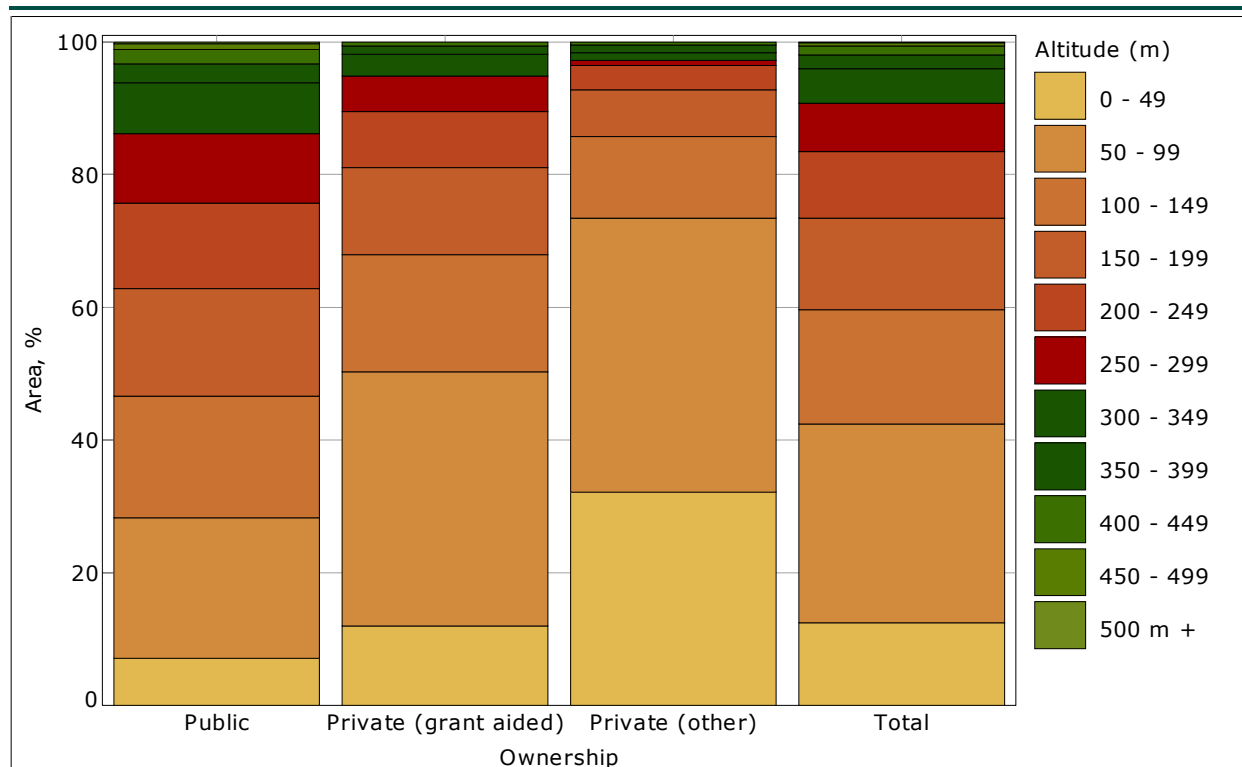
14.1.1 Stocked forest area by ownership and altitude

Definition
Altitude
Height (m) above sea level.

Methodology
The forest area is classified by ownership and altitude (m).

Altitude (m)	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
0 - 49	24.41	(18.46 - 30.36)	7.1	27.16	(20.95 - 33.38)	12.0
50 - 99	73.65	(63.97 - 83.34)	21.3	86.44	(76.09 - 96.80)	38.3
100 - 149	63.30	(53.97 - 72.62)	18.3	40.02	(32.46 - 47.57)	17.7
150 - 199	56.10	(47.36 - 64.85)	16.2	29.63	(23.10 - 36.16)	13.1
200 - 249	44.55	(36.63 - 52.47)	12.9	19.21	(13.89 - 24.52)	8.5
250 - 299	36.43	(29.22 - 43.64)	10.5	12.03	(7.82 - 16.24)	5.3
300 - 349	26.42	(20.22 - 32.63)	7.6	7.60	(4.23 - 10.97)	3.4
350 - 399	9.99	(6.13 - 13.84)	2.9	2.80	(0.74 - 4.87)	1.2
400 - 449	7.23	(4.03 - 10.43)	2.1	1.21	(0.00 - 2.57)	0.5
450 - 499	3.20	(0.99 - 5.42)	0.9	-	-	-
500 m +	0.80	(0.00 - 1.95)	0.2	-	-	-
Total	346.09	(330.30 - 361.87)	100.0	226.09	(211.18 - 241.00)	100.0

Altitude (m)	Ownership / Area					
	Private (other)			Total		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
0 - 49	32.46	(25.63 - 39.29)	32.2	84.04	(73.68 - 94.39)	12.5
50 - 99	41.64	(34.02 - 49.27)	41.2	201.74	(188.47 - 215.01)	30.0
100 - 149	12.42	(8.09 - 16.74)	12.3	115.73	(103.65 - 127.81)	17.2
150 - 199	7.21	(3.94 - 10.48)	7.1	92.94	(82.04 - 103.85)	13.8
200 - 249	3.60	(1.26 - 5.95)	3.6	67.36	(57.82 - 76.90)	10.0
250 - 299	0.81	(0.00 - 1.93)	0.8	49.26	(41.02 - 57.50)	7.3
300 - 349	1.19	(0.00 - 2.55)	1.2	35.22	(28.14 - 42.29)	5.2
350 - 399	1.20	(0.00 - 2.56)	1.2	13.99	(9.45 - 18.53)	2.1
400 - 449	0.40	(0.00 - 1.18)	0.4	8.83	(5.29 - 12.37)	1.3
450 - 499	-	-	-	3.20	(0.99 - 5.42)	0.5
500 m +	-	-	-	0.80	(0.00 - 1.95)	0.1
Total	100.94	(89.48 - 112.39)	100.0	673.11		100.0



14.1.2 Stocked afforested area by altitude and age class (10 yr)

Methodology

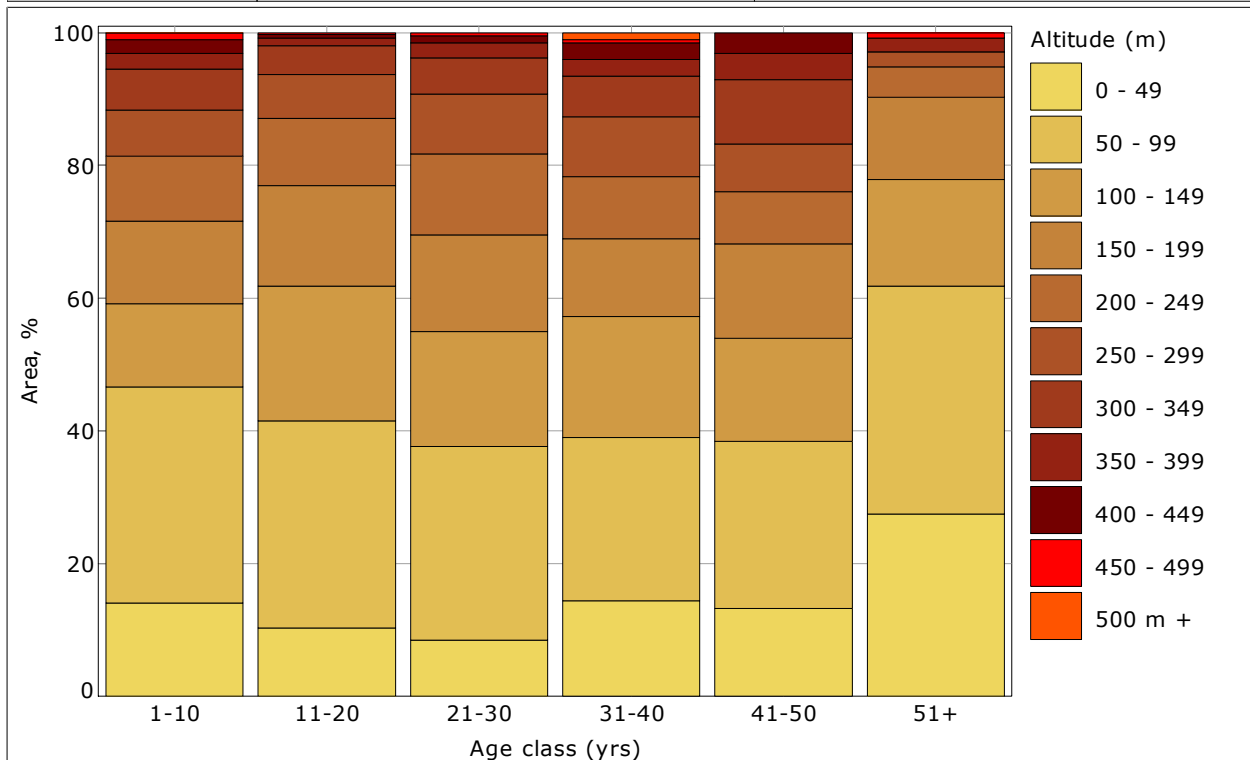
The stocked forest area is classified by altitude and age class (10 yr).

Age class (yrs)	Altitude (m) / Area					
	0 - 49			50 - 99		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
1-10	17.23	(12.79 - 21.66)	20.5	39.91	(33.18 - 46.63)	19.8
11-20	18.49	(13.85 - 23.13)	22.0	56.12	(47.97 - 64.27)	27.8
21-30	16.61	(12.21 - 21.01)	19.8	57.47	(49.31 - 65.63)	28.5
31-40	11.46	(8.09 - 14.83)	13.6	19.61	(15.10 - 24.12)	9.7
41-50	5.21	(3.04 - 7.38)	6.2	9.94	(6.86 - 13.02)	4.9
51+	15.03	(11.10 - 18.97)	17.9	18.69	(14.38 - 23.01)	9.3
Total	84.04	(73.68 - 94.39)	100.0	201.74	(188.47 - 215.01)	100.0
Age class (yrs)	Altitude (m) / Area					
	100 - 149			150 - 199		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
1-10	15.39	(10.98 - 19.79)	13.3	15.34	(10.81 - 19.88)	16.5
11-20	36.56	(29.61 - 43.52)	31.5	27.16	(21.14 - 33.19)	29.2
21-30	34.34	(27.55 - 41.13)	29.7	28.64	(22.39 - 34.89)	30.8
31-40	14.58	(10.20 - 18.95)	12.6	9.35	(5.78 - 12.92)	10.1
41-50	6.08	(3.42 - 8.75)	5.3	5.64	(2.83 - 8.45)	6.1
51+	8.78	(5.65 - 11.91)	7.6	6.81	(3.90 - 9.72)	7.3
Total	115.73	(103.65 - 127.81)	100.0	92.94	(82.04 - 103.85)	100.0
Age class (yrs)	Altitude (m) / Area					
	200 - 249			250 - 299		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
1-10	11.95	(7.80 - 16.10)	17.7	8.49	(4.98 - 12.00)	17.2
11-20	18.36	(13.26 - 23.45)	27.3	11.79	(7.66 - 15.92)	23.9
21-30	24.03	(18.13 - 29.93)	35.7	17.80	(12.73 - 22.87)	36.2
31-40	7.42	(4.16 - 10.68)	11.0	7.15	(3.87 - 10.43)	14.5
41-50	3.11	(1.01 - 5.22)	4.6	2.81	(0.75 - 4.88)	5.7
51+	2.49	(0.74 - 4.24)	3.7	1.23	(0.00 - 2.58)	2.5
Total	67.36	(57.82 - 76.90)	100.0	49.26	(41.02 - 57.50)	100.0

Age class (yrs)	Altitude (m) / Area					
	300 - 349			350 - 399		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
1-10	7.66	(4.39 - 10.93)	21.7	2.90	(0.83 - 4.97)	20.7
11-20	7.90	(4.53 - 11.28)	22.4	1.91	(0.24 - 3.58)	13.6
21-30	10.87	(6.93 - 14.82)	30.9	4.48	(1.90 - 7.07)	32.2
31-40	4.93	(2.22 - 7.63)	14.0	1.99	(0.25 - 3.74)	14.2
41-50	3.82	(1.46 - 6.19)	10.9	1.57	(0.03 - 3.11)	11.2
51+	0.03	(0.00 - 0.10)	0.09	1.14	(0.00 - 2.43)	8.1
Total	35.22	(28.14 - 42.29)	100.0	13.99	(9.45 - 18.53)	100.0

Age class (yrs)	Altitude (m) / Area					
	400 - 449			450 - 499		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
1-10	2.52	(0.59 - 4.44)	28.6	1.23	(0.00 - 2.61)	38.5
11-20	1.10	(0.00 - 2.37)	12.4	0.37	(0.00 - 1.09)	11.5
21-30	2.01	(0.26 - 3.76)	22.8	0.80	(0.00 - 1.91)	25.0
31-40	2.00	(0.25 - 3.75)	22.6	0.40	(0.00 - 1.18)	12.5
41-50	1.20	(0.00 - 2.59)	13.6	-	-	-
51+	-	-	-	0.40	(0.00 - 1.27)	12.5
Total	8.83	(5.29 - 12.37)	100.0	3.20	(0.99 - 5.42)	100.0

Age class (yrs)	Altitude (m) / Area					
	500 m +			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
1-10	0.01	(0.00 - 0.04)	1.7	122.62	(111.27 - 133.97)	18.2
11-20	-	-	-	179.76	(166.55 - 192.97)	26.7
21-30	-	-	-	197.06	(183.28 - 210.84)	29.3
31-40	0.79	(0.00 - 1.91)	98.3	79.67	(70.32 - 89.02)	11.8
41-50	-	-	-	39.40	(32.72 - 46.07)	5.9
51+	-	-	-	54.60	(47.29 - 61.91)	8.1
Total	0.80	(0.00 - 1.95)	100.0	673.11		100.0



14.2 TERRAIN CLASSIFICATION

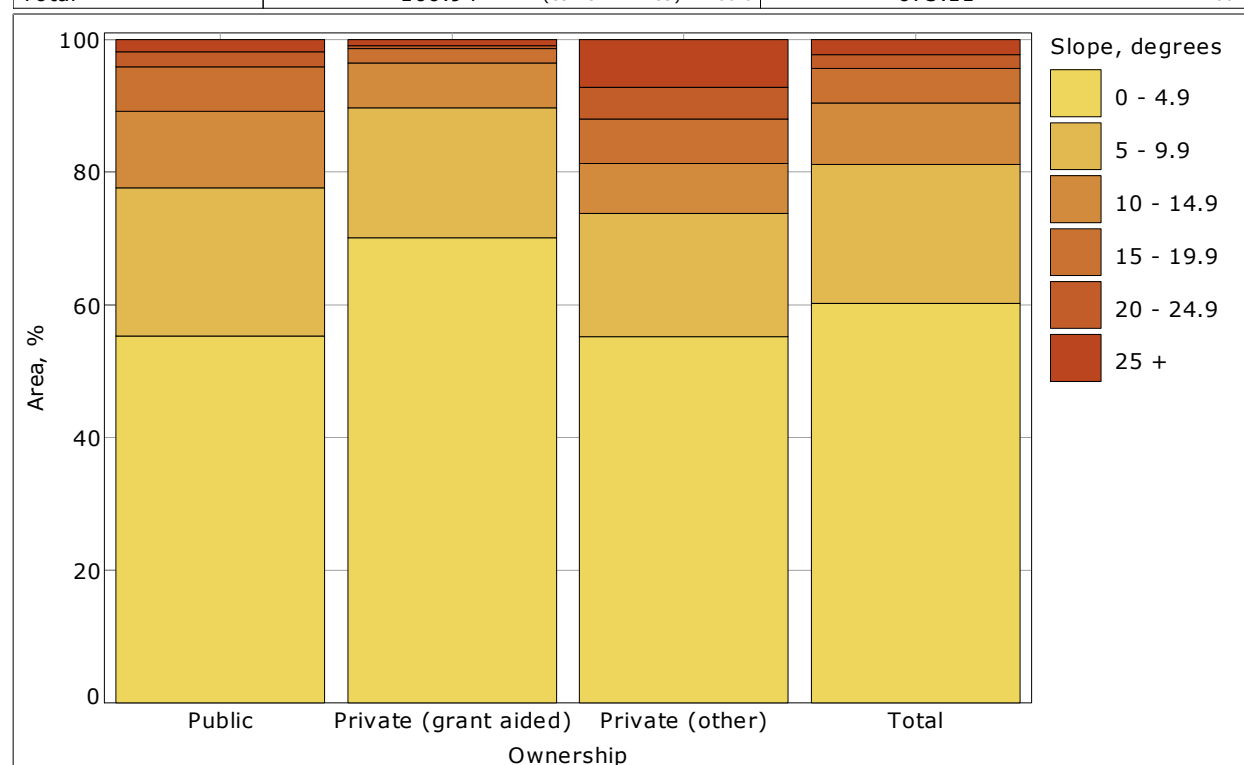
14.2.1 Stocked forest area by ownership and slope

Definition
Slope The measurement of the steepness of terrain, the ratio of vertical rise to horizontal distance expressed in degrees.

Methodology
The stocked forest area is classified by ownership and slope.

Slope, degrees	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
0 - 4.9	191.53	(177.28 - 205.78)	55.4	158.45	(145.15 - 171.75)	70.2
5 - 9.9	77.30	(67.15 - 87.46)	22.3	44.41	(36.43 - 52.39)	19.6
10 - 14.9	39.64	(32.10 - 47.17)	11.5	15.23	(10.46 - 20.01)	6.7
15 - 19.9	23.62	(17.74 - 29.50)	6.8	4.80	(2.10 - 7.51)	2.1
20 - 24.9	7.60	(4.20 - 11.01)	2.2	1.19	(0.00 - 2.55)	0.5
25 +	6.39	(3.28 - 9.50)	1.8	1.99	(0.25 - 3.74)	0.9
Total	346.09	(330.30 - 361.87)	100.0	226.09	(211.18 - 241.00)	100.0

Slope, degrees	Ownership / Area					
	Private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
0 - 4.9	55.66	(46.87 - 64.45)	55.0	405.64	(390.53 - 420.75)	60.3
5 - 9.9	18.83	(13.52 - 24.14)	18.7	140.55	(127.60 - 153.50)	20.9
10 - 14.9	7.61	(4.20 - 11.02)	7.5	62.48	(53.21 - 71.76)	9.3
15 - 19.9	6.81	(3.59 - 10.03)	6.8	35.24	(28.13 - 42.34)	5.2
20 - 24.9	4.80	(2.09 - 7.51)	4.8	13.60	(9.08 - 18.11)	2.0
25 +	7.22	(3.92 - 10.52)	7.2	15.61	(10.76 - 20.45)	2.3
Total	100.94	(89.48 - 112.39)	100.0	673.11		100.0



14.2.2 Stocked forest area by ownership and ground roughness

Definition

Site Roughness

Site roughness describes the unevenness of the surface of the terrain.

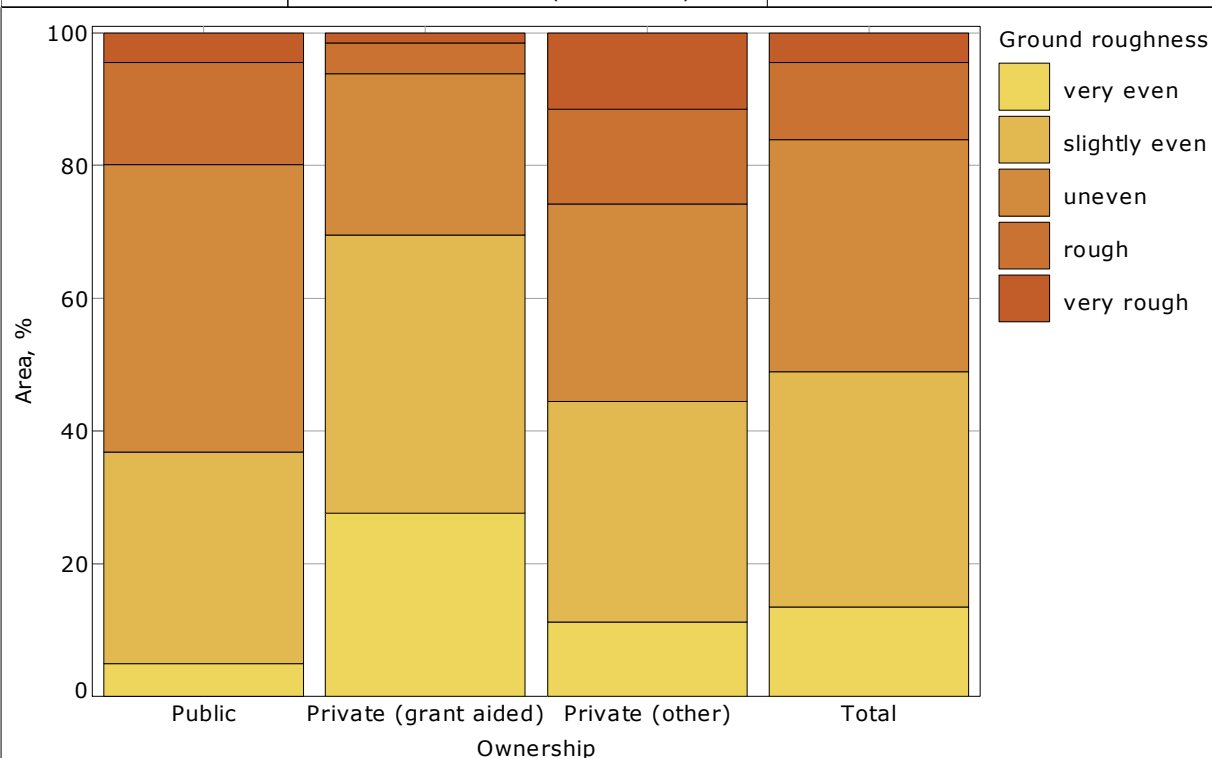
1. **Very even:** Low obstacles infrequent and taller obstacles isolated or absent. E.g. ripping.
2. **Slightly even:** Low obstacles moderately frequent and taller obstacles isolated. E.g. shallow mounding.
3. **Uneven:** Low obstacles frequent and taller obstacles infrequent. E.g. deep mounding.
4. **Rough:** Low obstacles frequent and taller obstacles moderately frequent. E.g. rough ploughing.
5. **Very rough:** Sites more severe than the rough classification. E.g. boulders.

Methodology

The stocked forest area is classified by ownership and ground roughness.

Ground roughness	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
very even	16.84	(11.81 – 21.86)	4.9	62.43	(53.31 – 71.55)	27.6
slightly even	110.59	(98.88 – 122.30)	32.0	94.81	(83.70 – 105.93)	42.0
uneven	150.21	(136.85 – 163.56)	43.3	54.82	(46.19 – 63.46)	24.2
rough	53.26	(44.69 – 61.84)	15.4	10.81	(6.80 – 14.82)	4.8
very rough	15.19	(10.46 – 19.93)	4.4	3.21	(0.99 – 5.43)	1.4
Total	346.09	(330.30 – 361.87)	100.0	226.09	(211.18 – 241.00)	100.0

Ground roughness	Ownership / Area					
	Private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
very even	11.23	(7.13 – 15.32)	11.1	90.49	(79.83 – 101.15)	13.4
slightly even	33.65	(26.64 – 40.65)	33.3	239.05	(223.82 – 254.28)	35.5
uneven	30.04	(23.39 – 36.68)	29.8	235.07	(219.84 – 250.30)	34.9
rough	14.42	(9.76 – 19.08)	14.3	78.50	(68.35 – 88.64)	11.7
very rough	11.60	(7.42 – 15.79)	11.5	30.00	(23.42 – 36.59)	4.5
Total	100.94	(89.48 – 112.39)	100.0	673.11		100.0



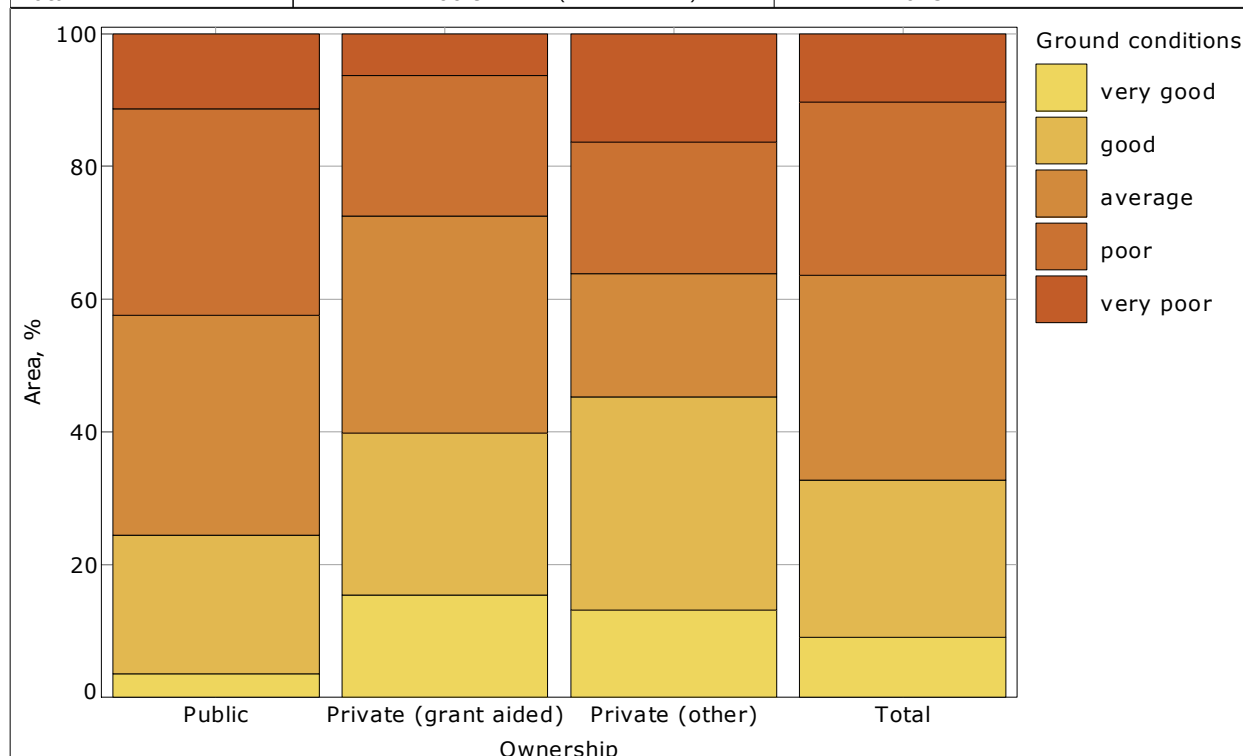
14.2.3 Stocked forest area by ownership and ground conditions

Definition
Ground Conditions
Describes the bearing capacity of the soil.
1. Very good: Freely drained gravels and sandy soils.
2. Good: Firm mineral soils.
3. Average: Soft mineral soils, including gleys.
4. Poor: Peaty gleys and podzols. Also wet gleyed soils.
5. Very poor: Soft, wet, deep peats.

Methodology
The stocked forest area is classified by ownership and ground conditions.

Ground conditions	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
very good	12.43	(8.11 – 16.75)	3.6	34.78	(27.84 – 41.73)	15.4
good	72.10	(62.36 – 81.84)	20.8	55.23	(46.46 – 63.99)	24.4
average	114.95	(102.99 – 126.91)	33.3	73.99	(64.06 – 83.91)	32.7
poor	107.73	(96.21 – 119.25)	31.1	48.05	(39.85 – 56.24)	21.3
very poor	38.88	(31.46 – 46.29)	11.2	14.05	(9.47 – 18.63)	6.2
Total	346.09	(330.30 – 361.87)	100.0	226.09	(211.18 – 241.00)	100.0

Ground conditions	Ownership / Area					
	Private (other)			Total		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
very good	13.23	(8.81 – 17.66)	13.1	60.44	(51.54 – 69.35)	9.0
good	32.45	(25.56 – 39.34)	32.2	159.78	(146.41 – 173.15)	23.7
average	18.82	(13.52 – 24.13)	18.6	207.76	(193.23 – 222.29)	30.9
poor	20.00	(14.56 – 25.44)	19.8	175.78	(162.12 – 189.44)	26.1
very poor	16.43	(11.51 – 21.34)	16.3	69.35	(59.74 – 78.96)	10.3
Total	100.94	(89.48 – 112.39)	100.0	673.11		100.0



14.2.4 Stocked forest area by ownership and drainage

Definition

Drainage

Drainage describes the capacity of the soil to drain water.

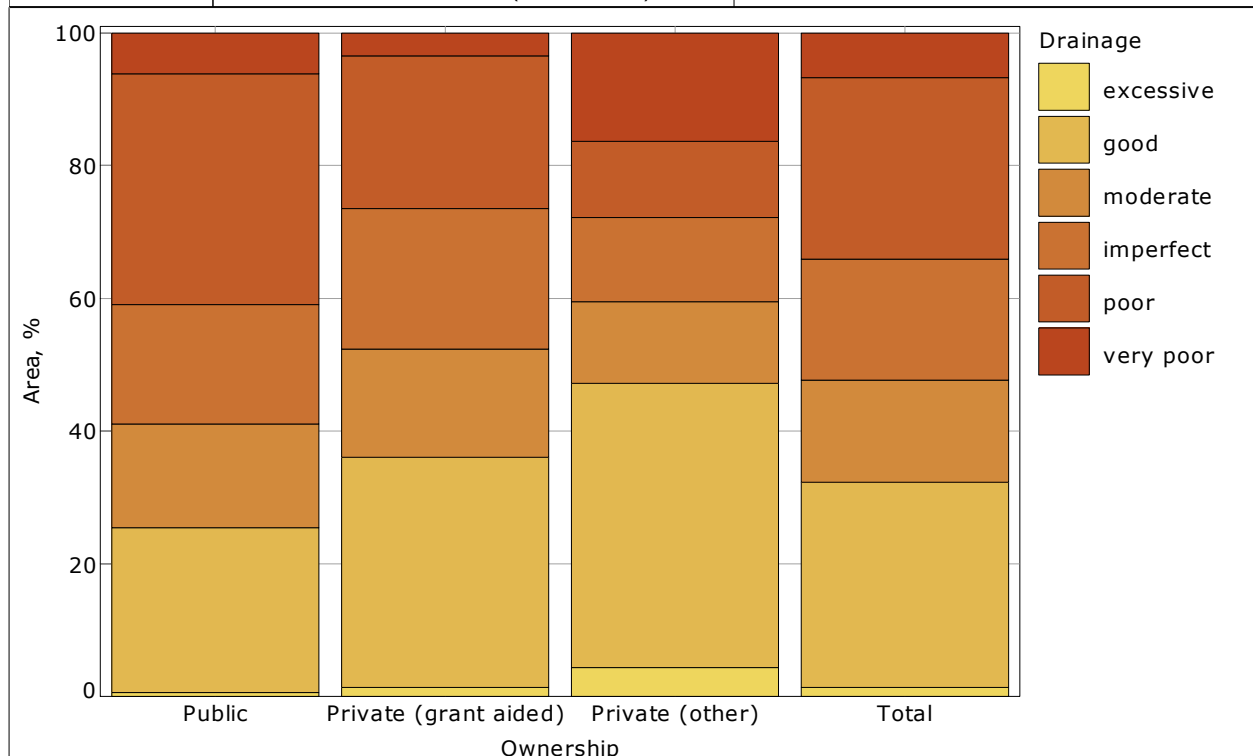
1. **Excessive:** Soil has poor moisture retaining ability, e.g. coastal sand.
2. **Good:** Site is dry and the soil profile shows no sign of water impedance.
3. **Moderate:** No significant sign of impedance, e.g. podzol.
4. **Imperfect:** Drainage is restricted due to soil texture and/or presence of an iron pan.
5. **Poor:** Soil has poor capacity to drain excess water.
6. **Very poor:** Site is very wet, i.e. water present at the surface.

Methodology

The stocked forest area is classified by ownership and drainage.

Drainage	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
excessive	1.99	(0.25 - 3.73)	0.6	3.19	(0.99 - 5.40)	1.4
good	86.06	(75.69 - 96.43)	24.9	78.36	(68.35 - 88.37)	34.6
moderate	54.09	(45.39 - 62.79)	15.6	36.80	(29.53 - 44.08)	16.3
imperfect	62.48	(53.22 - 71.74)	18.1	47.98	(39.76 - 56.19)	21.2
poor	120.19	(108.34 - 132.04)	34.7	52.13	(43.72 - 60.53)	23.1
very poor	21.27	(15.71 - 26.84)	6.1	7.63	(4.23 - 11.03)	3.4
Total	346.09	(330.30 - 361.87)	100.0	226.09	(211.18 - 241.00)	100.0

Drainage	Ownership / Area					
	Private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
excessive	4.40	(1.81 - 6.98)	4.4	9.58	(5.78 - 13.38)	1.4
good	43.27	(35.42 - 51.12)	42.8	207.69	(193.97 - 221.41)	31.0
moderate	12.42	(8.09 - 16.76)	12.3	103.31	(91.77 - 114.86)	15.3
imperfect	12.80	(8.42 - 17.18)	12.7	123.26	(111.00 - 135.51)	18.3
poor	11.62	(7.46 - 15.79)	11.5	183.94	(170.39 - 197.49)	27.3
very poor	16.42	(11.53 - 21.32)	16.3	45.33	(37.40 - 53.25)	6.7
Total	100.94	(89.48 - 112.39)	100.0	673.11		100.0



14.3 LITTER AND HUMUS

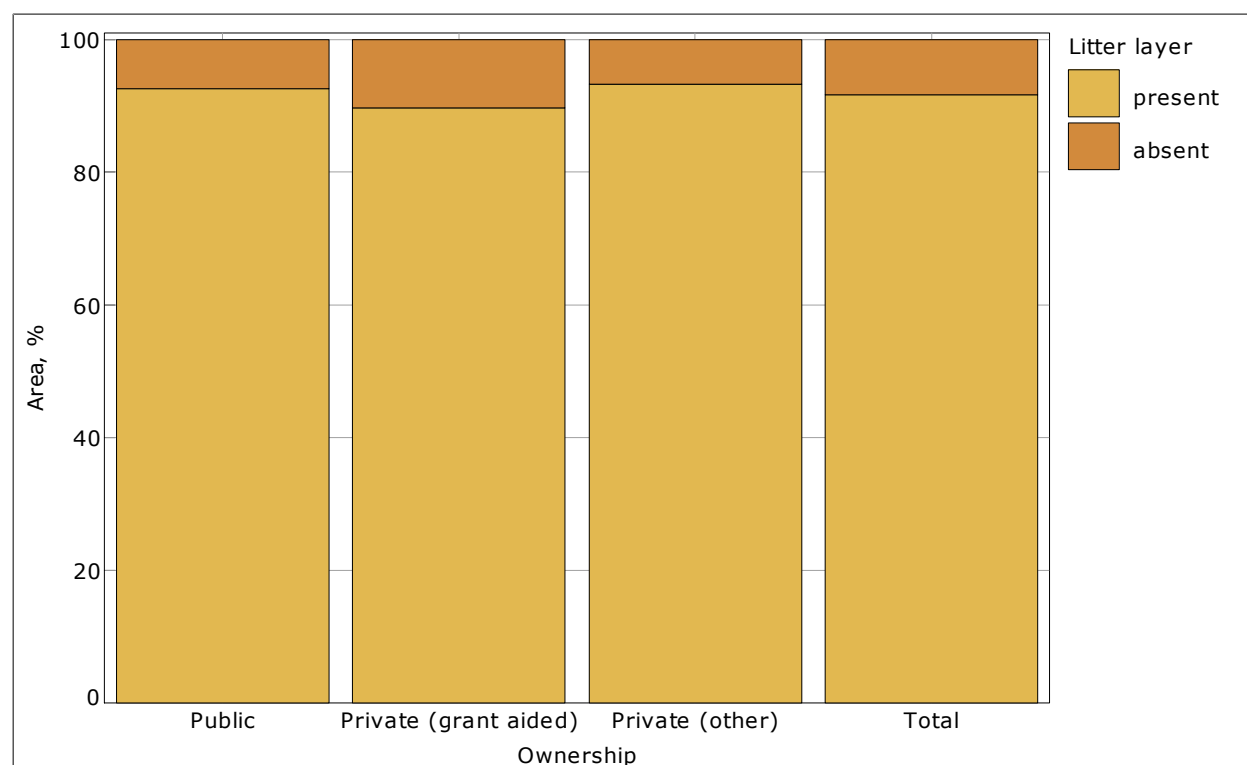
14.3.1 Stocked forest area by ownership and occurrence of a litter layer

Definition
Litter layer
The non-living, slightly decomposed, organic material on the surface of the forest floor.

Methodology
The stocked forest area is classified by ownership and the occurrence of a litter layer.

Litter layer	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
present	320.42	(304.60 – 336.25)	92.6	202.91	(188.33 – 217.49)	89.7
absent	25.66	(19.60 – 31.72)	7.4	23.18	(17.43 – 28.93)	10.3
Total	346.09	(330.30 – 361.87)	100.0	226.09	(211.18 – 241.00)	100.0

Litter layer	Ownership / Area					
	Private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
present	94.11	(83.00 – 105.22)	93.2	617.44	(608.82 – 626.06)	91.7
absent	6.83	(3.60 – 10.06)	6.8	55.67	(47.05 – 64.29)	8.3
Total	100.94	(89.48 – 112.39)	100.0	673.11		100.0



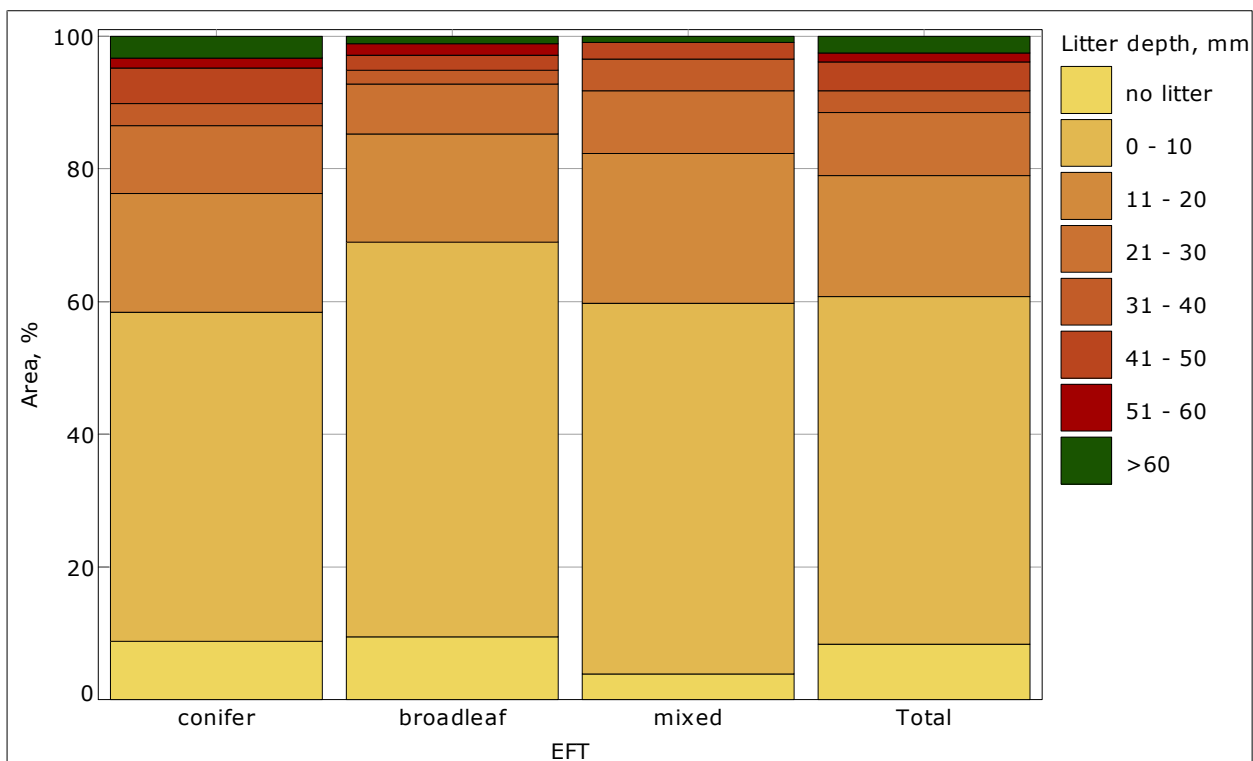
14.3.2 Stocked forest area by litter depth and European Forest Type

Methodology

The stocked forest area is classified by European Forest Type and litter depth.

Litter depth, mm	EFT / Area					
	conifer			broadleaf		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
no litter	38.83	(31.48 - 46.18)	8.8	13.22	(8.77 - 17.68)	9.5
0 - 10	218.91	(204.82 - 233.01)	49.7	82.58	(72.29 - 92.86)	59.5
11 - 20	79.25	(69.01 - 89.48)	17.9	22.80	(17.05 - 28.55)	16.4
21 - 30	45.17	(37.29 - 53.04)	10.2	10.37	(6.44 - 14.30)	7.5
31 - 40	14.78	(10.17 - 19.38)	3.3	2.80	(0.73 - 4.87)	2.0
41 - 50	23.59	(17.76 - 29.42)	5.3	3.20	(0.99 - 5.41)	2.3
51 - 60	6.39	(3.29 - 9.49)	1.4	2.39	(0.48 - 4.30)	1.7
>60	14.80	(10.19 - 19.41)	3.4	1.59	(0.03 - 3.15)	1.1
Total	441.72	(426.90 - 456.54)	100.0	138.95	(126.22 - 151.69)	100.0

Litter depth, mm	EFT / Area					
	mixed			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
no litter	3.61	(1.27 - 5.95)	3.9	55.67	(47.05 - 64.29)	8.3
0 - 10	51.65	(43.21 - 60.10)	55.9	353.14	(339.20 - 367.09)	52.3
11 - 20	20.81	(15.32 - 26.30)	22.5	122.85	(110.82 - 134.88)	18.3
21 - 30	8.78	(5.15 - 12.42)	9.5	64.32	(55.18 - 73.46)	9.6
31 - 40	4.39	(1.84 - 6.94)	4.7	21.96	(16.40 - 27.53)	3.3
41 - 50	2.40	(0.49 - 4.32)	2.6	29.20	(22.76 - 35.63)	4.3
51 - 60	-	-	-	8.78	(5.16 - 12.40)	1.3
>60	0.79	(0.00 - 1.90)	0.9	17.19	(12.22 - 22.15)	2.6
Total	92.44	(81.47 - 103.41)	100.0	673.11		100.0



14.3.3 Stocked forest area by humus form and European Forest Type

Definition

Humus

Organic layers at the soil surface, where leaf litter and other organic matter are decomposing and being incorporated into the upper mineral soil. Humus forms:

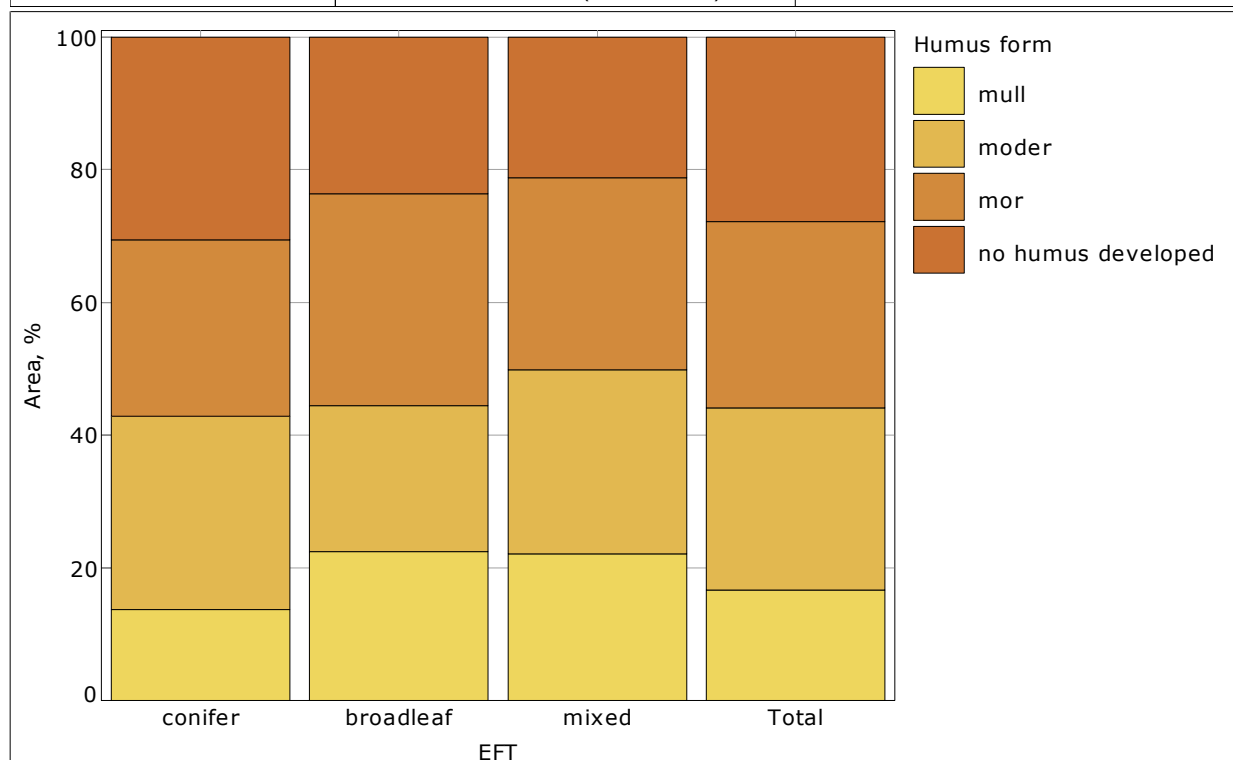
1. **Mull humus:** This is the humus-rich layer of forest soils consisting of mixed organic and mineral matter. The humus is being incorporated into the soil.
2. **Moder humus:** The current litter layer overlies partly decomposed material, which is not matted as in mor.
3. **Mor humus:** This is raw humus, composed of unincorporated organic material, usually distinct from the mineral soil. It comprises the current litter layer overlying a matted layer of partly decomposed material.
4. **No humus:** No humus development. The litter layer may not have formed yet or could be removed due to surface runoff or flooding.

Methodology

The stocked forest area is classified by European Forest Type and the humus form present.

Humus form	EFT / Area					
	conifer			broadleaf		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
mull	60.51	(51.39 – 69.62)	13.7	31.26	(24.68 – 37.85)	22.5
moder	129.03	(116.67 – 141.40)	29.2	30.46	(23.79 – 37.13)	21.9
mor	117.36	(105.31 – 129.41)	26.6	44.38	(36.59 – 52.18)	32.0
no humus developed	134.82	(122.99 – 146.65)	30.5	32.84	(25.99 – 39.69)	23.6
Total	441.72	(426.90 – 456.54)	100.0	138.95	(126.22 – 151.69)	100.0

Humus form	EFT / Area					
	mixed			Total		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
mull	20.41	(14.95 – 25.88)	22.1	112.18	(100.51 – 123.86)	16.7
moder	25.64	(19.49 – 31.79)	27.7	185.13	(171.08 – 199.19)	27.5
mor	26.79	(20.53 – 33.05)	29.0	188.53	(174.36 – 202.70)	28.0
no humus developed	19.60	(14.25 – 24.96)	21.2	187.27	(174.19 – 200.35)	27.8
Total	92.44	(81.47 – 103.41)	100.0	673.11		100.0



14.4 SOIL GROUP

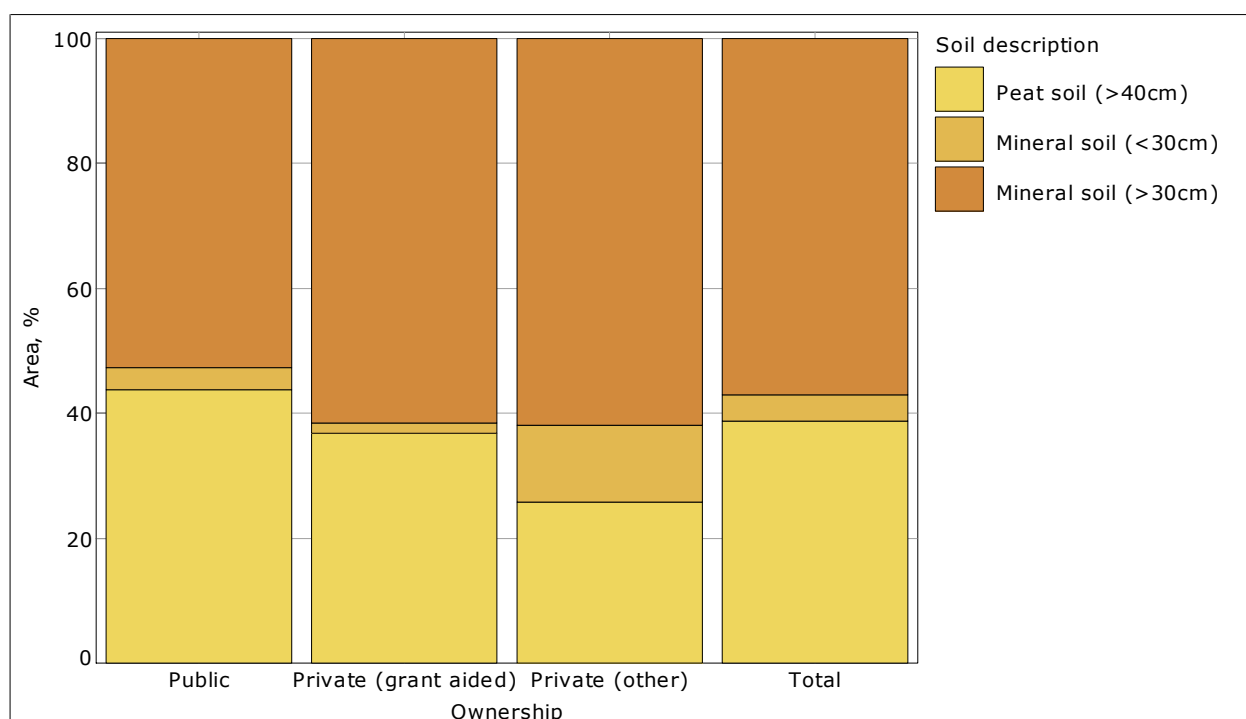
14.4.1 Stocked forest area by ownership and soil description

Definition
Soil Description Broad assessment of peat and mineral soil. Peat (>40cm): Peat soil greater than 40cm of peat. Mineral soil (<30cm): Mineral soil less than 30cm in depth. Mineral soil (>30cm): Mineral soil greater than 30cm in depth.

Methodology
The stocked forest area is classified by ownership and soil description.

Soil description	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Peat soil (>40cm)	151.43	(138.52 – 164.33)	43.8	83.28	(73.07 – 93.50)	36.8
Mineral soil (<30cm)	12.38	(8.08 – 16.67)	3.6	3.59	(1.27 – 5.92)	1.6
Mineral soil (>30cm)	182.28	(168.58 – 195.99)	52.6	139.21	(126.37 – 152.05)	61.6
Total	346.09	(330.30 – 361.87)	100.0	226.09	(211.18 – 241.00)	100.0

Soil description	Ownership / Area					
	Private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Peat soil (>40cm)	26.02	(19.96 – 32.08)	25.8	260.73	(246.21 – 275.24)	38.7
Mineral soil (<30cm)	12.40	(8.10 – 16.70)	12.3	28.37	(21.99 – 34.75)	4.2
Mineral soil (>30cm)	62.52	(53.20 – 71.83)	61.9	384.01	(369.22 – 398.81)	57.1
Total	100.94	(89.48 – 112.39)	100.0	673.11		100.0



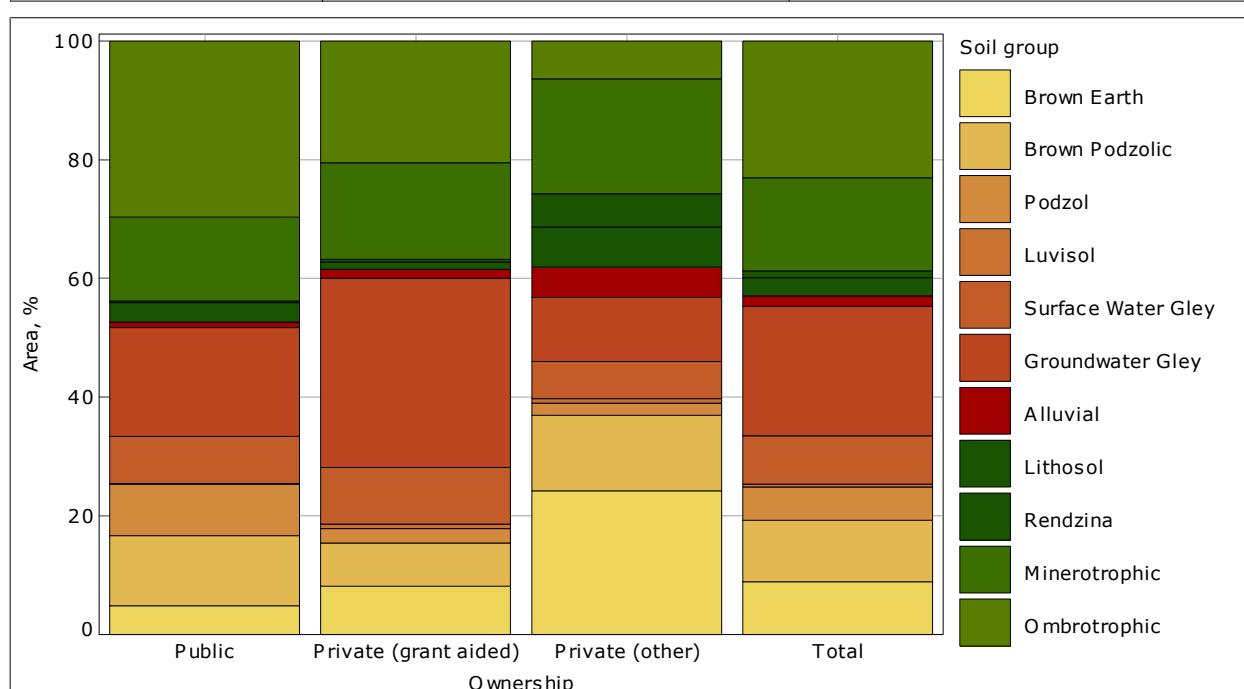
14.4.2 Stocked forest area by ownership and soil group

Definition
Soil group
A standardised system of nomenclature to classify peat and soil into groups.

Methodology
The stocked forest area is classified by ownership and soil group.

Soil group	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Brown Earth	16.82	(11.84 – 21.80)	4.9	18.42	(13.23 – 23.61)	8.1
Brown Podzolic	40.86	(33.37 – 48.35)	11.8	16.41	(11.46 – 21.36)	7.3
Podzol	30.03	(23.62 – 36.44)	8.7	5.61	(2.68 – 8.54)	2.5
Luvisol	0.40	(0.00 – 1.18)	0.1	1.60	(0.03 – 3.16)	0.7
Surface Water Gley	27.24	(20.95 – 33.53)	7.9	21.55	(16.00 – 27.10)	9.5
Groundwater Gley	63.73	(54.45 – 73.01)	18.4	72.01	(62.21 – 81.82)	31.9
Alluvial	3.21	(0.99 – 5.43)	0.9	3.60	(1.26 – 5.94)	1.6
Lithosol	11.18	(7.10 – 15.25)	3.2	2.79	(0.74 – 4.85)	1.2
Rendzina	1.20	(0.00 – 2.55)	0.3	0.80	(0.00 – 1.91)	0.4
Minerotrophic	48.89	(40.84 – 56.94)	14.1	36.87	(29.90 – 43.84)	16.3
Ombrotrophic	102.53	(91.58 – 113.49)	29.7	46.41	(38.72 – 54.10)	20.5
Total	346.09	(330.30 – 361.87)	100.0	226.09	(211.18 – 241.00)	100.0

Soil group	Ownership / Area					
	Private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
Brown Earth	24.44	(18.45 – 30.42)	24.2	59.68	(50.76 – 68.60)	8.9
Brown Podzolic	12.85	(8.43 – 17.27)	12.7	70.12	(60.50 – 79.75)	10.4
Podzol	2.00	(0.25 – 3.75)	2.0	37.64	(30.52 – 44.76)	5.6
Luvisol	0.80	(0.00 – 1.91)	0.8	2.79	(0.74 – 4.85)	0.4
Surface Water Gley	6.40	(3.28 – 9.52)	6.3	55.19	(46.60 – 63.78)	8.2
Groundwater Gley	10.82	(6.78 – 14.86)	10.7	146.56	(133.56 – 159.56)	21.8
Alluvial	5.21	(2.40 – 8.02)	5.2	12.02	(7.78 – 16.27)	1.8
Lithosol	6.78	(3.59 – 9.98)	6.7	20.76	(15.30 – 26.21)	3.1
Rendzina	5.62	(2.73 – 8.51)	5.6	7.61	(4.25 – 10.97)	1.1
Minerotrophic	19.61	(14.39 – 24.83)	19.4	105.37	(94.95 – 115.79)	15.7
Ombrotrophic	6.41	(3.29 – 9.53)	6.4	155.35	(143.14 – 167.57)	23.0
Total	100.94	(89.48 – 112.39)	100.0	673.11		100.0



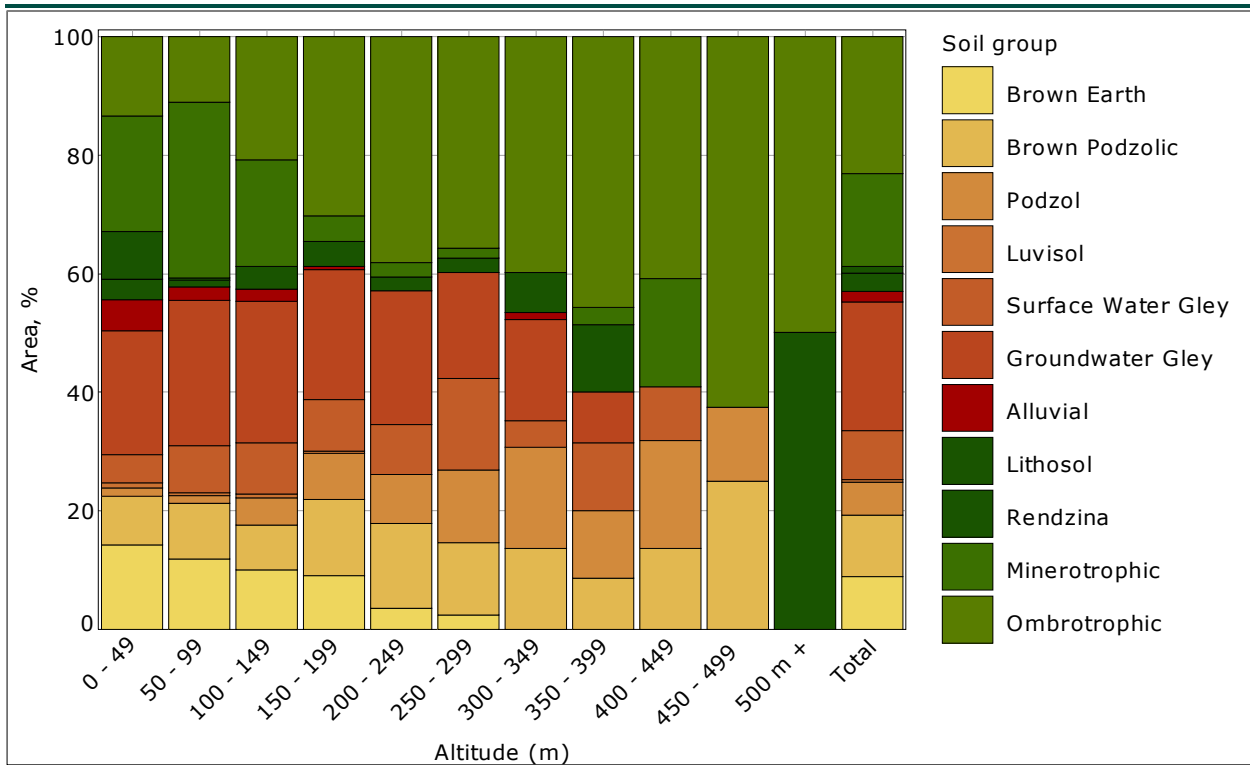
14.4.3 Stocked forest area by altitude and soil group

Methodology

The stocked forest area is classified by altitude and soil group.

Soil group	Altitude (m) / Area					
	0 - 49			50 - 99		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Brown Earth	12.00	(7.78 - 16.22)	14.3	24.02	(18.12 - 29.93)	11.9
Brown Podzolic	6.82	(3.59 - 10.04)	8.1	18.83	(13.55 - 24.11)	9.3
Podzol	1.20	(0.00 - 2.55)	1.4	2.80	(0.73 - 4.87)	1.4
Luvisol	0.80	(0.00 - 1.91)	0.9	0.80	(0.00 - 1.93)	0.4
Surface Water Gley	4.00	(1.55 - 6.46)	4.8	15.96	(11.18 - 20.74)	7.9
Groundwater Gley	17.58	(12.48 - 22.67)	21.0	49.64	(41.42 - 57.87)	24.6
Alluvial	4.40	(1.81 - 6.98)	5.2	4.41	(1.81 - 7.01)	2.2
Lithosol	2.79	(0.73 - 4.86)	3.3	2.39	(0.49 - 4.29)	1.2
Rendzina	6.81	(3.62 - 9.99)	8.1	0.81	(0.00 - 1.92)	0.4
Minerotrophic	16.42	(11.53 - 21.30)	19.5	59.69	(51.65 - 67.72)	29.6
Ombrotrophic	11.23	(7.14 - 15.32)	13.4	22.39	(16.78 - 28.00)	11.1
Total	84.04	(73.68 - 94.39)	100.0	201.74	(188.47 - 215.01)	100.0
Soil group	Altitude (m) / Area					
	100 - 149			150 - 199		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Brown Earth	11.61	(7.43 - 15.80)	10.0	8.41	(4.88 - 11.95)	9.1
Brown Podzolic	8.82	(5.16 - 12.48)	7.6	12.02	(7.80 - 16.24)	12.9
Podzol	5.21	(2.39 - 8.02)	4.5	7.20	(3.94 - 10.46)	7.7
Luvisol	0.80	(0.00 - 1.91)	0.7	0.40	(0.00 - 1.18)	0.4
Surface Water Gley	9.99	(6.12 - 13.85)	8.6	8.00	(4.53 - 11.47)	8.6
Groundwater Gley	27.65	(21.30 - 34.01)	24.0	20.45	(14.94 - 25.95)	22.0
Alluvial	2.41	(0.48 - 4.34)	2.1	0.40	(0.00 - 1.18)	0.4
Lithosol	4.38	(1.81 - 6.96)	3.8	3.99	(1.53 - 6.44)	4.3
Rendzina	-	-	-	-	-	-
Minerotrophic	20.84	(15.37 - 26.31)	18.0	4.01	(1.53 - 6.49)	4.3
Ombrotrophic	24.01	(18.14 - 29.89)	20.7	28.07	(21.86 - 34.28)	30.3
Total	115.73	(103.65 - 127.81)	100.0	92.94	(82.04 - 103.85)	100.0
Soil group	Altitude (m) / Area					
	200 - 249			250 - 299		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Brown Earth	2.42	(0.50 - 4.33)	3.6	1.21	(0.00 - 2.59)	2.5
Brown Podzolic	9.62	(5.83 - 13.40)	14.3	6.01	(2.99 - 9.03)	12.2
Podzol	5.61	(2.70 - 8.52)	8.3	6.00	(3.00 - 9.01)	12.2
Luvisol	-	-	-	-	-	-
Surface Water Gley	5.61	(2.70 - 8.52)	8.3	7.62	(4.27 - 10.98)	15.5
Groundwater Gley	15.22	(10.45 - 19.98)	22.6	8.82	(5.17 - 12.46)	17.9
Alluvial	-	-	-	-	-	-
Lithosol	1.60	(0.00 - 3.20)	2.4	1.20	(0.00 - 2.57)	2.4
Rendzina	-	-	-	-	-	-
Minerotrophic	1.61	(0.04 - 3.18)	2.4	0.81	(0.00 - 1.92)	1.6
Ombrotrophic	25.68	(19.71 - 31.66)	38.1	17.59	(12.49 - 22.68)	35.7
Total	67.36	(57.82 - 76.90)	100.0	49.26	(41.02 - 57.50)	100.0

Soil group	Altitude (m) / Area					
	300 - 349			350 - 399		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Brown Earth	–	–	–	–	–	–
Brown Podzolic	4.80	(2.12 – 7.47)	13.6	1.20	(0.00 – 2.56)	8.6
Podzol	6.01	(3.01 – 9.01)	17.1	1.60	(0.04 – 3.15)	11.4
Luvisol	–	–	–	–	–	–
Surface Water Gley	1.60	(0.03 – 3.17)	4.5	1.60	(0.03 – 3.17)	11.4
Groundwater Gley	6.01	(2.99 – 9.03)	17.1	1.20	(0.00 – 2.57)	8.6
Alluvial	0.40	(0.00 – 1.20)	1.1	–	–	–
Lithosol	2.40	(0.48 – 4.31)	6.8	1.60	(0.04 – 3.16)	11.4
Rendzina	–	–	–	–	–	–
Minerotrophic	–	–	–	0.40	(0.00 – 1.21)	2.9
Ombrotrophic	14.00	(9.42 – 18.57)	39.8	6.39	(3.28 – 9.49)	45.7
Total	35.22	(28.14 – 42.29)	100.0	13.99	(9.45 – 18.53)	100.0
Soil group	Altitude (m) / Area					
	400 - 449			450 - 499		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Brown Earth	–	–	–	–	–	–
Brown Podzolic	1.21	(0.00 – 2.59)	13.7	0.80	(0.00 – 1.91)	25.0
Podzol	1.61	(0.04 – 3.19)	18.3	0.40	(0.00 – 1.25)	12.5
Luvisol	–	–	–	–	–	–
Surface Water Gley	0.80	(0.00 – 1.91)	9.1	–	–	–
Groundwater Gley	–	–	–	–	–	–
Alluvial	–	–	–	–	–	–
Lithosol	–	–	–	–	–	–
Rendzina	–	–	–	–	–	–
Minerotrophic	1.61	(0.05 – 3.17)	18.2	–	–	–
Ombrotrophic	3.60	(1.28 – 5.93)	40.7	2.00	(0.25 – 3.76)	62.5
Total	8.83	(5.29 – 12.37)	100.0	3.20	(0.99 – 5.42)	100.0
Soil group	Altitude (m) / Area					
	500 m +			Total		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
Brown Earth	–	–	–	59.68	(50.76 – 68.60)	8.9
Brown Podzolic	–	–	–	70.12	(60.50 – 79.75)	10.4
Podzol	–	–	–	37.64	(30.52 – 44.76)	5.6
Luvisol	–	–	–	2.79	(0.74 – 4.85)	0.4
Surface Water Gley	–	–	–	55.19	(46.60 – 63.78)	8.2
Groundwater Gley	–	–	–	146.56	(133.56 – 159.56)	21.8
Alluvial	–	–	–	12.02	(7.78 – 16.27)	1.8
Lithosol	0.40	(0.00 – 1.21)	50.1	20.76	(15.30 – 26.21)	3.1
Rendzina	–	–	–	7.61	(4.25 – 10.97)	1.1
Minerotrophic	–	–	–	105.37	(94.95 – 115.79)	15.7
Ombrotrophic	0.40	(0.00 – 1.27)	49.9	155.35	(143.14 – 167.57)	23.0
Total	0.80	(0.00 – 1.95)	100.0	673.11		100.0



14.4.4 Stocked forest area by soil group and age class (10 yr)

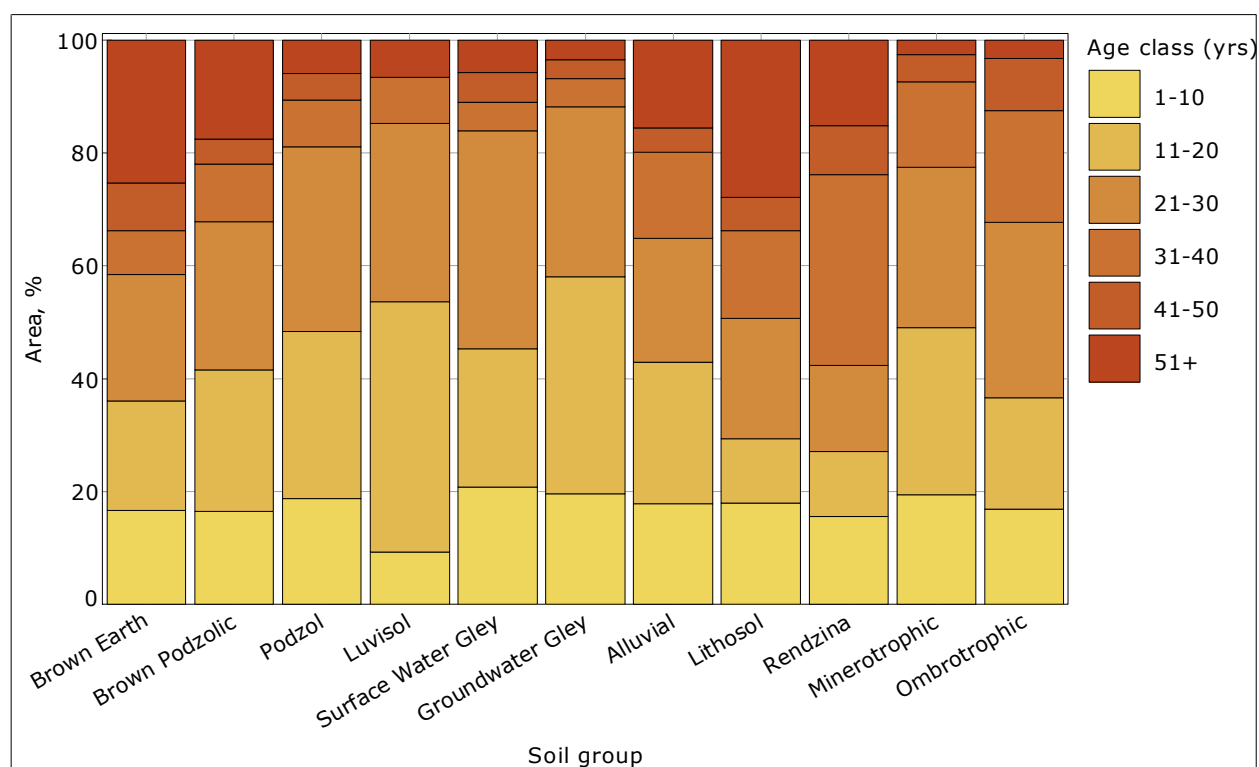
Methodology
The stocked forest area is classified by soil group and age class (10 yr).

Age class (yrs)	Soil group / Area					
	Brown Earth			Brown Podzolic		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
1-10	9.90	(6.63 - 13.16)	16.6	11.54	(7.66 - 15.42)	16.5
11-20	11.63	(7.82 - 15.44)	19.5	17.61	(12.81 - 22.42)	25.1
21-30	13.36	(9.38 - 17.34)	22.4	18.38	(13.34 - 23.42)	26.2
31-40	4.66	(2.77 - 6.56)	7.8	7.22	(4.31 - 10.12)	10.3
41-50	5.01	(2.75 - 7.28)	8.4	3.01	(1.27 - 4.75)	4.3
51+	15.12	(11.14 - 19.09)	25.3	12.36	(8.62 - 16.10)	17.6
Total	59.68	(50.76 - 68.60)	100.0	70.12	(60.50 - 79.75)	100.0
Age class (yrs)	Soil group / Area					
	Podzol			Luvisol		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
1-10	7.04	(3.96 - 10.13)	18.7	0.26	(0.00 - 0.71)	9.3
11-20	11.19	(7.24 - 15.14)	29.7	1.24	(0.00 - 2.60)	44.4
21-30	12.28	(8.12 - 16.44)	32.6	0.88	(0.00 - 1.96)	31.5
31-40	3.15	(1.01 - 5.30)	8.4	0.23	(0.00 - 0.60)	8.2
41-50	1.74	(0.26 - 3.22)	4.6	-	-	-
51+	2.24	(0.58 - 3.90)	6.0	0.19	(0.00 - 0.55)	6.6
Total	37.64	(30.52 - 44.76)	100.0	2.79	(0.74 - 4.85)	100.0
Age class (yrs)	Soil group / Area					
	Surface Water Gley			Groundwater Gley		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
1-10	11.46	(7.54 - 15.38)	20.8	28.73	(22.53 - 34.92)	19.6
11-20	13.58	(9.40 - 17.75)	24.6	56.25	(47.71 - 64.78)	38.4
21-30	21.27	(15.89 - 26.65)	38.4	44.39	(36.68 - 52.09)	30.3
31-40	2.84	(1.07 - 4.62)	5.2	7.17	(4.34 - 10.00)	4.9
41-50	2.84	(1.11 - 4.58)	5.2	4.98	(2.48 - 7.48)	3.4
51+	3.20	(1.50 - 4.89)	5.8	5.06	(2.81 - 7.30)	3.4
Total	55.19	(46.60 - 63.78)	100.0	146.56	(133.56 - 159.56)	100.0

Age class (yrs)	Soil group / Area					
	Alluvial			Lithosol		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
1-10	2.15	(0.68 – 3.62)	17.9	3.74	(1.52 – 5.96)	18.0
11-20	3.02	(1.10 – 4.93)	25.0	2.35	(0.67 – 4.03)	11.3
21-30	2.63	(0.85 – 4.41)	21.9	4.43	(2.13 – 6.72)	21.3
31-40	1.84	(0.38 – 3.30)	15.3	3.24	(1.16 – 5.32)	15.6
41-50	0.51	(0.05 – 0.97)	4.3	1.21	(0.06 – 2.36)	5.8
51+	1.87	(0.58 – 3.17)	15.6	5.79	(3.13 – 8.44)	28.0
Total	12.02	(7.78 – 16.27)	100.0	20.76	(15.30 – 26.21)	100.0

Age class (yrs)	Soil group / Area					
	Rendzina			Minerotrophic		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
1-10	1.19	(0.23 – 2.14)	15.6	20.43	(15.49 – 25.37)	19.4
11-20	0.88	(0.06 – 1.70)	11.5	31.29	(25.08 – 37.50)	29.8
21-30	1.16	(0.18 – 2.14)	15.3	29.96	(23.91 – 36.00)	28.4
31-40	2.57	(0.89 – 4.25)	33.8	15.96	(11.59 – 20.34)	15.1
41-50	0.66	(0.00 – 1.35)	8.7	5.10	(2.77 – 7.43)	4.8
51+	1.15	(0.13 – 2.17)	15.1	2.64	(0.92 – 4.36)	2.5
Total	7.61	(4.25 – 10.97)	100.0	105.37	(94.95 – 115.79)	100.0

Age class (yrs)	Soil group / Area		
	Ombrotrophic		
	thousands ha	($\alpha = 0.05$)	%
1-10	26.20	(20.33 – 32.07)	16.9
11-20	30.73	(24.43 – 37.03)	19.8
21-30	48.33	(40.46 – 56.19)	31.1
31-40	30.78	(24.32 – 37.25)	19.8
41-50	14.32	(9.78 – 18.86)	9.2
51+	4.99	(2.44 – 7.55)	3.2
Total	155.35	(143.14 – 167.57)	100.0



14.5 SOIL AND PEAT CHARACTERISTICS

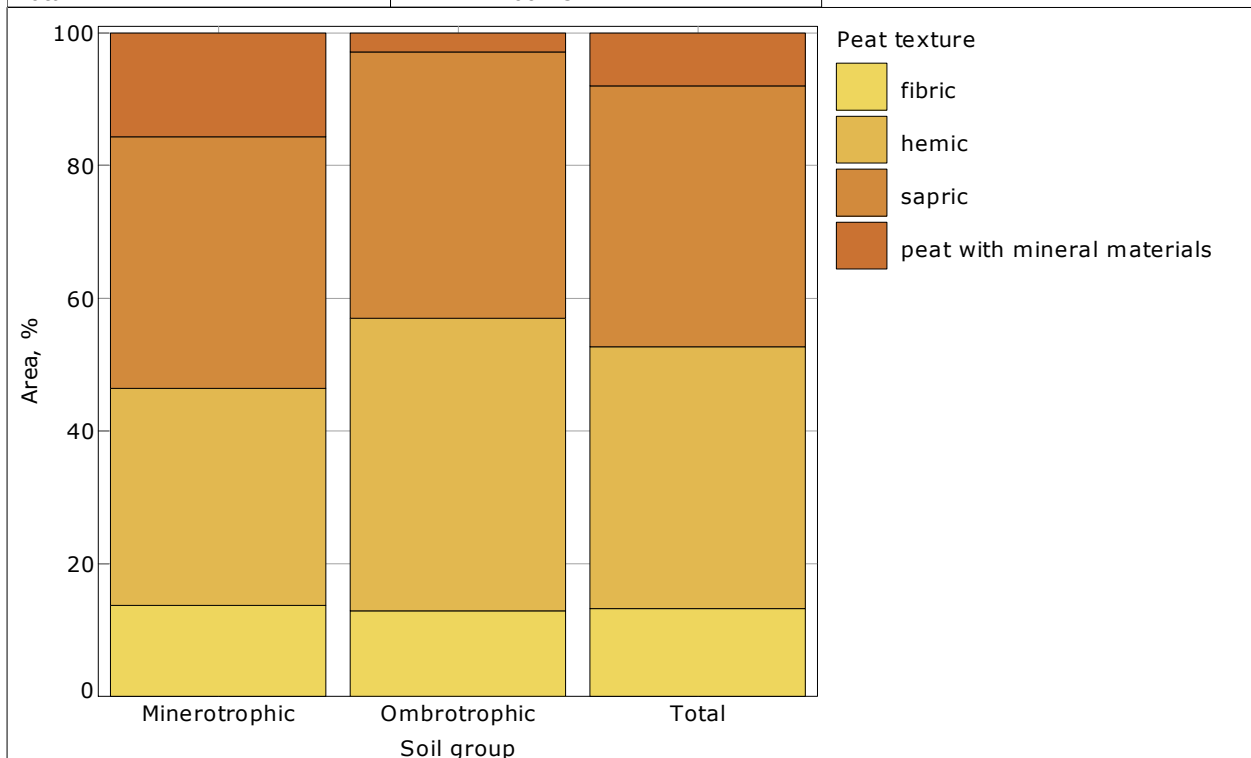
14.5.1 Stocked forest area, with peat present, by soil condition and peat texture

Definition
Peat texture Measures the degree of peat decomposition or humification on a ten point scale. Fibric: Degree of decomposition is from 1 to 3, very light in colour, full of non-decomposed plant remains. Hemic: Degree of decomposition is from 4 to 6 and it is dark brown in colour. Identification of plant residues is difficult. Sapric: Degree of decomposition is from 7 to 10. It is black in colour, greasy in texture and identification of plant remains is very difficult. Peat with mineral materials: This covers areas where reclamation has taken place or where most of the peat has been removed or incorporated into the mineral layer.

Methodology
The stocked forest area, with peat present, is classified by soil condition and peat texture.

Peat texture	Soil group / Area					
	Minerotrophic			Ombrotrophic		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
fibric	14.43	(9.86 – 19.00)	13.7	20.08	(14.78 – 25.38)	12.9
hemic	34.45	(27.58 – 41.32)	32.7	68.52	(59.30 – 77.75)	44.2
sapric	40.08	(32.94 – 47.22)	38.0	62.35	(53.43 – 71.27)	40.1
peat with mineral materials	16.41	(11.50 – 21.32)	15.6	4.40	(1.81 – 6.98)	2.8
Total	105.37	(94.95 – 115.79)	100.0	155.35	(143.14 – 167.57)	100.0

Peat texture	Soil group / Area		
	Total		
	thousands ha	($\alpha = 0.05$)	%
fibric	34.51	(27.70 – 41.33)	13.2
hemic	102.98	(91.90 – 114.05)	39.5
sapric	102.43	(91.16 – 113.70)	39.3
peat with mineral materials	20.81	(15.28 – 26.34)	8.0
Total	260.73		100.0

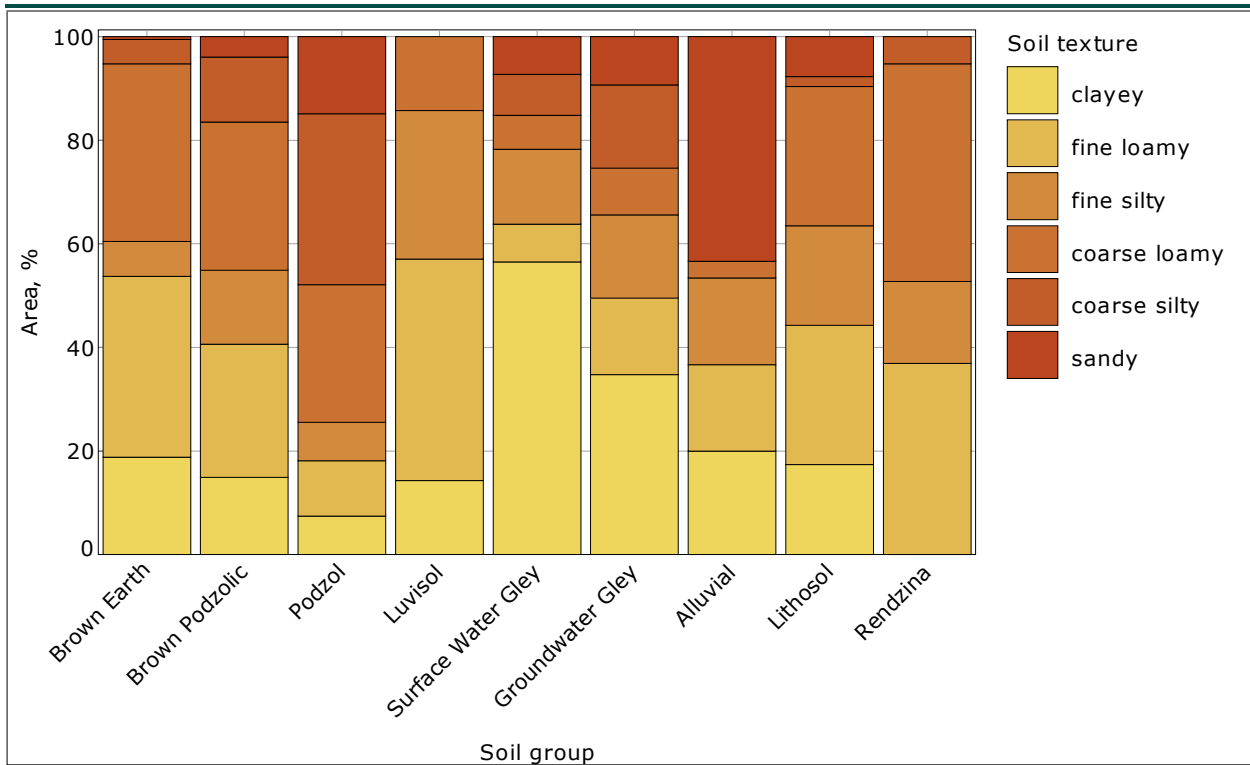


14.5.2 Stocked forest area, with no peat, by soil texture

Definition
Soil Texture
Soil texture refers to the relative proportions of the various size particles in the mineral fraction of the soil.

Methodology
The stocked forest area, with soil present, is classified by soil texture. Those forest areas on greater than 40cm of peat are excluded from the analysis.

Soil texture	Soil group / Area					
	Brown Earth			Brown Podzolic		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
clayey	11.24	(7.14 – 15.33)	18.8	10.42	(6.49 – 14.36)	14.9
fine loamy	20.83	(15.32 – 26.34)	34.9	18.06	(12.88 – 23.24)	25.7
fine silty	4.01	(1.53 – 6.50)	6.7	10.03	(6.13 – 13.93)	14.3
coarse loamy	20.41	(14.92 – 25.90)	34.2	20.01	(14.59 – 25.43)	28.6
coarse silty	2.79	(0.73 – 4.85)	4.7	8.80	(5.14 – 12.46)	12.5
sandy	0.40	(0.00 – 1.18)	0.7	2.81	(0.73 – 4.89)	4.0
Total	59.68	(50.76 – 68.60)	100.0	70.12	(60.50 – 79.75)	100.0
Soil texture	Soil group / Area					
	Podzol			Luvisol		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
clayey	2.80	(0.73 – 4.86)	7.4	0.40	(0.00 – 1.18)	14.3
fine loamy	4.01	(1.53 – 6.48)	10.6	1.19	(0.00 – 2.56)	42.8
fine silty	2.80	(0.73 – 4.87)	7.4	0.80	(0.00 – 1.91)	28.6
coarse loamy	10.02	(6.16 – 13.89)	26.6	0.40	(0.00 – 1.18)	14.3
coarse silty	12.41	(8.18 – 16.65)	33.1	–	–	–
sandy	5.60	(2.69 – 8.51)	14.9	–	–	–
Total	37.64	(30.52 – 44.76)	100.0	2.79	(0.74 – 4.85)	100.0
Soil texture	Soil group / Area					
	Surface Water Gley			Groundwater Gley		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
clayey	31.18	(24.56 – 37.80)	56.4	50.85	(42.51 – 59.20)	34.7
fine loamy	4.02	(1.53 – 6.50)	7.3	21.64	(16.06 – 27.21)	14.8
fine silty	8.00	(4.57 – 11.42)	14.5	23.63	(17.75 – 29.52)	16.1
coarse loamy	3.60	(1.26 – 5.94)	6.5	13.20	(8.86 – 17.53)	9.0
coarse silty	4.39	(1.82 – 6.97)	8.0	23.62	(17.70 – 29.54)	16.1
sandy	4.01	(1.53 – 6.48)	7.3	13.62	(9.11 – 18.13)	9.3
Total	55.19	(46.60 – 63.78)	100.0	146.56	(133.56 – 159.56)	100.0
Soil texture	Soil group / Area					
	Alluvial			Lithosol		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
clayey	2.40	(0.48 – 4.32)	20.0	3.61	(1.25 – 5.96)	17.4
fine loamy	2.01	(0.26 – 3.76)	16.7	5.58	(2.68 – 8.48)	26.9
fine silty	2.00	(0.25 – 3.75)	16.7	3.99	(1.54 – 6.45)	19.2
coarse loamy	0.40	(0.00 – 1.20)	3.3	5.58	(2.68 – 8.47)	26.9
coarse silty	–	–	–	0.40	(0.00 – 1.19)	1.9
sandy	5.21	(2.39 – 8.04)	43.3	1.60	(0.04 – 3.17)	7.7
Total	12.02	(7.78 – 16.27)	100.0	20.76	(15.30 – 26.21)	100.0
Soil texture	Soil group / Area					
	Rendzina			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
clayey	–	–	–	112.89	(101.18 – 124.60)	27.4
fine loamy	2.81	(0.74 – 4.88)	36.9	80.14	(69.85 – 90.43)	19.4
fine silty	1.20	(0.00 – 2.56)	15.8	56.47	(47.60 – 65.34)	13.7
coarse loamy	3.20	(1.01 – 5.39)	42.0	76.82	(66.74 – 86.89)	18.6
coarse silty	0.40	(0.00 – 1.20)	5.3	52.81	(44.22 – 61.40)	12.8
sandy	–	–	–	33.25	(26.31 – 40.20)	8.1
Total	7.61	(4.25 – 10.97)	100.0	412.38		100.0



14.6 SOIL AND PEAT DEPTH

Definition

Soil/Peat Depth

The depth of soil, peat or the combination of both is recorded to a maximum of 1m.

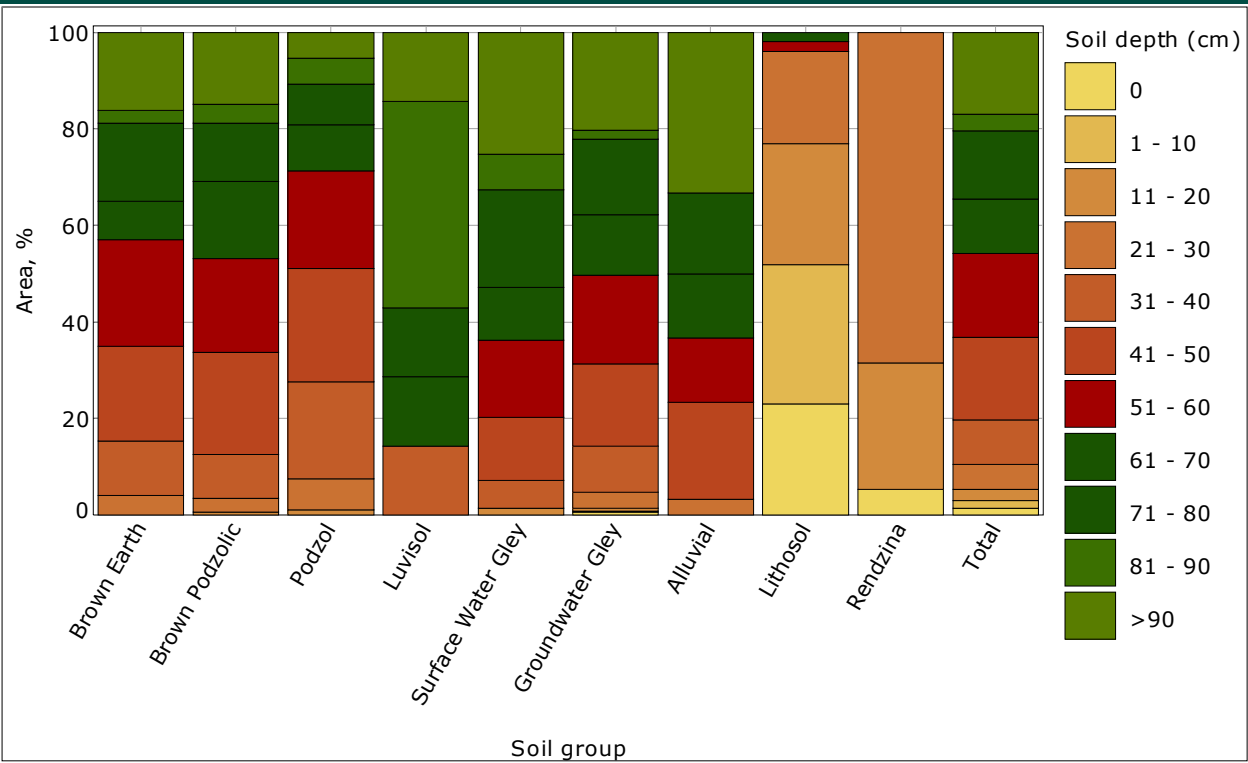
14.6.1 Stocked forest area, with no peat present, by soil group and soil depth

Methodology

The stocked forest area, with no peat present, is classified by soil group and soil depth.

Soil depth (cm)	Soil group / Area					
	Brown Earth			Brown Podzolic		
	thousands ha	($\alpha=0.05$)	%	thousands ha	($\alpha=0.05$)	%
0	–	–	–	–	–	–
1 - 10	–	–	–	–	–	–
11 - 20	–	–	–	0.40	(0.00 - 1.27)	0.6
21 - 30	2.41	(0.50 - 4.32)	4.0	1.99	(0.25 - 3.74)	2.8
31 - 40	6.79	(3.58 - 10.00)	11.4	6.40	(3.28 - 9.53)	9.1
41 - 50	11.63	(7.47 - 15.78)	19.5	14.84	(10.13 - 19.55)	21.2
51 - 60	13.20	(8.76 - 17.64)	22.2	13.64	(9.13 - 18.15)	19.5
61 - 70	4.80	(2.09 - 7.51)	8.0	11.21	(7.10 - 15.33)	16.0
71 - 80	9.64	(5.87 - 13.41)	16.1	8.42	(4.85 - 11.99)	12.0
81 - 90	1.61	(0.05 - 3.17)	2.7	2.81	(0.74 - 4.88)	4.0
>90	9.60	(5.83 - 13.37)	16.1	10.41	(6.47 - 14.34)	14.8
Total	59.68	(50.76 - 68.60)	100.0	70.12	(60.50 - 79.75)	100.0

Soil depth (cm)	Soil group / Area					
	Podzol			Luvisol		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
0	–	–	–	–	–	–
1 - 10	–	–	–	–	–	–
11 - 20	0.40	(0.00 - 1.18)	1.1	–	–	–
21 - 30	2.40	(0.49 - 4.31)	6.4	–	–	–
31 - 40	7.60	(4.30 - 10.89)	20.2	0.40	(0.00 - 1.18)	14.3
41 - 50	8.81	(5.17 - 12.45)	23.4	–	–	–
51 - 60	7.61	(4.22 - 10.99)	20.2	–	–	–
61 - 70	3.61	(1.26 - 5.97)	9.6	0.40	(0.00 - 1.18)	14.3
71 - 80	3.20	(0.99 - 5.41)	8.5	0.40	(0.00 - 1.18)	14.3
81 - 90	2.00	(0.25 - 3.76)	5.3	1.19	(0.00 - 2.56)	42.8
>90	2.01	(0.25 - 3.76)	5.3	0.40	(0.00 - 1.18)	14.3
Total	37.64	(30.52 - 44.76)	100.0	2.79	(0.74 - 4.85)	100.0
Soil depth (cm)	Soil group / Area					
	Surface Water Gley			Groundwater Gley		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
0	–	–	–	0.81	(0.00 - 1.93)	0.6
1 - 10	–	–	–	0.40	(0.00 - 1.21)	0.3
11 - 20	0.80	(0.00 - 1.90)	1.4	0.80	(0.00 - 1.93)	0.5
21 - 30	–	–	–	4.80	(2.09 - 7.52)	3.3
31 - 40	3.20	(0.99 - 5.40)	5.8	14.00	(9.41 - 18.58)	9.5
41 - 50	7.19	(3.90 - 10.49)	13.0	25.19	(19.11 - 31.27)	17.2
51 - 60	8.79	(5.17 - 12.40)	15.9	26.84	(20.58 - 33.09)	18.3
61 - 70	6.02	(2.99 - 9.05)	10.9	18.43	(13.19 - 23.67)	12.6
71 - 80	11.21	(7.12 - 15.31)	20.3	22.88	(17.06 - 28.69)	15.6
81 - 90	4.01	(1.54 - 6.48)	7.3	2.81	(0.73 - 4.88)	1.9
>90	13.97	(9.47 - 18.48)	25.4	29.61	(23.20 - 36.02)	20.2
Total	55.19	(46.60 - 63.78)	100.0	146.56	(133.56 - 159.56)	100.0
Soil depth (cm)	Soil group / Area					
	Alluvial			Lithosol		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
0	–	–	–	4.78	(2.11 - 7.46)	23.0
1 - 10	–	–	–	5.99	(2.98 - 8.99)	29.0
11 - 20	–	–	–	5.19	(2.39 - 7.99)	25.0
21 - 30	0.40	(0.00 - 1.20)	3.3	3.99	(1.53 - 6.46)	19.2
31 - 40	–	–	–	–	–	–
41 - 50	2.40	(0.48 - 4.32)	20.0	–	–	–
51 - 60	1.60	(0.04 - 3.17)	13.3	0.40	(0.00 - 1.22)	1.9
61 - 70	1.61	(0.03 - 3.19)	13.4	0.40	(0.00 - 1.18)	1.9
71 - 80	2.00	(0.25 - 3.75)	16.7	–	–	–
81 - 90	–	–	–	–	–	–
>90	4.00	(1.54 - 6.46)	33.3	–	–	–
Total	12.02	(7.78 - 16.27)	100.0	20.76	(15.30 - 26.21)	100.0
Soil depth (cm)	Soil group / Area					
	Rendzina			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
0	0.40	(0.00 - 1.20)	5.3	5.99	(2.99 - 8.99)	1.5
1 - 10	–	–	–	6.39	(3.28 - 9.50)	1.5
11 - 20	2.00	(0.25 - 3.75)	26.3	9.59	(5.79 - 13.38)	2.3
21 - 30	5.21	(2.41 - 8.01)	68.4	21.22	(15.60 - 26.83)	5.1
31 - 40	–	–	–	38.38	(30.96 - 45.80)	9.3
41 - 50	–	–	–	70.07	(60.34 - 79.79)	17.0
51 - 60	–	–	–	72.08	(62.24 - 81.92)	17.5
61 - 70	–	–	–	46.48	(38.32 - 54.65)	11.3
71 - 80	–	–	–	57.75	(48.82 - 66.69)	14.0
81 - 90	–	–	–	14.43	(9.81 - 19.06)	3.5
>90	–	–	–	70.00	(60.56 - 79.44)	17.0
Total	7.61	(4.25 - 10.97)	100.0	412.38		100.0



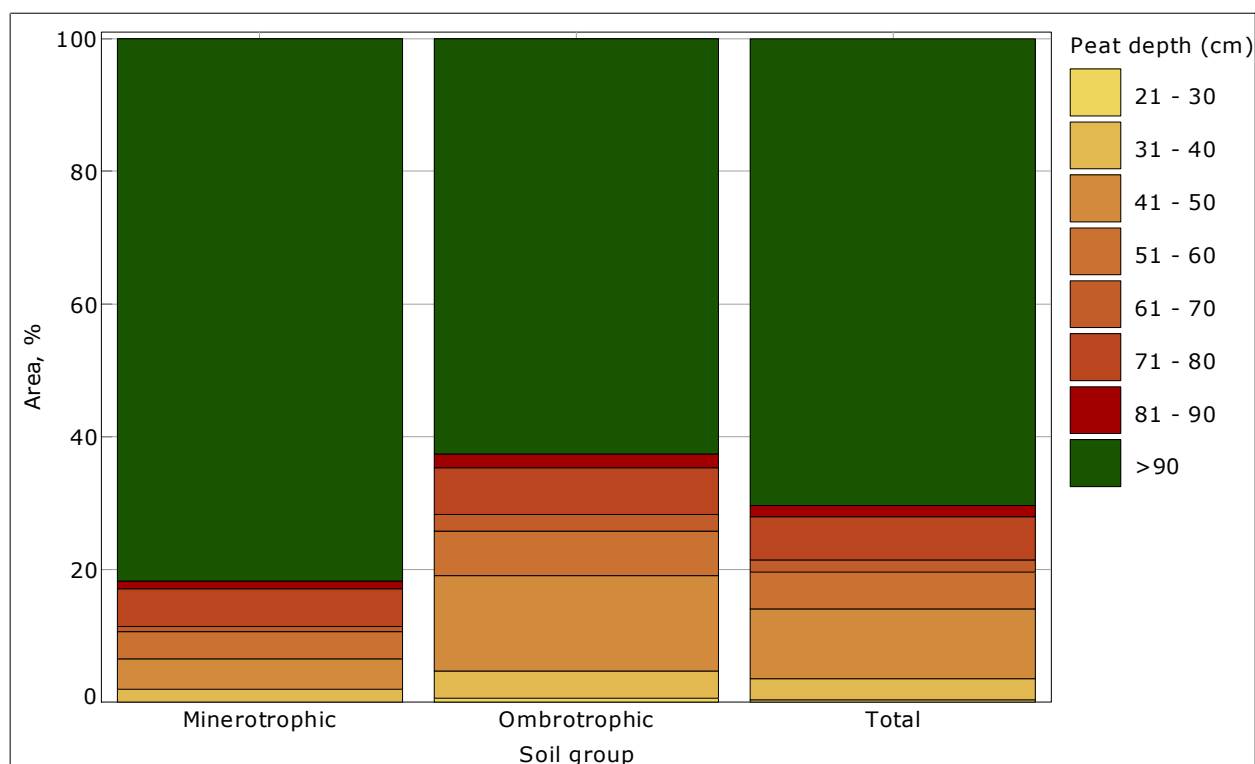
14.6.2 Stocked forest area with peat present by soil group and peat depth

Methodology

The stocked forest area with greater than 40cm of peat present is classified by soil group and peat depth.

Peat depth (cm)	Soil group / Area				
	Minerotrophic			Ombrotrophic	
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$) %
21 - 30	–	–	–	0.80	(0.00 – 1.91) 0.5
31 - 40	2.01	(0.25 – 3.76)	1.9	6.40	(3.29 – 9.52) 4.1
41 - 50	4.82	(2.10 – 7.53)	4.6	22.42	(16.70 – 28.13) 14.4
51 - 60	4.40	(1.81 – 6.99)	4.2	10.39	(6.44 – 14.35) 6.7
61 - 70	0.80	(0.00 – 1.93)	0.8	3.99	(1.53 – 6.46) 2.6
71 - 80	6.02	(3.00 – 9.04)	5.7	10.83	(6.81 – 14.86) 7.0
81 - 90	1.20	(0.00 – 2.58)	1.1	3.20	(1.00 – 5.41) 2.1
>90	86.12	(76.42 – 95.82)	81.7	97.31	(86.73 – 107.88) 62.6
Total	105.37	(94.95 – 115.79)	100.0	155.35	(143.14 – 167.57) 100.0

Peat depth (cm)	Soil group / Area		
	Total		
	thousands ha	($\alpha = 0.05$)	%
21 - 30	0.80	(0.00 – 1.91)	0.3
31 - 40	8.41	(4.84 – 11.98)	3.2
41 - 50	27.23	(20.93 – 33.54)	10.4
51 - 60	14.80	(10.09 – 19.51)	5.7
61 - 70	4.80	(2.10 – 7.50)	1.8
71 - 80	16.86	(11.85 – 21.86)	6.5
81 - 90	4.40	(1.81 – 7.00)	1.7
>90	183.43	(170.00 – 196.85)	70.4
Total	260.73		100.0



14.7 SOIL AND PEAT CHARACTERISTICS

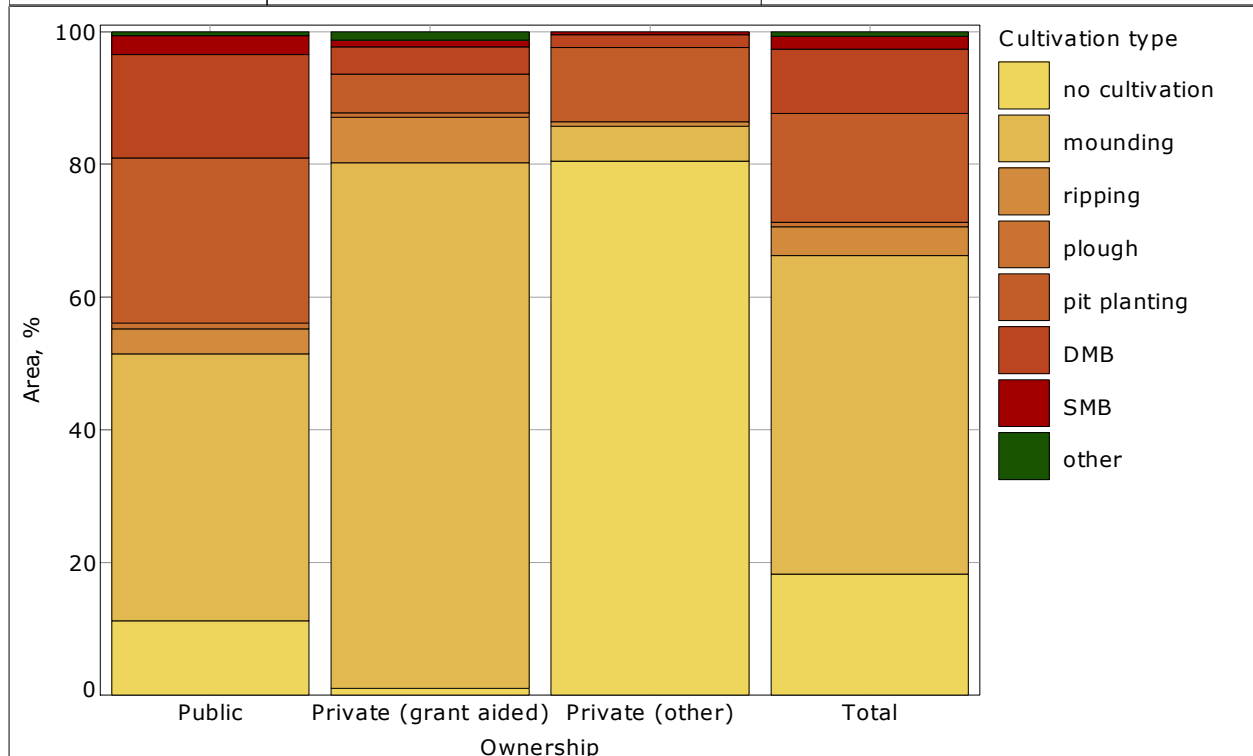
14.7.1 Stocked forest area by ownership and soil cultivation

Definition
Soil cultivation Describes the type of mechanical tilling applied to the soil in order to make it more suitable for natural regeneration or the establishment of planted trees.

Methodology
The stocked forest area is classified by ownership and type of cultivation.

Cultivation type	Ownership / Area					
	Public			Private (grant aided)		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
no cultivation	38.80	(31.33 - 46.28)	11.2	2.40	(0.49 - 4.31)	1.1
mounding	139.03	(126.15 - 151.91)	40.2	179.20	(165.41 - 192.99)	79.2
ripping	13.21	(8.78 - 17.64)	3.8	15.27	(10.58 - 19.95)	6.8
plough	3.21	(0.99 - 5.43)	0.9	1.61	(0.04 - 3.18)	0.7
pit planting	86.13	(75.99 - 96.26)	24.9	13.19	(8.75 - 17.64)	5.8
DMB	54.08	(45.67 - 62.49)	15.6	9.21	(5.52 - 12.90)	4.1
SMB	9.63	(5.83 - 13.42)	2.8	2.41	(0.49 - 4.34)	1.1
other	2.00	(0.25 - 3.75)	0.6	2.80	(0.73 - 4.87)	1.2
Total	346.09	(330.30 - 361.87)	100.0	226.09	(211.18 - 241.00)	100.0

Cultivation type	Ownership / Area					
	Private (other)			Total		
	thousands ha	($\alpha = 0.05$)	%	thousands ha	($\alpha = 0.05$)	%
no cultivation	81.30	(70.87 - 91.73)	80.5	122.50	(110.21 - 134.78)	18.2
mounding	5.21	(2.38 - 8.04)	5.2	323.44	(308.06 - 338.82)	48.2
ripping	0.80	(0.00 - 1.94)	0.8	29.28	(22.84 - 35.72)	4.3
plough	-	-	-	4.82	(2.11 - 7.53)	0.7
pit planting	11.23	(7.17 - 15.28)	11.1	110.54	(99.63 - 121.46)	16.4
DMB	2.01	(0.25 - 3.76)	2.0	65.30	(56.30 - 74.30)	9.7
SMB	0.40	(0.00 - 1.23)	0.4	12.44	(8.11 - 16.76)	1.8
other	-	-	-	4.80	(2.10 - 7.50)	0.7
Total	100.94	(89.48 - 112.39)	100.0	673.11		100.0



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