

# Forest Statistics - Ireland 2017



**An Roinn Talmhaíochta,  
Bia agus Mara**  
Department of Agriculture,  
Food and the Marine



The Department of Agriculture, Food and the Marine is responsible for ensuring the development of forestry within Ireland in a manner and to a scale that maximises its contribution to national socio-economic well-being on a sustainable basis that is compatible with the protection of the environment. Its strategic objectives are:

1. To foster the efficient and sustainable development of forestry;
2. To increase quality planting;
3. To promote the planting of diverse species;
4. To improve the level of farmer participation in forestry;
5. To promote research and training in the sector;
6. To encourage increased employment in the sector.

Published by:

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February 2018

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## **1 Introduction**

The Department of Agriculture, Food and the Marine is responsible for the collection and publication of forest statistics.

Forest stakeholders and policy makers require reliable statistics upon which to plan and make decisions. Ireland also has a series of international reporting requirements relating to forests and forestry. These include the United Nations Framework Convention on Climate Change (UNFCCC) for carbon stocks and stock changes, the Decision 529/2013/EU on land use, land-use change and forestry, the Food and Agriculture Organisation (FAO) for series of forest related data including the Global Forest Resource Assessment, EUROSTAT, FAO, ITTO and the United Nations Economic Commission for Europe (UNECE) for wood harvest and trade data, (the Joint Forest Sector Questionnaire), the Joint Wood Energy Enquiry of the UNECE, IEA, FAO and the European Commission in respect of forest health.

*Forests Statistics – Ireland 2017* is an annual compilation of statistics on the forest estate and the forest industry in Ireland.

### **Data revision and correction policy**

While every effort is made to ensure the accuracy of data provided, amendments can occur as new data become available or errors are detected and corrected.

## 2 Forest Area

### 2.1 *Introduction*

This chapter contains statistics on:

- Irish forest area and area changes over time;
- Forest ownership;
- Tree species composition;
- Age structure of the forest estate.

#### **Key Facts**

- The area of forest is estimated to be 731,650 ha or 10.5% of the total land area of Ireland (NFI 2012);
- Forest cover is estimated to be at its highest level in over 350 years;
- Of the total forest area, nearly 389,356 ha or 53.2% is in public ownership, mainly Coillte<sup>1</sup>;
- The forest estate is comprised of three quarters conifers and one quarter broadleaves;
- Nearly three quarters of the stocked forest area is less than 30 years of age.

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<sup>1</sup>Coillte is a State owned company operating in forestry, land based businesses and added-value processing operations. The company was established as a private limited company under the Forestry Act 1988 which set out its objectives and duties. The company's shareholders are the Minister for Finance and the Minister for Agriculture and Food.



## 2.2 Forest definition

Forest is defined as land with a minimum area of 0.1 ha under stands of trees 5 m or higher, having a minimum width of 20 m and a canopy cover of 20% or more within the forest boundary; or trees able to reach these thresholds *in situ*. The forest definition relates to land use rather than land cover, with the result that open space within a forest boundary either permanently or temporarily unstocked with trees, along with felled areas that are awaiting regeneration, are included as forest.

## 2.3 Forest area

In 2012, the National Forest Inventory (NFI) estimated that the area of forest was 731,650 hectares or 10.5% of the land area, excluding inland water bodies (Table 1 and Figure 1). Of the total forested area, 653,980 ha comprises areas occupied by trees or potentially occupied by trees, while permanently unstocked open area within the forest (roads, ridelines, powerlines, etc.) comprise 77,670ha (Table 1). Conifers account for 68.6%, broadleaves 17.5% and mixed forests 13.9% of the stocked forest area.

Table 1 Forest Area 2012

Land use category	Area (ha)	% of total land area
Forest	653,980	9.5
Forest open area	77,672	1.0
<b>Total</b>	<b>731,652</b>	<b>10.5</b>

## 2.4 Hedges, Trees & scrub outside of forest and other wooded land

Teagasc developed a hedge map in 2010 based on 2005 colour orthophotography. In 2005, the total area of hedges, trees & scrub outside of the forest was 482,000ha or 6.9% of the total land area of Ireland<sup>2</sup>.

<sup>2</sup> [The Irish Hedge Map – Version 1.0. 2010. Teagasc.](#)



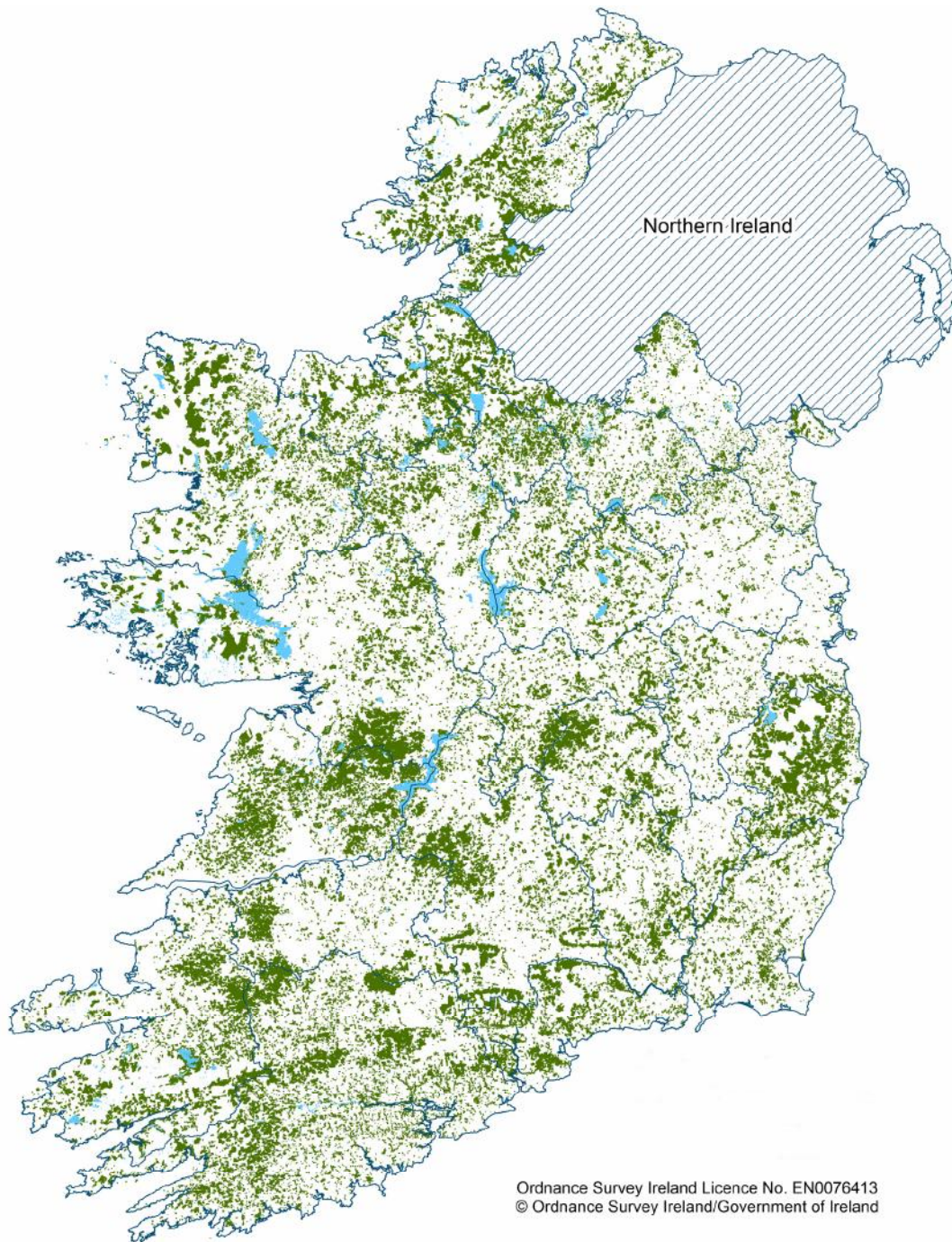


Figure 1. Ireland's forest estate 2015.

## 2.5 Forest area changes over time

The 731,650 ha of forest in Ireland in 2012 represents 10.5% of the total land area. The changes in forest cover in Ireland since 1656 are indicated in Table 2 and Figure 2. All estimates prior to 1918 relate to the whole of the island of Ireland, thereafter estimates are for the Republic of Ireland only. A 1905 forest cover estimate for the province of Ulster was 15,000 ha, but overall on the island of Ireland forest cover was still declining up to 1928.

Since the foundation of the State the area of land under forest in Ireland has grown from 1.4% of the land area, to the current 10.5%. Figure 3 shows the growth in area of both public and private forests over this period. Three inventories of the private forest estate have taken place: 1973, 2006 and 2012. The area of privately- owned forests has increased from 81,958 ha in 1973 to 335,900 ha in 2012; over a four-fold increase. Over the same period the state-owned forest area has also significantly increased from 242,056 ha to 395,760 ha.

Table 2. Forest area in Ireland

Year	Area (ha)	% of Total Land Area
1656 <sup>3</sup>	170,000	2.5
1841 <sup>4</sup>	140,000	2.0
1908 <sup>5</sup>	125,200	1.8
1918 <sup>6</sup>	100,717	1.4
1928 <sup>7</sup>	89,000	1.2
1949 <sup>8</sup>	144,000	2.1
1965 <sup>9</sup>	254,350	3.7
1973 <sup>10</sup>	323,654	4.6
1985 <sup>11</sup>	411,529	5.9
2006 <sup>12</sup>	697,730	10.1
2012 <sup>13</sup>	731,650	10.5

<sup>3</sup> Rackham, O.1986. *The History of the Countryside*. Dent & Sons Ltd., London.

<sup>4</sup> Aalen, F.H.A, Whelan K. And Stout M. (Eds). 1997. *Atlas of the Irish Rural Landscape*. Cork University Press

<sup>5</sup> Dept. Of Agriculture & Technical Instruction. 1908. *Report of the Departmental Committee on Irish Forestry*. A. Thom & Co., 1908.

<sup>6</sup> Dept. of Agriculture. 1926. *Forest Lands and Timber Supply in the Irish Free State*. Proceedings of the First International Congress on Sylviculture, Rome, 1926.

<sup>7</sup> Minister for Lands & Agriculture. Dail Eireann, Volume 23, 3<sup>rd</sup> May 1928.

<sup>8</sup> Estimate generated from Annual Report of the Department of Agriculture 1943/49.

<sup>9</sup> Estimate generated from Annual Report of the Department of Agriculture 1964/65.

<sup>10</sup> Estimate generated from Purcell, T.J, 1973. *Inventory of Private Forests -1973*. Department of Fisheries and Forestry and Annual Report of the Department of Agriculture 1972/73.

<sup>11</sup> Estimate generated from Annual Report of the Department of Agriculture 1985.

<sup>12</sup> *National Forest Inventory Republic of Ireland Results*. 2007. Forest Service, Department of Agriculture Fisheries and Food.

<sup>13</sup> *National Forest Inventory Republic of Ireland Results*. 2013. Forest Service, Department of Agriculture Food and the Marine.

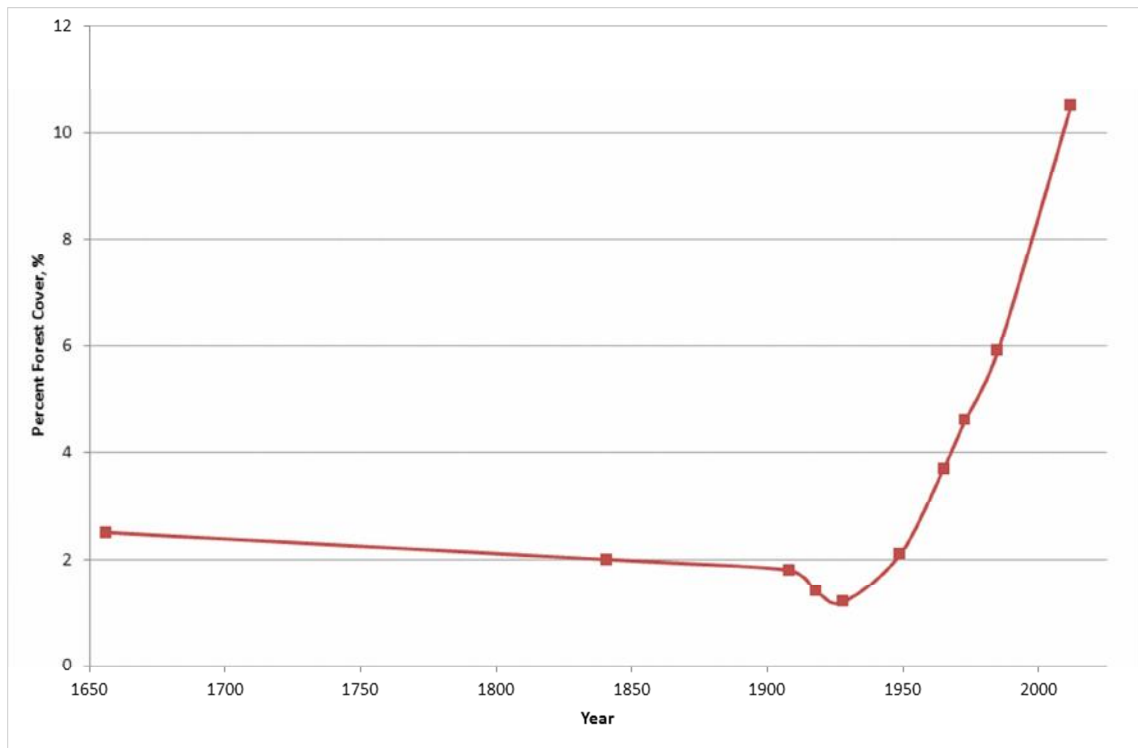


Figure 2. Forest cover, 1656-2012.

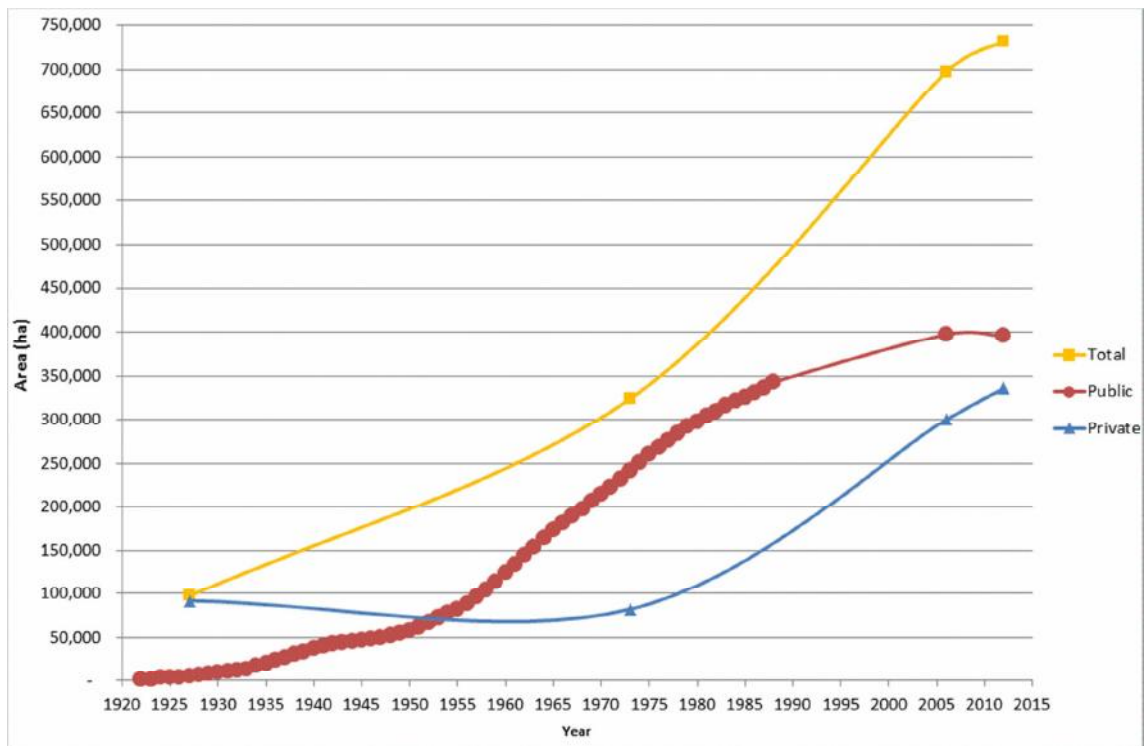


Figure 3. Forest area change since the foundation of the State, 1922-2012.

## 2.6 Forest Ownership

Within the national forest estate there are three main forest ownership categories:

1. **Public:** all state owned forests, mainly Coillte;
2. **Private (grant aided):** private afforested land which was in receipt of either grant and/or premium since 1980;
3. **Private (other):** private forests not in receipt of grant-aid post 1980.

In 2012, 53.2% of forests were in state ownership, a reduction from 57% in 2006 (primarily due to private sector afforestation in the intervening period). Of the public forest area (Table 3), the total forest area of 389,356 ha comprises 355,310 ha of stocked forest land and 34,040 ha of forest open area. Of the public forests Coillte owns 381,355 ha.

Table 3. Forest ownership in Ireland (Source: NFI, 2012)

Ownership	Area (ha)	%
Public	389,356	53.2
Private (grant aided)	248,554	34.0
Private (Other)	93,742	12.8
<b>Total</b>	<b>731,650</b>	<b>100</b>

## 2.7 Species composition

Sitka spruce is the most common species, occupying 52.4% of the forest area (Table 5). Over one quarter of the forest estate contains broadleaves. Of the broadleaves 33.9% are 'Other broadleaf species' (both long living and short living), of which over half are willow<sup>14</sup>. The next largest broadleaf species group was birch species (22.7%), ash (12.5%), followed by oak (10.2%). Conifers occupy 472,830ha while broadleaved species cover 164,310ha.

The interpretation of stocked areas of individual species presented in Table 4 needs to be carefully considered since many forests contain an intimate mixture of species. Methods are used to apportion the constituent individual species from these intimate mixtures into the total area covered by the forest. 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 areas of mixed forest apportioned to them.

<sup>14</sup> 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 of long living broadleaves are as follows: field maple, maple, horse chestnut, strawberry tree, hornbeam, sweet chestnut, holly, notofagus sp., white poplar, black poplar, Turkey oak, red oak, whitebeam, small-leaved lime, large-leaved lime, wych elm. The species group composition of short living broadleaves are as follows: crab apple, aspen, cherry, blackthorn, goat willow, other willows, mountain ash, and hazel.

Table 4. Tree Species Composition (Source: NFI, 2012)

Species	Area (ha)	%
Sitka spruce	334,560	52.4
Norway spruce	26,340	4.1
Scots pine	8,010	1.3
Other pine spp.	61,950	9.7
Douglas fir	10,380	1.6
Larch spp.	27,740	4.4
Other conifers	3,850	0.6
Pedunculate and sessile oak	16,840	2.6
Beech	9,500	1.5
Ash	20,610	3.2
Sycamore	9,250	1.5
Birch spp.	37,370	5.9
Alder spp.	15,080	2.4
Other short living broadleaves	46,220	7.3
Other long living broadleaves	9,440	1.4
Total	637,140	100

## 2.8 Forest age

Just under three quarters of the national forest estate consists of trees of 30 years old or less (Figure 4). Conifers tend to have a shorter rotation than broadleaves; 91.5% of conifers are 30 years old or less while 74.4% of broadleaves are 30 years old or less. The age structure of the national forest estate differs according to ownership: public and private grant-aided categories have 90.9% of forests aged 30 years or less ; while the Private Other category has 47.7% forests aged 31 years and more (Figure 4).

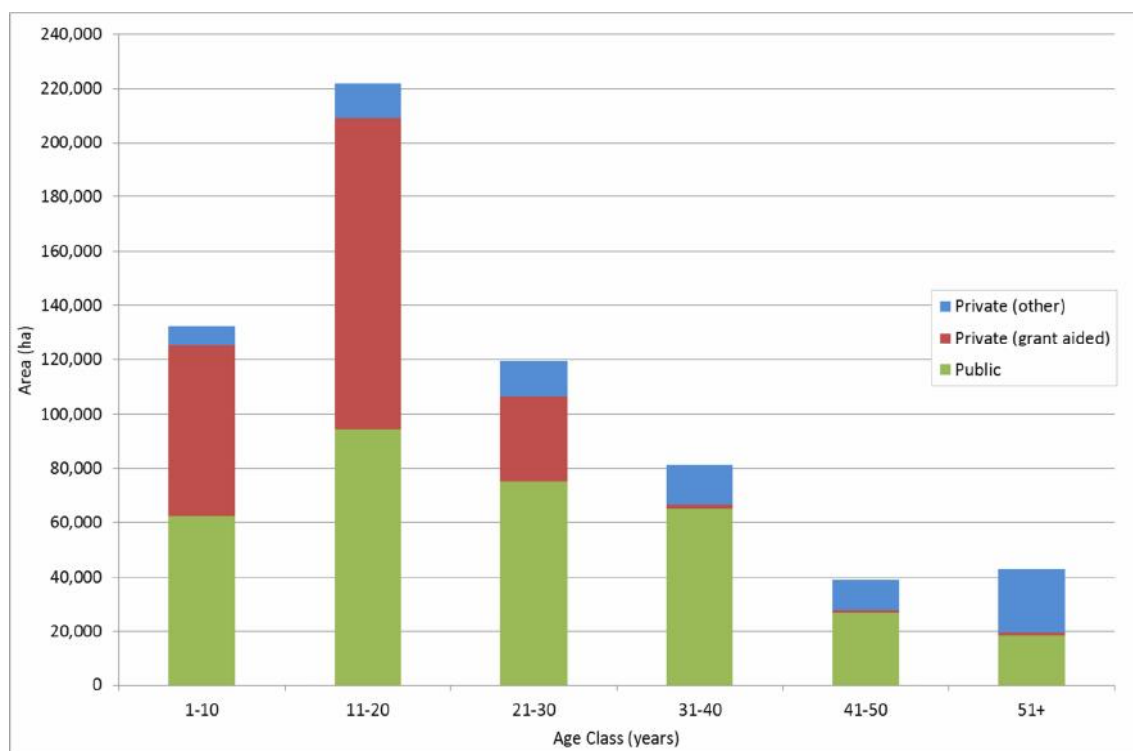


Figure 4. Forest age-class distribution by ownership (Source: NFI, 2012).



### **3. Afforestation**

This section provides information on afforestation levels since the foundation of the State, with a particular emphasis on private afforestation since 1980.

#### **3.1 Introduction**

This chapter provides information on:

- Species composition of afforestation;
- Forest size and number of private grant aided afforestation since 1980;
- Ownership and forest size patterns of private grant-aided afforestation since 1980;
- Ownership patterns of private forests established prior to 1980.

#### **Key statistics**

- State afforestation was relatively low up until the 1950s, but thereafter increased up to the year 2000;
- Private afforestation came to the fore in the mid-eighties: over 286,479 ha of private forests were established between 1980 and 2016 ;
- The proportion of broadleaf afforestation significantly increased after 1993, and up to the present, comprising 23% of all afforestation since that year;
- Tree diseases such as Phytophthora ramorum (mainly larch) and Chalara fraxinea (ash) may influence species diversity into the future;
- 83% of the forests afforested since 1980 have been planted by farmers;
- The average size of private grant-aided afforestation since 1980 is 8.8 ha;
- Since 1980, nearly 21,994 unique private forest owners have received grant aid to establish forests;
- Over half (54.1%) of all individual owners have received afforestation grant aid at least twice since 1980, which should contribute to management efficiencies, due to the increased size of the individuals holding.

### 3.2 Afforestation 1922-2016

As shown in Table 2, forest cover on the island of Ireland continued to decline up to 1928. With the introduction of the first Forestry Act in 1928 the decline of forest area was largely halted. However afforestation levels remained relatively low right up until the 1950s. The level of state afforestation dramatically increased from the 1950s up to 2000, after which state planting declined to a negligible level. One critical factor was the decision by the European Commission in August 1999 that Coillte Teoranta was not entitled to receive annual [non-farmer] forest premiums. The European Court of Justice (ECJ) subsequently upheld this decision. In the 10 years from 1990 to 1999, 43% of all afforestation was on Coillte land. As a result, Coillte reviewed its planting programme and has not engaged in afforestation to any appreciable extent since the ECJ decision.

Private afforestation came to the fore in the mid-80s following the introduction of a grant and particularly an annual premium scheme for afforestation. Long-run afforestation trends, including the change from state-led to private-led grant-aided afforestation in the 1980s and 1990s, are shown in Figure 5.

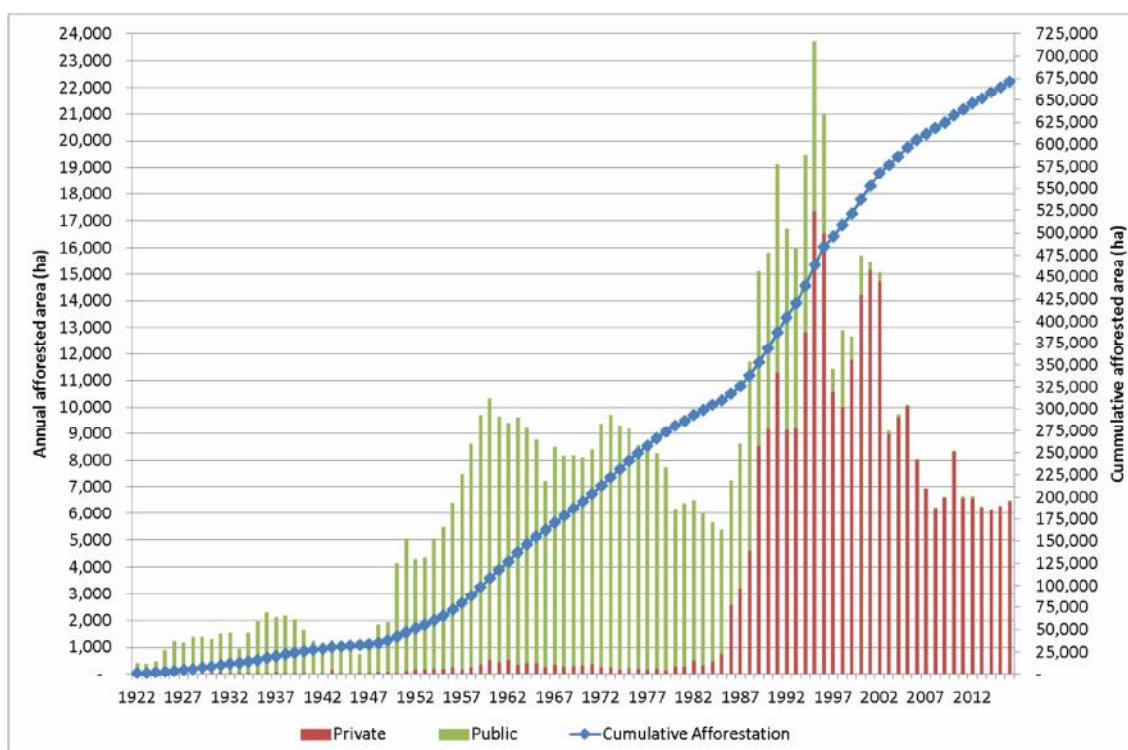


Figure 5. Annual state and private afforestation 1922-2016.

Afforestation, conifers: broadleaves, averaged 90:10 during the 1930s and 1940s (Figure 6). Thereafter, up to the early 1990s, broadleaves comprised 4% of afforestation. As a result of the positive differential in favour of broadleaf species in both the afforestation grant and premium schemes the proportion of broadleaves planted significantly increased from 1993 up to the present, with an average of 23% broadleaves planted since that year.



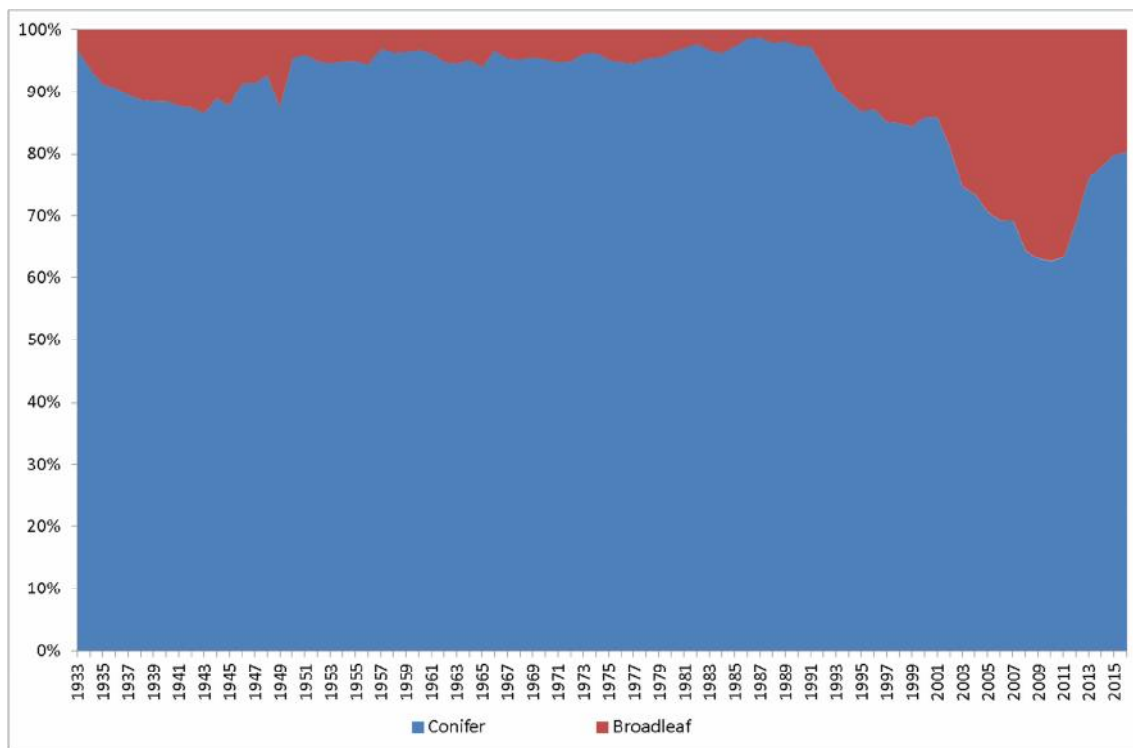


Figure 6. Conifer - broadleaf afforestation 1933-2016.

A range of conifer species were planted in the 1930s and 1940s, including Norway spruce, Scots pine and larch, along with Sitka spruce and Lodgepole pine. This reflected the untested nature of the North American species being planted at the time. From the 1950s onwards confidence in Sitka spruce and Lodgepole pine grew, leading to their dominance in afforestation up to the mid-90s, after which the role of Lodgepole pine declined, reflecting primarily the improved land quality available for afforestation after this period (Figure 7) and the generally poor form of the species.

From 2006 to 2010 the species composition of afforestation remained largely stable. However the finding of *Phytophthora ramorum* in Japanese larch in 2010, led to its withdrawal from the afforestation programme (Figure 8). From the mid-90s onwards a wider range of tree species has been planted, with ash and oak dominating broadleaf planting. However, more recently, the fungal disease *Chalara fraxinea* was found in ash in 2012, resulting in the cessation of grant aid for this species. Nearly 17,000 ha of ash have been planted since 1990 (Figure 9). This has resulted in a contraction in broadleaf species for afforestation since 2012.

Sitka spruce remains the predominant species used in Irish forestry. It has proven to be one of the most productive conifers in Ireland and as such has become the mainstay in roundwood processing.

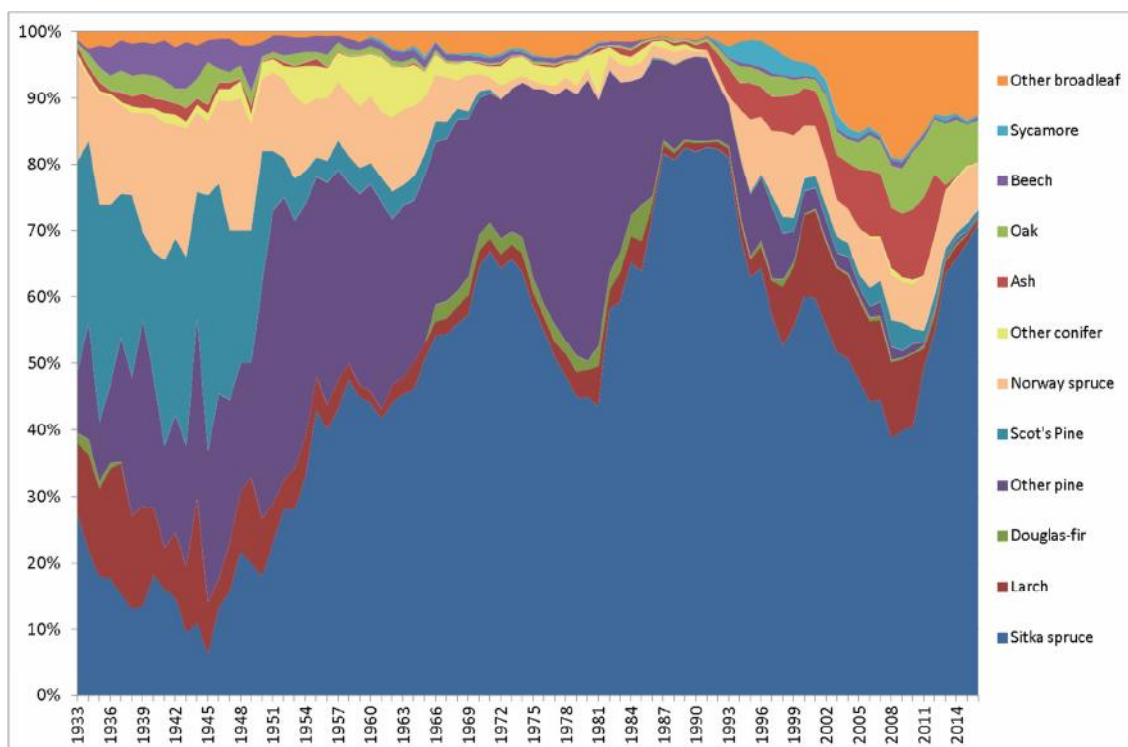


Figure 7. Species groups used in afforestation 1933-2016.

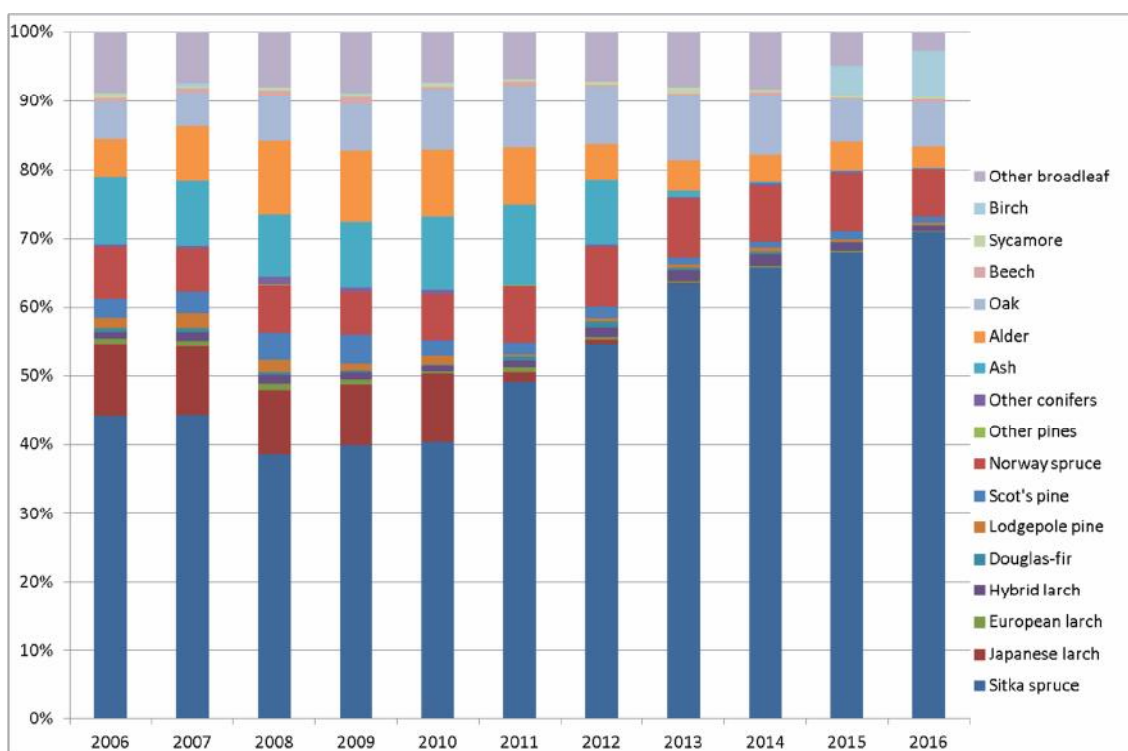


Figure 8. Grant-aided species groups, 2006-2016.

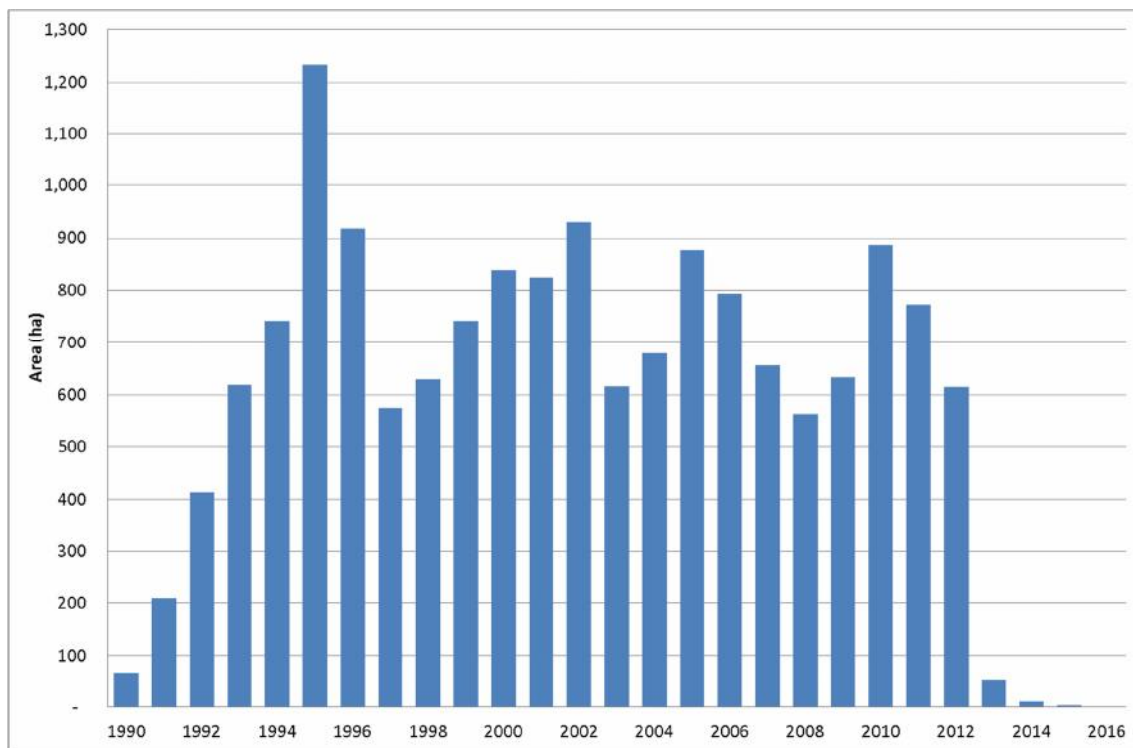


Figure 9. Ash afforestation 1990-2016.

### 3.3 *Private lands afforested, forest size and number*

This section provides statistics of private lands afforested over the period 1980 to 2016. The average size of private grant-aided afforestation since 1980 to 2016 was 8.8 ha (Table 5). From 1980 up to the mid-80s the average afforestation parcel was relatively small at 5.9 ha. With the introduction of the grant and premium scheme average afforestation increased to 9.6 ha.

A significant proportion of private afforestation in the 90s was “whole farm” planting and planting on unenclosed land. By 2016 the average area afforested has decreased to 6.6 ha as a result of planting mostly within individual agricultural holdings and a movement away from unenclosed land.

In terms of the size class contribution to overall afforestation since 1980, the distribution is slightly skewed towards parcels of 10-30 ha; over a wide range from 0.1 ha to over 100+ ha (Figure 10). Figure 11 shows that large sized individual plantings were a feature of mid-80s - late 90s planting. The threshold for a mandatory Environmental Impact Assessment (EIA) was reduced from 200 to 70 ha in 1996. The size of afforestation parcels decreased between 1997 and 2002, with area afforested in parcels greater than 20 ha decreasing from 46% to 35%. In 2001 the EIA threshold was further reduced from 70 to 50 ha along with sub threshold EIAs in the case of afforestation likely to have a significant effect on the environment. Since 2002, 20% of afforestation parcels have been greater than 20 ha; in the last 10 years no individual forest greater than 50 ha has been established. Since 2010 all afforestation applications are screened to determine whether they require an EIA; all developments over 50 ha are subject to a mandatory Environmental Impact Statement. Presently 33% of the total afforested area (1980-2016) consists of plantations greater than 20 ha, 64% are greater than 10 ha and 75% are greater than 7.5ha in size.

Table 5. Size and number of individual private grant-aided afforestation 1980-2016.

Year	Number of parcels		Mean forest size (ha)	
	Annual	Cumulative	Annual	Cumulative
1980	53	53	3.4	3.4
1981	46	99	7.0	5.1
1982	70	169	4.2	4.7
1983	82	251	4.3	4.6
1984	108	359	3.2	4.2
1985	156	515	6.7	4.9
1986	269	784	7.8	5.9
1987	386	1,170	7.5	6.4
1988	484	1,654	9.3	7.3
1989	720	2,374	11.7	8.6
1990	718	3,092	11.6	9.3
1991	779	3,871	9.4	9.3
1992	620	4,491	9.3	9.3
1993	1,036	5,527	8.0	9.1
1994	1,341	6,868	10.2	9.3
1995	1,465	8,333	11.1	9.6
1996	1,476	9,809	9.4	9.6
1997	1,275	11,084	9.2	9.5
1998	1,133	12,217	9.8	9.6
1999	1,141	13,358	10.4	9.6
2000	1,291	14,649	10.7	9.7
2001	1,370	16,019	10.5	9.8
2002	1,267	17,286	9.8	9.8
2003	1,132	18,418	8.6	9.7
2004	950	19,368	9.0	9.7
2005	1,342	20,710	8.4	9.6
2006	1,127	21,837	8.0	9.5
2007	836	22,673	7.1	9.4
2008	685	23,358	8.1	9.4
2009	730	24,088	8.7	9.4
2010	945	25,033	8.1	9.3
2011	891	25,924	7.4	9.3
2012	906	26,830	6.4	9.2
2013	1,002	27,832	6.6	9.1
2014	1,016	28,848	6.0	9.0
2015	921	29,769	6.6	8.9
2016	966	30,735	6.6	8.8

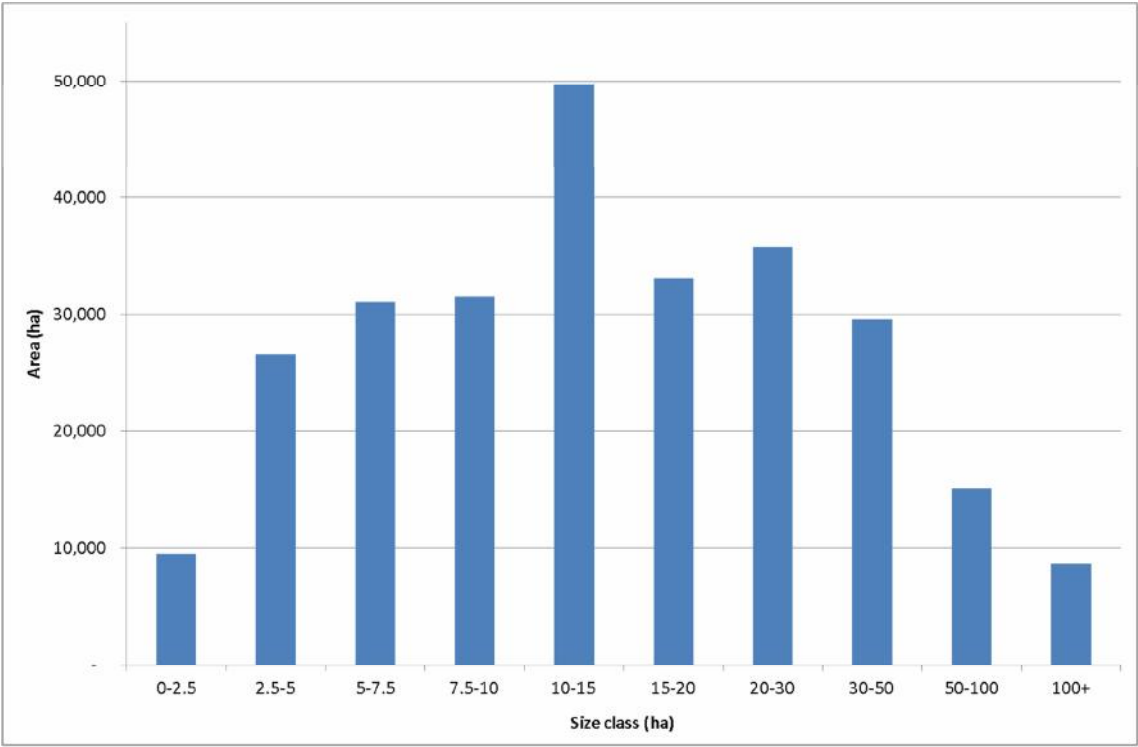


Figure 10. Size class distribution of private grant-aided afforestation 1980-2016.

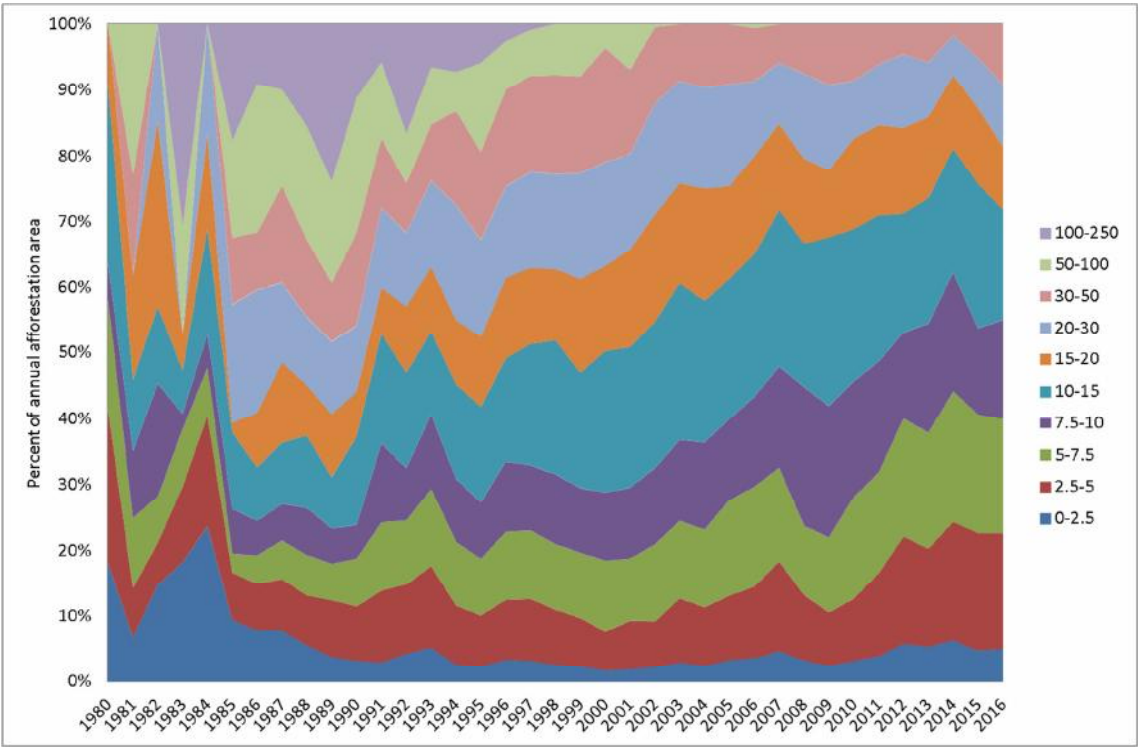


Figure 11. Proportion of annual afforested area by size class of private grant aided afforestation from 1980-2016.

### 3.4 Private afforestation ownership

This section provides information on the nature of private forest owners who afforested between 1980 and 2015<sup>15</sup>.

#### 3.4.1 Farmer/non-farmer

The category 'Non farmers' includes landowners who in general are not actively farming; this category includes retired farmers, sons and daughters of farmers or other relatives who might have inherited land but who have careers outside of farming and this category also includes other landowners who may have recently bought the land

Farmers accounted for 83% of private lands afforested between 1980 and 2016. Farmers and non-farmers were planting, on average, equal amounts of forest throughout the 80s and up to the early 90s. A feature of the period was the higher average forest parcel size planted by non-farmer investors (15 ha), compared to an average of 5 ha for farmers (Figure 12). From 1993 up to the present day farmer planting has dominated afforestation (Figure 13).

In the Afforestation Grant and Premium Scheme (2014 - 2020) changes were implemented to the differentiation of Farmers and Non-farmers in terms of grant and premium payments. Farmers and Non-farmers are now eligible for the same rate of grant and premium payments. The result of this change has seen the participation of non-farmers increase to 35% of the area afforested in 2016, which is the highest level since 1995 (15%). The average forest parcel size for non-farmers has increased from 3.6 ha in 2014 to 6.6 ha in 2016, bringing the size in line with average farmer forest parcel size.

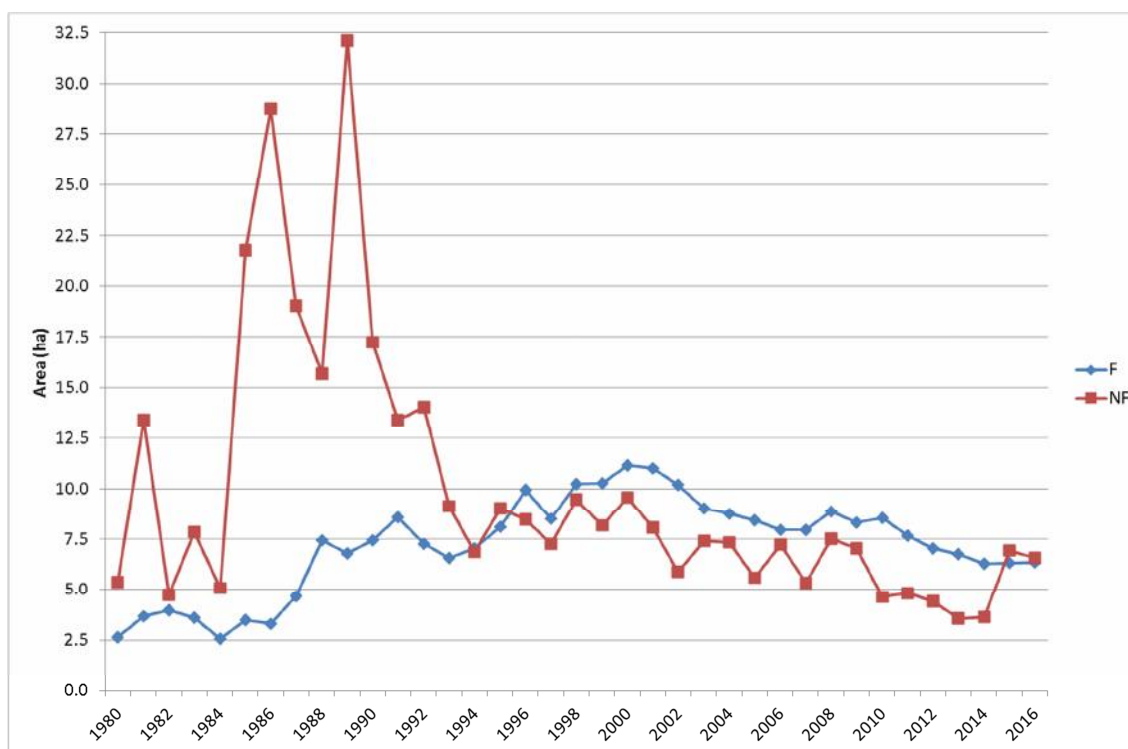


Figure 12. Average forest area of Farmer/Non-Farmer private grant-aided afforestation 1980-2016.

<sup>15</sup> The year data refers to when the forest was planted.

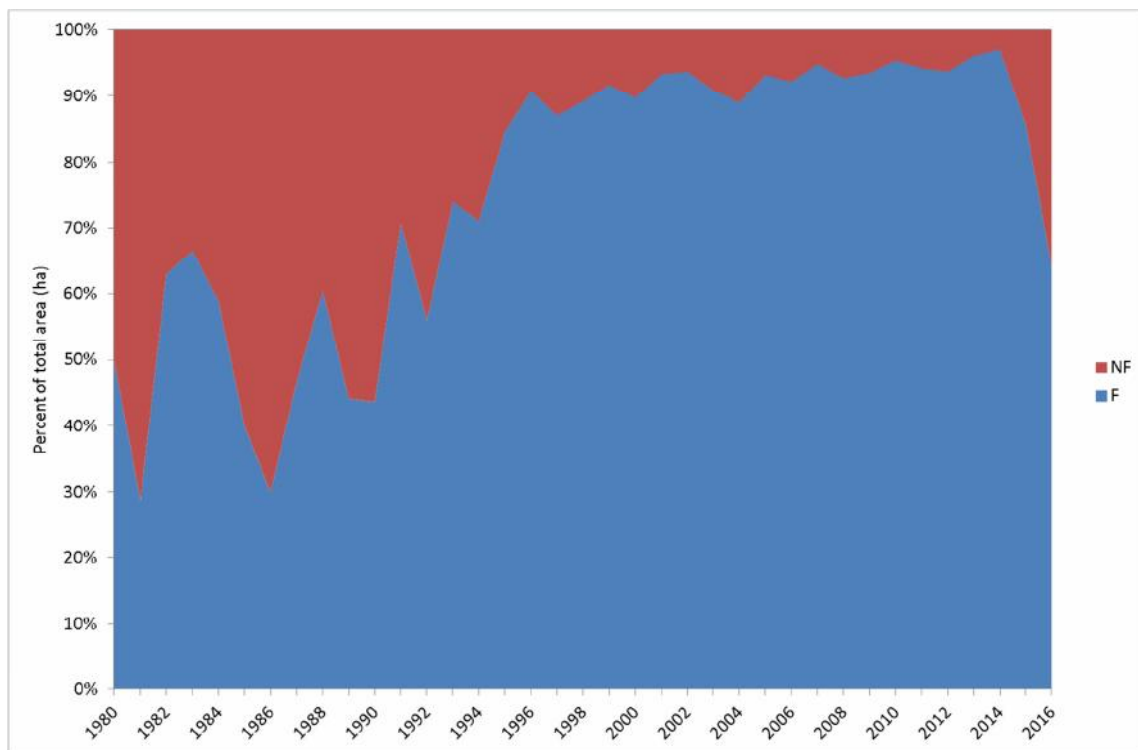


Figure 13. Farmer and Non-Farmer participation in afforestation from 1980- 2016.

### 3.4.2 Number of grant aided forests planted by unique owners in 2016

It has been common for forest owners to afforest more than one forest. Table 6 details the number of individual forest owners who have had one or more grant aided forests planted since 1980. Some 79% of owners have planted one forest, accounting for 146,452ha. In terms of overall area, over half (54.1%) of the individual owners have had two or more grant aided forests planted. For individual owners with one forest planted the average size is 8.5ha, while individual owners with two or more forests planted have an average size of 26.9ha.

While these forests may not be all contiguous, the information presented shows that the private grant-aided forest estate is less fragmented than considered heretofore. It also shows potentially more consolidated forest holdings among individual owners than was heretofore assumed.

Table 6. Number of private grant aided forests planted by unique owner and associated area (1980-2016).

No. of forests	No. of unique owners	Area ha	Owner %	Area %
1	17,327	146,452	79.0	54.1
2	3,133	51,225	14.3	18.9
3	870	22,154	4.0	8.2
4	284	10,452	1.3	3.9
5	123	6,448	0.6	2.4
6-7	99	7,296	0.5	2.7
8-9	40	3,581	0.2	1.3
10-19	44	8,158	0.2	3.0
20-49	20	8,060	0.1	3.0
50+	4	7,027	0.0	2.6
Total	21,944	270,853	100	100



### 3.4.3 Annual grant applications by unique owner

As stated, when assessing the average size of the total forest holdings of individual owners a profile of a less fragmented private forest estate emerges when compared to using a simple average of individual afforestation areas. By 2016, the average cumulative area afforested by unique owners was 12.3 ha (Table 7), compared to the average individual afforestation areas of 8.8 ha (Table 5). Looking only at the average size of individual afforestation areas ignores the fact that some owners have afforested multiple forest holdings over time (Figure 14).

Table 7. Number of grant applications per owner and associated afforested areas 1980-2016.

Year	No. of unique owners		Mean forest size (ha)	
	Annual	Cumulative	Annual	Cumulative
1980	46	46	3.9	3.9
1981	41	74	7.8	6.8
1982	70	133	4.2	6.0
1983	78	193	4.5	6.0
1984	104	272	3.3	5.5
1985	142	382	7.4	6.7
1986	229	573	9.1	8.1
1987	353	860	8.2	8.7
1988	464	1,239	9.7	9.7
1989	658	1,789	12.8	11.4
1990	646	2,331	12.9	12.3
1991	764	3,058	9.6	11.8
1992	594	3,581	9.8	11.7
1993	938	4,410	8.8	11.4
1994	1,249	5,504	10.9	11.6
1995	1,354	6,625	12.0	12.1
1996	1,362	7,712	10.1	12.2
1997	1,163	8,600	10.0	12.3
1998	1,041	9,389	10.6	12.4
1999	1,037	10,185	11.4	12.6
2000	1,160	11,019	12.0	12.9
2001	1,247	11,964	11.5	13.1
2002	1,133	12,784	11.0	13.2
2003	1,005	13,464	9.7	13.3
2004	830	14,062	10.3	13.3
2005	1,185	14,906	9.5	13.3
2006	1,025	15,635	8.7	13.3
2007	759	16,168	7.9	13.2
2008	629	16,623	8.8	13.2
2009	694	17,150	9.2	13.2
2010	897	17,836	8.5	13.1
2011	858	18,522	7.7	12.9
2012	843	19,187	6.9	12.8
2013	933	19,897	7.1	12.7
2014	946	20,605	6.5	12.5
2015	855	21,240	7.1	12.5
2016	905	21,944	7.0	12.3

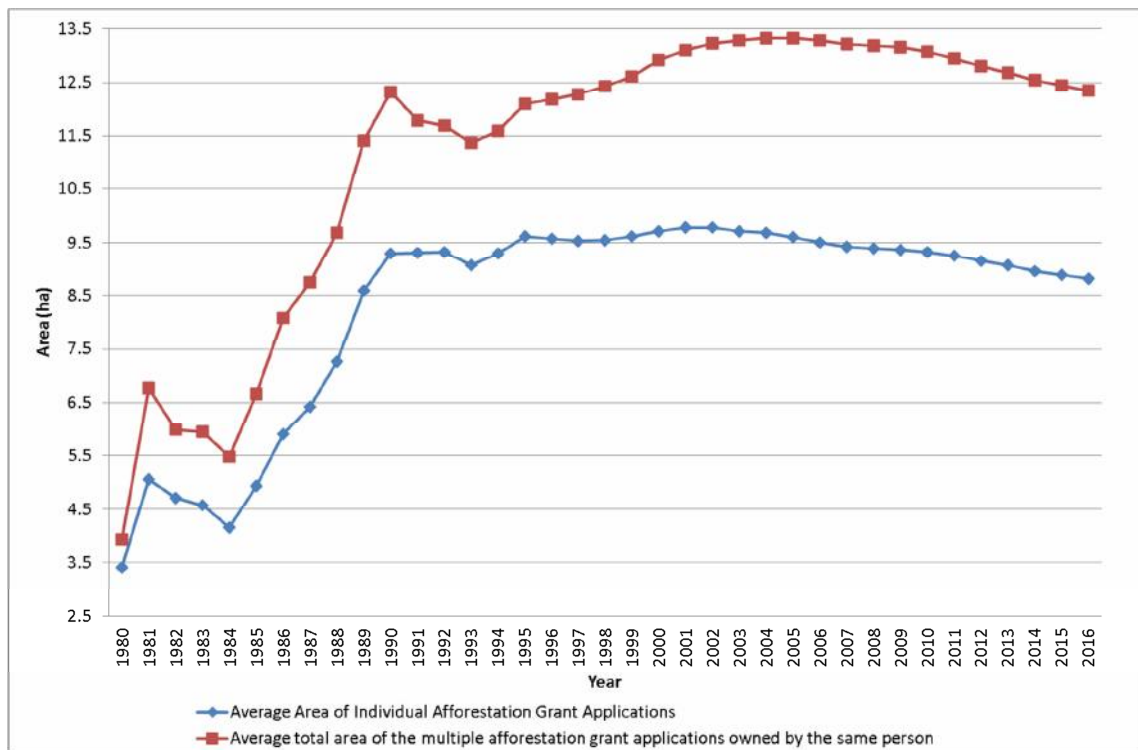


Figure 14. Average private grant-aided afforested area; average area of individual afforestation grant application vs. the average area of the combined multiple afforestation grant applications owned by the same person (1980-2016).

### 3.4.4 Number of individual private forest owners per county

The number of unique owners that have afforested by county between 1980 and 2016 is detailed in Table 8. It should be noted that individual owners recorded in any one year may have subsequently planted again in the following years.

Table 8. Cumulative number of unique owners and area by county in 1980-2016

County	No. owners	Area ha	County	No. owners	Area ha
Carlow	212	1,717	Longford	544	5,278
Cavan	735	7,834	Louth	77	692.2398
Clare	1,766	22,110	Mayo	1,632	18,803
Cork	2,800	29,957	Meath	418	4,291
Donegal	928	15,619	Monaghan	278	1,835
Dublin	81	821.641	Offaly	656	8,303
Galway	1,414	15,634	Roscommon	1,071	11,781
Kerry	2,039	28,601	Sligo	814	8,680
Kildare	335	3,228	Tipperary	1,462	18,566
Kilkenny	814	9,347	Waterford	678	7,500
Laois	535	7,000	Westmeath	526	7,029
Leitrim	737	10,909	Wexford	644	5,434
Limerick	1,046	13,241	Wicklow	565	6,642

### 3.4.5 Age profile of forest owners

In this section information is presented on the age of the persons at the time of when their land was afforested. It is clear from Figure 15 that between 2006 and 2016, the age of people engaged in afforestation is increasing. In 2006, 28% of the area afforested was by people aged

60 years or more, in 2016 this had increased to 47%. Figure 16 details the age profile of the forest owners in receipt of premium. In 2016, 49% of the total area that received premium payments was owned by people aged 60 years or more.

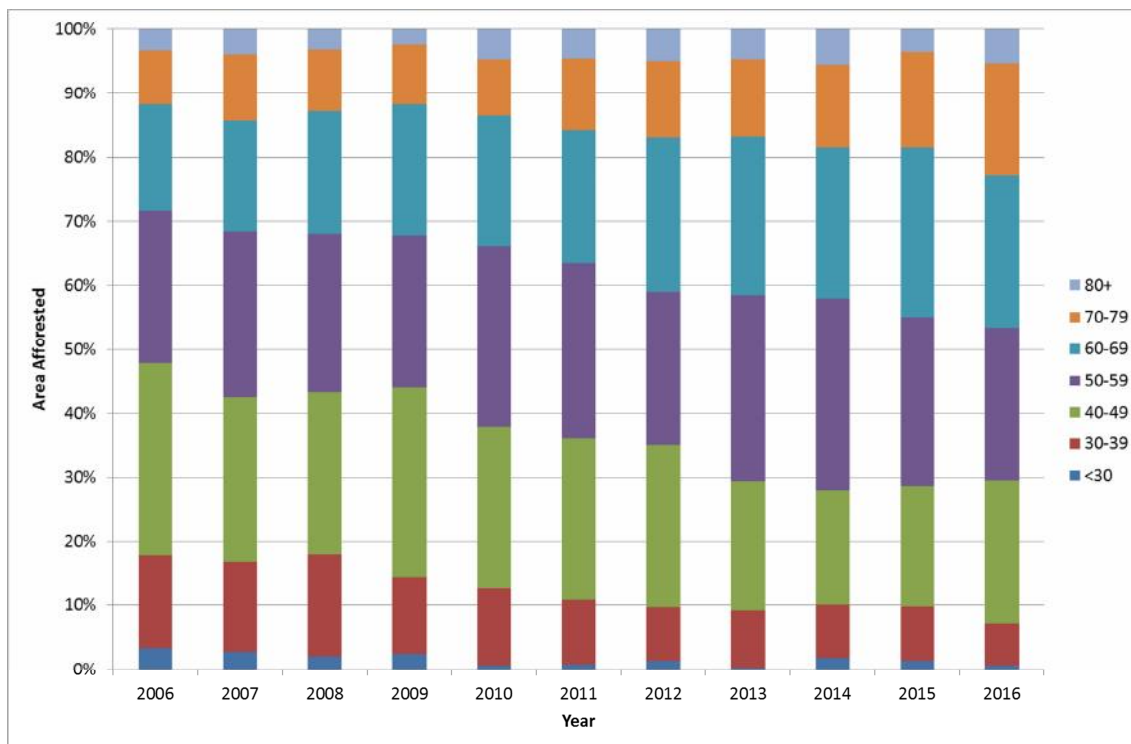


Figure 15. Age profile of forest owners at the time of when their land was afforested (2006-2016).

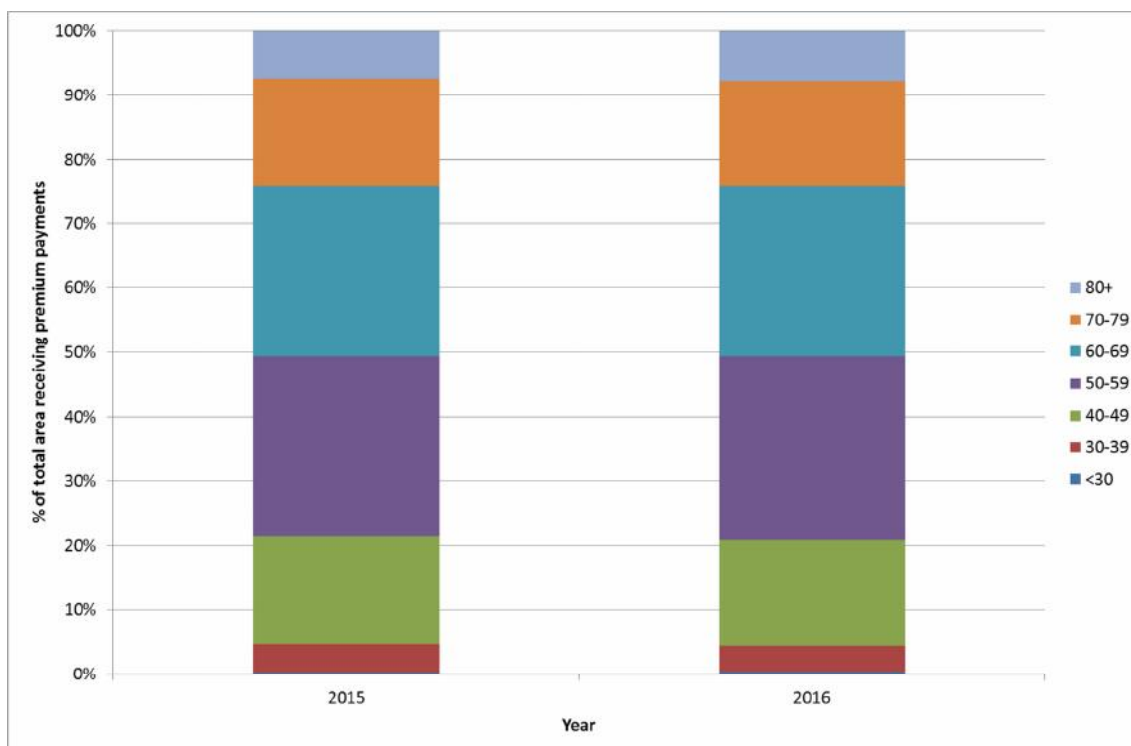


Figure 16. Age profile of forest premium recipients, 2015-2016 (% of total area receiving premium).

### 3.4.6 Gender of forest owners

This section presents on the gender of forest owners at the time of when their land was afforested. Over the 11 year period (2006-2016) 84% of owners were male (Figure 17).

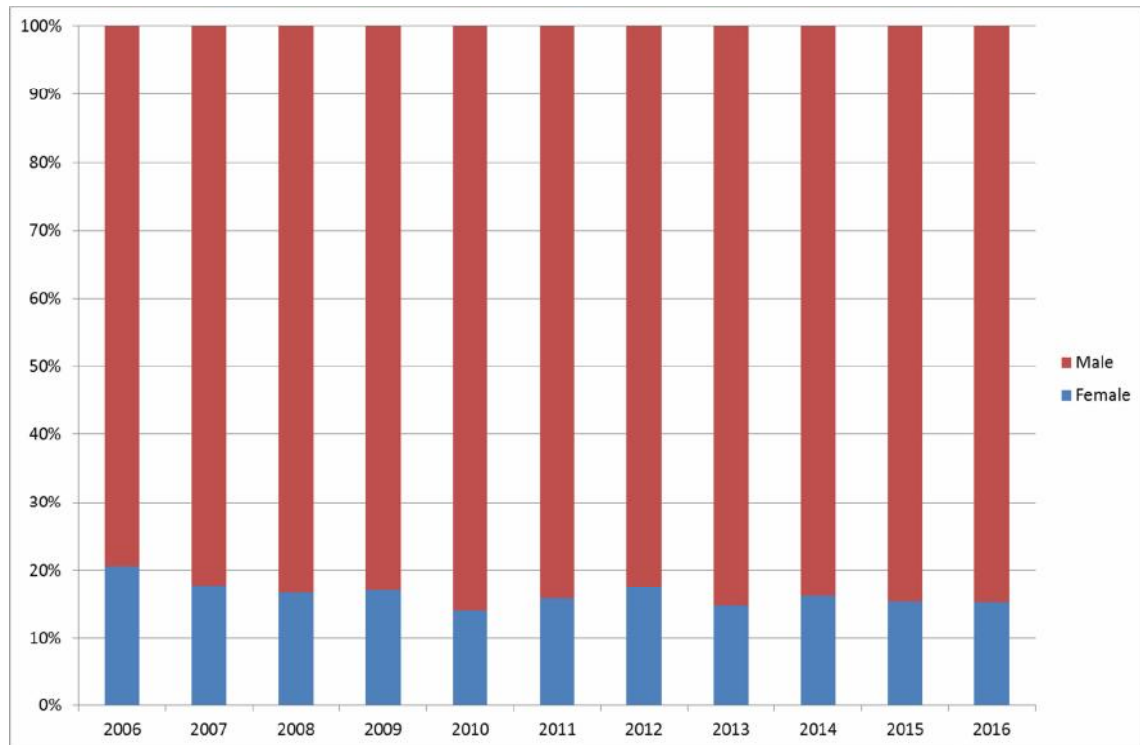


Figure 17. Gender of forest owners at the time of when their land was afforested (2006-2016).

### 3.4.7 Private (other) ownership details

Previous sub-sections in this chapter have outlined ownership profiles of the private grant-aided estate. Information on ownership in the Private (other) component of the forest estate is not available, which comprised 89,350 ha in 2012 (NFI). The 1973 Inventory of Private Woodlands<sup>16</sup> provided inventory information for forest areas of 40 ha or more (17,481 ha) or 21% of the total of 81,958 ha of private forests estimated at the time. At the time areas 40 ha or more and under single ownership represented the more commercially viable forest stands in private ownership. The remaining Private (other) forest is comprised of primarily juvenile, short-living, naturally regenerated broadleaf species such as birch. These forest areas are commonly quite small and frequently of limited use for agriculture due to slope and other restrictions. The number of owners in this category is in the region of 20-30,000. In 1973 over 40% of the 81,958 ha was comprised of “scrub” category. The size category of the 151 estates with detailed historical inventory information is shown in Table 9.

Table 9. 1973 Inventory of Private Forest - size categories.

Estate Forest Area (ha)	Number of estates	Area (%)
40-50	25	7
51-100	67	24
101-500	56	59
501-1,000	3	11

<sup>16</sup> Purcell, T. 1979. Inventory of Private Woodlands, 1973, Department of Fisheries and Forestry, Forest and Wildlife Service.

### 3.5 *Grant aided forest removal*

The area of private grant aided forest taken out of afforestation between 2007 and 2016 is shown in Table 10, and account for 1-4% of the annual afforestation rate over the same years.

Table 10. Lands taken out of afforestation 2007-2016.

Year	Number	Area (ha)
2007	47	67
2008	101	209
2009	110	147
2010	74	99
2011	68	87
2012	75	91
2013	63	70
2014	52	64
2015	13	36
2016	47	156

### 3.6 *Change of applicant*

A substantial area of private grant-aided forests change ownership each year (Table 11). Most ownership change is within families from one generation to the next.

Table 11. Change of ownership by area of forest 2007-2016.

Year	Number	Area (ha)
2007	345	3,385
2008	348	3,309
2009	374	3,850
2010	393	3,612
2011	335	2,970
2012	402	3,999
2013	379	3,440
2014	366	3,911
2015	362	3,503
2016	543	5,453

### 3.7 *County level statistics*

The total afforestation by county from 1997 to 2016 is detailed in Table 12. In 2016, Cork had the highest afforestation area at 608 ha and is followed by Clare at 552 ha. County level statistics detailing Private and Public afforestation are detailed in Tables 13 and 14, respectively.

In Table 15, information is presented on the total area afforested in each county by Farmers and Non-farmers from 2011-2016. Broad level county information is presented on the species composition (Broadleaf/Conifer) of lands afforested between 2007-2016 in Table 16.

Table 12. Total Afforestation (ha) by County, 1997-2016.

County	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Carlow	40	96	91	57	71	81	79	54	88	60	43	49	47	100	21	73	44	15	82	46
Cavan	311	419	225	402	555	716	220	436	303	217	300	197	260	243	204	171	210	241	277	425
Clare	763	881	932	1,467	1,504	1,012	590	833	749	698	669	695	564	521	484	480	347	420	568	552
Cork	800	1,397	1,306	1,636	1,709	2,094	978	1,434	1,734	1,441	1,024	1,006	799	1,157	1,035	1,041	672	690	663	608
Donegal	1,347	1,192	877	955	1,016	900	388	309	345	239	321	197	172	147	59	96	40	28	72	36
Dublin	80	63	5	17	4	5	19	11	0	0	18	11	0	0	1	20	0	12	8	3
Galway	528	768	446	640	454	660	452	527	499	372	403	263	318	561	300	336	419	387	432	331
Kerry	1,420	1,055	1,126	1,828	2,018	1,825	930	893	770	664	549	478	556	736	641	366	490	574	430	405
Kildare	237	250	156	234	136	154	134	84	129	84	79	17	111	86	141	220	48	90	29	13
Kilkenny	444	363	503	422	530	529	456	297	545	322	229	199	203	523	292	294	218	231	264	181
Laois	393	285	287	584	441	476	148	183	203	71	144	178	100	178	95	193	112	168	198	163
Leitrim	615	591	478	688	464	467	325	394	411	227	191	167	179	176	325	278	356	272	513	434
Limerick	553	489	584	964	1,183	1,175	807	767	684	521	373	441	329	411	381	281	243	122	177	329
Longford	214	250	216	280	175	416	212	255	208	255	124	86	87	243	174	178	255	225	286	272
Louth	14	99	2	10	2	63	8	18	2	20	55	65	65	46	19	51	26	0	22	40
Mayo	795	1,094	841	914	924	929	556	483	359	325	402	344	474	548	289	293	346	453	455	429
Meath	181	185	346	349	250	169	149	150	217	287	42	89	130	252	90	203	192	67	73	105
Monaghan	42	76	23	23	48	47	59	74	59	107	70	56	88	140	70	107	93	137	38	89
Offaly	117	296	654	585	509	309	386	316	262	218	135	242	324	279	268	263	174	128	156	136
Roscommon	480	360	517	557	577	503	462	575	287	322	309	352	398	360	311	252	431	449	343	435
Sligo	420	406	176	446	524	315	242	237	254	172	205	132	233	82	87	180	354	382	268	302
Tipperary	621	898	1,154	1,252	1,195	893	710	633	1,087	663	546	465	455	532	494	486	410	330	341	305
Waterford	238	333	442	381	129	482	231	220	239	308	310	156	245	264	204	128	138	122	125	240
Westmeath	408	448	336	182	332	276	209	320	351	155	141	145	200	203	251	271	241	236	204	281
Wexford	140	251	516	344	289	158	225	187	247	216	178	102	182	426	308	201	229	160	128	89
Wicklow	244	385	428	478	426	402	122	48	65	71	89	115	128	100	109	188	164	219	139	251
<b>Total</b>	<b>11,444</b>	<b>12,928</b>	<b>12,667</b>	<b>15,696</b>	<b>15,464</b>	<b>15,054</b>	<b>9,098</b>	<b>9,739</b>	<b>10,096</b>	<b>8,037</b>	<b>6,947</b>	<b>6,249</b>	<b>6,648</b>	<b>8,314</b>	<b>6,653</b>	<b>6,652</b>	<b>6,252</b>	<b>6,156</b>	<b>6,293</b>	<b>6,500</b>

Table 13. Private Afforestation (ha) by County, 1997-2016.

County	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Carlow	40	53	64	57	71	81	79	54	88	60	43	49	47	100	21	73	44	15	82	46
Cavan	226	228	225	353	555	700	220	436	303	217	300	197	260	243	204	171	210	241	277	425
Clare	668	677	878	1,377	1,457	1,009	588	800	736	698	669	695	564	521	484	480	347	420	568	552
Cork	761	1,039	1,286	1,531	1,615	2,026	963	1,432	1,734	1,441	1,024	1,006	799	1,157	1,035	1,041	672	690	663	608
Donegal	1,233	841	825	767	931	861	388	292	330	230	321	197	172	147	59	96	40	28	72	36
Dublin	80	63	5	11	4	5	19	11	0	0	18	11	0	0	1	20	0	12	8	3
Galway	465	458	407	434	446	634	382	494	477	356	403	235	318	561	300	336	419	387	432	331
Kerry	1,313	843	1,106	1,767	2,018	1,825	914	893	770	664	549	478	556	736	641	366	490	574	430	405
Kildare	237	250	156	234	136	154	134	84	129	84	79	17	111	86	101	186	48	90	29	13
Kilkenny	408	227	488	359	530	529	456	297	545	322	229	197	203	523	292	294	218	231	264	181
Laois	369	224	268	553	437	464	148	183	203	71	144	178	93	178	95	193	112	168	198	163
Leitrim	587	490	411	598	447	452	319	388	411	227	191	167	179	176	325	278	356	272	513	434
Limerick	535	289	505	882	1,183	1,175	807	763	684	521	373	441	329	411	381	281	243	122	177	329
Longford	201	144	195	231	168	405	212	255	208	255	124	86	87	243	174	178	255	225	286	272
Louth	14	78	2	10	2	63	8	18	2	20	55	65	65	46	19	51	26	0	22	40
Mayo	795	962	653	768	905	904	554	483	359	325	402	344	474	544	289	293	343	453	455	429
Meath	181	172	340	349	242	169	149	150	217	287	42	89	130	252	90	203	192	67	73	105
Monaghan	42	44	23	23	48	47	59	74	59	107	70	56	88	140	70	107	93	137	38	89
Offaly	117	296	654	579	509	309	386	316	262	218	135	242	324	279	268	263	174	128	156	136
Roscommon	449	264	435	402	550	437	451	559	272	322	309	315	370	360	288	252	431	449	334	435
Sligo	378	304	149	417	524	305	242	226	254	172	205	132	233	82	87	180	354	382	268	302
Tipperary	562	788	1,140	1,195	1,195	868	710	633	1,087	663	546	465	455	532	494	460	410	330	341	305
Waterford	176	309	387	358	127	482	231	220	239	308	310	156	245	264	204	128	138	122	125	240
Westmeath	408	370	336	177	332	276	209	320	351	155	141	145	200	203	251	271	241	236	204	281
Wexford	137	251	472	344	289	158	225	187	247	216	178	102	182	426	308	201	229	160	128	89
Wicklow	202	341	366	456	426	398	116	48	65	71	89	115	128	100	109	188	164	219	139	251
<b>Total</b>	<b>10,583</b>	<b>10,002</b>	<b>11,776</b>	<b>14,231</b>	<b>15,147</b>	<b>14,735</b>	<b>8,969</b>	<b>9,617</b>	<b>10,032</b>	<b>8,011</b>	<b>6,947</b>	<b>6,182</b>	<b>6,613</b>	<b>8,310</b>	<b>6,591</b>	<b>6,592</b>	<b>6,249</b>	<b>6,156</b>	<b>6,284</b>	<b>6,500</b>



Table 14. Public Afforestation (ha) by County, 1997-2016.

COUNTY	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Carlow	1	43	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cavan	85	191	-	49	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clare	94	204	54	90	46	3	2	34	13	-	-	-	-	-	-	-	-	-	-	-
Cork	39	359	21	105	93	68	15	2	-	-	-	-	-	-	-	-	-	-	-	-
Donegal	114	352	52	188	85	40	-	17	14	9	-	-	-	-	-	-	-	-	-	-
Dublin	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galway	64	310	39	206	8	26	69	33	22	16	-	28	-	-	-	-	-	-	-	-
Kerry	107	212	21	62	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-
Kildare	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39	34	-	-	-	-
Kilkenny	36	136	15	63	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Laois	24	61	19	31	5	11	-	-	-	-	-	-	7	-	-	-	-	-	-	-
Leitrim	28	101	67	90	17	15	6	6	-	-	-	-	-	-	-	-	-	-	-	-
Limerick	19	199	79	82	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Longford	13	106	21	49	7	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Louth	-	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mayo	-	133	189	146	19	24	3	-	-	-	-	-	-	4	-	-	3	-	-	-
Meath	-	13	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Monaghan	-	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Offaly	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roscommon	31	96	82	155	27	66	11	16	15	-	-	37	28	-	23	-	-	-	9	-
Sligo	41	103	27	30	-	10	-	10	-	-	-	-	-	-	-	-	-	-	-	-
Tipperary	59	110	14	57	-	25	-	-	-	-	-	-	-	-	-	26	-	-	-	-
Waterford	61	24	55	23	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Westmeath	-	77	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wexford	2	-	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wicklow	42	44	62	22	-	4	6	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>TOTAL</b>	<b>861</b>	<b>2,926</b>	<b>891</b>	<b>1,465</b>	<b>316</b>	<b>319</b>	<b>128</b>	<b>122</b>	<b>64</b>	<b>25</b>	<b>-</b>	<b>67</b>	<b>35</b>	<b>4</b>	<b>62</b>	<b>60</b>	<b>3</b>	<b>-</b>	<b>9</b>	<b>-</b>

Table 15. Total Afforestation (ha) by County and Farmer/Non-farmer, 2011-2016.

County	2011				2012				2013				2014				2015				2016			
	Farmer		Non Farmer		Farmer		Non Farmer		Farmer		Non Farmer		Farmer		Non Farmer		Farmer		Non Farmer		Farmer		Non Farmer	
	No.	ha	No.	ha	No.	ha	No.	ha	No.	ha	No.	ha	No.	ha	No.	ha	No.	ha	No.	ha	No.	ha	No.	ha
Carlow	3	19	1	2	9	73	-	-	10	43	1	1	5	15	-	-	9	82	-	-	5	17	4	28
Cavan	24	187	4	17	27	161	4	10	29	198	3	12	39	239	2	1	42	218	11	59	33	213	26	212
Clare	62	451	3	33	70	459	4	21	54	346	1	1	62	394	3	25	85	498	8	70	60	314	33	238
Cork	128	997	15	39	138	1,010	15	31	87	660	7	12	97	679	5	11	95	589	11	74	49	354	34	254
Donegal	6	31	3	29	10	92	1	5	8	40	-	-	5	24	1	4	10	47	5	25	6	28	2	8
Dublin	1	1	-	-	3	16	1	4	-	-	-	-	1	6	2	6	1	5	1	3	1	3	-	-
Galway	47	291	3	9	58	332	2	5	56	388	4	31	57	384	1	3	62	387	7	45	49	242	17	89
Kerry	68	612	10	29	61	358	4	9	59	489	1	1	82	571	2	3	48	359	10	72	51	285	20	120
Kildare	11	87	4	54	20	175	3	45	12	48	-	-	18	85	2	5	3	20	2	9	2	8	3	6
Kilkenny	44	283	2	9	39	270	4	25	35	216	2	1	42	229	1	2	38	208	4	56	19	132	7	49
Laois	12	92	1	3	21	186	1	7	18	100	1	12	26	168	-	-	11	173	2	26	15	111	11	52
Leitrim	31	325	-	-	30	269	2	9	42	338	4	18	32	260	4	12	58	416	10	97	34	239	28	195
Limerick	44	367	3	14	42	253	5	29	35	239	1	4	24	119	3	3	26	163	4	14	35	219	14	110
Longford	31	174	-	-	29	171	3	7	34	254	2	1	39	216	4	9	37	215	6	71	26	144	15	128
Louth	5	18	1	2	6	51	-	-	5	21	2	5	-	-	-	-	2	4	2	19	2	12	4	28
Mayo	35	272	7	17	46	251	9	42	57	299	11	47	84	422	6	31	72	424	8	31	53	316	22	113
Meath	16	87	1	3	26	191	3	12	24	182	2	9	10	67	-	-	12	60	2	13	11	64	9	41
Monaghan	16	70	-	-	19	107	-	-	16	82	3	11	13	121	1	16	8	24	2	14	9	46	6	43
Offaly	31	268	-	-	34	250	1	13	32	174	-	-	25	128	-	-	18	130	5	26	14	106	9	30
Roscommon	41	275	4	36	30	225	3	27	55	431	-	-	68	427	4	22	49	285	7	58	50	305	29	130
Sligo	8	77	4	9	25	165	6	15	45	333	5	21	58	367	4	15	31	233	6	35	43	200	15	102
Tipperary	57	471	5	22	49	429	8	57	68	394	4	16	55	328	1	2	49	301	8	40	19	186	13	120
Waterford	29	196	4	8	21	123	1	5	20	134	1	4	21	118	1	3	23	119	2	7	17	221	4	19
Westmeath	20	216	2	35	29	262	5	9	29	235	5	7	30	236	-	-	27	204	-	-	21	173	18	108
Wexford	35	294	2	14	25	179	8	23	44	219	5	10	31	157	1	3	23	109	4	20	14	67	5	22
Wicklow	10	107	1	2	16	182	1	6	16	144	3	20	26	216	1	3	13	118	3	21	14	151	9	99
<b>Total</b>	815	6,269	80	384	883	6,237	94	415	890	6,009	68	243	950	5,978	49	178	852	5,389	130	904	652	4,156	357	2,344

Table 16. Total Afforestation (ha) by County and Broadleaf/Conifer, 2007-2016.

County	2007		2008		2009		2010		2011		2012		2013		2014		2015		2016	
	B'leaf	Conifer	B'leaf	Conifer	B'leaf	Conifer	B'leaf	Conifer	B'leaf	Conifer	B'leaf	Conifer	B'leaf	Conifer	B'leaf	Conifer	B'leaf	Conifer	B'leaf	Conifer
Carlow	17	25	10	39	22	25	55	46	4	17	23	50	14	31	3	12	19	63	14	32
Cavan	46	254	72	125	84	176	107	136	75	129	49	123	58	152	50	191	57	220	89	336
Clare	232	436	273	422	226	338	190	332	154	331	91	390	58	289	65	354	106	461	73	479
Cork	419	606	367	639	311	487	524	633	469	566	345	696	185	487	182	508	148	515	111	497
Donegal	49	271	26	171	53	119	42	106	23	37	17	79	10	30	4	24	10	62	7	29
Dublin	10	8	10	1	-	-	-	-	1	-	9	11	-	-	2	10	2	7	1	1
Galway	73	331	59	204	111	207	204	357	128	172	109	228	93	326	103	283	115	317	56	275
Kerry	200	348	223	255	191	365	276	459	224	417	95	271	115	375	105	470	104	327	114	291
Kildare	28	50	10	7	42	70	28	59	54	87	91	129	27	21	49	41	5	24	4	9
Kilkenny	91	138	91	107	81	123	180	343	118	174	131	163	62	156	51	180	73	192	66	115
Laois	37	107	55	123	34	67	57	121	44	51	70	123	27	85	35	133	22	176	32	132
Leitrim	73	117	48	120	50	129	63	113	115	210	79	198	71	285	41	231	71	442	73	361
Limerick	134	238	176	264	126	204	111	300	122	259	78	203	51	192	26	96	24	152	65	263
Longford	25	98	38	48	29	58	80	162	61	113	37	141	54	201	50	175	88	198	45	227
Louth	28	27	28	38	27	38	29	18	7	13	16	35	20	7	-	-	18	5	5	35
Mayo	77	324	99	245	112	362	129	419	46	243	37	257	59	288	76	378	62	393	59	369
Meath	19	23	43	46	90	40	178	74	50	40	116	87	61	131	33	33	25	48	31	74
Monaghan	13	56	18	38	38	50	61	79	30	40	37	69	32	61	33	104	8	29	16	73
Offaly	21	114	89	153	186	138	129	150	95	173	96	167	32	142	28	100	29	127	30	106
Roscommon	64	245	99	253	103	295	84	276	59	252	56	195	67	364	69	380	60	283	82	353
Sligo	43	161	38	94	80	152	16	65	21	66	36	145	69	285	49	333	28	240	42	260
Tipperary	224	323	173	292	175	280	203	329	204	290	167	319	78	332	64	266	73	268	39	266
Waterford	113	197	63	93	94	151	97	168	89	115	39	90	25	113	36	85	26	99	36	205
Westmeath	44	97	43	103	85	115	84	119	98	152	104	167	106	136	81	155	44	160	102	179
Wexford	82	96	41	62	80	102	188	239	116	192	69	132	66	163	59	101	29	100	42	47
Wicklow	18	72	35	80	43	85	36	63	40	69	48	140	54	111	53	166	17	122	37	213
<b>Total</b>	2,182	4,765	2,227	4,022	2,473	4,175	3,149	5,165	2,447	4,206	2,045	4,607	1,492	4,760	1,348	4,808	1,263	5,030	1,270	5,230
<b>Percentages</b>	<b>31%</b>	<b>69%</b>	<b>36%</b>	<b>64%</b>	<b>37%</b>	<b>63%</b>	<b>38%</b>	<b>62%</b>	<b>37%</b>	<b>63%</b>	<b>31%</b>	<b>69%</b>	<b>24%</b>	<b>76%</b>	<b>22%</b>	<b>78%</b>	<b>20%</b>	<b>80%</b>	<b>20%</b>	<b>80%</b>

## 4. Forest Management Operations

### 4.1 *Introduction*

This chapter provides information on forest roads, felling activity, reforestation and forest certification as follows:

- Public forest road construction trends 1944-2016;
- Private forest road building between 2007 and 2016;
- Felling licenses issued annually between 2010 and 2016;
- Clearfell levels in state forests between 1933 and 2016;
- Private sector broadleaf tending and thinning between 2009 and 2016;
- The level of annual state reforestation between 1933 and 2016;
- The certified forest area.

### Key findings

- Since 1944, on average, 131 km of forest roads have been built annually in Public forests;
- Between 2007 and 2016, an average of 90 km of private grant-aided forest roads were built annually;
- Over 7,831ha were reforested on public lands in 2016;
- Public forest clearfell peaked between 2001 and 2007, coinciding with a peak in domestic construction activity;

## 4.2 Forest Roads

Forest roads enhance the economic viability of forests primarily by improving access for harvesting. In addition, forest roads also provide roundwood stacking, drying and chipping areas. Apart from economic enhancement, forest roads also improve the environmental and biodiversity value of forests by increasing edge effects, improve access to deal with fire and allow for better health and safety by providing access for emergency vehicles.

### 4.2.1 Public forest roading

Since 1944, 9,531 km of forest roads have been built in the public forest estate or on average 131 km annually (Figure 18).

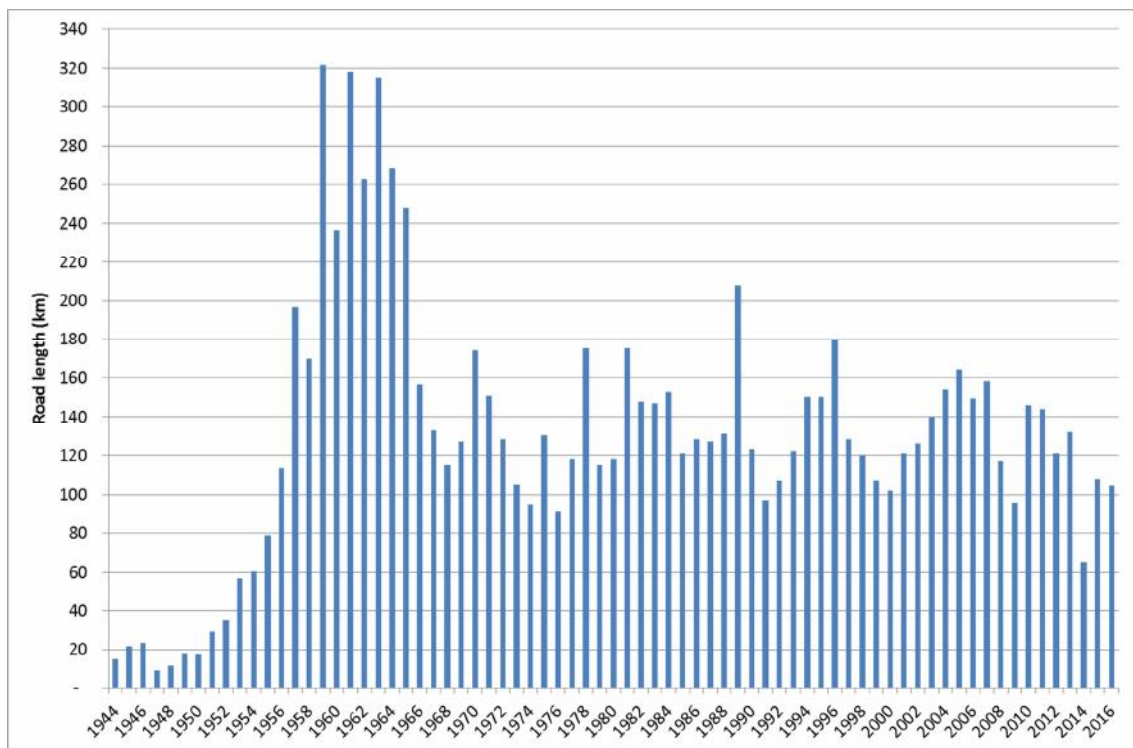


Figure 18. Forest road construction in public forests 1944–2015.

### 4.2.2 Private forest grant-aided roading

Due to the age profile of forests, forest roads were built primarily in public forests; however with the maturation of private sector forests, roads are increasingly required in private forests (Figure 19).

Since 2006, IFORIS<sup>17</sup> has been used to record the number and length of forest roads grant aided. As the private estate reaches harvesting stage there has been an increase in the length of forest road built. Between 2006 and 2016, on average 90 km of private grant-aided forest roads were built annually.

<sup>17</sup> IFORIS is an Integrated Forest Information System which was developed for the processing of forestry pre-approval, grant and premium applications.

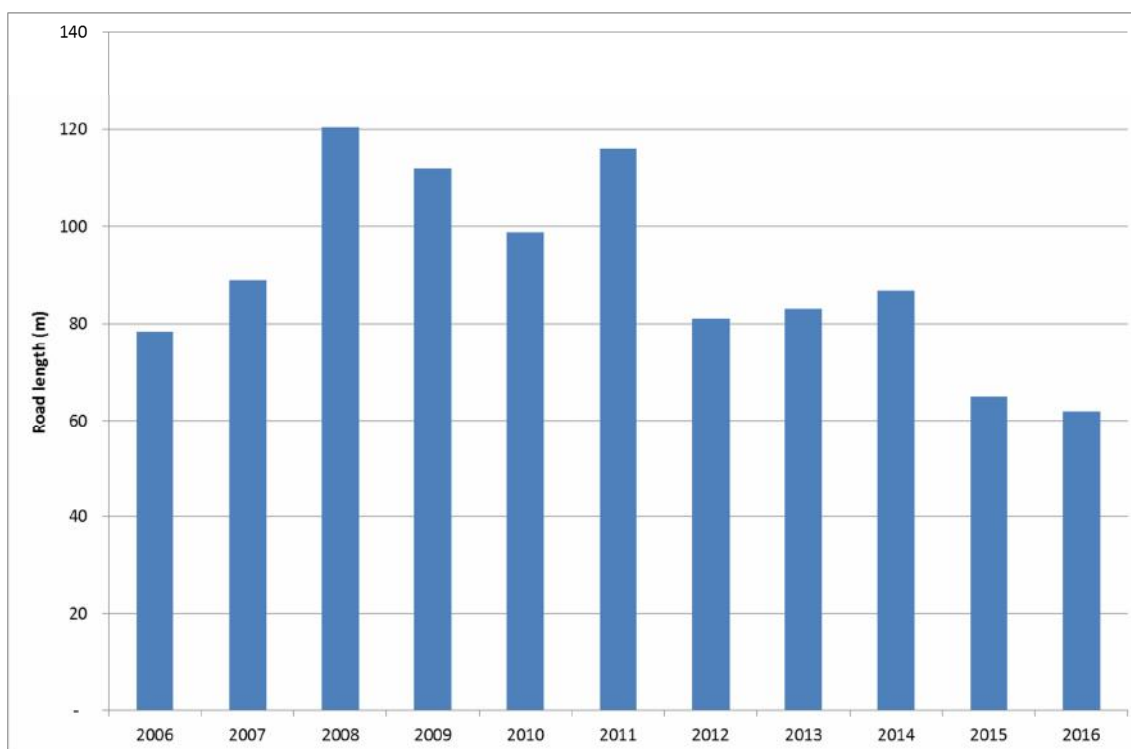


Figure 19. Private grant-aided forest road building 2006 to 2016.

### 4.3 Private forest estate felling activity

A felling licence granted by the Minister for Agriculture, Food & the Marine provides authority under the Forestry Act 2014 to fell or otherwise remove a tree or trees and to thin a forest for silvicultural reasons.

Table 17 shows the area of lands granted felling licences for both thinning and clearfelling in privately-owned forests between 2010 and 2016. The area issued with felling licences for thinning was on an upward trend between 2010 and 2014, and declined by approximately 4,544ha in 2015. However in 2016 the area licenced for thinning increased by 5,351ha. A massive increase in the area licensed for clearfell was evident in 2014 due to Storm Darwin. The clearfell area licenced in 2016 declined to 1,384 ha, which is still high when compared to pre-Storm Darwin clearfell areas. It should be noted that not all areas licensed for thinning & clearfell are actually thinned or clearfelled on the ground.

Table 17. Area of felling licences issued for private forests, 2010-2016.

Year	Thinning area (ha)	Clearfell area (ha)
2010	10,382	439
2011	12,275	590
2012	13,037	467
2013	15,150	395
2014	15,742	3,447
2015	11,198	2,012
2016	16,549	1,384

#### 4.4 Public forest thinning and clearfelling

The area of public forest clearfelled peaked in 2003, coinciding with a peak in domestic construction activity (Figure 20). Thinning activity in the public estate is shown in Figure 21.

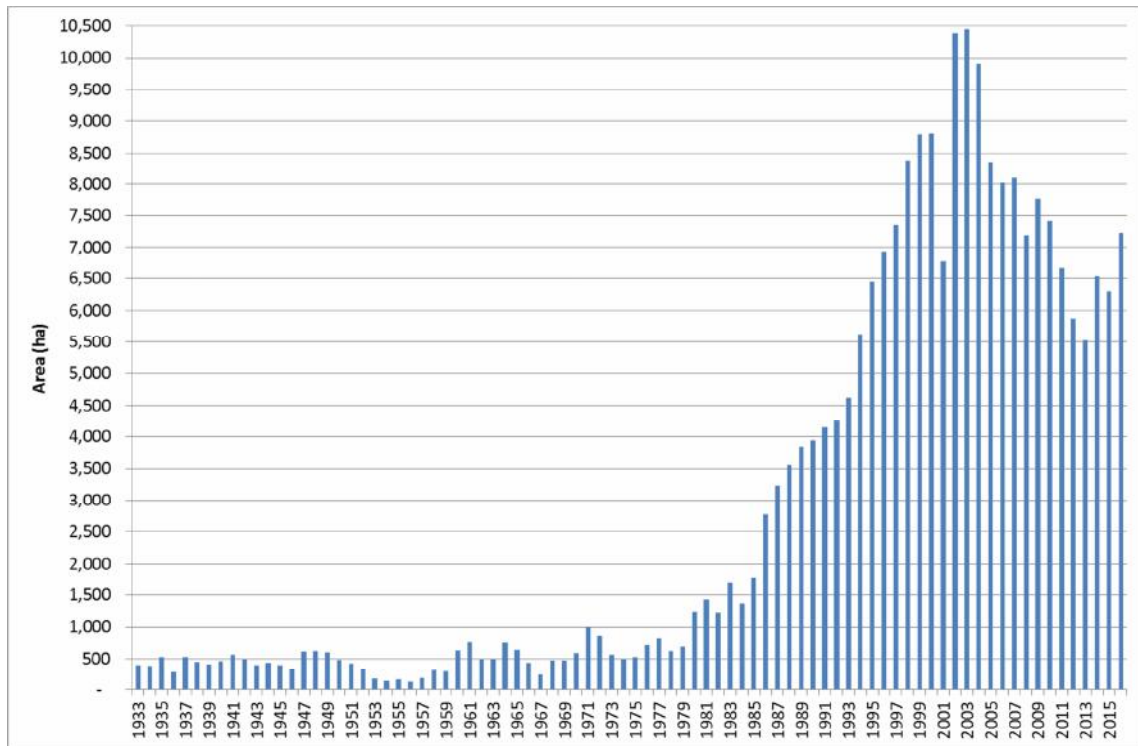


Figure 20. Public estate clearfelling 1933-2016<sup>18</sup>

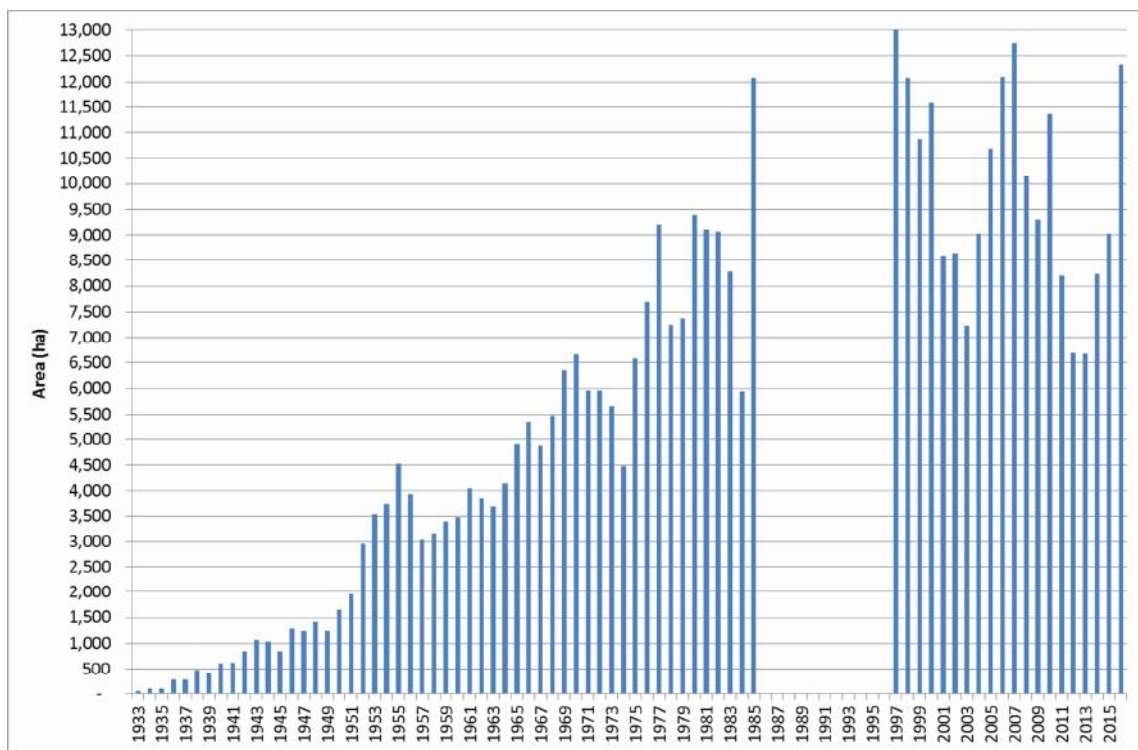


Figure 21. Public estate thinning 1933-2016<sup>19</sup>.

<sup>18</sup> Clearfell areas from 1986-2000 were estimated by averaging the reforestation areas for the two years following clearfell.



## 4.5 Public forest reforestation

Reforestation is the regeneration of existing areas of forests that have been felled. It is a condition of most felling licences that the felled forest is reforested, annual reforestation rates are mainly driven by harvesting levels (with a time lag, usually of around 2 years, between harvesting and reforestation).

Public forest reforestation rates from 1933 to 2016 are shown in Figure 22. Up until the early 80s, reforestation rates were low due to relatively low afforestation up to 1950. In the 50s and 60s afforestation greatly expanded, which in turn was reflected in the increasing reforestation of the 80s and 90s. The area of public reforestation has fallen by about a third, since a peak of 10,000 ha in 2003. The years 2008 and 2009 show a significant decrease in reforestation as a result of a sharp decrease in harvesting for the same period, as a result of a downturn in the domestic construction sector.

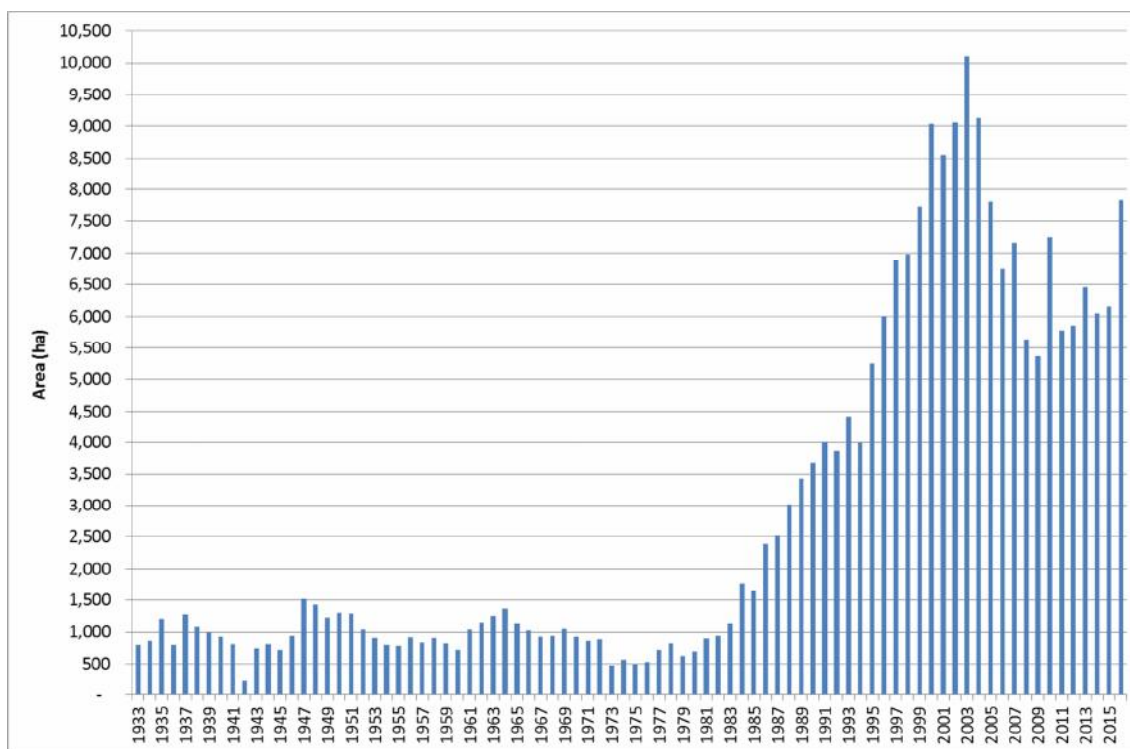


Figure 22. Public sector reforestation 1933 to 2016.

<sup>19</sup> Thinning data for 1986-1996 are currently not available.

#### 4.6 *Private Broadleaf Thinning and Tending*

As part of the Forest Improvement Scheme (FIS) grants have been available for the tending and thinning of broadleaves. The objectives of the scheme are:

- Improvement felling of malformed or over-mature trees;
- Felling of additional trees to release potential final crop trees;
- Pruning to improve stem quality;
- Thinning or re-spacing to promote growth;
- Management and re-spacing of natural regeneration.

Grant aid for the treated area is available for either tending or thinning operations, depending on which are the most appropriate to the site (i.e. it is not necessary to carry out both sets of operations for grant aid). The tending and thinning element of the FIS was introduced in 2009. In total 5,429 ha has been tended or thinned between 2010 and 2016 (Figure 23). Ash has been the main species grant aided. Figure 24 shows the species areas grant aided.

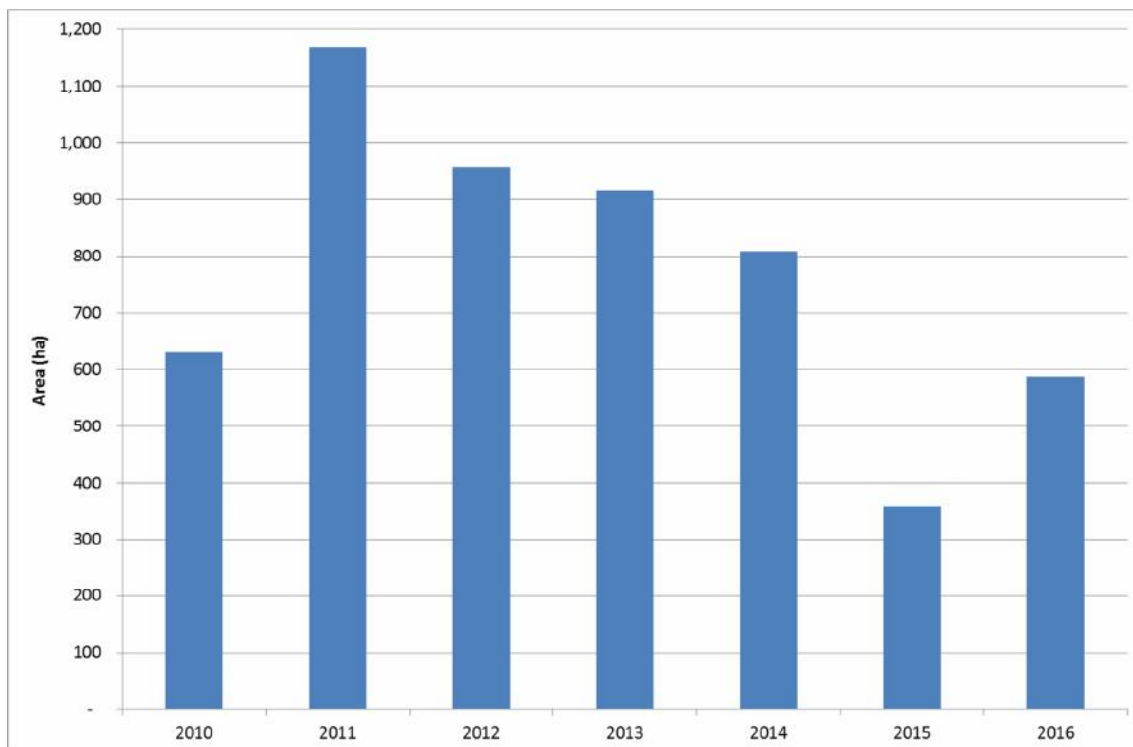


Figure 23. Areas tended and thinned between 2010 and 2016 under the Forest Improvement Scheme.

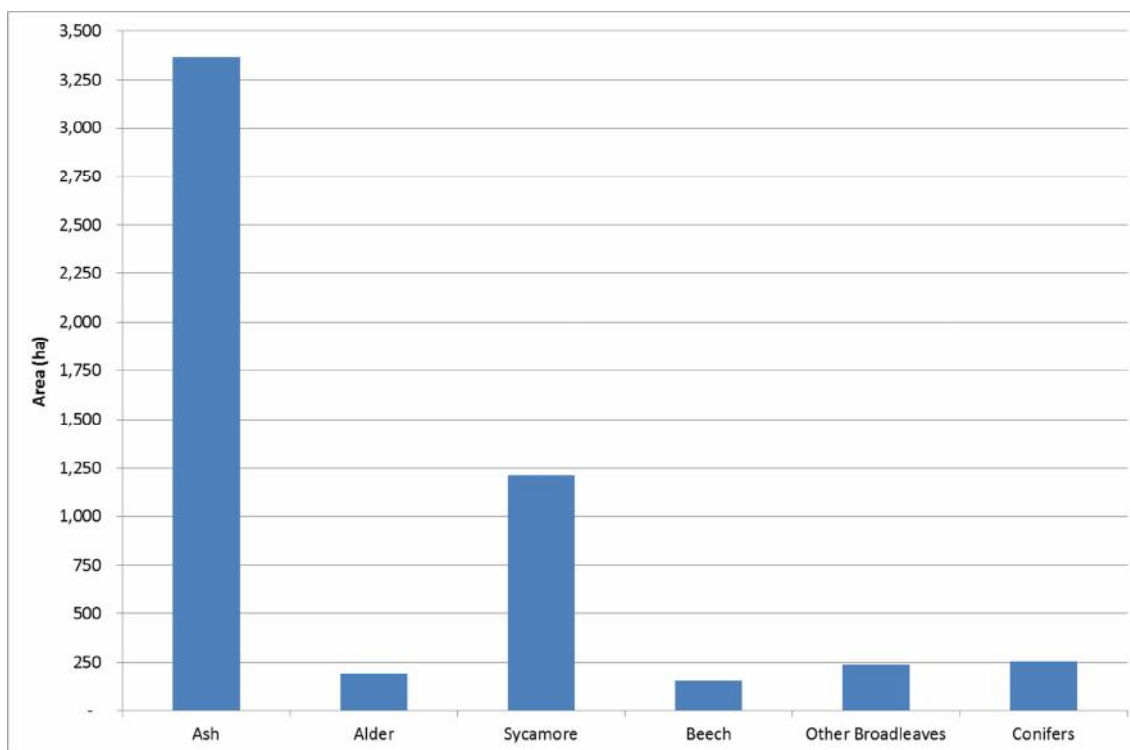


Figure 24. Species tended/thinned under the Forest Improvement Scheme, 2010-2016.

#### 4.7 Certification

Voluntary forest certification schemes are run by international non-governmental organisations to promote good forest practice. In Ireland, there are currently two certifying bodies: the Programme for the Endorsement of Forest Certification (PEFC) and the Forest Stewardship Council (FSC). Voluntary forest certification links the demand for forest products to environmental and social standards to producers who to show that wood or wood products come from certified forests. All major Irish sawmills are certified.

The Forest Stewardship Council has certified the management of the Coillte estate which comprises 54% of the national forest estate. Certification has mainly been an issue for public forests up to now. However as the private sector harvest increases, certification is likely to be an issue for private forest owners in the near future. Currently about 6,500 ha of private forest is certified.

## 5. Forest Production and Carbon

### 5.1 Introduction

This chapter provides information on:

- The annual roundwood harvest between 1955 and 2016;
- The roundwood available for processing, 2006-2016;
- The roundwood forecast 2016-2035;
- Roundwood timber prices for both Coillte and the Private sector;
- Timber and paper products trade;
- Firewood production;
- Forest based biomass usage;
- The role of forests in climate change mitigation;
- Ireland's Kyoto obligation and its fulfilment;
- Irish forest carbon stocks.

### Key statistics

- The total roundwood harvest in 2016 (including firewood) was 3.36 million cubic metres, the highest level since records began;
- Softwood available for processing in 2016 was 3.11 million m<sup>3</sup>.
- Eighty three per cent of the roundwood available for processing came from Coillte in 2016, with the balance mainly coming from the private sector;
- The share of private sector roundwood available for processing has increased from 7.6% in 2006 to 16.6% in 2016, however this is a 4.4% decrease on the 2015 private share of the total.
- The total forecast of net realisable volume production for the Republic of Ireland over the forecast period, 2016-2035, is estimated as being 107.8 million m<sup>3</sup> overbark with an additional 4.5 million m<sup>3</sup> potentially available in the tip - 7cm category;
- The average Coillte timber price in 2016 was down 11.7% over 2015;
- In value terms Ireland was exporting 124% more sawn timber in 2015 than in 2008, mainly to the UK;
- In 2016, 34% of the roundwood harvested in the Republic of Ireland was used for energy generation, mainly within the forest products sector;
- The national forest estate is an important carbon reservoir, amounting to 381 million tonnes of carbon in 2012; an increase from 348 million tonnes in 2006;
- Article 3.3 forests represented a net removal of 16 Mt of CO<sub>2</sub> eq. from the atmosphere between 2008 and 2012, offsetting ca. 5% of all national emissions.

## 5.2 Roundwood

### 5.2.1 Roundwood Harvest 1955-2016

The national roundwood harvest (excluding firewood & hardwood) from Irish forests between 1955 and 2016 is shown in Figure 25. No data are available for the private roundwood harvest prior to 2006, however it was estimated that 100,000 m<sup>3</sup> was harvested from the private forest estate in 2000<sup>20</sup>.

Up until the early eighties roundwood harvest was low, due to relatively low afforestation rates up to 1950. The early 80s saw the opening of the Finsa and Medite board mills which drove up demand for roundwood and sawmilling residues. In 2016, 3.36 million m<sup>3</sup> of roundwood was harvested in the Republic of Ireland, the highest level since records began.

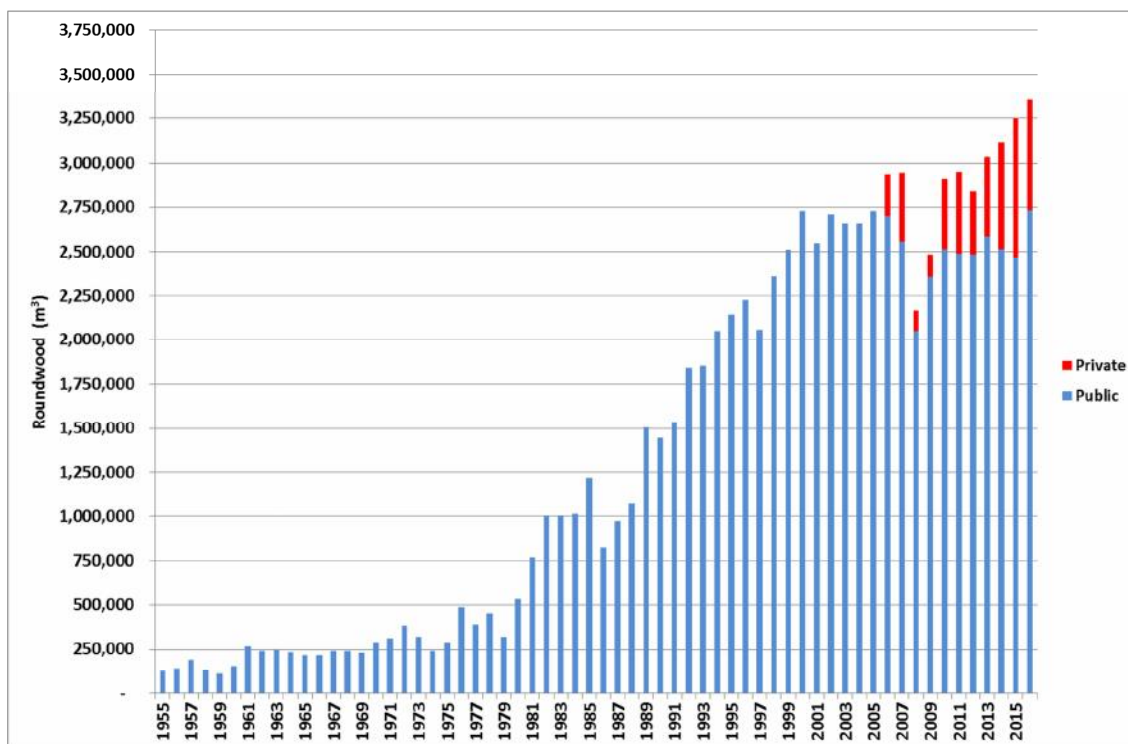


Figure 25. Roundwood harvest 1955-2016.

<sup>20</sup> Gallagher, G. and O'Carroll, J. 2001 *Forecast of Roundwood Production from the Forests of Ireland 2001-2015*. COFORD, Dublin.

### 5.2.2 Roundwood available for processing

The annual national roundwood available for wood processing, excluding firewood and hardwood, is shown in Table 18. The sharp downturn in roundwood available for processing in 2008 and 2009 reflected the downturn in the domestic construction sector. At this time domestic sawmills were also seeking to increase their share in export markets. In 2016, 3.11 million cubic metres of roundwood were available for processing (excluding firewood) in the Republic of Ireland, a 1.4% increase on 2015 production. Between 2006 and 2016 roundwood production from privately owned forests averaged just over 364,455 m<sup>3</sup>. In 2016, 518,000m<sup>3</sup> of roundwood came from privately owned forests, a 20% decrease over the 2015 output. This partly reflects market conditions and may also be related to the higher levels of harvest by Coillte.<sup>21</sup>

Table 18. Roundwood available (Commercial softwood) for processing in the Republic of Ireland 2006-2016.

Year	Log imports less exports	Coillte Output	Private output	Total Roundwood	Sawlog	Pulp	Stake
2006	214,000	2,700,000	240,000	3,154,000	2,176,000	820,000	158,000
2007	57,000	2,556,000	390,000	3,003,000	1,934,000	889,000	180,000
2008	106,000	2,279,000	118,000	2,503,000	1,619,000	804,000	80,000
2009	-63,000	2,354,000	130,000	2,421,000	1,602,000	731,000	88,000
2010	28,000	2,217,000	463,000	2,708,000	1,603,000	987,000	118,000
2011	55,000	2,299,000	386,000	2,740,000	1,580,000	1,044,000	116,000
2012	-18,000	2,269,000	343,000	2,594,000	1,622,000	841,000	131,000
2013	49,000	2,474,000	328,000	2,851,000	1,710,000	1,024,000	117,000
2014	68,000	2,434,000	447,000	2,949,000	1,815,000	987,000	147,000
2015	40,000	2,377,000	646,000	3,063,000	1,867,000	1,027,000	169,000
2016	-16,000	2,600,000	518,000	3,102,000	1,977,000	961,000	164,000

In recent years the private sector has begun to make a substantial contribution to the annual harvest. This reflects the greater area of private forests reaching first thinning stage, much of which was planted in the early 1990s, and increased export market share gained by sawmills. Commercial hardwoods are still a very minor element of the annual roundwood available for processing; just 6,000m<sup>3</sup> of commercial hardwoods came on the market in 2016 (Table 19).

Table 19. Roundwood available (Commercial hardwood 000 m<sup>3</sup> OB) for processing in the Republic of Ireland 2010-2016.

	2010	2011	2012	2013	2014	2015	2016
Imports less exports	0	0	0	-1	0	0	0
Coillte	0	1	1	2	6	3	5
Private Sector	0	1	1	1	0	0	1

In 2016, 34% of the roundwood harvested in the Republic of Ireland was used for energy generation, mainly within the forest products sector. Intake of sawmill roundwood was 1.97 million m<sup>3</sup> in 2016, which was converted to 0.98 million m<sup>3</sup> of sawn timber.<sup>22</sup>

<sup>21</sup> <http://www.coford.ie/media/coford/content/publications/2016/WoodflowAndForestBasedBiomassEnergyUse011217.pdf>

<sup>22</sup> Woodflow and forest-based biomass energy use on the island of Ireland (2016). COFORD, Dublin.

### 5.2.3 Roundwood Forecast

The total forecast of net realisable volume production for the Republic of Ireland over the forecast period, 2016-2035, is estimated as being 107.8 million m<sup>3</sup> overbark which includes 4.5 million m<sup>3</sup> potentially available in the tip - 7cm category.

The annual forecast of net realisable volume will increase from 3.6 million m<sup>3</sup> in 2016 to 7.6 million m<sup>3</sup> by 2035. Table 20 displays the future sustainable harvest levels between 2016 and 2035 by assortment and ownership type. Privately owned forests will steadily increase their share of the total harvest of roundwood from 27% in 2016 to 63% in 2035.<sup>23</sup>

Table 20. Forecast of potential conifer net realisable volume production by assortment category and ownership type 2016 -2035, (000 m<sup>3</sup> overbark).

Year	Private					Coillte					Overall Total
	Tip - 7cm	7- 13cm	14- 19cm	20+cm	Total	Tip - 7cm	7 - 13cm	14- 19cm	20+ cm	Total	
2016	60	368	219	328	976	150	548	695	1,262	2,655	3,630
2017	55	356	174	329	914	126	499	669	1,399	2,694	3,608
2018	59	375	212	281	926	149	493	757	1,362	2,762	3,688
2019	76	451	334	298	1,158	150	510	783	1,401	2,844	4,003
2020	78	473	372	401	1,324	148	481	754	1,438	2,821	4,145
2021	80	501	446	412	1,439	145	538	924	1,294	2,902	4,341
2022	91	547	560	564	1,762	145	538	924	1,294	2,902	4,663
2023	106	595	766	842	2,309	145	538	924	1,294	2,902	5,211
2024	103	595	782	1,194	2,674	145	538	924	1,294	2,902	5,576
2025	109	632	969	1,260	2,970	145	538	924	1,294	2,902	5,872
2026	117	656	1,048	1,508	3,329	124	449	764	1,347	2,684	6,013
2027	120	683	1,049	1,523	3,375	124	449	764	1,347	2,684	6,059
2028	99	560	863	1,461	2,982	124	449	764	1,347	2,684	5,667
2029	99	609	905	1,455	3,068	124	449	764	1,347	2,684	5,752
2030	110	650	1,084	1,479	3,323	124	449	764	1,347	2,684	6,007
2031	94	528	890	1,837	3,350	110	390	724	1,603	2,828	6,177
2032	99	578	1,062	1,853	3,592	110	390	724	1,603	2,828	6,419
2033	95	563	1,018	2,033	3,709	110	390	724	1,603	2,828	6,536
2034	103	609	1,104	2,151	3,967	110	390	724	1,603	2,828	6,794
2035	123	753	1,376	2,595	4,847	110	390	724	1,603	2,828	7,674
Total	1,876	11,083	15,232	23,803	51,994	2,621	9,418	15,721	28,082	55,842	107,837

<sup>23</sup> Phillips, H., Corrigan, E., McDonagh, M., Fairgrieve, M., Farrelly, N., Redmond, J., Barrett, F. and Twomey, M. 2016. *All Ireland Roundwood Production Forecast 2016-2035*. COFORD, Department of Agriculture, Food and the Marine, Dublin.



## 5.2.4 Actual Harvest Vs. Forecasted

Actual and forecast harvest (net realisable volume (NRV) for the Republic of Ireland has been compared for the period 2011 to 2015. NRV forecast data is taken from the All-Ireland Roundwood Production Forecast (2011-2028)<sup>24</sup>. Actual harvest is from the COFORD Connects Woodflow Series<sup>25</sup>.

Over the period 2011-2015, private sector harvest was 129% of NRV forecast, while Coillte harvest was 88% of NRV forecast. Over the same period, the combined harvest (i.e. Coillte + private) was 93% of NRV forecast (Table 21).

Table 21. Actual and forecast roundwood harvest (000 m<sup>3</sup> OB) in the Republic of Ireland (2011-2015).

Year	2011			2012			2013		
Harvest type <sup>1</sup>	A	F	%	A	F	%	A	F	%
Private	460	371	124	354	384	92	448	369	121
Coillte	2,492	2,979	84	2,485	2,737	91	2,588	2,798	92
Total	2,952	3,350	88	2,839	3,121	91	3,036	3,167	96

Year	2014			2015			Total (2011-2015)			
Harvest type	A	F	%	A	F	%	A	F	D	%
Private	597	425	140	780	504	155	2,639	2,053	586	129
Coillte	2,517	2,906	87	2,470	2,844	87	12,552	14,264	-1,712	88
Total	3,114	3,331	93	3,250	3,348	97	15,191	16,317	-1,126	93

<sup>1</sup> A: Actual harvest: F: Forecast harvest. D: Difference % = actual harvest expressed as a % of NRV forecast

Actual and forecast harvest (net realisable volume (NRV) for the Republic of Ireland has also been compared 2016. NRV forecast data is taken from the All-Ireland Roundwood Production Forecast (2016-2035). Actual harvest is from the COFORD Connects Woodflow Series.

For 2016 the private sector harvest was 63.7% of NRV forecast, while Coillte harvest was 102.9% of NRV forecast. The combined harvest (i.e. Coillte and private) was 92.4% of NRV forecast (Table 22).

Table 22. Actual and forecast roundwood harvest (000 m<sup>3</sup> OB RWE) in the Republic of Ireland (2016).

Ownership	Actual Harvest	Forecast Harvest	Actual harvest expressed as a % of NRV forecast
Private	622	976	63.7
Coillte	2,733	2,655	102.9
Total	3,355	3,630	92.4

<sup>24</sup> [http://www.coford.ie/media/coford/content/publications/projectreports/forecast\\_31Jan11.pdf](http://www.coford.ie/media/coford/content/publications/projectreports/forecast_31Jan11.pdf)

<sup>25</sup> <http://www.coford.ie/publications/cofordconnects/>

### 5.2.5 Roundwood Prices- Coillte

Coillte is the dominant supplier of logs to the processing sector in Ireland. The standing timber price is the price paid per cubic metre of timber by the purchaser, where the purchaser is responsible for harvesting. The figures quoted in Table 23 below are for sales to the sawmill sector only and include all species and harvest types. As the mix of species and harvest types can vary from quarter to quarter, this can impact on contracted prices in addition to the impact of other market factors. The majority of prices quoted are for standing sales with retained pulpwood, i.e. there is no value for pulp included in these prices. Coillte retain the pulpwood to supply their boardmills i.e. Smartply and Medite. The average timber price in 2016 was down 12% over 2015.

Table 23. Average Standing Timber Prices (€) by category, Coillte 2005 – 2016<sup>26</sup>.

Category (m <sup>3</sup> )	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
0.001 - 0.074	8.91	4.11	10.04	-	-	-	-	10.5	-	-	-	-
0.075 - 0.124	7.8	6.67	9.37	-	3.96	-	-	-	-	-	41.2	-
0.125 - 0.174	9.45	12.22	8.64	19.38	4	-	8.5	9.5	-	-	-	-
0.175 - 0.224	12.4	17.15	19.43	24.14	15.04	38.64	32.75	-	-	-	-	-
0.225 - 0.274	17.28	18.07	34.41	21.43	19.01	47.59	39.53	40.92	48.73	49.08	50.02	43.48
0.275 - 0.324	22.27	26.44	37.98	28.86	19.9	43.8	42.26	43.17	47.09	51.1	49.91	45.77
0.325 - 0.374	22.64	22.11	43.43	30.37	23.2	44.06	43.73	44.46	51.32	56.54	53.94	44.70
0.375 - 0.424	24.56	24.58	41.24	33.78	24.48	58.17	44.37	46.84	48.64	57.88	56.53	48.11
0.425 - 0.474	26.17	34.42	43.72	31.45	24.03	55.54	47.16	45.57	51.99	59.05	58.38	50.48
0.475 - 0.499	25.89	34.31	47.91	35.69	25.12	55.07	45.95	48.47	54.54	62.05	62.94	54.39
0.500 - 0.599	31.71	32.52	50.46	37.76	26.82	59.91	48.25	50.46	51.59	64.84	63.32	54.53
0.600 - 0.699	35.1	36.3	52	38.41	27.07	63.67	48.99	52.9	55.39	70.20	66.03	57.16
0.700 - 0.799	37.89	39.42	52.09	39.04	26.97	58.75	49.92	54.12	55.60	66.29	59.58	56.99
0.800 - 0.899	38.71	41.19	50.64	42.06	27.34	57.11	50.65	52.79	57.41	74.51	67.88	58.68
0.900 - 0.999	40.48	37.88	53.59	41.44	28.86	56	51.25	53.95	60.68	66.99	67.01	58.42
1.000 +	38.53	45.11	55.62	39.59	29.35	59.55	51.31	53.77	54.00	75.83	71.05	60.84
Average (€/m <sup>3</sup> )	30.00	30.94	47.21	35.29	25.74	56.67	47.84	49.97	53.56	65.14	60.76	53.65

<sup>26</sup> Coillte Sales and Marketing as presented by Teagasc

<https://www.teagasc.ie/crops/forestry/advice/markets/timber-sales-and-prices-index/>

### 5.2.6 Roundwood Prices- Private Sector

The number of timber sales and the size of timber sales lots from private sales are relatively small compared to Coillte and as a result, Coillte's price information is more robust than any information on sales in the private sector<sup>27</sup>. Prices presented in Table 24 below are therefore for guidance purposes only. The UCD Forestry Section and the Irish Timber Growers Association (ITGA) collate timber price information from private sources. Private timber prices follow a nominal upwards trend in prices since 2006, although this trend estimation is less reliable due to the small sample size. Overall there has been a decrease in prices between 2015 and 2016. The prices presented in Table 19 include pulpwood prices from the private sector.

Table 24. Average roundwood prices received by Private Growers by average tree size category 2006 – 2016. (\* denotes small number of sales)<sup>28</sup>

Category (m <sup>3</sup> )	2006	2007	2009	2010	2011	2012	2013	2014	2015	2016
0.001 - 0.074	3.98	6	8.28	10.5	10.6	10.2	9.44	14.04	13.17	9.10
0.075 - 0.124	6.54	10.51	7.15	14.4	14.3	14.3	12.8	13.53	16.33	11.95
0.125 - 0.174	10.31	12.76	7.26	17.4	13.5	19.2	18.96	18.4	19.55	14.56
0.175 - 0.224	16.06	17.8	11.59	22.9	15.8	17.8	20.44	28.72	20.79	18.62
0.225 - 0.274	15.16	37.82	11.29	35.3	23.1	25.1	18.62	33.14	30.75	16.37
0.275 - 0.324	24.82	27.47	11.64	47.1	36.9	32.9	21.84	34.06	33.59	22.73
0.325 - 0.374	21.54	49.65	14.5	64.1	57.5	38.6	47.42*	39.64	34.32	27.70
0.375 - 0.424	23.73	33.06	16	56.7	52.3	28.4	44.48	49.03	43.32	37.10
0.425 - 0.474	43.17	43.8	50	54.2	53.3	48.3	32.00*	65.93	39.21	47.79
0.475 - 0.499	-	52	-	53	35	-				
0.500 - 0.599	38.43	53.09	-	57.1	50.3	49.2	45.05	61.85	47.56	44.25
0.600 - 0.699	43.37	41.68	-	54.3	51.7	51.8	45.99	56.82	58.99	62.50
0.700 - 0.799	44.8	52.57	-	54.3	52.6	54.7	53.79	64.21	59.53	48.28
0.800 - 0.899	45.06	57.2	-	53.7	50.4	54.9	53.35	67.72	59.54	45.10
0.900 - 0.999	45	50.51	-	52.9	53.4	54.8	51.26	65.16	64.74	57.50
1.000 and over	45.27	56.32	-	56.9	45	54.2	52.97	60.38	61.5	60.03

An additional source of information on the range of prices paid for privately owned timber during 2016 is the IFA timber survey (Table 25). The prices paid for timber varied significantly, for example the pulp prices quoted ranged from €18/tonne to €30/tonne, depending on distance to market, access to the site and the size of the sale. The prices for sawlog varied from €62/tonne to €77/tonne throughout the year, which was down when compared to 2015 prices.

<sup>27</sup> *Forestry Economic Review 2012/2013*. Teagasc, 2013.

<sup>28</sup> UCD Forestry Section and the Irish Timber Growers. Presented in *Forestry & Timber Yearbook 2017*.

Table 25. IFA Timber Price Survey 2016 (Price € /tonne Roadside excl. vat).<sup>29</sup>

Product Type	Length (m)	Diameter (cm)	Jan-Feb	Mar-Apr	July	Aug-Sept	Oct-Nov
Pulp	3 m	< 7cm	23 – 28	20 – 30	23 – 30	18 – 30	18 – 30
Stakewood	1.6 m	> 8cm < 15 cm	37 – 45	40 – 46	35 – 45	38 – 44	40 – 44
Palletwood	2.5 m	> 14 cm	40 – 47	40 – 47	38 – 50	32 – 44	32 – 42
	3.1 m		44 – 49	46 – 55	44 – 52	40 – 49	40 – 50
	3.4 m			47 – 55	44 – 52	40	40 – 46
	3.7 m		44 – 52	48 – 57	46 – 54	40 – 50	40 – 52
Sawlog	4.9m	> 20cm	65 – 75	65 – 77	64 – 70	62-75	64 – 70
	5.5 m		65 – 75	73 – 77		62-75	70 – 72

### 5.2.7 Forest-based biomass

Forests also provide a source of renewable raw materials for fuel and wood products which help mitigate rises in greenhouse gases. Usage of wood fuels is increasing due to renewable energy policies and as young plantations enter the production stage.

In 2016, 34% of roundwood harvested was used for energy generation, mainly within the forest products sector (Table 26). The usage of forest based biomass for the energy sector abated 0.76 million tonnes of CO<sub>2</sub> emissions in 2016, up almost 22% on the 2015 level.

Table 26. Use of forest-based biomass and as a proportion of total roundwood harvest (2010-2016) (000 m3 OB RWE).

	2010	2011	2012	2013	2014	2015	2016
Wood-biomass use by the energy <sup>30</sup> and forest products industry	554	572	611	660	760	796	1,049
Roundwood chipped for primary energy use	39	41	30	100	100	114	117
Domestic firewood use	199	214	225	230	235	237	237
Short rotation coppice	1	5	5	5	5	5	20
Wood pellets and briquettes	121	129	144	161	150	154	160
Charcoal	2	5	2	1	1	1	1
<b>Total</b>	<b>916</b>	<b>966</b>	<b>1,017</b>	<b>1,157</b>	<b>1,251</b>	<b>1,307</b>	<b>1,584</b>
<b>Roundwood harvest</b>							
Roundwood available for processing	2,708	2,740	2,594	2,852	2,975	3,016	3,104
Firewood harvest	199	214	225	230	235	237	237
<b>Total</b>	<b>2,907</b>	<b>2,954</b>	<b>2,819</b>	<b>3,082</b>	<b>3,210</b>	<b>3,253</b>	<b>3,341</b>
Forest-based biomass as a % of total roundwood harvest	31.5	32.6	36.0	33.5	36.3	34.8	34.1

<sup>29</sup> <https://www.ifa.ie/market-reports/market-reports-4/>

<sup>30</sup> This includes co-firing of wood-biomass at Edenderry Power; [www.edenderrypower.ie](http://www.edenderrypower.ie)

### 5.3 Firewood production

Statistics on the sale of firewood from public forests between 1937 and 1987 are shown in Figure 26. Firewood consumption peaked during the Second World War due to restricted coal imports. There was also increasing firewood demand during the eighties, reflected in increased sales in this decade. Official estimates of firewood use are unavailable between the years 1988 and 2005.

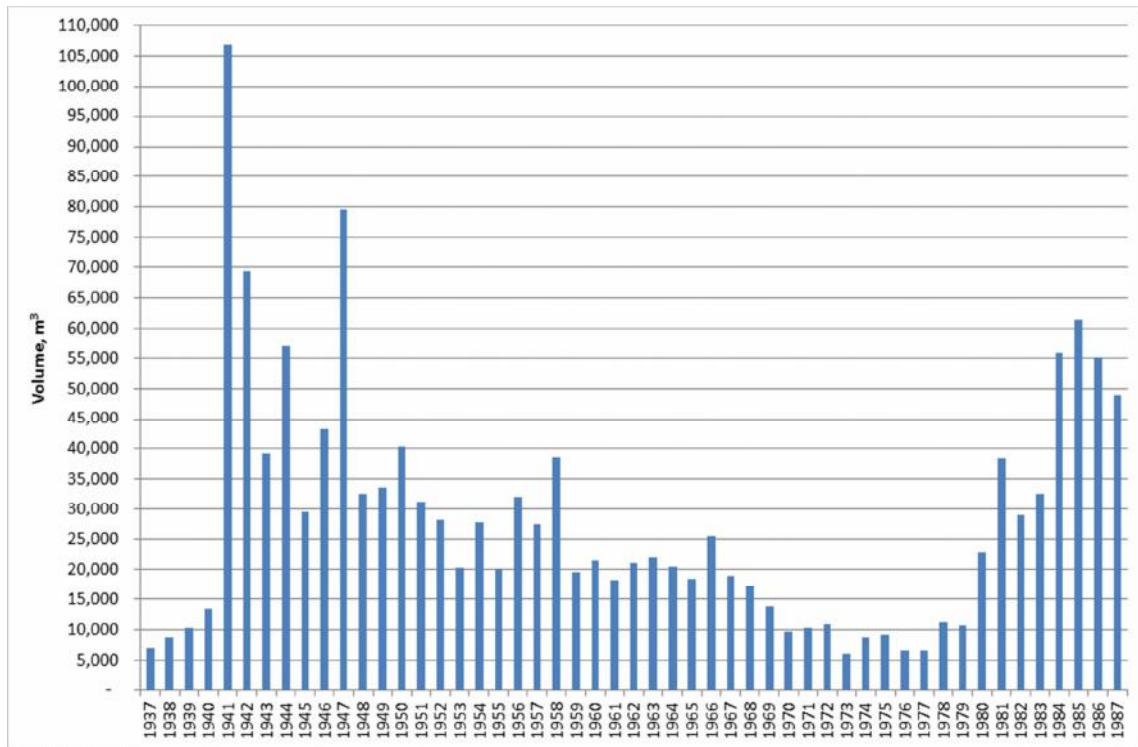


Figure 26. Firewood production volume from public forests 1937-1987.

Residential energy use grew by 26% (1.1% per annum) over the period 1990– 2011. Corrected for climate the growth was 19%. During this time the number of households in the State increased by 64%, from approximately 1.0 million to 1.65 million. Since 1990, there has also been a decrease in the use of firewood in open fires, in line with the general decline of solid-fuel open fires, with a concurrent rise in the use of oil, gas and electricity for residential energy consumption. As a result the share of firewood used for domestic heating has decreased since 1990<sup>31</sup>. However with the significant increase in the number of households and energy usage per household there has been a concurrent significant increase in firewood sales since the eighties. In recent years there has also been a large increase in the number of stoves used domestically, with a 35% increase in stove sales noted for 2011 from 2010<sup>32</sup>.

Firewood use in Ireland between 2006 and 2016 from state and private forests, including wood sourced from non-forest areas, is shown in Figure 27<sup>33</sup>. The firewood market in Ireland has grown by 61%, from 147,000m<sup>3</sup> in 2006 to 237,000m<sup>3</sup> in 2016. First-thinning of broadleaf forests also qualify for grant aid since 2009. This measure has resulted in substantial mobilisation of firewood from first thinnings, principally for domestic use. In addition, firewood is also harvested by forest owners for their own use and firewood.

<sup>31</sup> *Energy in Ireland 1990 – 2011*. Sustainable Energy Authority of Ireland Report 2012

<sup>32</sup> *Situation and Outlook for Forestry 2011/2012*. Teagasc 2012

<sup>33</sup> *Woodflow and forest-based biomass energy use on the island of Ireland (2015)*. Coford

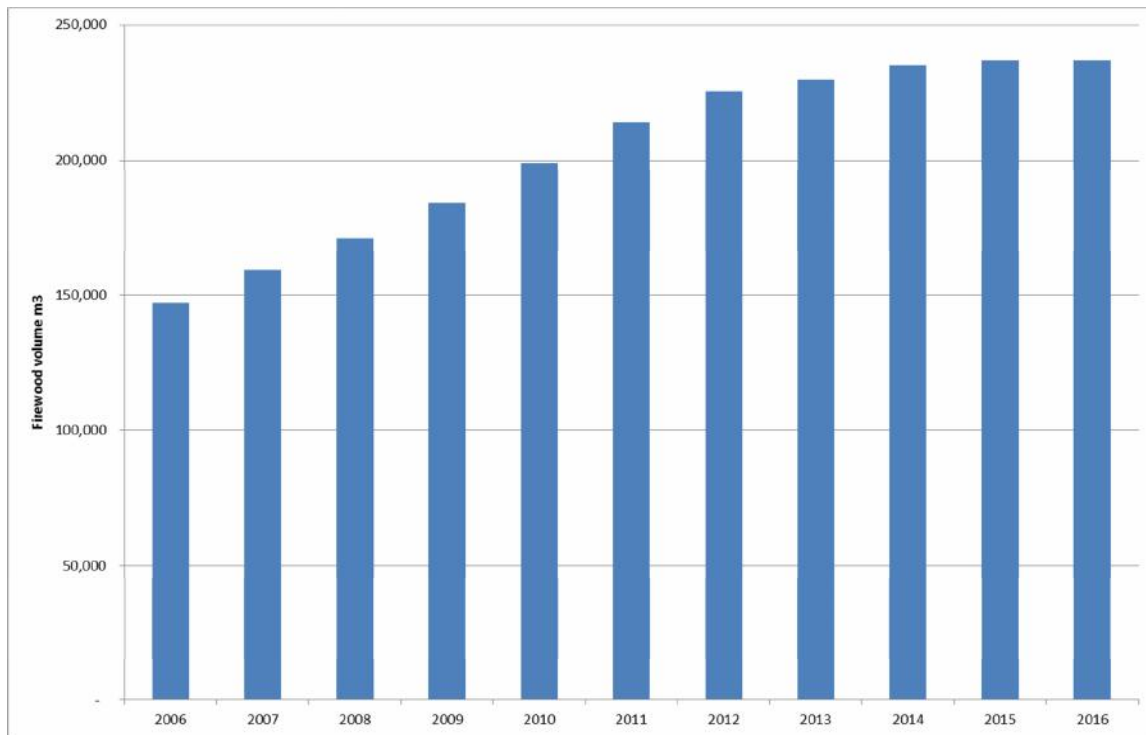


Figure 27. The domestic firewood market 2006-2016.

## 5.4 Timber and paper products trade

In 2015, exports of forest products from the Republic of Ireland were valued at €355 million, a 4% decline on 2014. Wood-based panels accounted for nearly 54% of the value of forest products exports, the balance comprising paper and sawn timber exports (Table 27). In value terms Ireland became a net exporter of sawn timber in 2010, the first time since 1961, when forest products statistics began to be compiled by the FAO. This came about due to the closing of the gap between the value of exports and imports from 2008 onwards due to the collapse of the domestic construction market and greatly increased exports of sawn timber. In value terms Ireland was exporting 124% more sawn timber in 2015 than in 2008, mainly to the UK.

Forest product trade data for 2016 are under review by the Department of Agriculture, Food and the Marine and the Central Statistics Office. On completion of the review the data will be published.

Table 27. Timber and paper products trade, volume and value (2008-2015)<sup>34</sup>

	Imports															
	2008	2009	2010	2011	2012	2013	2014	2015	2008	2009	2010	2011	2012	2013	2014	2015
	000 m <sup>3</sup>								€ million							
Sawn timber	412	232	242	201	145	134	205	227	141	66	74	64	54	51	74	88
Wood-based panels	264	181	166	195	204	194	235	240	108	68	65	68	75	78	98	112
	000 tonnes								€ million							
Pulp products	29	32	41	54	47	50	46	51	20	22	31	45	45	41	42	53
Paper & particle-board products	526	379	370	383	415	428	404	427	520	308	313	333	339	340	340	359
TOTAL									789	464	483	510	513	510	554	612
	Exports															
	2008	2009	2010	2011	2012	2013	2014	2015	2008	2009	2010	2011	2012	2013	2014	2015
	000 m <sup>3</sup>								€ million							
Sawn timber	389	564	658	619	534	601	718	701	54	51	85	83	73	81	122	121
Wood-based panels	614	580	660	616	630	665	610	610	195	147	179	173	179	199	198	190
	000 tonnes															
Pulp products	2		1													
Paper and particle-board products	77	45	33	59	68	81	67	86	69	45	44	52	51	59	50	44
TOTAL									318	243	308	308	303	339	370	355

<sup>34</sup> Roundwood, sawmill residues and secondary processed timber products are not included. *Woodflow and forest-based biomass energy use on the island of Ireland (2012-2015)*. Coford.



## 5.5 Carbon stocks

Forests and forest sector policies play an important role in mitigating climate change by:

- afforestation and reforestation;
- forest management;
- controlling deforestation (land use change from forest to non-forest);
- the use of wood products to store carbon and displace emissions from energy intensive materials;
- Use of forest products for bioenergy to replace fossil fuel use.

In 1997, Ireland committed to maintain national greenhouse gases emissions at 13% above 1990 levels, as part of a legally-binding commitment under the Kyoto Protocol. Over the five years of the first commitment period of the Kyoto Period (i.e. 2008 to 2012), Ireland met its Kyoto obligations when forest carbon stock changes associated with afforestation and deforestation activities since 1990 were taken into account. Article 3.3 forests represented a net removal of over 16 Mt of CO<sub>2</sub> eq. from the atmosphere between 2008 and 2012, offsetting ca. 5% of all national emissions.

The national forest estate is an important carbon reservoir, amounting to 381 million tonnes of carbon in 2012 as estimated from the 2<sup>nd</sup> cycle NFI. Carbon in biomass, deadwood and litter pools have increased between 2006 and 2012 (Table 28).

The carbon stock in forest soils is the dominant component, accounting for 85.1% of the carbon in the forest estate in 2012. Total living tree biomass amounted to 12.7% of the total carbon stock, while deadwood, including logs, stumps and standing dead trees along with litter constituted the remaining 2.2%.

Table 28. Forest carbon stocks 2006 and 2012.

Carbon Stock	2006		2012	
	Million t	% Total	Million t	% Total
Above-ground biomass*	30.6	8.9	39.7	10.4
Below-ground biomass**	6.7	1.9	8.8	2.3
Deadwood***	1.2	0.4	2.5	0.6
Litter	2.3	0.7	6.3	1.6
Soil	304.9	88.1	323.7	85.1
Total	348.4	100.0	381.0	100.0

\* Above-ground biomass includes all living stems, branches and needles/leaves based on a stump height at 1% of total tree height.

\*\* Below-ground biomass includes all roots to a minimum diameter of 5 mm.

\*\*\* Deadwood includes all logs, stumps and branches with a minimum diameter of 7 cm.

## 6 The Socio-Economic Contribution of the Forest Sector

### 6.1 Introduction

This Chapter provides information on the socio-economic contribution of forestry in Ireland in the following areas:

- The value of direct economic activity in the growing/harvesting subsector (excluding wood processing and related activities) and employment for the years 2003 and 2012;
- The value of total (Direct, Indirect and Induced) economic activity in the growing/harvesting subsector and employment for the years 2003 and 2012.

### Key statistics

- An approximation of the full economic value of the forest sector in 2012 is €2.3 billion, when both indirect and induced effects are taken into account;
- The total GVA of the Forest sector was €1,096.5m in 2012;
- The total value of economic activity in the Growing/Harvesting sector in 2012 was €387m;
- For every €1 of economic activity generated in the growing and Harvesting subsector a further €0.78 is generated in the wider economy in 2012;
- The total value of economic activity in the wood processing sector in 2012 was €1389.1m;
- For every €1 of economic activity in wood processing an extra €0.66 is generated in the wider economy in 2012;
- The number of people employed directly in the forestry and logging sector has averaged 2,600 between 1998 and 2012;
- In 2010 direct and induced employment supported by the forest sector was estimated to be 5,530 persons. While in the wood processing sector direct and induced employment was estimated to be 6,410 persons.
- The overall value of both the growing and harvesting sub-sector and wood processing subsector has grown by 46% and 39% respectively since 2003;
- The number of people employed directly in the wood-processing subsector has decreased since the economic downturn in 2008;
- Over 18,000,000 forest visits took place in 2005;
- In 2013, €108 million was spent on planting grants, maintenance grants, annual premium payments and grant aid for forest roads.

## 6.2 Value of the Forest Sector

The total value of economic activity of the forest sector, both directly of itself and to the wider Irish economy, is shown in Table 29. The total direct value of economic activity in the Growing/Harvesting sub-sector in 2012 was €387m. Value to overall Gross Domestic Product or Gross Value Added (GVA) was €136.6m. In terms of the multiplier effect of this economic activity, for every €1 generated in the Growing/Harvesting sub-sector a further €0.78 was generated in the wider economy in 2012. This resulted in the growing and harvesting sub sector contributing an overall value of €688.7m to the wider Irish economy, an increase of €216m since 2003.

The total value of economic activity in the wood processing sub-sector in 2012 was €1389.1m. It added €391.6m in terms of GVA to the economy. For every €1 of economic activity in wood processing an extra €0.66 was generated in the wider economy, an increase of €79.3m over the 2003 figure. Total extra activity in the wider economy in 2012 was €910.3m (€2,299.4–1,389.1m), an increase of €235 m since 2003.

The total GVA of the Forest sector was €1,096.5m in 2012. An approximation of the full economic value of the forest sector in 2012 is €2.3 billion, when both indirect and induced effects are taken into account.<sup>35</sup>

Table 29. Value of economic activity in the forestry sector.

Growing and Harvesting sub-sector		
	2003 <sup>36</sup>	2012 <sup>37</sup>
	Million, €	
Direct Economic Activity Value	255.4	386.9
Gross Value Added	134.5	136.6
Overall Value to Wider Irish Economy	472.4	688.7
Type 2 Multiplier	1.9	1.78
Wood processing sub-sector		
Direct Economic Activity Value	975.0	1389.1
Gross Value Added	312.3	391.6
Overall Value to Wider Irish Economy	1650.0	2299.4
Type 2 Multiplier		1.66

<sup>35</sup> *Annual Review and Outlook for Agriculture, Food and the Marine 2013/14*. Department of Agriculture, Food and the Marine.

<sup>36</sup> Ní Dhubháin, Á., Flechard, M., Moloney, R., O'Connor, D., Crowley, T., 2006. *The Socioeconomic Contribution of Forestry in Ireland – an Interdisciplinary Approach*. COFORD, Dublin.

<sup>37</sup> Personal Communication. Dr. Richard Moloney, 2014.

### 6.3 *Employment in the forest sector*

In 2010 direct and induced employment supported by the forest sector was estimated to be 5,531. While in the wood processing sector direct and induced employment was estimated 6,408<sup>38</sup>.

In 2012 the total employment generated by activities in the forest and wood products sector was 12,000 full time equivalents<sup>39</sup>.

#### 6.3.1 **Categorisation of employment statistics**

There is an EU wide nomenclature for the classification of economic activity, which is referred to as NACE. The class '**Forestry and Logging**' is most relevant for the purpose of this publication and includes the following four components<sup>40</sup>:

- Silviculture and other forestry activities;
- Logging;
- Gathering of wild growing non-wood products;
- Support services to forestry.

It is important to note that the Forestry and Logging class is concerned only with what occurs within the forest. Activities outside of the forest, such as transport of logs to a sawmill, are not included.

There is one other class which is relevant for this publication, '**Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials**'. This class can be broken into the following sub-categories:

- Sawmilling and planning of wood;
- Manufacture of products of wood, cork, straw and plaiting materials:
  - Manufacture of veneer sheets and wood-based panels;
  - Manufacture of assembled parquet floors;
  - Manufacture of other builders' carpentry and joinery;
  - Manufacture of wooden containers;
  - Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials.

#### 6.3.2 **Quarterly National Household Survey**

The Quarterly National Household Survey (QNHS) is a large-scale, nationwide survey of households in Ireland, which began in September 1997. It is designed to produce quarterly labour force estimates that include the official measure of employment and unemployment in the state. Each quarter field interviewers visit 39,000 households. In figure 28 below, average annual estimates are displayed.

The number of people employed directly in the forestry and logging sector has averaged 2,700 between 1998 and 2014 while the average number employed directly in sawmilling and planning of wood has averaged 7,500 for the same period. A downward trend in employment in the wood processing sector has been a feature since 1998, particularly since the economic recession in 2008, (Figure 29). Estimates were not produced for 2015 as the sample size was

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<sup>38</sup> An Economic Evaluation of the Market and Non-Market Functions of Forestry. Coford. 2013.

<sup>39</sup> Irish Forests and the economy. Coford. 2014.

<sup>40</sup> Description of NACE codes at <http://www.cso.ie/px/u/NACECoder/NACEItems/searchnace.asp>

too small to be considered reliable. Estimates for 2014 and 2016 are considered to have a wide margin of error and should be treated with caution.

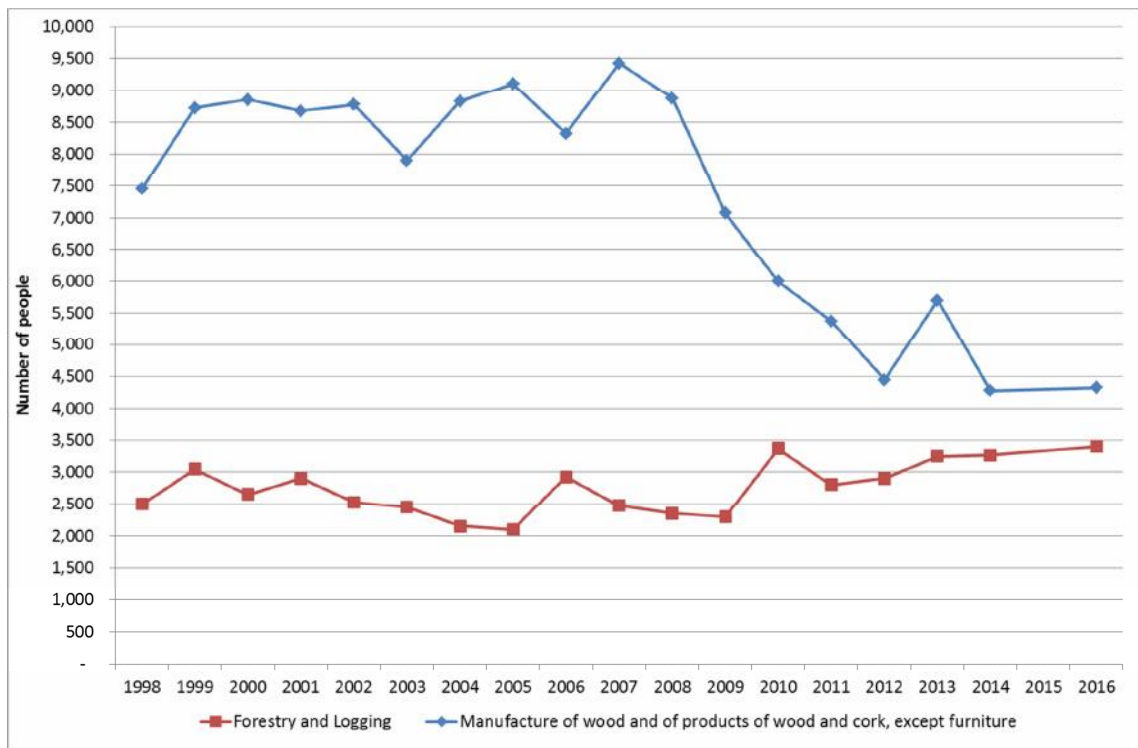


Figure 28. Quarterly National Household Survey labour force estimates 1998 to 2016.

### 6.3.3 Census of Ireland 2006, 2011 and 2016

The table below outlines persons aged 15 and over, classified by principal economic status and detailed industrial group involved in forestry, logging and related activities<sup>41</sup>. The unemployment rate in the sector has fallen to 5.5% in 2016 in both Forestry and Logging and Manufacture of wood and wood products. The total in the labour force for wood and wood products has also decreased significantly from 5,530 in 2011 to 4,000 in 2016 (Table 30).

The statistical classification of economic activities in the European Community, abbreviated as NACE, is used to categorise the census data in Table 30. The NACE Rev.1 classification was used in 2006, whereas the NACE Rev.2 classification data is used for the 2011 and 2016.

Table 30. Persons 15 years and over involved in forestry by principal economic status.

NACE 02 - Forestry and Logging						
Census Year	Total in labour force	At Work			Unemployed (incl. looking for first regular job)	Unemployment rate (%)
		Male	Female	Total		
2006	2,548	2,142	282	2,424	124	4.9
2011	2,169	1,676	237	1,913	256	9.5
2016	2,468	1,978	290	2,268	200	5.5
NACE 16 - Manufacture of wood and of products of wood and cork, except furniture						
Census Year	Total in labour force	At Work			Unemployed (incl. looking for first regular job)	Unemployment rate (%)
		Male	Female	Total		
2006	6,188	5,168	752	5,920	268	4.3
2011	5,530	3,767	647	4,414	1116	20.6
2016	4,000	3,182	429	3,611	389	5.5

<sup>41</sup> Source:

[http://www.cso.ie/en/media/csoie/census/documents/census2011profile3/Profile3\\_Statistical\\_Tables\\_and\\_Appendices.pdf](http://www.cso.ie/en/media/csoie/census/documents/census2011profile3/Profile3_Statistical_Tables_and_Appendices.pdf)

## 6.4 Forests & Recreation

There has been a long-standing policy in place of encouraging the use of forests for outdoor recreation. Table 31 shows an upward trend in visitor number to Irish forests between 1999 and 2005.

Table 31. Number of visits to Irish forests 1999, 2004 & 2005.

Year	Number of forest visits
1999 <sup>42</sup>	8,500,000
2004 <sup>43</sup>	11,000,000
2005 <sup>44</sup>	18,000,000

Since the early 1970s there has been an active programme of providing recreational facilities in state forests. At the present time<sup>45</sup> there are 150 recreational sites and 11 forest parks in forests throughout the country. In addition to providing recreational sites such as picnic areas and trails, Coillte has an open forest policy that allows free public access to its 445,000 ha estate. The National Parks and Wildlife Service (NPWS) provide access to national parks and nature reserves, and arboreta managed by the Office of Public Works are open to the public. Also urban forests (public forests established and managed for recreation) owned by County Councils or local communities are quite intensively used being close to population centres.

For the private forest estate the decision to allow public access rests with the forest owner, and is provided on a goodwill basis<sup>46</sup>. Private forest owners who have availed of a roading grant in recent years must allow public access to the forest road.

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<sup>42</sup> Clinch, P. (1999), *The Economics of Irish Forestry*, COFORD, Dublin

<sup>43</sup> Bacon, P. and Associates (2004). *A Review and Appraisal of Ireland's Forestry Development Strategy*, Final Report. Stationery Office, Dublin

<sup>44</sup> Fitzpatrick and Associates (2005). *Economic Value of Trails and Forest Recreation in the Republic of Ireland*. Coillte and the National Trails Strategy Working Group of the Irish Sports Council. Final Report, Dublin

<sup>45</sup> <http://www.forestryfocus.ie/social-environmental-aspects/recreation/>

<sup>46</sup> Forest Service. (2006). *Forest Recreation in Ireland A Guide For Owners & Managers*.



## 6.5 Expenditure, 1993-2016

Since 1993, nearly €2.2 billion has been expended by the state and European Union on afforestation and other support measures for the forest sector. In 2016, €103.8 million was spent on forest activities including afforestation grants, maintenance grants, annual premium payments and grants for forest roading infrastructure (Figure 29). Expenditure in 2016 slightly decreased by €0.2 million on the previous year. A detailed breakdown of expenditure by activity since 2007 is provided in Table 32.

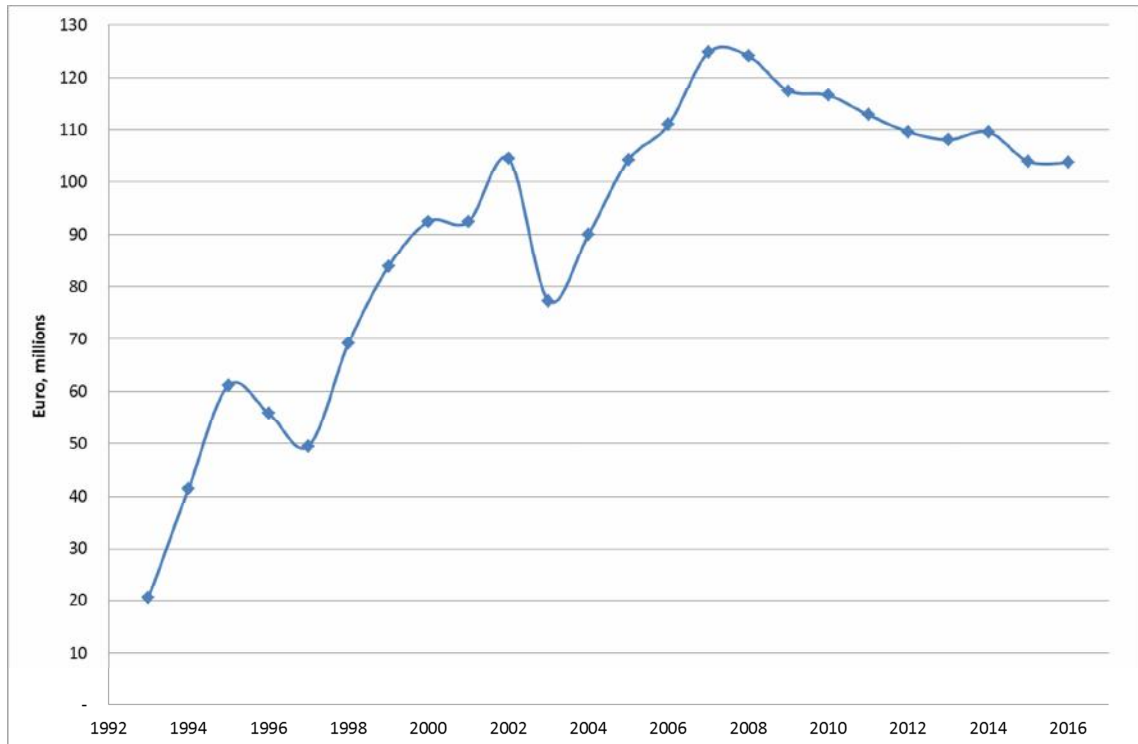


Figure 29. Total state expenditure 1993-2016.

Table 32. Department of Agriculture, Food and the Marine expenditure, 2007-2016.

<b>Expenditure (Euro)</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
<b>Main Afforestation Programme</b>										
Grant - 1st Instalment	21,262	19,852	22,080	27,557	20,482	19,215	17,033	16,759	17,480	18,420
Grant - 2nd Instalment	10,515	9,470	8,675	7,441	7,697	6,334	7,291	7,630	7,357	6,881
Premium	70,306	74,264	70,496	72,285	75,005	75,685	76,013	77,501	73,609	72,418
Sundry (e.g. EU Debt Recovery)	1,088	1,192	1,075	505	647	379	523	620	259	79
<b>Afforestation Total</b>	<b>103,171</b>	<b>104,778</b>	<b>102,326</b>	<b>107,789</b>	<b>103,831</b>	<b>101,614</b>	<b>100,860</b>	<b>102,511</b>	<b>98,705</b>	<b>97,798</b>
Forest Roads-Harvesting	7,517	7,129	5,400	3,694	4,204	3,077	2,709	2,794	2,381	2,561
Reconstitution of Woodlands	1,579	2,108	790	966	827	567	257	253	222	248
Chalara (RCW)	0	0	0	0	0	0	693	1,274	688	446
Woodland Improvement Sch.	390	233	374	248	164	70	65	76	28	22
Thinning & Tending - WIS	0	0	0	610	750	971	864	666	470	593
Shaping of Broadleaves	52	57	83	10	0	0	0	0	0	0
Pruning of Conifers	130	189	454	56	0	233	94	0	0	0
NeighbourWood	76	578	670	180	351	435	146	6	0	167
Native Woodland Conserv.	3,763	1,724	851	819	829	1,221	845	514	211	194
NDP Other Measures	412	170	52	3	11	-2	0	0	0	0
<b>Support Schemes Total</b>	<b>13,919</b>	<b>12,187</b>	<b>8,674</b>	<b>6,587</b>	<b>7,136</b>	<b>6,573</b>	<b>5,673</b>	<b>5,582</b>	<b>3,999</b>	<b>4,356</b>
Reforestation	4	8	4	13	11	0	5	0	0	11
Forest Inventory	106	69	15	7	69	41	30	18	68	34
<b>Other Capital Total</b>	<b>110</b>	<b>76</b>	<b>19</b>	<b>20</b>	<b>81</b>	<b>41</b>	<b>35</b>	<b>18</b>	<b>68</b>	<b>45</b>
<b>Total Capital</b>	<b>117,201</b>	<b>117,041</b>	<b>111,018</b>	<b>114,395</b>	<b>111,048</b>	<b>108,227</b>	<b>106,568</b>	<b>108,111</b>	<b>102,772</b>	<b>102,199</b>
Promotion	2,047	1,738	487	289	864	799	828	684	693	840
Training	963	820	1,122	954	226	105	80	103	0	0
Technical Support	303	379	752	393	92	85	232	266	278	234
Fees International Organisations	37	31	37	39	189	8	16	8	10	10
Forest Sector Development (COFORD)	4,169	4,258	4,289	401	408	380	425	304	350	424
Miscellaneous (e.g. legal, printing)	99	-123	-195	94	4	41	20	144	-65	119
<b>Total Current</b>	<b>7,618</b>	<b>7,103</b>	<b>6,491</b>	<b>2,171</b>	<b>1,782</b>	<b>1,418</b>	<b>1,601</b>	<b>1,510</b>	<b>1,265</b>	<b>1,627</b>
<b>Overall Total</b>	<b>124,819</b>	<b>124,145</b>	<b>117,510</b>	<b>116,566</b>	<b>112,830</b>	<b>109,646</b>	<b>108,169</b>	<b>109,621</b>	<b>104,037</b>	<b>103,826</b>

## 7 Forest Protection and Health

### 7.1 Introduction

One of the key objectives of the Forestry Inspectorate of DAFM is to implement the forestry aspects of the EU plant Health Directive 2000/29/EC which includes monitoring and control programmes for harmful forestry pests and diseases. In this regard with increased levels and new emerging patterns in trade and greater mobility of larger numbers of people, the risk from the introduction of exotic pests and diseases is ever present. Damage may also be caused to forests by abiotic factors, with fire and wind the most common cause.

The majority of forests in Ireland are established using planting stock and ensuring the traceability, suitability and quality of forest seed and plants used is vitally important. The Forestry Inspectorate has responsibility for the implementation of the Council Directive 1999/105/EC on the marketing of forest reproductive material and the associated implementing regulations as well as the being the designated authority in Ireland for the OECD Scheme for the Certification of Forest Reproductive Material Moving in International Trade.

The Forestry Inspectorate also oversees the national implementation of the FAO, IPPC International Standard for Phytosanitary Measures (ISPM) No. 15, Guidelines for Regulating Wood Packaging Material in International Trade. Not only is this important in terms of imports and protecting Ireland's forests but also for companies exporting who require compliant wood packaging, thereby facilitating Irish exports of goods of all kinds.

#### Key statistics

- No harmful pests or diseases for which Ireland has current EU Protected Zone status have been detected in Irish forests during annual surveys in 2016;
- The first detection of *Hymenoscyphus fraxineus* (previously referred to as *Chalara fraxinea*) in Ireland was in October 2012. The systematic and targeted plant health surveys undertaken by the Department over the summer months of 2016 recorded significant increases in findings of the disease. At the end of 2016 the disease had been confirmed present on ash at a total of 322 plantations, distributed over 24 counties. There were also first confirmed findings of the disease in native hedgerows distributed over 5 counties, increasing the distribution of findings in native hedgerows from 12 to 17 counties. The number of counties with confirmed findings of the disease in roadside plantings rose from 13 to 14 counties.
- *Phytophthora ramorum* was first detected in Japanese larch in 2010 and at the end of 2016 has been confirmed present at a total of 48 locations in this tree species;
- In 2010/2011, fire damage peaked at 1500ha. Low levels of damage were experienced in 2012/2013 with levels not exceeding 400ha;
- 83 Seed Collection Permits and 36 Master Certificates of Provenance were issued in 2016 in relation to home collected forest reproductive material;
- 44 Irish companies are currently registered in Ireland to produce wood packaging material to the FAO IPPC International Standard for the Regulation of Wood Packaging Material in International Trade (ISPM No. 15) thus facilitating the export of goods worldwide from Ireland on compliant pallets and crates.

## 7.2 Biotic – Pests and Diseases

The Forestry Inspectorate is responsible for implementing the forestry aspects of the EU Plant Health Directive, Council Directive 2000/29/EC on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community. This Directive has recently been reformed by the European Commission and the Standing Committee on Plant Health in Brussels which is regularly attended by the Forestry Inspectorate at its monthly meetings. Under the EU Plant Health Directive for logistical plant health reasons the island of Ireland is considered as a whole. As a result there is close co-operation with Northern Ireland's Department of Agriculture, Environment and Rural Affairs involving regular meetings of the North South Ministerial Council and the Plant Health Sub-Group.

The Forestry Inspectorate implements the provisions of the Directive relating to timber, wood packaging material (pallets, crates, etc.), forest plants, Christmas trees and other forest products and surveys the national forest estate for quarantine forest pests and diseases.

Council Directive 2000/29/EC is to be replaced by Regulation (EU) 2016/2031 effective from 14th December 2019. DAFM is actively organising policy and operational requirements to meet the articles of Regulation 2016/2031.

### 7.2.1 Protected Zone Organisms

Ireland has Protected Zone status for 13 harmful organisms present in other EU Member States but not present here (Table 33). In accordance with Commission Regulation EC No 690/2008 to justify Ireland's Protected Zone status, the Forestry Inspectorate conducts annual national forest surveys and submits reports annually to European Commission.

Table 33. Protected Zone Survey results 2013-2016.

Protected Zone Organism	Forest Detections by Year		
	2014	2015	2016
<i>Cephalcia lariciphila</i> (European web-spinning larch sawfly)	0	0	0
<i>Gilpinia hercyniae</i> (European spruce sawfly)	0	0	0
<i>Gremmeniella abietina</i> (Brunchorstia disease)	0	0	0
<i>Dendroctonus micans</i> (great spruce bark beetle)	0	0	0
<i>Ips amitinus</i> (small spruce bark beetle)	0	0	0
<i>Ips cembrae</i> (large larch bark beetle)	0	0	0
<i>Ips duplicatus</i> (northern bark beetle)	0	0	0
<i>Ips sexdentatus</i> (six-tooted bark beetle)	0	0	0
<i>Ips typographus</i> (eight-tooted spruce bark beetle)	0	0	0
<i>Hypoxyton mammatum</i> (hypoxyton canker)	0	0	0
<i>Cryphonectria parasitica</i> (chestnut blight)	0	0	0
<i>Thaumetopoea processioneae</i> (oak processionary moth)	0	0	0
<i>Dryocosmus kuriphilus</i> (oriental chestnut gall wasp)	0	0	0

### 7.2.2 Other Regulated Organisms

Other harmful organisms listed in the EU Plant Health Directive of significance which also require mandatory annual surveys and reporting include *Anoplophora chinensis* (citrus long-horn beetle), *Anoplophora glabripennis* (Asian long-horn beetle), *Bursaphelenchus xylophilus*

(pine wood nematode), *Monochamus* spp. (sawyer beetle), *Phytophthora ramorum* and *Gibberella circinata* (pitch canker of pine).

### 7.2.3 Surveys

In surveys for the above regulated organisms and for general forest health monitoring purposes, a network of observation points, pheromone traps, bait logs and sampling points distributed around the country in public and private forests and forest nurseries is used. The Forestry Inspectorate also deals with queries and reports from the industry and general public in relation to forest and tree health issues. This may involve site visits and taking of samples for laboratory analysis. This diagnostic and advisory service is part of the National Forest Protection Policy. During 2016 in excess of 600 ground site visits were conducted for specific plant health reasons (official EU surveys, Ash Dieback surveys and reported site follow ups etc.).

In September 2016 Dothistroma Needle Blight (DNB) was confirmed in Ireland for the first time. It was identified as being present on Scots pine trees at two privately owned (grant aided) forests, one in southwest Limerick and one in northwest Cork. Samples taken from Scots pine trees at the two forests in early August were analysed and laboratory results confirmed the presence of *D. septosporum* in early September. DNB is listed as a quarantine pest and is regulated under the EU Plant Health Directive - Council Directive 2000/29/EC, which requires Member States to take measures to eradicate, or where that is impossible, to inhibit the spread of the harmful organism. In accordance with Council Directive 2000/29/EC, Article 16(1), and Implementing Decision 2014/917/EU, Article 2(1), paragraph 1, a preliminary official notification report of the confirmed presence of DNB was forwarded to the EU Standing Committee on Plants, Animals, Food and Feed.

In the EU, the movement of plants for planting is regulated through the plant passport system. In Ireland therefore there are regular inspections of nurseries each year. The Department will only grant authorisation to issue a plant passport if a place of production and its immediate vicinity is free of the relevant harmful organisms. Further information on the DNB finding can be found on the following link:

<https://www.agriculture.gov.ie/forests-service/treediseases/dothistromaneedleblight/>

### 7.2.4 Ash Dieback (*Hymenoscyphus fraxineus*)

Following the first confirmed finding of the Ash Dieback disease in October 2012, on imported trees used in forestry plantations, intensive surveys for the disease have been conducted year on year since. In addition to forest surveys, staff in the wider Department conducted surveys in horticultural nurseries, garden centres, private gardens, roadside landscaping and farm agri-environment scheme plantings. The surveys conducted in 2016 included a targeted survey of forestry plantations and a systematic survey of National Forest Inventory points across the country.

The summer surveys also included a spore-trapping element aimed at detecting, quantifying, and establishing dispersal patterns around known positive locations. The study was conducted with the assistance of experts from the French National Institute for Agricultural Research (INRA).

The position at the end of 2016 regarding the total number of confirmed findings up to that date in comparison to those by the end of 2015 is outlined in Table 34 below.

Table 34. Overview of Number and Type of Confirmed Ash Dieback Findings.

No. by site type / county	Number of Confirmed Findings Oct 2012 to End of 2015	Number of additional Confirmed Findings in 2016	Total at End of 2016
Forestry plantations	115	207	322
Horticultural nurseries	25	3	28
Garden centres	4	0	4
Private gardens	7	1	8
Farm / agri- environment plantings	25	3	28
No. of counties with hedgerow findings	12 <sup>2</sup>	5	17 <sup>1</sup>
No. of counties with roadside / motorway findings	13 <sup>3</sup>	1	14 <sup>2</sup>

<sup>1</sup> At the end of 2016, 17 counties with individual positive samples taken from trees in native hedgerows: Cavan, Clare, Donegal, Galway, Kildare, Kilkenny, Leitrim, Limerick, Longford, Mayo, Meath, Monaghan, Roscommon, Sligo, Tipperary, Wexford, and Wicklow.

<sup>2</sup> There are currently 14 counties with individual positive samples taken from trees in roadside / motorway landscaping plantings: Clare, Cork, Dublin, Galway, Kilkenny, Limerick, Laois, Louth, Meath, Monaghan, Offaly, Tipperary, Waterford, and Westmeath.

While *Hymenoscyphus fraxineus* is not a regulated disease under the EU Plant Health Directive (Council Directive 2000/29/EC) a Ministerial Order to provide for measures to prevent the spread of *Hymenoscyphus fraxineus* in the genus *Fraxinus* L. was introduced on the 6<sup>th</sup> November 2012 (S.I. 431 of 2012). It restricted the movement of ash plants and seed into Ireland as well as imposing restrictions on ash wood imports. Further to the adoption of the 'All Ireland Chalara Control Strategy' in July 2013, which was developed jointly with the Department of Agriculture and Rural Development (DARD) in Northern Ireland, the Department continued its co-operation with the UK authorities throughout 2016. The legislation in relation to ash wood imports was updated in 2015 (S.I. No 479 of 2015). The new Order restated the provisions contained in the previous Order as they pertain to plant and plant products but introduced a number of changes in relation to the documentary requirements around the importation of ash wood, the required pre-importation treatments, as well as taking into account the change in the scientific name of the organism in 2014.

The Forestry Inspectorate also continued its participation in the European Cooperation in Science and Technology (COST) funded action into the disease (FP1103 FRAXBACK [www.fraxback.eu](http://www.fraxback.eu)) which held its final meeting in March 2016. The Forestry Inspectorate co-authored a paper entitled 'Ash dieback on the island of Ireland' as part of the COST Action's final publication 'Dieback of European ash (*Fraxinus* spp.) – Consequences and Guidelines for Sustainable Management.'

For update information and distribution map on the Ash Dieback disease please visit the following webpage:

<http://www.agriculture.gov.ie/forests-service/treediseases/ashdiebackchalara/>.

### 7.2.5 *Phytophthora ramorum*

Since the first finding in Ireland of *Phytophthora ramorum* in Japanese larch in 2010 the Forestry Inspectorate has continued to conduct annual ground and aerial surveys of larch with the assistance of the Air Corps and Coillte. At the start of 2016 the disease had been confirmed

present in Japanese larch at 47 forest locations, up from 44 at the start of the previous year. At the end of 2016 the disease has been confirmed present at one additional location, bringing the total number of confirmed locations in Ireland to 48, and affecting approximately 315ha of forestry (Table 35). Since 2010 the Forestry Inspectorate has worked with Coillte (as the principle landowner affected) in undertaking sanitation felling of infected larch in an effort to limit spread and continued to do so in 2016.

Table 35. Number of confirmed site findings in Japanese larch.

Year	Number of confirmed new findings
2010	8
2011	4
2012	4
2013	10
2014	18
2015	3
2016	1

The disease has also been detected during forest surveys on beech, noble fir, Spanish chestnut, *Vaccinium myrtillus* and *Gaultheria shallon* (first world finding in the wild) growing in close proximity to infected Japanese larch. While previous surveys detected the disease for the first time worldwide on a single Sitka spruce and European silver fir tree, no subsequent findings have been detected here. Also of significance is that since 2003 a number of detections of the disease have been made in wild invasive rhododendron in forest locations. By the end of 2015 the number of such findings was 26. There were no additional findings in 2016.

*Phytophthora kernoviae* has been detected on wild rhododendron in a number of forest locations. By the end of 2015 there were 8 such findings, 6 of which were in forests which also had Japanese larch infected with *Phytophthora ramorum*. To date all the confirmed findings of the disease have been limited to counties Wicklow, Wexford, Kilkenny, Tipperary, Waterford, Cork and Kerry. There were no additional findings of *P. kernoviae* in 2016.

### 7.3 EU Plant Health Directive & Protected Zone Monitoring

Import inspections of wood and wood products from Third Countries regulated under the EU Plant Health Directive are routinely conducted to ensure compliance with entry requirements as part of the Customs clearance process (Table 36). In 2016, 570 third country consignments received a documentary check and if appropriate to the requirements, were physically inspected. Five were found to be non-compliant with the import requirements. Appropriate measures were taken on the non-compliant imports ranging inter alia from requesting correct documentation to entry refusal.

Under the EU internal markets regime goods coming from within the EU are not subject to Customs clearance but monitored to ensure Ireland's Protected Zone requirements are met. DAFM operates two designated Border Inspection Posts in Dublin and Cork ports for import controls from Third countries and has an office in Waterford port. Shipments coming into the other ports and airports are covered from these locations if required.

In 2013 the European Commission introduced special measures regarding inspections of wood packaging material associated with certain stone commodities imported into the EU from China. In 2016, 214 containerised consignments from China were inspected, with two non-



compliances detected where appropriate phytosanitary measures were imposed (Table 37). In addition, the Forestry Inspectorate carries out monitoring of Portuguese wood packaging material in relation to the threat of pine wood nematode (as required under Commission Implementing Decision 2012/535) and wood packaging from other countries. The Forestry Inspectorate also provides advice and deal with queries regarding import and export requirements related to wood/wood products and forest reproductive material. Phytosanitary Certificates may also be issued to accompany certain consignments leaving the free trade area of the EU.

Table 36. Third Country Timber Import Inspections from January to December 2016.

Country	Number of Inspections	Not Regulated or Compliant	Non Compliant
USA	506	503	3
Canada	23	23	0
Ukraine	9	7	2
Chile	7	7	0
China	5	5	0
Norway	5	5	0
Russia	4	4	0
Malaysia	3	3	0
Brazil	3	3	0
Honduras	2	2	0
Egypt	1	1	0
Nicaragua	1	1	0
Turkey	1	1	0
<b>Total</b>	<b>570</b>	<b>565</b>	<b>5</b>

Table 37. Wood Packaging Inspections from Jan to Dec 2016.

Country	Number of Inspections	Compliant	Non Compliant
China	214	212	2
Portugal	1	1	0
Other	4	3	1
<b>Total</b>	<b>219</b>	<b>216</b>	<b>3</b>

## 7.4 Forest Reproductive Material

The Forestry Inspectorate is responsible for implementing Council Directive 1999/105/EC on the marketing of forest reproductive material. Forest reproductive material (FRM) is a collective term to describe seeds, plants and cuttings, which are important for forestry purposes. The aim of the legislation is to ensure that forest reproductive material, which is marketed, is from approved suitable sources and is clearly labelled and identified throughout the entire process from tree seed collection to processing, storage, forest nursery production and delivery to the final forest user. In recent years the Forestry Inspectorate has been participating in the ongoing EU review of seed and propagating material legislation.

DAFM provides the following services in relation to forest reproductive material:

- Registration of suppliers of forest reproductive material - seed collectors, nurseries, seed and plant importers and brokers
- Registration of seed stands Issuing of Certificates of Provenance for seed collections
- Advice on forest seed and plant regulations

In 2016 83 Seed Collection Permits were issued - an increase on the previous year (65 issued in 2015). During 2016, 36 Master Certificates of Provenance were issued (41 issued in 2015). These figures vary from year to year depending on availability of suitable seed and levels of demand.

DAFM is also the National Designated Authority in Ireland for the OECD Scheme for the Certification of Forest Reproductive Material Moving in International Trade. The object of the international OECD Scheme is to encourage the production and use of forest seeds, parts of plants and plants that have been collected, transported, processed, raised and distributed in a manner that ensures their trueness to name.

Forest plants may also be subject to the requirements of the EU Plant Health Directive, Council Directive 2000/29/EC on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community.

### **7.5 *ISPM No. 15 (IPPC International Standard for Wood Packaging Material)***

In relation to exports (in addition to import controls), the Forestry Inspectorate is responsible for the implementation of the FAO, IPPC, International Standard for Phytosanitary Measures (ISPM) No. 15, Guidelines for Regulating Wood Packaging Material in International Trade. ISPM No. 15 describes phytosanitary measures to reduce the risk of introduction and/or spread of quarantine pests associated with wood packaging material made of raw wood, in use in international trade.

Wood packaging material, which is being exported from Ireland to most non-EU countries around the world, is required to comply with ISPM No. 15. ISPM No. 15 thereby facilitates exports by Irish companies of goods of all kinds, which are being transported using wooden pallets, crates, loose wood dunnage etc. In practice wood packaging material made from unprocessed raw wood and used in supporting, protecting or carrying a commodity, must be heat treated or fumigated in a specified manner and each individual unit of the wood packaging material must be stamped on at least two sides with the officially approved ISPM No. 15 mark verifying the treatment and incorporating the country code and the registration number of the producer of the packaging.

ISPM No. 15 currently does not apply to wood packaging material which is being dispatched to other EU Member States. The following services are available in relation to ISPM No. 15:

- Registration of producers of wood packaging material and kiln operators in association with NSAI
- Advice to wood packaging material manufacturers and kiln operators concerning ISPM No. 15
- Advice to importing and exporting companies concerning ISPM No. 15

To the end of 2015, there were 44 companies registered to operate under the scheme in Ireland. Companies in the scheme are inspected to ensure compliance with agreed Standard Operating Procedures and that the wood packaging material is fully compliant with the standard.

## 7.6 Abiotic

This section details the extent of damage to the forest estate arising from non-living or abiotic sources.

### 7.6.1 Forest fires

Forest fires normally occur each year in Ireland and reach their peak in spring, particularly in forests established on formerly unenclosed land, with a preponderance of purple moor grass and heather vegetation. Figure 30 shows the area of forests damaged by fire from 1930 to 2016. In the late 70s and early 80s considerable areas of public forest were burnt. The scale of fire damage in public forests has decreased in recent years. However fire damage levels were high in both public and private forests in 2010 and 2011 following protracted dry periods in spring.

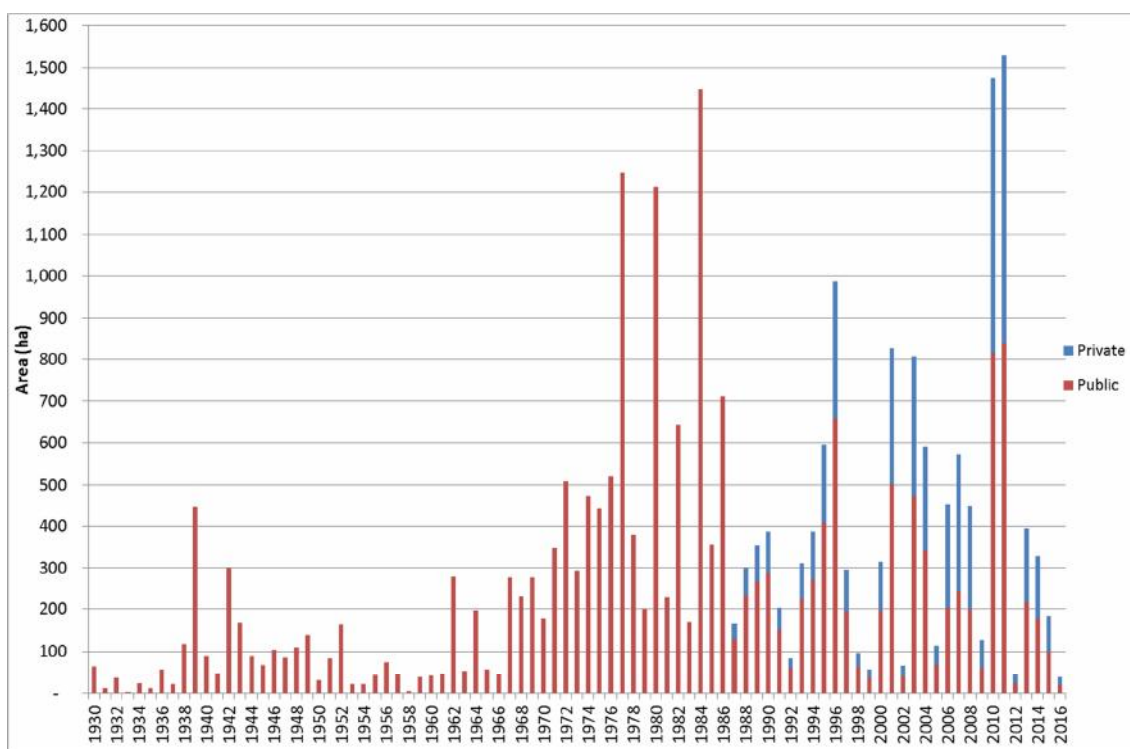


Figure 30. Area of forest damaged by fire 1930-2016<sup>47</sup>

<sup>47</sup> Estimates of fires in privately-owned forests for the periods 1985-2005 and 2010-2015, were derived from the proportion of private forest area to public forest area.

## **8 International comparators**

### ***8.1 Introduction***

This chapter contains information international forest cover and other key statistics such as increment are presented. Information is primarily presented on forests in the EU 28.

#### **Key statistics**

- Forest cover in Ireland, at 10.5% in 2012 is one of the lowest in the EU where the average is 33.5%; Worldwide forest cover is 30.6%;
- Ireland, at 54% is close to the EU average of 59% for public forest ownership;
- Annual roundwood harvest at 2.7 million m<sup>3</sup> in 2010 compares a with an EU average of 18.9 million m<sup>3</sup> in the same year;
- Fellings represented at 47% of annual increment in 2012, which is below the EU average of 59%, which is a reflection of the relatively young age of Ireland's forests in comparison to the rest of the Europe;
- Since 1990 Ireland has had the highest rate of increase in forest expansion, as a percentage of total forest cover, among EU Member States.

## 8.2 Global & EU 28 Forest Cover

Despite having afforested 294,000 ha since 1990, Ireland remains one of the least forested countries in Europe, with over 10% forest cover and 0.8% of the total European forest cover (Figures 31 - 33). This compares with 33.5% for the EU 28 and 30.6% worldwide.



Figure 31. Global forest cover (Source: FAO Global Forest Resources Assessment 2015)

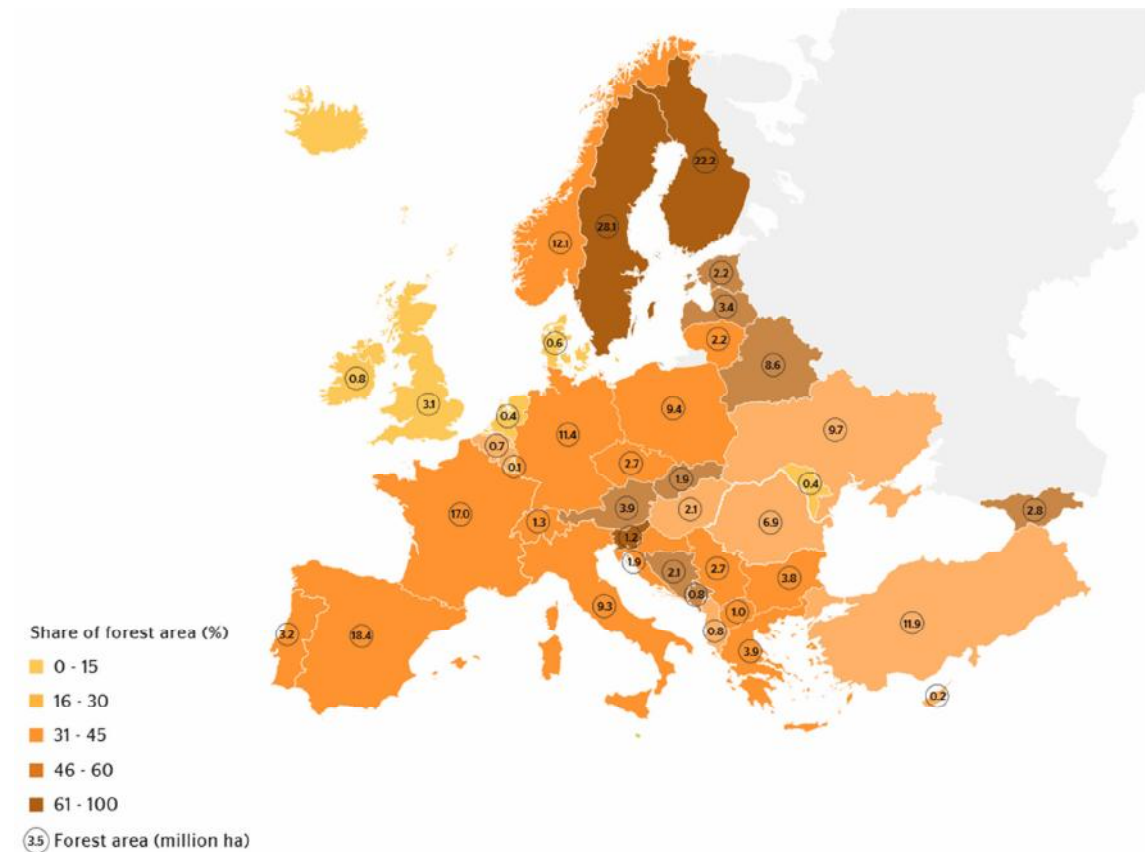


Figure 32. Forest area (million ha) and share (percentage) of land area by country (Source: State of Europe's Forests 2015).

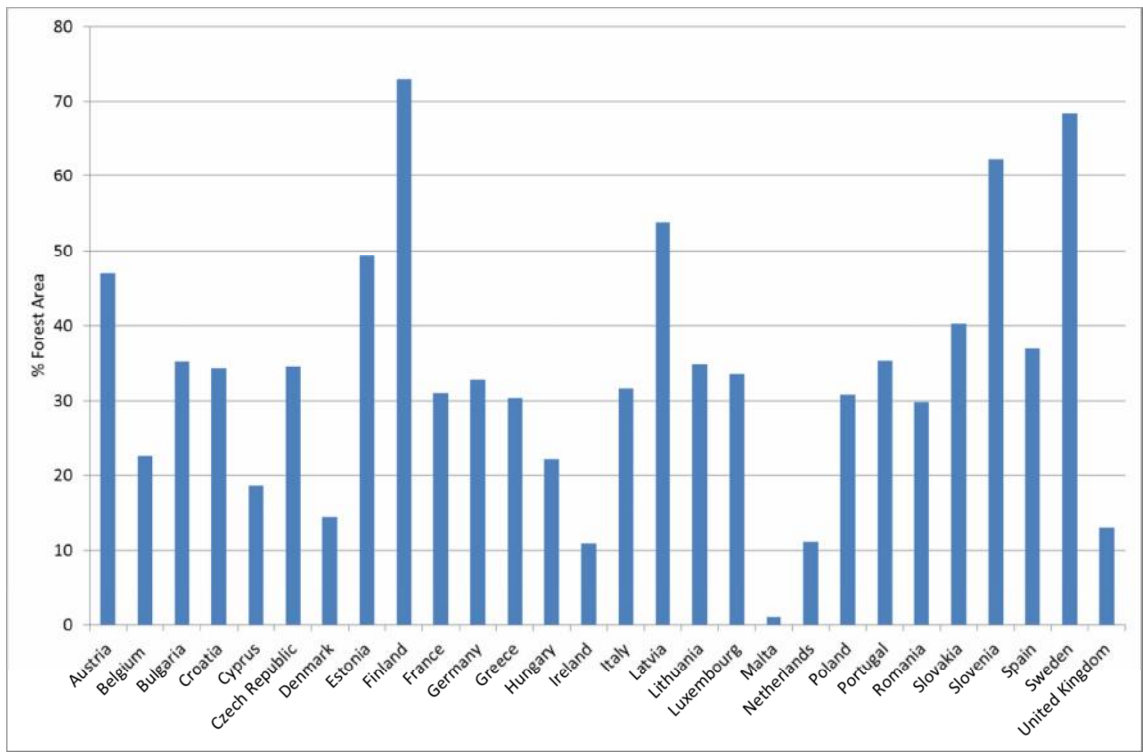


Figure 33. Forest cover in EU 28 (Source: State of Europe’s Forests 2015).

**8.3 Forest comparison: EU 28**

Public forest ownership in Ireland at 54% is close to the EU average of 59% (Figure 34). Due to afforestation, the proportion of privately owned forest is increasing in Ireland. Germany has the highest total growing stock of the EU 28, at over 3.6 billion m<sup>3</sup> (Figure 35).

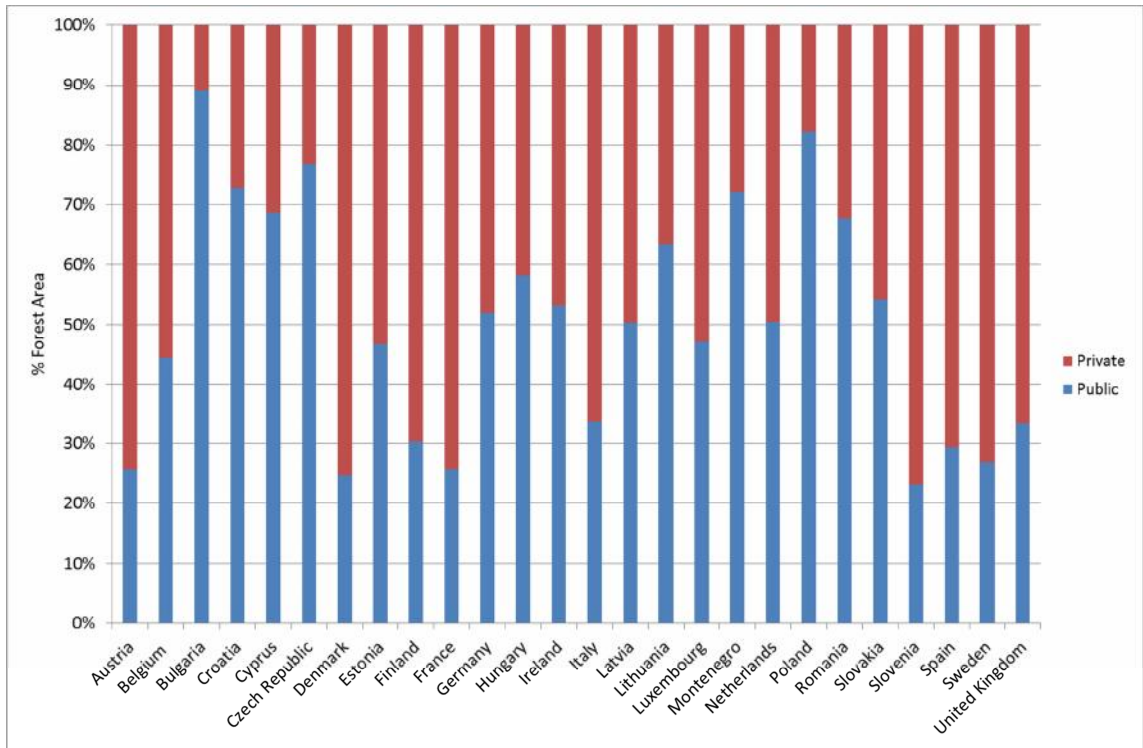


Figure 34. Forest ownership in the EU 28 (Source State of Europe’s Forests 2015).

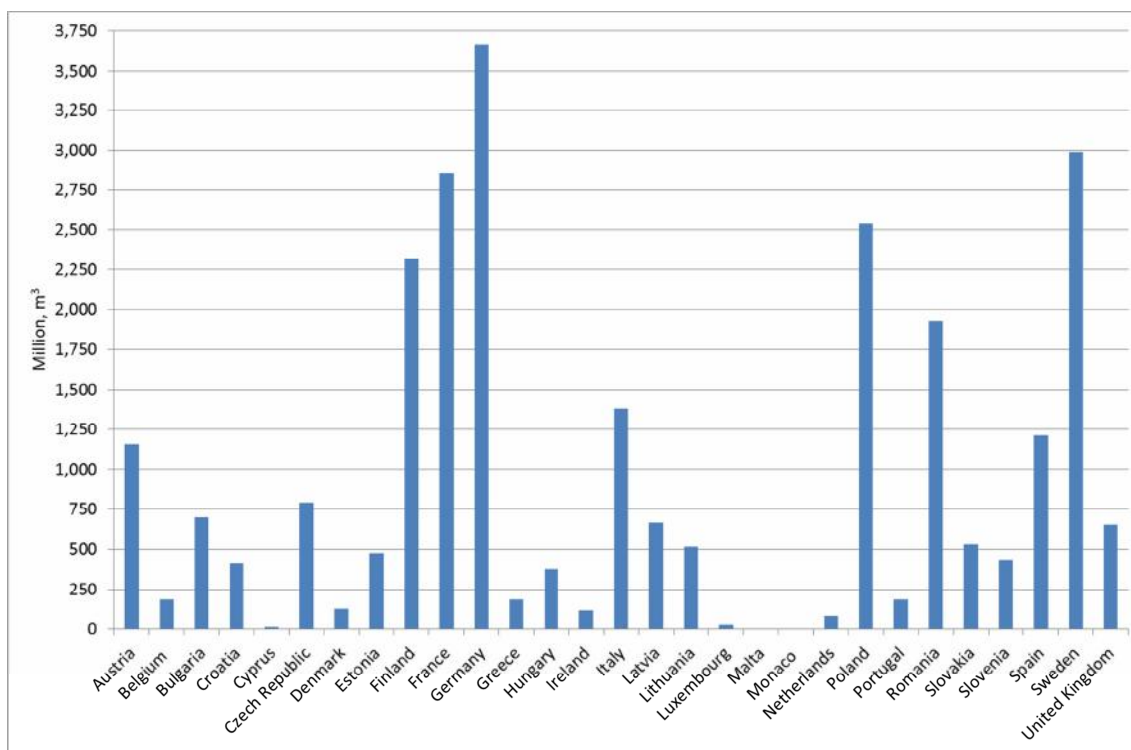


Figure 35. Growing stock in the EU 28 countries (Source State of Europe's Forests 2015).

Annual roundwood harvest at 2.7 million m<sup>3</sup> in 2010 compares with an EU average of 18.9 million m<sup>3</sup> in the same year (Figure 36). Fellings represented at 47% of annual increment in 2010, which is below the EU average of 59% (Figure 37), which is a reflection of the relatively young age of Ireland's forests in comparison to the rest of the Europe.

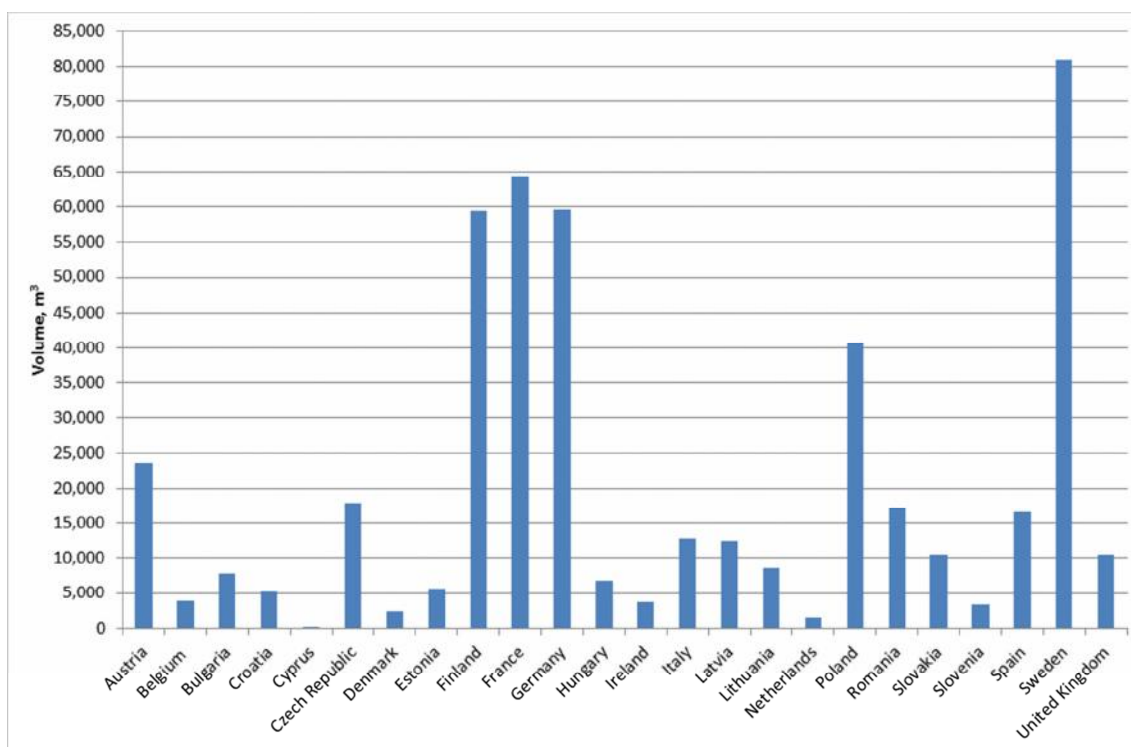


Figure 36. Felling volumes in the EU 28 (Source: State of Europe's Forests 2015).



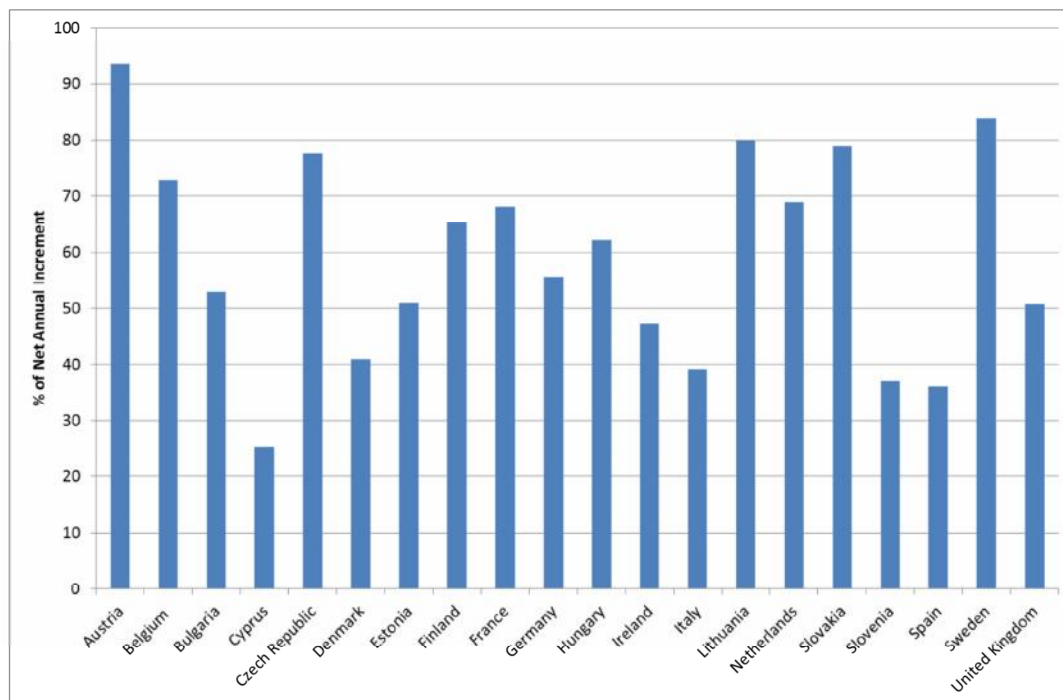


Figure 37. Harvest as a percentage of net annual increment (Source: State of Europe's Forests 2015).

#### 8.4 European Forest Expansion Rate

According to the State of Europe's Forests 2015 report, since 1990 Spain has had the greatest expansion of forests at 184,000 ha per year, France at 102,000 ha per year and Turkey at 93,000 ha per year. The annual rate of change, expressed as a percentage of total forest area is highest for Iceland (4.6%), Ireland (2.0%) and Spain (1.2%) for the period 1990-2015 (Figure 38).

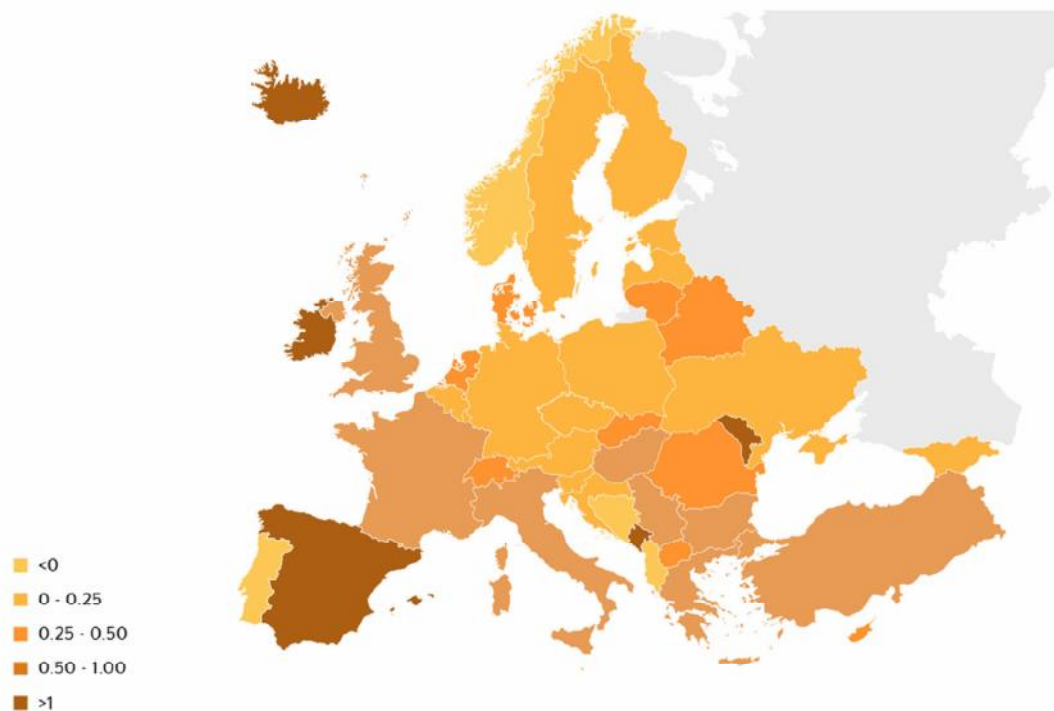


Figure 38. Annual rate of change in forest area by country 1990 -2015 (percent). (Source: State of Europe's Forests 2015).



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